



Land of Cheese, Trees and Ocean Breeze

**CONDITIONAL USE REVIEW REQUEST #851-26-000207-PLNG:
UTILITY SUBSTATION FOR TELECOM INFRASTRUCTURE**

*NOTICE TO MORTGAGEE, LIENHOLDER, VENDOR OR SELLER:
ORS 215 REQUIRES THAT IF YOU RECEIVE THIS NOTICE,
IT MUST BE PROMPTLY FORWARDED TO THE PURCHASER*

**NOTICE OF ADMINISTRATIVE REVIEW
Date of Notice: July 16, 2026**

Notice is hereby given that the Tillamook County Department of Community Development is considering the following:

#851-26-000207-PLNG: A Conditional Use request for construction of a utility substation for telecom infrastructure on a property within the Unincorporated Community of Pacific City/Woods accessed via Brooten Road, a County road, designated as Tax Lot 4600 in Section 30BA of Township 4 South, Range 10 West of the Willamette Meridian, Tillamook County, Oregon. The property is zoned Pacific City/Woods Commercial One (PCW-C1). The applicant is Ziplly Fiber Pacific. The property owner is Bluecore Power, LLC.

Written comments received by the Department of Community Development prior to 4:00p.m. on July 30, 2026, will be considered in rendering a decision. Comments should address the criteria upon which the Department must base its decision. A decision will be rendered no sooner than the next business day, August 3, 2026.

Notice of the application, a map of the subject area, and the applicable criteria are being mailed to all property owners within 250 feet of the exterior boundaries of the subject parcel for which an application has been made and other appropriate agencies at least 14 days prior to this Department rendering a decision on the request.

A copy of the application, along with a map of the request area and the applicable criteria for review are available for inspection on the Tillamook County Department of Community Development website:

<https://www.tillamookcounty.gov/commdev/landuseapps> and is also available for inspection at the Department of Community Development office located at 1510-B Third Street, Tillamook, Oregon 97141.

If you have any questions about this application, please call the Department of Community Development at 503-842-3408 x3314 or conrad.kurrelmeier@tillamookcounty.gov.

Sincerely,

Sarah Absher, CFM, Director

Enc. Applicable Ordinance Criteria, Maps

REVIEW CRITERIA

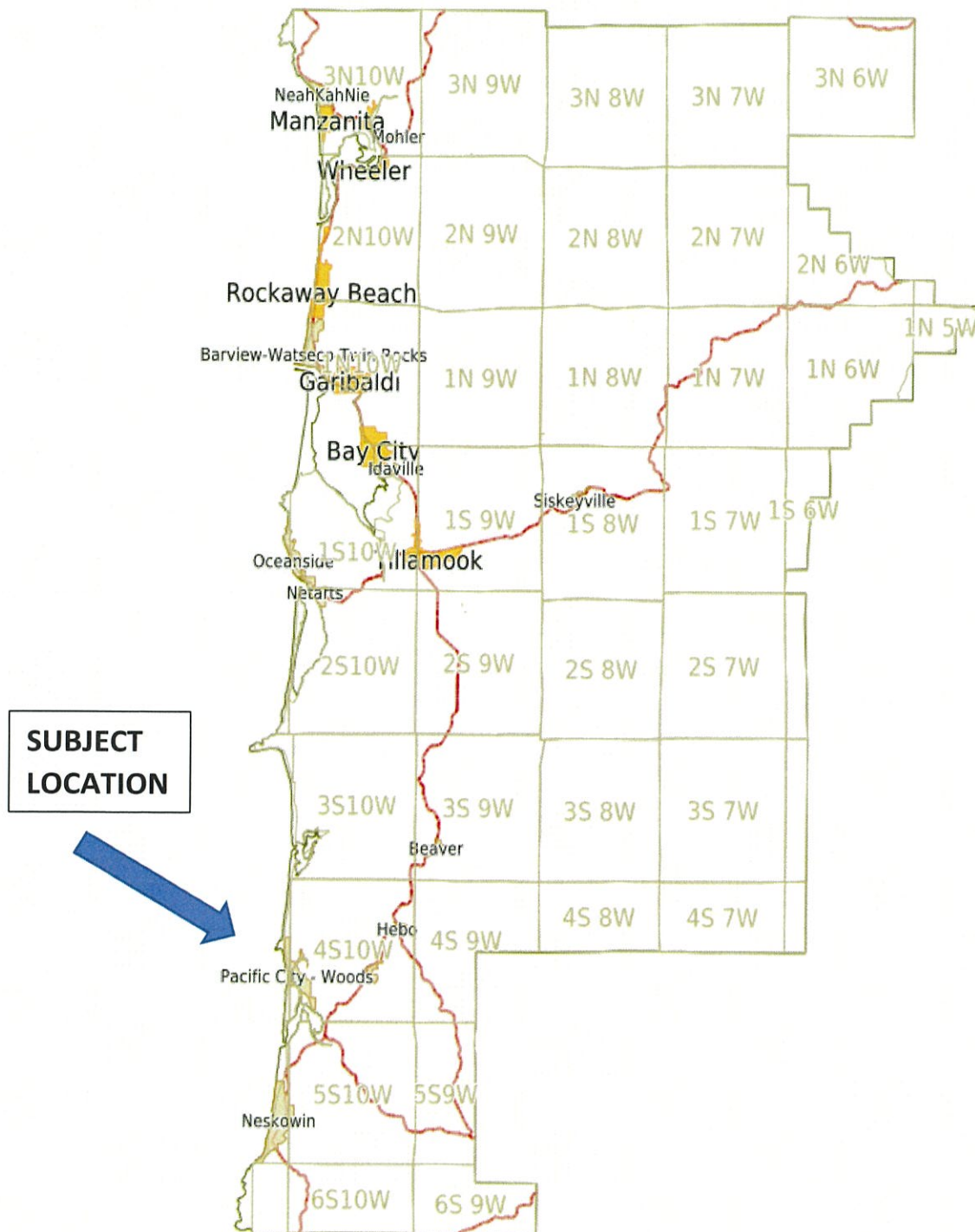
TCLUO ARTICLE VI:

SECTION 6.040: REVIEW CRITERIA

Any CONDITIONAL USE authorized according to this Article shall be subject to the following criteria, where applicable:

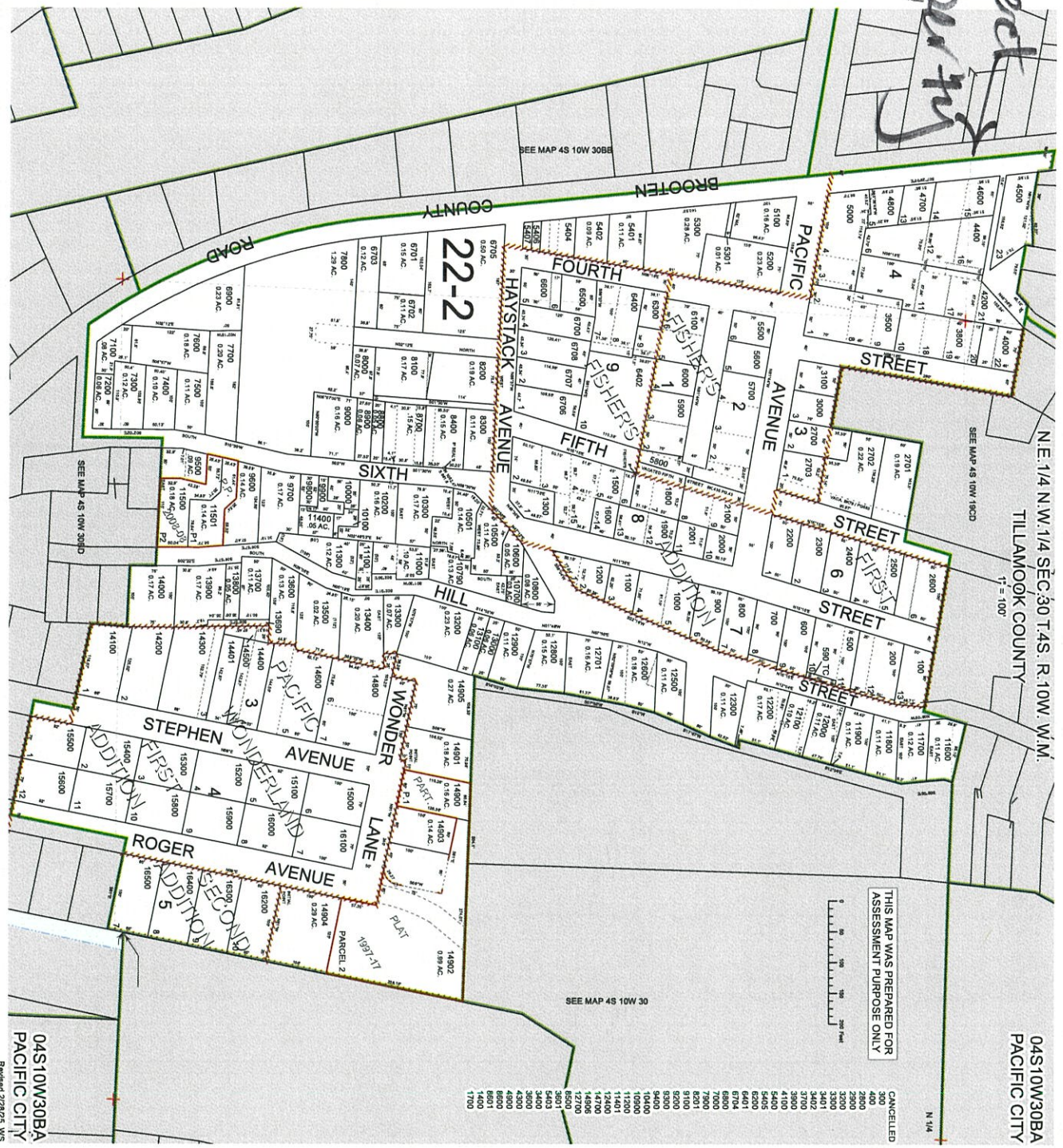
- (1) The use is listed as a CONDITIONAL USE in the underlying zone, or in an applicable overlying zone.
- (2) The use is consistent with the applicable goals and policies of the Comprehensive Plan.
- (3) The parcel is suitable for the proposed use considering its size, shape, location, topography, existence of improvements and natural features.
- (4) The proposed use will not alter the character of the surrounding area in a manner which substantially limits, impairs or prevents the use of surrounding properties for the permitted uses listed in the underlying zone.
- (5) The proposed use will not have detrimental effect on existing solar energy systems, wind energy conversion systems or wind mills.
- (6) The proposed use is timely, considering the adequacy of public facilities and services existing or planned for the area affected by the use

VICINITY MAP



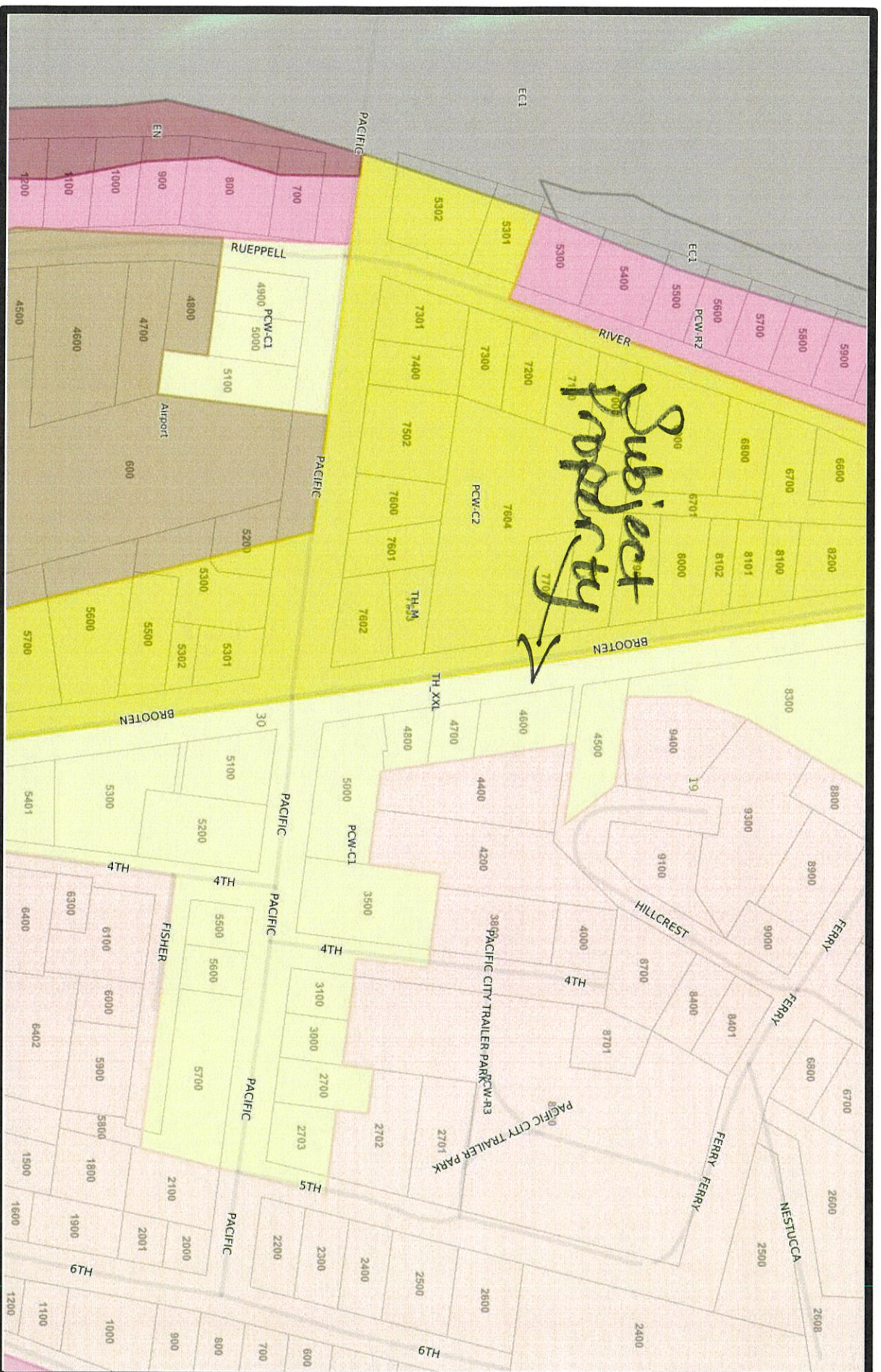
#851-26-000207-PLNG:
UTILITY SUBSTATION FOR TELECOM INFRASTRUCTURE

Subject
Property



04S10W30B4
PACIFIC CITY
Revised 2/28/25, WS

Map





Tillamook County Department of Community Development
1510-B Third Street. Tillamook, OR 97141 | Tel: 503-842-3408 Fax: 503-842-1819
www.co.tillamook.or.us

PLANNING APPLICATION

Applicant ☐ (Check Box if Same as Property Owner)

Name: Bluecore Power, LLC - Annie Reyer-Guzman Phone: 406-839-3630

Address: PO Box 9036

City: Tacoma State: Washington Zip: 98490

Email: annie.reyer@bluecorepower.com

Property Owner

Name: Zply Fiber Pacific Phone: 206-255-3181

Address: 135 Lake Street S, Unit 115

City: Kirkland State: Washington Zip: 98033

Email: robert.muegge@zply.com

OFFICE USE ONLY	
Date Stamp	
RECEIVED	
APR 28 2026	
BY: SAT-Mail	
☐ Approved	☐ Denied
Received by:	
Receipt #:	
Fees:	
Permit No:	
851-26-000207-PLNG	

Request: Application for a Conditional Use Permit to construct a building containing telecom infrastructure.

Type II	Type III	Type IV
☐ Farm/Forest Review	☐ Detailed Hazard Report	☐ Ordinance Amendment
☒ Conditional Use Review	☐ Conditional Use (As deemed by Director)	☐ Large-Scale Zoning Map Amendment
☐ Variance	☐ Ordinance Amendment	☐ Plan and/or Code Text Amendment
☐ Exception to Resource or Riparian Setback	☐ Map Amendment	
☐ Nonconforming Review (Major or Minor)	☐ Goal Exception	
☐ Development Permit Review for Estuary Development	☐ Nonconforming Review (As deemed by Director)	
☐ Non-farm dwelling in Farm Zone	☐ Variance (As deemed by Director)	
☐ Fore-dune Grading Permit Review		
☐ Neskowin Coastal Hazards Area		

Location:
Site Address:
Map Number: 4s 10w 30 4600
Township Range Section Tax Lot(s)

Clerk's Instrument #: _____

Authorization

This permit application does not assure permit approval. The applicant and/or property owner shall be responsible for obtaining any other necessary federal, state, and local permits. The applicant verifies that the information submitted is complete, accurate, and consistent with other information submitted with this application.

Jason Roseen

Property Owner Signature (Required)

Annie Reyer-Guzman

Applicant Signature

Digitally signed by Jason Roseen
DN: C=US, E=jason.roseen@zply.com, O=Zply Fiber, OU=Director of Critical Facilities, CN=Jason Roseen
Date: 2026.04.24 07:23:17-07'00'

4/24/26

Digitally signed by Annie Reyer-Guzman
DN: C=US, E=annie.reyer@bluecorepower.com, O=BlueCore Power, CN=Annie Reyer-Guzman
Date: 2026.04.24 07:28:34-07'00'

Date
4/24/26

Date

Ziply Conditional Use Permit

Prepared for:

BlueCore Power, LLC
2001 6th Avenue, Suite 1776
Seattle, Washington 98121

Prepared by:



1500 Valley River Drive, Suite 100
Eugene, OR 97401
503.746.8812
emeriodesign.com

April 24, 2026

Project Summary

Request:	Application for a Conditional Use Permit to construct a building containing telecom infrastructure.	
Location and Map Number:	Unaddressed Tillamook County Assessor's Map No. 4s-10w-308A, Tax Lot 4600	
Applicant:	C/O Annie Reyer-Guzman BlueCore Power, LLC 2001 6 th Avenue, Suite 1776 Seattle, Washington 98121 Phone: 206-201-0300 Email: annie.reyer@bluecorepower.com	
Owner:	Robert Muegge Ziply Fiber Pacific, LLC 135 Lake Street S, Unit 115 Kirkland, Washington 98033 Phone: 206-255-3181 Email: Robert.muegge@ziply.com	
Engineer/Planner:	Emerio Design, LLC 1500 Valley River Drive Suite 100 Eugene, OR 97401 503-746-8812 Engineer: Scott Zelenka, P.E. szelenka@emeriodesign.com	Planner: Jennifer Arnold jarnold@emeriodesign.com

I. Project Description

BlueCore Power LLC, the applicant, is proposing to construct a new building containing telecommunications/internet infrastructure on a 6,500 square foot (or 0.15-acre) parcel identified as Tillamook County Assessor's Map No. 4s-10w-30BA, Tax Lot 4600 (Exhibit A). The base zone applied to the property is Pacific City/Woods Commercial One Zone (PCW-C1) and overlays include Flood Hazard and Tsunami Hazard.

The proposed development conforms to all applicable sections of the Tillamook County Land Use Ordinance (TCLUO). This application provides findings of fact that demonstrate conformance with all applicable standards of the previously mentioned governing regulations. Applicable criteria of the TCLUO will appear in *italics* followed by the applicant's responses in **bold** font.

II. Existing Conditions

The subject property has frontage on Brooten Road, an unimproved public street under Tillamook County's jurisdiction. Presently, the subject property is undeveloped and does not contain any significant vegetation or trees. Overhead power lines cross over the subject property near its north property line. The property is relatively level near the southwest corner and is much steeper near the northeast corner. Elevations on the property range from 14 feet to 31 feet above mean average sea level. For adjacent zones and land uses refer to Exhibit B for an aerial photograph and Exhibit C for a zoning map:

North: Unimproved alley right-of-way. Detached single-unit dwelling zoned PCW-C1 by Tillamook County.

South: Commercial use zoned PCW-C1 by Tillamook County.

East: Detached single-unit dwelling zoned PCW-R3 by Tillamook County.

West: Commercial uses zoned PCW-C2 by Tillamook County.

III. Article 3 – Zone Regulations

TCLUO 3.337 – *Pacific City/Woods Commercial One Zone (PCW-C1)*

- (1) *Purpose: The purpose of the PCW-C1 zone is to permit a moderate level of commercial activities to serve the commercial needs of neighborhoods, rural areas, and tourist areas. Commercial uses in the PCW-C1 zone typically provide goods and services that would be required by most households in the area, and they have relatively few impacts on neighboring areas. Land is suitable for the PCW-C1 zone because it:*
 - (a) *Is needed;*
 - (b) *Is physically capable of being developed;*
 - (c) *Can obtain access to a public road without causing traffic hazards or congestion;*
 - (d) *Will not cause significant conflicts with nearby residential uses; and*
 - (e) *Has sufficient land area to accommodate off-street parking.*

- (2) *Uses Permitted Outright: In the PCW-C1 zone, the following uses and their accessory uses are permitted outright, subject to all applicable supplementary regulations contained in this ordinance.*
- (a) *General retail trade establishments such as grocery stores, drug stores, or hardware stores, provided that such establishments do not require over 25 parking spaces.*
 - (b) *Repair and maintenance services for the type of goods to be found in the above permitted retail trade establishments, provided that such services are performed either off-site or entirely within an enclosed building.*
 - (c) *Personal and business services such as barbers, tailors, printing shops, funeral homes, and laundry and dry cleaning services.*
 - (d) *Business, government, professional, and medical offices, financial institutions, and libraries.*
 - (e) *Eating and drinking establishments.*
 - (f) *A single-family residential structure for the owner of an active business located on the same lot or parcel.*
 - (g) *Mobile homes or recreational vehicles used during the construction of a use for which a building or placement permit has been issued.*
 - (h) *Swimming, tennis, racquetball, or other similar facilities*
 - (i) *Signs, subject to Section 4.020.*
 - (j) *Dwelling unit or units accessory to an active commercial use, located above the first story.*
 - (k) *Bed and breakfast enterprises, within an owner-occupied primary residence.*
 - (l) *Section not codified.*
 - (m) *Public park and recreation uses.*
 - (n) *Miniature Golf Course.*

Response: The proposed development is best classified as a “utility substation.” This use category is not listed as an outright permitted use in the PCW-C1 zoning district.

- (3) *Uses Permitted Conditionally: In the PCW-C1 zone, the following uses and their accessory uses are permitted subject to the provisions of Article VI and the requirements of all applicable supplementary regulations contained in this ordinance:*
- (a) *General retail trade establishments such as grocery stores, drug stores, and hardware stores that require over 25 parking spaces.*
 - (b) *Retail establishments requiring drive-in facilities such as gas stations, bank or restaurant drive- up windows, and car washes.*

- (c) *Sales and service activities requiring a large outdoor storage space, including the sale and repair of cars, trucks, farm equipment, heavy machinery and marine craft; the storage of construction, plumbing, heating, paving, electrical and painting materials; and parking for trucks as part of a construction or shipping operation.*
- (d) *Warehousing, including mini-storage.*
- (e) *Shopping centers.*
- (f) *Animal hospitals, kennels or other animal boarding facilities.*
- (g) *Lodges, clubs, or meeting facilities for private organizations.*
- (h) *Motels, hotels, and cabin camps not exceeding 100 units.*
- (i) *Commercial amusement or entertainment establishments.*
- (j) *Temporary mobile kitchen units.*
- (k) *Light industries.*
- (l) *Multifamily dwellings exceeding 4 units, including townhouses, row houses and condominiums and apartments.*
- (m) *Mobile homes or recreational vehicles.*
- (n) *Places of worship or schools.*
- (o) *Community meeting buildings and associated facilities.*
- (p) *Hospitals, sanitariums, rest homes, and nursing homes.*
- (q) *Fire and ambulance stations.*
- (r) *Utility substations and power transmission lines.*
- (s) *Towers for communications, wind energy conversion systems, or structures having similar impacts.*
- (t) *Water supply and treatment facilities, and sewage treatment plants and pump facilities.*
- (u) *Mobile home parks or recreational vehicle parks.*
- (v) *Foster family homes accommodating six or more children or adults.*
- (w) *Planned development subject to section 3.520.*
- (x) *Recreational campgrounds.*
- (y) *Offsite advertising sign.*

- (z) *Residential care, training, or treatment facility as defined by ORS 443.400; any facility which provides care, training or treatment for six or more physically, mentally, emotionally, or behaviorally disabled individuals. Facilities that provide for five or less are addressed as ADULT FOSTER HOMES or FOSTER FAMILY HOMES.*
- (aa) *Commercial Uses allowed in this zone exceeding 8000 square feet according to provisions of Section 3.337(4)(b).*

Response: The proposed development is best classified as a “utility substation,” which is listed as a conditional use per TCLUO 3.337(3)(r).

- (4) *Standards: Land divisions and development in the PCW-C1 zone shall conform to the following standards, unless more restrictive supplemental regulations apply:*
 - (a) *Commercial use shall occur in a building or buildings not exceeding 8,000 square feet except for the following uses:*
 - (A) *Grocery Store*
 - (B) *Hardware Store*

Response: The proposed development is best classified as a “utility substation,” an industrial use. While this standard is not directly applicable, the proposed structure is 294 square feet and is much smaller than the maximum square footage required by this standard.

- (b) *A conditional use to permit larger structures for the uses identified in (4)(a) shall meet the review criteria contained in Article VI of this ordinance and the following additional review criteria:*
 - (1) *The use is consistent with the Pacific City/Woods Community Plan adopted as part of the Tillamook County Comprehensive Plan and uses exceeding 8,000 square feet but no more than 10,000 square feet are limited to the following uses:*
 - (2) *The use is intended to serve the community and surrounding rural area or the travel needs of people passing through the area;*
 - (3) *The use is compatible with the rural character of the community;*
 - (4) *The size and type of development does not dominate the character of the commercial uses in the community;*

Response: As detailed in the applicant’s response to TCLUO 3.337(4)(r), the proposed development does not need to comply with that standard but is much smaller than maximum permitted square footage regardless. Therefore, a conditional use permit is not being requested to permit a structure larger than permitted by that standard, and this section does not apply to the proposed development.

- (c) *Motels and hotels are exempt from the 8000 square-foot limit, but are limited to 100 units.*

Response: The proposed development does not include the construction of a motel/hotel. Therefore, this standard is not applicable to this project.

- (d) *An Industrial Use allowed in this zone (including light industries, storage of industrial equipment, warehousing, rural industries, some cottage industries) shall not exceed 20,000 square feet in a single or multiple buildings.*

Response: The proposed development is best classified as a “utility substation,” an industrial use, and the proposed structure is 294 square feet. Therefore, this standard is met.

- (e) *The minimum lot dimensions, yard setbacks, and building height restrictions for structures containing only residential use shall be the same as in the PCW-R3 zone. In the PCW-C1 zone, motels, hotels and cabin camps shall be considered a commercial use.*

Response: The proposed development does not include the construction of a residential dwelling(s) or a motel, hotel, or cabins. Therefore, this standard does not apply to the proposed project.

- (f) *Minimum yards for any structure on a lot or parcel adjacent to a residential zone shall be 5 feet on the side adjacent to the residential zone, and 10 feet in the front yard. No rear yard is required.*

Response: The subject property abuts residential properties to the east. The proposed structure is setback approximately 30 feet from the eastern property line. Please refer to Sheet 3, Proposed Site Plan, for a visual illustration of compliance with this standard. Therefore, this standard is met.

- (g) *For commercial or combined commercial-residential structures, structures shall be either constructed on the property line or setback at least 3 feet or as required in Section 3.020 (4) (b).*

Response: The proposed development is not considered a commercial or combined commercial-residential structure. The proposed structure will contain telecommunications/internet infrastructure and is not accessible to the public. Therefore, this standard does not apply to this project.

- (h) *All structures shall meet the requirements for clear-vision areas specified in Section 4.010.*

Response: The applicant has provided detailed responses to the standards and requirements for clear-vision areas specified in TCLUO Section 4.010 later in this narrative. Findings and conclusions from the previously mentioned responses are incorporated herein by reference. Therefore, this standard is met.

- (i) *All uses shall meet off-street parking requirements as provided in Section 4.030.*

Response: The applicant has provided detailed responses to the standards and requirements for off-street parking in TCLUO Section 4.030 later in this narrative. Findings and conclusions from the previously mentioned responses are incorporated herein by reference. Therefore, this standard is met.

- (j) *Outdoor storage abutting or facing a lot in a residential zone shall be screened with a sight-obscuring fence.*

Response: The proposed development does not include outdoor storage. Therefore, this standard is not applicable to this project.

- (k) *The maximum building height shall be 35 feet, except on ocean or bay front lots, it shall be 24 feet. Bay frontage lots are defined as those bay/river frontage lots located downstream from the Beachy Bridge (Pacific Avenue).*

Response: The proposed structure is 19 feet tall, and the subject property is not on an ocean or bay front lot. Therefore, this standard is met.

- (l) *Creation of new lots or parcels, and construction on existing lots or parcels, shall only be allowed if water availability and sewer service or adequate on-site sanitation are provided, as follows:*
- (1) *Confirmation of water service availability from the water district, or evidence of an alternative functioning domestic water supply, shall be provided to the Department prior to approval of residential construction or other development requiring potable water.*
 - (2) *If sewer service is available, as defined in OAR 340-071-160(5)(f), hookup to the sewer system shall be required prior to approval of a building permit for a structure containing plumbing fixtures or otherwise requiring sanitary waste disposal.*
 - (3) *If sewer service is not available, as defined in OAR 340-071-160(5)(f), approval(s) for on-site sanitation disposal shall be required for:*
 - (i) *each lot or parcel prior to lot or parcel creation through partition or subdivision process; in some cases on-site sanitation may require larger lot sizes than the minimum allowed by the zone;*
 - (ii) *building permit approval for a structure containing plumbing fixtures or otherwise requiring sanitary waste disposal.*

Response: The proposed development does not require potable water or sanitary waste disposal. Therefore, this section is not applicable to this project.

- (m) *New uses authorized within the community growth boundary shall not adversely affect farm or forest management practices conducted in accordance with federal and state laws. Authorization to create a parcel or construct a dwelling adjacent to land zoned for farm or forest use shall require a notarized declaratory statement signed by all current property owners who appear on the property deed or contract. This statement shall serve as a covenant that runs with the land binding heirs, assigns, lessees and successors. This covenant shall affirm that residents of the parcel may be subject to farm or forest management practices conducted in accordance with federal and state laws which ordinarily and necessarily produce noise, dust, smoke and other impacts. Those signing the statement acknowledge that they "do hereby accept the potential impacts from farm and forest practices as normal and necessary and part of the risk of establishing a dwelling in this area, and acknowledge the need to avoid activities that conflict with nearby farm or forest uses." The signed and notarized covenant must be approved by the County Planning Director or representative thereof and recorded with the Tillamook County Clerk.*

Response: The subject property is not located near land zoned for farm or forest operations. Therefore, this standard does not apply to this project.

TCLUO 3.510 – Flood Hazard Overlay Zone (FH)

The State of Oregon has in ORS 203.035 (COUNTIES) OR ORS 197.175 (CITIES) delegated the responsibility to local governmental units to adopt floodplain management regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, Tillamook County, does ordain as follows:

- A. *The flood hazard areas of Tillamook County are subject to periodic inundation which may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.*
- B. *These flood losses may be caused by the cumulative effect of obstructions in areas of special flood hazards that increase flood heights and velocities, and when inadvertently anchored, damage uses in other areas. Uses that are inadequately flood proofed, elevated, or otherwise protected from flood damage also contribute to the flood loss.*

Pursuant to the requirement established in ORS 455 that Tillamook County administers and enforces the State of Oregon Specialty Codes, Tillamook County does hereby acknowledge that the Oregon Specialty Codes contain certain provisions that apply to the design and construction of buildings and structures located in special flood hazard areas. Therefore, this ordinance is intended to be administered and enforced in conjunction with the Oregon Specialty Codes.

- (1) *Purpose: It is the purpose of the FH zone to promote the public health, safety and general welfare and to minimize public and private losses or damages due to flood conditions in specific areas of unincorporated Tillamook County by provisions designed to:*
 - (a) *Protect human life and health;*
 - (b) *Minimize expenditure of public money for costly flood control projects;*
 - (c) *Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the public;*
 - (d) *Minimize prolonged business interruptions;*
 - (e) *Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazards;*
 - (f) *Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas;*
 - (g) *Ensure that potential buyers are notified that property is in an area of special flood hazard; and*
 - (h) *Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.*

- (i) *Maintain the functions and values associated with Special Flood Hazard Areas which reduce the risk of flooding.*
- (2) *Basis for Establishing the Areas of Flood Hazard: The areas of special flood hazard identified by the Federal Insurance Administration in a scientific and engineering report entitled "The Flood Insurance Study for Tillamook County" dated September 28, 2018, with an accompanying Flood Insurance Rate Maps (FIRMs), are hereby adopted by reference and declared to be a part of this ordinance. The Flood Insurance Study and the FIRM are on file at the Tillamook County Department of Community Development at 1510-B Third Street, Tillamook, OR 97141. The best available information for flood hazard area identification as outlined in this Section shall be the basis for regulation until a new FIRM is issued that incorporates data utilized under this Section.*
- (3) *Content: In order to accomplish this purpose, this Section of the Land Use Ordinance includes methods and provisions for:*
 - (a) *Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;*
 - (b) *Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;*
 - (c) *Maintaining the natural and existing flood plains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;*
 - (d) *Minimizing and controlling filling, grading, dredging, and other development which may increase flood damage or may increase flood hazards in other areas;*
 - (e) *Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or may increase flood hazards in other areas;*
 - (f) *Encouraging mitigation and restoration programs in "exchange" (in addition to) for alteration of Special Flood Hazard Areas, existing and natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters.*
- (4) *Definitions: Unless specifically defined below or in Article XI of this ordinance, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application.*
- (5) *General Standards: In all areas of special flood hazards the following standards are required:*

Letter of Map Revisions

- (a) *If hydrologic and hydraulic analysis indicates an increase in flood levels, the applicant shall obtain a Conditional Letter of Map Revision (CLOMR) from FEMA before any encroachment, including fill, new construction, substantial improvement, or other development is permitted. Upon completion of the project, but no later than six months after project completion, a Letter of Map Revision (LOMR) shall be submitted to FEMA to*

reflect the changes on the FIRM and/or Flood Insurance Study. A LOMR is required only when the CLOMR documents an increase in flood levels during the occurrence of the base flood or where post-development conditions do not reflect what was proposed on the CLOMR.

Response: The proposed development is considered a substantial improvement. However, due to the proposed methods of construction – primarily, using piers to raise the structure's bulk above the flood elevation – there will be negligible impacts on current floodplain levels. If Tillamook County determines a Conditional Letter of Map Revision is required regardless of the design, one will be provided during the Building Permit process. Therefore, if found applicable, this standard could be reasonably met via a condition of approval.

Alteration of Water Courses

- (b) *The flood carrying capacity within the altered or relocated portion of said watercourse shall be maintained. A maintenance plan for the altered or relocated portion of said watercourse shall be submitted to the Department to ensure that the flood carrying capacity is not diminished.*

Response: The subject property does not contain or abut an identified water course. Therefore, this standard is not applicable to the proposed project.

Anchoring

- (c) *All new construction and substantial improvements shall be anchored to prevent flotation, collapse or lateral movement of the structure.*
- (d) *All manufactured dwellings shall likewise be anchored to prevent flotation, collapse or lateral movement, and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (See FEMA's "Manufactured Home Installation in Flood Hazard Areas" guidebook for techniques). A certificate signed by a registered architect or engineer which certifies that the anchoring system is in conformance with FEMA regulations shall be submitted prior to final inspection approval.*

Response: The proposed structure will be anchored in a manner to prevent flotation, collapse, or lateral movement. Building plans and exact specifications will be provided during the Building Permit process. Therefore, this standard could be reasonably met via a condition of approval.

Construction Materials and Methods

- (e) *All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.*
- (f) *All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.*
- (g) *Electrical, heating, ventilation, plumbing, and air-conditioning equipment and other service facilities shall be elevated to prevent water from entering or accumulating within*

the components during conditions of flooding. In Flood Zones A, A1-A30, AE, V, V1-V30 or VE, such facilities shall be elevated three feet above base flood elevation. In Flood Zone AO, such facilities shall be elevated above the highest grade adjacent to the building, a minimum of one foot above the depth number specified on the FIRM (at least two feet above the highest adjacent grade if no depth number is specified).

Response: The proposed structure will consist of equipment and materials resistant to flood damage when located around base flood elevations. Building plans and exact specifications will be provided during the Building Permit process. Therefore, this standard could be reasonably met via a condition of approval.

Utilities

- (h) *Electrical, heating, ventilating, air-conditioning, plumbing, duct systems, and other equipment and service facilities shall be elevated at or above the base flood level or shall be designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during conditions of flooding. In addition, electrical, heating, ventilating, air-conditioning, plumbing, duct systems, and other equipment and service facilities shall:*
 - (1) *If replaced as part of a substantial improvement meet all the requirements of this section.*
 - (2) *Not be mounted on or penetrate through breakaway walls.*
- (i) *All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood water into the system.*
- (j) *New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters.*
- (k) *On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding, consistent with Oregon Department of Environmental Quality (DEQ) standards.*

Response: The proposed structure will contain telecommunications/internet infrastructure. Consequently, the structure will be placed on piers to ensure all service facilities are located above the base flood elevation. Building plans and exact specifications will be provided during the Building Permit process. Therefore, this standard could be reasonably met via a condition of approval.

Tanks

- (l) *Underground tanks shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood.*
- (m) *Above-ground tanks shall be installed at or above the base flood level or shall be anchored to prevent flotation, collapse, and lateral movement under conditions of the base flood.*

- (n) *In coastal flood zones (V Zones or coastal A Zones) when elevated on platforms, the platforms shall be cantilevered from or knee braced to the building or shall be supported on foundations that conform to the requirements of the State of Oregon Specialty Code.*

Response: The proposed development does not include the construction of an underground tank. Therefore, these standards are not applicable to this project.

Subdivision and Partition Proposals

- (o) *All subdivision (including proposals for manufactured dwelling parks and subdivision) and partition proposals governed by the Land Division Ordinance shall be consistent with the need to minimize flood damage.*
- (p) *All subdivision (including proposals for manufactured dwelling parks and subdivision) and partition proposals governed by the Land Division Ordinance shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage.*
- (q) *All subdivisions (including proposals for manufactured dwelling parks and subdivision) and partition proposals governed by the Land Division Ordinance shall have adequate drainage provided to reduce exposure to flood hazards.*
- (r) *Where base flood elevation data has not been provided or is not available from another authoritative source, it shall be generated for subdivision and partition proposals governed by the Land Division Ordinance and other proposed developments which contain at least 50 lots or 5 acres (whichever is less).*

Response: The proposed development does not include the creation of lots through the subdivision or partition processes. Therefore, these standards are not applicable to this project.

Review of Building and Manufactured Dwelling Permits

- (s) *Where elevation data is not available either through the Flood Insurance Study or from another authoritative source, applications for building permits and/or manufactured dwelling permits shall be reviewed to assure that proposed construction will be reasonably safe from flooding. The test of reasonableness is a local judgment and includes use of historical data, high water marks, photographs of past floodings, etc., where available. Failure to elevate at least three feet above grade in these zones may result in higher insurance rates.*

Response: The proposed development does not include the construction of residential dwellings. Therefore, this standards is not applicable to this project.

Garages

- (t) *Attached garages may be constructed with the garage floor slab below the Base Flood Elevation (BFE) in riverine flood zones, if the following requirements are met:*
 - 1. *If located within a floodway the proposed garage shall comply with the requirements of Section 3.510(9);*

2. *The floors are at or above grade on not less than one side;*
3. *The garage is used solely for parking, building access, and/or storage;*
4. *The garage is constructed with flood openings to equalize hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwater.*
5. *The portions of the garage constructed below the BFE are constructed with materials resistant to flood damage;*
6. *The garage is constructed in compliance with the applicable standards of this ordinance; and*
7. *The garage is constructed with electrical, and other service facilities located and installed so as to prevent water from entering or accumulating within the components during conditions of the base flood.*
8. *Detached garages shall be constructed in compliance with the applicable standards of this ordinance.*

Response: The proposed development does not include the construction of garages. Therefore, these standards are not applicable to this project.

Appurtenant (Accessory) Structures

- (u) *Relief from elevation or floodproofing requirements for residential and non-residential structures in Riverine (Non-Coastal) flood zones may be granted for appurtenant structures that meet the following requirements:*
1. *Appurtenant structures located partially or entirely within the floodway shall comply with requirements for development within a floodway.*
 2. *Appurtenant structures shall only be used for parking, access, and/or storage and shall not be used for human habitation;*
 3. *In compliance with State of Oregon Specialty Codes, appurtenant structures on properties that are zoned residential are limited to one-story structures less than 200 square feet, or 400 square feet if the property is greater than two (2) acres in area and the proposed appurtenant structure will be located a minimum of 20 feet from all property lines. Appurtenant structures on properties that are zoned as non-residential are limited in size to 120 square feet.*
 4. *The portions of the appurtenant structure located below the Base Flood Elevation shall be built using flood resistant materials;*
 5. *The appurtenant structure shall be adequately anchored to prevent flotation, collapse, and lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the base flood.*

6. *The appurtenant structure shall be designed and constructed to equalize hydrostatic flood forces on exterior walls and comply with the requirements for flood openings;*
7. *Appurtenant structures shall be located and constructed to have low damage potential;*
8. *Appurtenant structures shall not be used to store toxic material, oil, or gasoline, or any priority persistent pollutant identified by the Oregon Department of Environmental Quality unless confined in a tank installed in compliance with this ordinance.*
9. *Appurtenant structures shall be constructed with electrical, mechanical, and other service facilities located and installed so as to prevent water from entering or accumulating within the components during conditions of the base flood.*

Response: No accessory structures are included in the proposed development. Therefore, these standards are not applicable to this project.

Use of Other Flood Data

- (v) *When Base Flood Elevation data has not been provided the local floodplain administrator shall obtain, review, and reasonably utilize any Base Flood Elevation data available from a federal, state, or other source, in order to administer the provisions of this ordinance. All new subdivision proposals and other proposed new developments (including proposals for manufactured dwelling parks and subdivisions) shall meet the requirements for development as set forth in this ordinance.*

Base Flood Elevations shall be determined for development proposals that are 5 acres or more in size or are 50 lots or more, whichever is lesser in any A zone that does not have an established base flood elevation. Development proposals located within a riverine unnumbered A Zone shall be reasonably safe from flooding; the test of reasonableness includes use of historical data, high water marks, FEMA provided Base Level Engineering data, and photographs of past flooding, etc... where available. Failure to elevate at least two feet above grade in these zones may result in higher insurance rates.

Response: The applicant understands and acknowledges these standards. However, no action is required at the time of this application.

Structures Located in Multiple or Partial Flood Zones

- (w) *In coordination with the State of Oregon Specialty Codes:*
 - (1) *When a structure is located in multiple flood zones on the community's Flood Insurance Rate Maps (FIRM) the provisions for the more restrictive flood zone shall apply.*

- (2) *When a structure is partially located in a special flood hazard area, the entire structure shall meet the requirements for new construction and substantial improvements.*

Response: The applicant understands and acknowledges that when a structure is located in multiple flood zones the most restrictive zone.

- (6) *Specific Standards for A Zones (A, AE or A1-A30): In all areas of special flood hazards where base flood data has been provided as set forth in Section 3.510(2) or other base flood data are utilized, the following provisions are required:*

Residential Construction

- (a) *New construction and substantial improvement of any residential structure, including manufactured dwellings, shall have the lowest floor, including basement, at a minimum of three feet above base flood elevation.*
- (b) *Fully enclosed areas below the lowest floor that are subject to flooding are prohibited, or shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement shall either be certified by a registered professional engineer or shall meet or exceed the following minimum criteria:*
- (1) *A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided.*
- (2) *The bottom of all openings shall be no higher than one foot above grade.*
- (3) *Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.*

Response: The proposed development is not classified as residential construction. Therefore, these standards are not applicable to this project.

Nonresidential Construction

- (c) *New construction and substantial improvement of any commercial, industrial or other nonresidential structure shall have either the lowest floor including basement elevated to three feet above the level of the base flood elevation or higher; or, together with attendant utility and sanitary facilities, shall:*
- (1) *Be floodproofed so that the portion of the structure that lies below the portion that is three feet or more above the base flood level is watertight with walls substantially impermeable to the passage of water.*
- (2) *Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.*
- (3) *Be certified by a registered professional engineer or architect that the design and methods of construction are in compliance with accepted standards of practice*

for meeting provisions of this Subsection based on their development and/or review of the structural design, specifications and plans. Such certifications shall be provided to the Community Development Director.

- (4) *Nonresidential structures that are elevated, not floodproofed, shall meet the same standards for space below the lowest floor as described for residential construction in Section 3.510(6)(a) and (b).*
- (5) *Applicants floodproofing nonresidential buildings shall be notified that flood insurance premiums will be based on rates that are one foot below the floodproofed level (e.g. a building constructed to the base flood level will be rated as one foot below that level).*

Response: The subject property is partially located in Zone AE and partially outside of the floodplain. The proposed structure will have a finished floor elevation 7 feet above ground level, exceeding the base flood elevation. While the piers that support the structure will be designed to be resistant to flood damage, the structure, due to its height, will not require floodproofing. Building plans and exact specifications will be provided during the Building Permit process. Therefore, this standard could be reasonably met via a condition of approval.

(7) *Manufactured Dwellings*

- (a) *Any manufactured dwelling which incurs substantial damage as the result of a flood, shall be elevated to the standards listed in (b) or (c) below.*
- (b) *All manufactured dwellings to be placed or substantially improved within Zones A, AE or A1-30 shall be elevated on a permanent foundation such that the lowest floor of the manufactured dwelling is at or above three feet above the base flood elevation and shall be securely anchored to an adequately anchored foundation system in accordance with Section 3.510(5) and requirements of the Oregon Residential Specialty Code.*
 - (1) *New or substantially improved manufactured dwellings supported on solid foundation walls shall be constructed with flood openings that comply with Section 3.510(6);*
 - (2) *The bottom of the longitudinal chassis frame beam shall be at or above Base Flood Elevation;*
 - (3) *New or substantially improved manufactured dwellings shall be anchored to prevent flotation, collapse, and lateral movement during the base flood. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors (Reference FEMA's "Manufactured Home Installation in Flood Hazard Areas" guidebook for additional techniques), and;*
 - (4) *Electrical crossover connections shall be a minimum of twelve (12) inches above Base Flood Elevation (BFE).*
- (c) *Manufactured dwellings to be placed or substantially improved on sites in a Velocity (V1-V30, VE, V or Coastal A) Zones shall meet the following requirements:*

- (1) *The bottom of the longitudinal chassis frame beam of the manufactured dwelling is elevated to a minimum of three feet above the base flood elevation, and*
- (2) *Development complies with the standards outlined in Section 3.510(10) of this ordinance.*
- (3) *Electrical crossover connections shall be a minimum of 12 inches above base flood elevation.*

Response: The proposed development does not include placement of a manufactured dwelling. Therefore, these standards are not applicable to this project.

- (8) *Recreational Vehicles: Recreational vehicles may occupy a site in a Special Flood Hazard Area for periods of 180 consecutive days or less provided they are fully licensed and highway ready. Recreational vehicles are on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices and has no permanently attached additions. Recreational vehicles that do not meet these criteria become manufactured dwellings and shall be anchored and elevated pursuant to this ordinance.*

Response: The proposed development does not include infrastructure for parking recreational vehicles. Therefore, this standard is not applicable to this project.

- (9) *Specific Standards for Floodways: Located within areas of special flood hazard established in Section 3.510(2) are areas designated as regulatory floodways. Since the floodway is an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles, and erosion potential, the following provisions apply:*
 - (a) *Prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless certification by a registered professional civil engineer is provided demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment shall not result in any increase in flood levels within the community during the occurrence of the base flood discharge;*
 - (b) *If Subsection 9(a) is satisfied, all new construction and substantial improvement shall comply with all applicable flood hazard reduction provisions of Section 3.510(5) and (6).*
 - (c) *A community may permit encroachments within the adopted regulatory floodway that would result in an increase in base flood elevations, provided that a Conditional Letter of Map Revision (CLOMR) is applied for and approved by the Federal Insurance Administrator, and the requirements for such revision as established under Volume 44 of the Code of Federal Regulations, section 65.12 are fulfilled.*
 - (d) *Projects for stream habitat restoration may be permitted in the floodway provided:*
 - (1) *The civil engineer shall, as a minimum, provide a feasibility analysis and certification that the project was designed to keep any rise in 100-year flood levels and that no structures will be impacted by a potential rise in flood elevation; and,*

- (2) *An agreement to monitor the project, correct problems, and ensure that flood carrying capacity remains unchanged is included as part of the local approval.*
- (e) *Before a Regulatory Floodway is determined in an A1-A30 or AE Zone: In areas where a regulatory floodway has not been designated, no new construction, substantial improvements or other development (including fill) shall occur within an AE Zone designated on the community's Flood Insurance Rate Map, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.*
- (f) *As noted in "The Flood Insurance Study for Tillamook County" as revised on September 28, 2018, certain areas of Tillamook County are subject to heavy tidal influence and sheet flows. Floodways are not applicable in this type of flooding. Thus, the following areas are not subject to the requirement of Section (9)(e) above:*
 - (1) *Nehalem River downstream of cross-section A*
 - (2) *Nestucca River where it joins Nestucca Bay*
 - (3) *Tillamook River*
 - (4) *Wilson River from cross-sections A to Y*
 - (5) *Trask River from cross-sections A to AF*
 - (6) *Kilchis River downstream of cross-section C*
- (g) *In areas where a regulatory floodway has not been designated, no new construction, substantial improvement, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's Flood Insurance Rate Map (FIRM), unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.*

Response: The subject property is not located within a floodway. Therefore, these standards are not applicable to this project.

- (10) *Specific Standards for Coastal High Hazard Areas (V, VE or V1-V30 ZONES): Located within areas of special flood hazard established in Section 3.510(2) are Coastal High Hazard Areas. These areas have special flood hazards associated with high velocity waters from tidal surges and, therefore, in addition to meeting all provisions in this Section the following provisions shall apply to residential, non-residential, manufactured dwellings and other development in Coastal High Hazard Areas:*
 - (a) *All new construction and substantial improvements in Zones V1-V30, VE, V and coastal A zones (where base flood elevation data is available) shall be elevated on pilings and columns so that:*

- (1) *The bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated a minimum of one foot above the base flood level: and*
 - (2) *The pile or column foundation and structure attached thereto is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Water loading values used shall be those associated with the base flood. Wind loading values used shall be those specified by the State of Oregon Specialty Codes.*
- (b) *A registered professional engineer or architect shall develop or review the structural design, specifications and plans for the construction and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of (a)(1) and (a)(2) above. A certificate shall be submitted, signed by the registered professional engineer or architect that the requirements of this Section will be met.'*
- (c) *Obtain the elevation (in relation to mean sea level) of the bottom of the lowest structural member of the lowest floor (excluding pilings and columns) of all new and substantially improved structures in Zones V1-30, VE, and V and whether or not such structures contain a basement. The Community Development Director shall maintain a record of all such information.*
- (d) *All new construction shall be located landward of the reach of mean high tide.*
- (e) *Provide that all new construction and substantial improvements have the space below the lowest floor either free of obstruction or constructed with non-supporting breakaway walls, open wood lattice-work, or insect screening intended to collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system, For the purpose of this Section a breakaway wall shall have a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot. Use of breakaway walls which exceed a design safe loading resistance of 20 pounds per square foot (either by design or when so required by local or state codes) may be permitted only if a registered professional engineer or architect certifies that the designs proposed meet the following conditions:*
 - (1) *Breakaway wall collapse shall result from a water load less than that which would occur during the base flood; and*
 - (2) *The elevated portion of the building and supporting foundation system shall not be subject to collapse, displacement, or other structural damage due to the effects of wind and water loads acting simultaneously on all building components (structural and nonstructural). Maximum wind and water loading values to be used in this determination shall each have a one percent chance of being equaled or exceeded in any given year (100-year mean recurrence interval).*
- (f) *If breakaway walls are utilized, such enclosed space shall be usable solely for parking of vehicles, building access, or storage. Such space shall not be used for human habitation.*

- (g) *Prohibit the use of fill for structural support of buildings.*
- (h) *Prohibit man-made alteration of sand dunes, including vegetation removal, which would increase potential flood damage.*

Response: The subject property is not located with a coastal high hazard area. Therefore, these standards are not applicable to this project.

- (11) *Specific Standards for Areas of Shallow Flooding (AO Zone): Shallow flooding areas appear on FIRM's as AO zones with depth designations. The base flood depths in these zones range from 1 to 3 feet where a clearly defined channel does not exist, or where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is usually characterized as sheet flow. In these areas the following provisions apply:*

- (a) *Require adequate drainage paths around structures on slopes to guide floodwaters around and away from proposed structures.*

Residential

- (b) *New construction and substantial improvements of residential structures (including manufactured dwellings) within AO zones shall have the lowest floor (including basement) elevated above the highest grade adjacent to the building, a minimum of one foot above the depth number specified on the FIRM (at least two feet above the highest adjacent grade if no depth number is specified). For manufactured dwellings the lowest floor is considered to be the bottom of the longitudinal chassis frame beam.*

Nonresidential

- (c) *New construction and substantial improvements of nonresidential structures, including manufactured dwellings used for non-residential purposes, within AO zones shall either:*
 - (1) *Have the lowest floor (including basement) elevated above the highest adjacent grade to the building, a minimum of one foot above the depth number specified on the FIRM (at least two feet above the highest adjacent grade if no depth number is specified) or*
 - (2) *Together with attendant utility and sanitary facilities, be completely floodproofed to one foot above the depth number specified on the FIRM so that any space below that level is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. If this method is used, compliance shall be certified by a registered professional engineer or architect as in Subsection (6)(c)(3) of this Section.*
 - (3) *Recreational vehicles placed on sites within AO Zones on the community's Flood Insurance Rate Maps (FIRM) shall either:*
 - a. *Be on the site for fewer than 180 consecutive days, and*

- b. *Be fully licensed and ready for highway use, on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions; or*
- c. *Meet the elevation requirements of this ordinance and the anchoring and other requirements for manufactured dwellings.*
- d. *In AO zones, new and substantially improved appurtenant structures shall comply with the applicable requirements outlined in Section 3.510(5) and (6).*
- e. *In AO zones, enclosed areas beneath elevated structures shall comply with the applicable requirements outlined in Section 3.510(5) and (6).*

Response: The subject property is not located with an AO zone. Therefore, these standards are not applicable to this project.

(12) *Section not codified.*

(13) *Special Administrative Provisions for FH Zone:*

- (a) *Designation of the Local Administrator: The Community Development Director of Tillamook County is hereby appointed to administer and implement the provisions of this Flood Hazard Overlay Zone by granting or denying development permit applications in accordance with its provisions.*
- (b) *Duties of the Community Development Director shall include, but not be limited to:*
 - (1) *Review of all Floodplain Development Permits for construction and other development within an Area of Special Flood Hazard identified on the Flood Insurance Rate Map to assure that the requirements of this Section have been satisfied and that all other necessary permits have been obtained from those federal, state or local governmental agencies from which prior approval is required.*
 - (2) *Review all other permit applications to determine compliance with this Section.*
 - (3) *Notify adjacent communities and the Department of Land Conservation and Development prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration.*
 - (4) *Require that maintenance is provided within the altered or relocated portion of said watercourse so that the flood carrying capability is not diminished.*
 - (5) *Provide base flood elevation and structure elevation requirements to the Building Official.*
 - (6) *Determine if structures meet substantial improvement or substantial damage thresholds.*

- (7) *Where base flood elevation data is provided through the Flood Insurance Study or required within this Section, obtain and record on an Elevation Certificate the actual elevation (in relation to mean sea level) of the lowest floor (including basement) of all new or substantially improved structures, and whether or not the structure contains a basement.*
 - (8) *For all new or substantially improved floodproofed structures:*
 - (a) *Verify and record the actual elevation (in relation to mean sea level), and*
 - (b) *Maintain the floodproofing certifications required in this Section.*
 - (9) *Maintain for inspection in perpetuity the affidavits of certification required in this Section. Affidavits of certification, such as elevation certificates, V zone certification, floodproofing, breakaway walls, floodway no-rise, etc., are required to be submitted by the permit applicant for elevations and structural requirements as specified in this Section, both pre- and post-construction, utilizing forms provided for this purpose by FEMA. Elevations may be certified by a licensed surveyor or a registered professional architect or engineer. Structural requirements may be certified by a registered professional architect or engineer.*
 - (10) *Where interpretation is needed requiring the boundaries of the areas of special flood hazard, the Community Development Director will make the necessary interpretation. The person contesting the ruling of the Community Development Director shall be given a reasonable opportunity to appeal the ruling as provided in Section 3.510(15).*
 - (11) *When base flood elevation has not been provided as set forth in Section 3.510(2), the Community Development Director shall obtain, review and reasonably utilize any base flood data and floodway available from federal, state, or other source in order to administer the provisions of Section 3.510.*
 - (12) *All records pertaining to the provisions of this Section shall be maintained in the Tillamook County Community Development Department and shall be open for public inspection.*
 - (13) *When a Variance is granted, the Community Development Director shall give written notice that the structure will be allowed to be built with the lowest floor elevation at or below base flood elevation, and that the cost of flood insurance will be commensurate with the increased risk resulting from the lowest floor elevation.*
- (c) *Restrict the location of structures placed on undeveloped parcels between Brooten Road and the Nestucca River, from the Woods Bridge downstream to map cross-section line F on the amended floodway map for the Nestucca River.*

Such structures shall occupy no more than 62.5% of the lot width of the parcel to be built upon. This requirement does not apply if the structure is built upon pilings with the area beneath the structure open to permit passage of flood water.

Any such structure shall comply with all other requirements of this Section and shall provide a regulatory floodway analysis for structures in the floodway. The intent of this Subsection is to maintain a minimum of 1000 feet of open space on the east bank of the Nestucca River, between Brooten Road and the river, from the Woods Bridge structure downstream to map cross-section line F on the amended floodway map for the Nestucca River.

- (d) *Publicly owned open land recreation parks and accessory restroom facilities, where allowed in the underlying zone, shall be allowed in floodplain areas below the base flood elevation. The accessory restroom facilities shall be located outside of floodplain areas if possible. If it is not possible, the restroom structures shall be located:*

- (1) On the highest portion of the park grounds; and*
- (2) Be wet-floodproofed; and*
- (3) Maintain riparian setbacks; and*
- (4) Adequate backflow valves shall be installed;*

If the structure is located in a designated floodway, it shall conform to 1 through 4 above and shall be small enough and positioned so that it will not divert floodwaters. Any structure located within the regulatory floodway shall have a floodway analysis to assure there is no-rise in base flood elevation.

- (e) *All residential and non-residential development and substantial improvements, within the Pacific City Airport Overlay Zone where the height is restricted by the PAO zone, below that allowed by the underlying zone, shall conform to the FH zone regulations except that the lowest floor elevation and the floodproofing shall be certified at the base flood elevation given on the FIRM maps instead of the required three foot above base flood elevation level. Any structure located within the regulatory floodway shall have a floodway analysis to assure there is no-rise in base flood elevation.*

Response: The applicant understands and acknowledges the responsibilities of Tillamook County, and the proposed development has been designed to comply with the relevant standards of the Flood Hazard Overlay Zone.

- (14) *Development Permit Procedures: A development permit shall be obtained before construction or development begins within any area of special flood hazard zone. The permit shall be for all structures including manufactured dwellings, and for all development including fill and other development activities, as set forth in the Definitions contained in this Section of the Land Use Ordinance.*

- (a) *Application for a development permit shall be made on forms furnished by the Community Development Director and shall include but not necessarily be limited to: plans in duplicate drawn to scale showing the nature, location, dimensions, and elevations of the area in question, existing or proposed structures, fill, storage of materials, drainage facilities, and the location of the foregoing. Specifically, the following information in 3.510(14)(a)(1)–*

(4) is required and Development Permits required under this Section are subject to the Review Criteria put forth in Section 3.510(14)(b):

- (1) Elevation in relation to mean sea level of the lowest floor, including basement, of all structures as documented on an Elevation Certificate;*
- (2) Elevation in relation to mean sea level to which any proposed structure will be floodproofed as documented on an Elevation Certificate;*
- (3) If applicable, certification by a registered professional engineer or architect that the floodproofing methods for any nonresidential structure meet the floodproofing criteria in Subsection (6)(c)(3) of this Section; and*
- (4) Description of the extent to which any watercourse will be altered or relocated as a result of proposed development.*

Response: All requested relevant materials are contained within this application package. Therefore, these standards are met.

(b) Development Permit Review Criteria

- (1) The fill is not within a Coastal High Hazard Area.*

Response: As previously mentioned, the subject property is not located within a coastal high hazard area. Therefore, this criterion is not applicable to this project.

- (2) Fill placed within the Regulatory Floodway shall not result in any increase in flood levels during the occurrence of the base flood discharge.*

Response: As previously mentioned, the subject property is not located within a regulatory floodway. Therefore, this criterion is not applicable to this project.

- (3) The fill is necessary for an approved use on the property.*

Response: The proposed development is considered a conditional use in PCW-C1 zoning district and will be an approved use of the proposed once this land use application is approved. While no fill is required, a small amount of cut (0.04 cubic yards) to construct the required vehicle access and maintenance worker access as illustrated on the attached plan set. Therefore, this criterion is satisfied.

- (4) The fill is the minimum amount necessary to achieve the approved use.*

Response: The proposed development will result in a small amount of cut, 0.04 cubic yards. This limited amount of earthwork cannot be further reduced and will not have any noticeable impact on the floodplain. Therefore, this criterion is satisfied.

- (5) No feasible alternative upland locations exist on the property.*

Response: The subject property contains upland; however, it is not suitable for development due to steep slopes. It will not be possible to develop the uplands without significant earthwork, likely resulting in fill within the floodplain. Therefore, this criterion is satisfied.

- (6) *The fill does not impede or alter drainage or the flow of floodwaters.*

Response: The proposed development will result in 0.04 cubic yards of cut. This is an insignificant amount of earthwork and will not impede or alter drainage or the flow of floodwaters. Therefore, this criterion is satisfied.

- (7) *If the proposal is for a new critical facility, no feasible alternative site is available.*

Response: A critical facility is defined as “A facility for which even a slight chance of flooding might be too great. Critical facilities include, but are not limited to schools, nursing homes, hospitals, police, fire and emergency response installations, installations which produce, use or store hazardous materials or hazardous waste.” The proposed development does not fit this definition. Therefore, this criterion is not applicable to this project.

- (8) *For creation of new, and modification of, Flood Refuge Platforms, the following apply, in addition to (14)(a)(1-4) and (b)(1-5):*

- i. *The fill is not within a floodway, wetland, riparian area or other sensitive area regulated by the Tillamook County Land Use Ordinance.*
- ii. *The property is actively used for livestock and/or farm purposes,*
- iii. *Maximum platform size = 10 sq ft of platform surface per acre of pasture in use, or 30 sq ft per animal, with a 10-ft wide buffer around the outside of the platform,*
- iv. *Platform surface shall be at least 1 ft above base flood elevation,*
- v. *Slope of fill shall be no steeper than 1.5 horizontal to 1 vertical,*
- vi. *Slope shall be constructed and/or fenced in a manner so as to prevent and avoid erosion.*

Response: The proposed development does not include the creation or modification of flood refuge platforms. Therefore, this criterion is not applicable to this project.

Conditions of approval may require that if the fill is found to not meet criterion (5), the fill shall be removed or, where reasonable and practical, appropriate mitigation measures shall be required of the property owner. Such measures shall be verified by a certified engineer or hydrologist that the mitigation measures will not result in a net rise in floodwaters and be in coordination with applicable state, federal and local agencies, including the Oregon Department of Fish and Wildlife.

Response: The applicant understands and acknowledges that Tillamook County may impose conditions of approval to ensure compliance with criterion five.

- (c) *Before approving a development permit application for other than a building, the Community Development Director may determine that a public hearing should be held on the application. Such hearing shall be held before the Planning Commission and a decision made by the Planning Commission in accordance with the provisions of Article 10.*

Response: The applicant understands and acknowledges that the Community Development Director may determine that a public hearing should be held on the application.

(15) Appeals, Reductions and Variances:

(a) *An appeal of the ruling of the Community Development Director regarding a requirement of this Section may be made to the Tillamook County Planning Commission pursuant to Section 10.100.*

(b) *Reductions of the "3 feet above base flood elevation" standard may be granted by the Community Development Director, upon findings that:*

(1) *Strict application of the three-foot standard would produce an unreasonable or inequitable result; and*

(2) *A lesser elevation requirement will not result in an appreciable increase in flood damage.*

Reductions to below 1 foot above base flood elevation require a Variance as described in (c), below.

The intent of this provision is to limit this application of the Director's discretion to those rare and unusual circumstances where the three-foot standard would result in unnecessary and burdensome development requirements.

(c) *Variances to the standards contained in Section 3.510 shall be issued only in accordance with the following criteria:*

(1) *Generally, the only condition under which a variance from the elevation standard may be issued is for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, providing the items in subsection (15)(c)(2) have been fully considered. As the lot size increases the technical justification required for issuing the variance increases.*

(2) *The following items shall be considered in review of variance applications:*

(i) *The danger that materials may be swept onto other lands to the injury of others;*

(ii) *The danger to life and property due to flooding or erosion damage;*

(iii) *The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;*

(iv) *The importance of the services provided by the proposed facility to the community;*

(v) *The necessity to the facility of a waterfront location, where applicable;*

- (vi) *The availability of alternative locations for the proposed use which are not subject to flooding or erosion damage;*
 - (vii) *The compatibility of the proposed use with existing and anticipated development;*
 - (viii) *The relationship of the proposed use to the comprehensive plan and flood plain management program for that area;*
 - (ix) *The safety of access to the property in times of flood for ordinary and emergency vehicles;*
 - (x) *The expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site; and,*
 - (xi) *The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, and streets and bridges.*
- (3) *Variances may be issued for the reconstruction, rehabilitation, or restoration of structures listed on the National Register of Historic Places or the Statewide Inventory of Historic Properties, without regard to the procedures set forth in this section.*
- (4) *Variances shall not be issued within a designated floodway if any increase in flood levels during the base flood discharge would result.*
- (5) *Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.*
- (6) *Variances shall be issued only upon:*
- (i) *A showing of good and sufficient cause;*
 - (ii) *A determination that failure to grant the variance would result in exceptional hardship to the applicant;*
 - (iii) *A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public as identified in subsection (15)(c)(2), or conflict with existing local laws or ordinances.*
- (7) *Variances as interpreted in the National Flood Insurance Program are based on the general zoning law principle that they pertain to a physical piece of property; they are not personal in nature and do not pertain to the structure, its inhabitants, economic or financial circumstances. They primarily address small lots in densely*

populated residential neighborhoods. As such, variances from the flood elevations should be quite rare.

- (8) *Variances may be issued for nonresidential buildings in very limited circumstances to allow a lesser degree of floodproofing than watertight or dry-floodproofing, where it can be determined that such action will have low damage potential, complies with all other variance criteria except subsection (15)(c)(1), and otherwise complies with general standards in Section 3.510(5).*
- (9) *Any applicant to whom a variance is granted shall be given written notice that the structure will be permitted to be built with a lowest floor elevation below the base flood elevation and that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced lowest floor elevation.*
- (d) *The procedures for reviewing and taking action on a variance under the provisions of this Section shall be pursuant to the procedures for a Type II review in accordance with Article 10 of the TCLUO.*
- (16) *Requirements to Notify other Entities and Submit New Technical Data:*

 - (A) *Community Boundary Alterations: The Floodplain Administrator shall notify the Federal Insurance Administrator in writing whenever the boundaries of the community have been modified by annexation or the community has otherwise assumed authority or no longer has authority to adopt and enforce floodplain management regulations for a particular area, to ensure that all Flood Hazard Boundary Maps (FHBM) and Flood Insurance Rate Maps (FIRM) accurately represent the community's boundaries. Include within such notification a copy of a map of the community suitable for reproduction, clearly delineating the new corporate limits or new area for which the community has assumed or relinquished floodplain management regulatory authority.*
 - (B) *Watercourse Alterations: The Floodplain Administrator shall notify the Federal Insurance Administrator in writing whenever the boundaries of the community have been modified by annexation or the community has otherwise assumed authority or no longer has authority to adopt and enforce floodplain management regulations for a particular area, to ensure that all Flood Hazard Boundary Maps (FHBM) and Flood Insurance Rate Maps (FIRM) accurately represent the community's boundaries. Include within such notification a copy of a map of the community suitable for reproduction, clearly delineating the new corporate limits or new area for which the community has assumed or relinquished floodplain management regulatory authority.*
 - (C) *Requirement to Submit New Technical Data: A community's base flood elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information becomes available, a community shall notify the Federal Insurance Administrator of the changes by submitting technical or scientific data in accordance with Section 44 of the Code of Federal Regulations (CFR), Sub-Section 65.3. The community may require the applicant to submit such data and review fees required for compliance with this section through the applicable FEMA Letter of Map Change (LOMC) process.*

The Floodplain Administrator shall require a Conditional Letter of Map Revision prior to the issuance of a floodplain development permit for:

- A. *Proposed floodway encroachments that increase the base flood elevation; and*
- B. *Proposed development which increases the base flood elevation by more than one foot in areas where FEMA has provided base flood elevations but no floodway.*

An applicant shall notify FEMA within six (6) months of project completion when an applicant has obtained a Conditional Letter of Map Revision (CLOMR) from FEMA. This notification to FEMA shall be provided as a Letter of Map Revision (LOMR).

- (17) *Substantial Improvement and Substantial Damage Assessment and Determination: Conduct Substantial Improvement (SI) reviews for all structural development proposal applications and maintain a record of SI calculations within permit files. Conduct Substantial Damage (SD) assessments when structures are damaged due to a natural hazard event or other causes. Make SD determinations whenever structures within the special flood hazard area are damaged to the extent that the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the real market value of the structure before the damage occurred.*
- (18) *Compliance: All development within special flood hazard areas is subject to the terms of this ordinance and other applicable regulations.*
- (19) *Penalties for Noncompliance: No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this ordinance and other applicable regulations. Violations of the provisions of this ordinance by failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with conditions) shall be subject to citation and fines in addition to and not in lieu of any other enforcement and penalties contained in this Ordinance or other County Ordinance or State law and. Nothing contained herein shall prevent Tillamook County from taking such other lawful action as is necessary to prevent or remedy any violation.*
- (20) *Abrogation: This ordinance is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this ordinance and another ordinance, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.*
- (21) *Severability: This ordinance and the various parts thereof are hereby declared to be severable. If any section clause, sentence, or phrase of the Ordinance is held to be invalid or unconstitutional by any court of competent jurisdiction, then said holding shall in no way effect the validity of the remaining portions of this Ordinance.*
- (22) *Interpretation: In the interpretation and application of this ordinance, all provisions shall be:*
 - 1) *Considered as minimum requirements;*
 - 2) *Liberally construed in favor of the governing body; and,*

- 3) *Deemed neither to limit nor repeal any other powers granted under state statutes.*
- (23) *Warning: The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages.*
- (24) *Disclaimer of Liability: This ordinance shall not create liability on the part of Tillamook County, any officer or employee thereof, or the Federal Insurance Administrator for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.*
- (25) *Provisions: The provisions of Section 3.510 shall take precedence over all prior resolutions or orders of the Board of County Commissioners relating to Floodplain Management.*

Response: The applicant understands and acknowledges these sections.

TCLUO 3.580 *Tsunami Hazard Overlay Zone (TH)*

- (1) *Purpose: The purpose of the Tsunami Hazard Overlay Zone is to increase the resilience of the community to a local source (Cascadia Subduction Zone) tsunami by establishing standards, requirements, incentives, and other measures to be applied in the review and authorization of land use and development activities in areas subject to tsunami hazards. The standards established by this section are intended to limit, direct and encourage the development of land uses within areas subject to tsunami hazards in a manner that will:*
- a. *Reduce loss of life;*
 - b. *Reduce damage to private and public property;*
 - c. *Reduce social, emotional, and economic disruptions; and*
 - d. *Increase the ability of the community to respond and recover.*

Significant public and private investment has been made in development in areas which are now known to be subject to tsunami hazards. It is not the intent or purpose of this section to require the relocation of or otherwise regulate existing development within the Tsunami Hazard Overlay Zone. However, it is the intent of this section to control, direct and encourage new development and redevelopment such that, over time, the community's exposure to tsunami risk will be reduced.

- (2) *Applicability: All lands identified as subject to inundation from the XXL magnitude local source tsunami event as set forth on the applicable Tsunami Inundation Map(s) (TIM) published by the Oregon Department of Geology and Mineral Industries (DOGAMI) are subject to the requirements of this section. The boundary of the Tsunami Hazard Overlay Zone as depicted on the Tillamook County Zoning Map, including the Large (L) and Medium (M) inundation boundaries, shall not be modified after the date of adoption of this Section unless modified in accordance with the provisions in Article 10.*

Response: The subject property is located within the Tsunami Hazard Overlay Zone. Therefore, this section is applicable to the proposed development.

(3) *Definitions:*

(4) *Uses: In the Tsunami Hazard Overlay Zone, except for the prohibited uses set forth in subsection (5), uses authorized by the underlying zone as outright or conditional uses are permitted.*

Response: The proposed development is classified as a “utility substation,” a conditional use in the PCW-C1 zoning district. Therefore, the proposed development is a permitted use in Tsunami Hazard Overlay Zone.

(5) *Prohibited Uses: Unless authorized in accordance with subsection (6), the following uses are prohibited in the specified portions of the Tsunami Hazard Overlay Zone:*

- a. *In areas identified as subject to inundation from the LARGE (L) magnitude local source tsunami event as set forth on the Tsunami Inundation Map (TIM), the following uses are prohibited:*
 - i. *Hospitals and other medical facilities having surgery and emergency treatment areas.*
 - ii. *Fire and police stations.*
 - iii. *Structures and equipment in government communication centers and other facilities required for emergency response.*
 - iv. *Buildings with a capacity greater than 250 individuals for every public, private or parochial school through secondary level or child care centers.*
 - v. *Buildings for colleges or adult education schools with a capacity of greater than 500 persons.*
 - vi. *Jails and detention facilities.*
- b. *In areas identified as subject to inundation from the MEDIUM (M) magnitude local source tsunami event as set forth on the Tsunami Inundation Map (TIM), the following uses are prohibited:*
 - i. *Tanks or other structures containing, housing or supporting water or fire-suppression materials or equipment required for the protection of essential or hazardous facilities or special occupancy structures.*
 - ii. *Emergency vehicle shelters and garages.*
 - iii. *Structures and equipment in emergency preparedness centers.*
 - iv. *Standby power generating equipment for essential facilities.*
 - v. *Covered structures whose primary occupancy is public assembly with a capacity of greater than 300 persons.*

- vi. *Medical facilities with 50 or more resident, incapacitated patients.*
- c. *Notwithstanding the provisions of Article 7, the requirements of this subsection shall not have the effect of rendering any lawfully established use or structure nonconforming.*

Response: The proposed development does not include the construction of any of the uses or structures listed as prohibited in the Tsunami Hazard Overlay Zone.

- (6) *Use Exceptions. A use listed in subsection (5) of this section may be permitted upon authorization of a Use Exception in accordance with the following requirements:*
- a. *Public schools may be permitted upon findings that there is a need for the school to be within the boundaries of a school district and fulfilling that need cannot otherwise be reasonably accomplished.*
 - b. *Fire or police stations may be permitted upon findings that there is a need for a strategic location.*
 - c. *Other uses prohibited by subsection (4) of this section may be permitted upon the following findings:*
 - i. *There are no reasonable, lower-risk alternative sites available for the proposed use;*
 - ii. *Adequate evacuation measures will be provided such that life safety risk to building occupants is minimized; and,*
 - iii. *The buildings will be designed and constructed in a manner to minimize the risk of structural failure during the design earthquake and tsunami event.*

Response: As previously mentioned, the proposed development does not include construction of a use listed in TCLUO 3.580(5). Therefore, these standards are not applicable to this project.

- (7) *Applications, review, decisions, and appeals for Use Exceptions authorized by this subsection shall be in accordance with the requirements for a Type III procedure as set forth in Article 10.*

Response: The proposed development is not applying for a use exception authorized by this subsection. Therefore, this standard is not applicable to this project.

- (8) *Evacuation Route Improvement Requirements. Except single family and two-family dwellings (attached or detached) on existing lots and parcels, all new development, substantial improvements and land divisions in the Tsunami Hazard Overlay Zone shall incorporate evacuation measures and improvements, including necessary vegetation management. Such measures shall include:*
- a. *On-site improvements:*
 - i. *Improvements necessary to ensure adequate pedestrian access from the development site to designated evacuation routes in all weather and lighting conditions.*

- ii. *Frontage improvements to designated evacuation routes that are located on or contiguous to the proposed development site. Such improvements shall be proportional to the evacuation needs created by the proposed development.*
- iii. *Tsunami evacuation structure(s) of sufficient capacity to accommodate the evacuation needs of the proposed development where determined under a Type III review to be proportional to the evacuation needs created by the proposed development.*
- b. *Off-site improvements: Improvements to portions of designated evacuation routes that are needed to serve, but are not contiguous to, the proposed development site. Such improvements shall be proportional to the evacuation needs created by the proposed development.*
- c. *Evacuation route signage adequate to provide necessary evacuation information consistent with the proposed use of the site.*
- d. *Evacuation route improvements and measures required by this subsection shall include, at a minimum, the following:*
 - i. *Improved streets and/or all-weather surface paths of sufficient width and grade to ensure pedestrian access to designated evacuation routes in all lighting conditions; and*
 - ii. *Improved streets and paths shall provide and maintain horizontal clearances sufficient to prevent the obstruction of such paths from downed trees and structure failures likely to occur during a Cascadia earthquake.*

Response: The proposed development will not be accessible to the public or regularly occupied by employees. The structure is only intended to house telecommunication/internet infrastructure. The subject property does have frontage on Brooten Road, which is paved with two lanes in each direction. Therefore, the available evacuation infrastructure is proportional to the proposed development, and these standards are met.

(8) Tsunami Evacuation Structures

- a. *All vertical tsunami evacuation structures shall be of sufficient height to place evacuees above the level of inundation for the XXL local source tsunami event.*
- b. *Tsunami evacuation structures are not subject to the building height limitations of this ordinance.*

Response: The proposed development does not include construction of a tsunami evacuation structure. Therefore, these standards are not applicable to this project.

(9) Flexible Development Option

- a. *The purpose of the Flexible Development Option is to provide incentives for, and to encourage and promote, site planning and development within the Tsunami Hazard Overlay Zone that results in lower risk exposure to tsunami hazard than would otherwise*

be achieved through the conventional application of the requirements of this chapter. The Flexible Development Option is intended to:

- i. *Allow for and encourage development designs that incorporate enhanced evacuation measures, appropriate building siting and design, and other features that reduce the risks to life and property from tsunami hazard; and*
 - ii. *Permit greater flexibility in the siting of buildings and other physical improvements and in the creation of new lots and parcels in order to allow the full realization of permitted development while reducing risks to life and property from tsunami hazard.*
- b. *The Flexible Development Option may be applied to the development of any lot, parcel, or tract of land that is wholly or partially within the Tsunami Hazard Overlay Zone.*
- c. *The Flexible Development Option may include any uses permitted outright or conditionally in any zone, except for those uses prohibited pursuant to subsection (5) of this section.*
- d. *Overall residential density shall be as set forth in the underlying zone or zones. Density shall be computed based on total gross land area of the subject property, excluding street right-of-way.*
- e. *Yards, setbacks, lot area, lot width and depth, lot coverage, building height and similar dimensional requirements may be reduced, adjusted or otherwise modified as necessary to achieve the design objectives of the development and fulfill the purposes of this section.*
- f. *Applications, review, decisions, and appeals for the Flexible Development Option shall be in accordance with the requirements for a Type II procedure as set forth in Article 10.*
- g. *Approval of an application for a Flexible Development Option shall be based on findings that the following criteria are satisfied:*
 - i. *The applicable requirements of sub-paragraphs (b) and (d) of this subsection are met; and*
 - ii. *The development will provide tsunami hazard mitigation and/or other risk reduction measures at a level greater than would otherwise be provided under conventional land development procedures. Such measures may include, but are not limited to:*
 1. *Providing evacuation measures, improvements, way finding techniques and signage;*
 2. *Providing tsunami evacuation structure(s) which are accessible to and provide capacity for evacuees from off-site;*
 3. *Incorporating building designs or techniques which exceed minimum structural specialty code requirements in a manner that increases the capacity of structures to withstand the forces of a local source tsunami; and*

4. *Concentrating or clustering development in lower risk portions or areas of the subject property, and limiting or avoiding development in higher risk areas.*

Response: The proposed development does not intend on utilizing the flexible design options detailed in this section. Therefore, these standards are not applicable to this project.

IV. Article 4 – Development Standards

TCLUO 4.000 – General Requirements

No lot or parcel area, dimension, required setback or yard, or off-street parking or loading area that exists on or is created after the effective date of this Ordinance shall be reduced below the applicable standards required by this Ordinance.

TCLUO 4.005 – Residential and Commercial Zone Standards

Purpose: In all Residential and Commercial Zones, the purpose of land use standards are the following:

- (1) *To ensure the availability of private open space;*
- (2) *To ensure that adequate light and air are available to residential and commercial structures;*
- (3) *To adequately separate structures for emergency access;*
- (4) *To enhance privacy for occupants of residences;*
- (5) *To ensure that all private land uses that can be reasonably expected to occur on private land can be entirely accommodated on private land, including but not limited to dwellings, shops, garages, driveways, parking, areas for maneuvering vehicles for safe access to common roads, alternative energy facilities, and private open spaces;*
- (6) *To ensure that driver visibility on adjacent roads will not be obstructed;*
- (7) *To ensure safe access to and from common roads;*
- (8) *To ensure that pleasing views are neither unreasonably obstructed nor obtained;*
- (9) *To separate potentially incompatible land uses;*
- (10) *To ensure access to solar radiation for the purpose of alternative energy production.*

TCLUO 4.010 – Clear-Vision Areas

- (1) *Purpose: The purpose of a clear visions area is to ensure safe sight distance for drivers approaching street intersections.*
- (2) *A clear vision area shall be maintained on the corners of all properties located at the intersection of two streets or private ways or a street or private way and a railroad.*
- (3) *A clear vision area is a triangular area consisting of two equidistant sides which are lot lines measured from the point of intersection of the lot lines abutting streets; or, where the lot lines*

have rounded corners, such lines extended straight to their point of intersection, and then so measured; and a line joining the two non-intersecting ends at a distance from their intersection specified in Subsection (5) below.

- (4) *A clear vision area shall contain no planting, fence, wall, structure, parked cars, or other temporary or permanent obstructions exceeding thirty inches in height, measured from the top of the highest curb in the clear vision area or, where no curb exists, from the highest established street center line grade adjacent to the clear vision area. Trees exceeding this height may be located in this area, provided that all branches and foliage are removed to a height of eight feet above the specified grade.*
- (5) *The following measurements shall establish clear vision areas:*
 - (a) *In agricultural or residential zones, the minimum distance shall be 25 feet or, at intersections including an alley, 10 feet.*
 - (b) *In all other zones, the minimum distance shall be 15 feet or, at intersections including an alley, 10 feet. When the angle of intersection between streets is 30 degrees or less, the distance shall be 25 feet.*

Response: The subject property is not located on an intersection of two streets or private ways or a street or private way and a railroad; therefore, these standards are not applicable to this project.

TCLUO 4.020 – Signs

- (1) *Purpose: The purpose of these supplemental regulations governing signs is to promote scenic values; to prevent unsafe driver distraction; to provide orientation and directions to visitors; to facilitate emergency response; and in general to provide for the placement of necessary signs in appropriate areas. These provisions shall not be construed to preclude the placement of street address signs in locations that can be readily seen by operators of emergency vehicles, provided that such placement does not impair efforts to maintain roads, drainage ways, or brush-free road right-of-ways. No sign shall be constructed within a required yard that will impair the use of an existing solar energy system on adjoining property.*
- (2) *No sign shall be placed in or extend over a required non-street side yard or street right-of-way, or within 10 feet of the front property line in a required front yard.*
- (3) *Any lighting for sign purposes shall be directed away from any adjacent residential use.*
- (4) *No flashing or moving signs shall be located within 100 feet of a traffic control signal. No SIGN lighting shall present a traffic hazard.*
- (5) *In the F-1, SFW-20, SFW-10, RR, CSFR, CR-1, CR-2, CR-3, RMH, NT-RMD, RC, CC, and those unincorporated communities with adopted boundaries, RM and WDD zones, signs, other than off-site advertising signs, shall be limited to the following kinds, which may be directed towards each facing street or located at needed points of vehicular access where such access points are over 200 feet apart:*
 - (a) *A name plate or sign not exceeding two square feet for each dwelling.*

- (b) *A temporary sign not exceeding eight square feet pertaining either to the lease, rental, or sale of the property upon which the sign is located, or to a construction project.*
 - (c) *A sign not exceeding 64 square feet advertising a subdivision.*
 - (d) *A sign not exceeding 150 square feet, identifying a multi-family dwelling or motel in the CR-3 zone and those zones with adopted unincorporated community boundaries.*
 - (e) *A sign not exceeding 50 square feet identifying a non-residential use such as the sale of farm produce, a golf course, or a church.*
 - (f) *A sign not exceeding 24 square feet identifying a cottage industry.*
 - (g) *A sign not exceeding 50 square feet identifying a rural or light industry in the SFW-10 zone.*
 - (h) *A sign not exceeding 24 square feet directing traffic to places of interest to the public, such as tourist accommodations and recreation sites, which would otherwise be difficult to find. Such SIGNS shall be located within 600 feet of the intersecting roadway which provides access from the highway to the place of interest.*
 - (i) *Signs not exceeding a total area of 200 square feet for each commercial establishment in a RC, CC, commercial zones within unincorporated community boundaries where permitted, or WDD zone.*
 - (j) *A sign identifying a home occupation up to 12 square feet in size.*
 - (k) *A sign or signs not exceeding a total of 200 square feet identifying a mobile home park, recreational campground, primitive campground, commercial farm, or community identification.*
 - (l) *A sign not exceeding 16 square feet for a bed & breakfast enterprise. signs for bed & breakfast enterprises, which are greater than 16 square feet but less than 24 square feet may be approved according to the provisions of Article 6.*
- (6) *In the F zone, the following signs are permitted:*
- (a) *Signs pertaining solely to uses permitted and conducted within the F (Forest) zone.*
 - (b) *Road identification signs.*
 - (c) *Intermittent flashing lights are only permitted where necessary to provide warning for a traffic hazard.*
 - (d) *Signs allowed in a Forest zone shall not be located in, or extend over, a public right-of-way except for road identification signs and highway regulatory signs.*
- (7) *In the EC-1, EC-2 and ED zones, the following signs are permitted:*
- (a) *Signs pertaining solely to uses permitted and conducted in the zone in which the signs are located.*

- (b) *Placement of signs shall not involve any regulated activities.*
 - (c) *A temporary sign not exceeding eight square feet in area pertaining either to the lease, rental or sale of the property or to a construction project.*
 - (d) *A sign exceeding 100 square feet for each recreational use in the EC-1 zone.*
 - (e) *A sign not exceeding 200 square feet for each recreational, commercial or industrial use in the EC-2 or ED zones.*
- (8) *Signs larger than those permitted by this Section may be allowed only after consideration according to the provisions of Article 6.*

Response: No signage is proposed by this application; therefore, these standards are not applicable to this project.

TCLUO 4.021 – Off-site Advertising Sign Standards

- (1) *Purpose: The purpose of the supplemental regulations for off-site advertising signs is to provide standards to safeguard property and public welfare, to preserve locally recognized values of community appearance, and to reduce hazards to motorists and pedestrians traveling on public streets.*
- (2) *General Requirements:*
 - (a) *No off-site advertising sign shall exceed 600 square feet in size.*
 - (b) *All required setback of the underlying zone shall be maintained. A sign may be located within a clear-vision area if the bottom of the sign is not located less than 8 feet above the existing grade, and the sign support is not obstructive.*
 - (c) *The maximum height of the sign structure, including any protrusions, shall be 24 feet measured from the existing grade.*
 - (d) *No person shall erect, construct, or maintain any sign upon property or building without the consent of the owner of the property or building if any, or their authorized representatives.*
 - (e) *Signs may only be illuminated by a concealed light source, and shall not flash, blink, fluctuate, or produce glare.*

Response: No off-site advertising is proposed by this application; therefore, these standards are not applicable to this project.

TCLUO 4.030 – Off-Street Parking and Off-Street Loading Requirements

- (1) *Purpose: The purpose of requirements for off-street parking and loading areas is to relieve traffic congestion; to ensure customer convenience and safety; to provide safe access to parked vehicles; and to help ensure safe and timely response of emergency vehicles.*
- (2) *Parking Space: A single parking space shall be at least 8 feet by 20 feet in size.*

- (3) *Timing of Compliance: At the time any structure or use is erected or enlarged, or the use of any parcel or structure is changed, all required off-street parking spaces and loading areas provided in conjunction with an existing use shall not be reduced below the minimum requirements of this Ordinance.*
- (4) *Parking for Multiple Uses: In the event several uses occupy a single structure or parcel of land, the total parking requirements shall be the sum of the requirements of the several uses computed separately. Joint use of the same parking and loading spaces by more than one use may be permitted, provided that the hours of operation of the separate uses do not overlap, and that satisfactory legal evidence is presented to the Department to establish the joint uses.*
- (5) *Use of Required Parking Areas: Parking areas required by this Section are designated for the operable vehicles of residents and their guests, and the owner, customer, patrons, and employees of commercial or industrial activities only. Vehicle or material storage, or the parking of vehicles used to conduct an activity, shall require additional parking areas.*
- (6) *Drainage: Areas used for standing and maneuvering of vehicles shall have a surface that is suitable for all-weather use, and shall be drained so as to avoid the flow of water across public sidewalks and streets.*
- (7) *Buffering Non-Residential Parking Areas: Non-residential parking and loading areas adjacent to a residential use shall be enclosed along the residential use by a sight-obscuring fence that is from five to six feet in height, except where vision clearance is required.*
- (8) *Curbing: Parking spaces along the boundaries of a lot shall be contained by a curb or bumper rail that is at least four inches high and is set back at least four and one-half feet from the property line.*
- (9) *Lighting: Artificial lighting shall not create or reflect substantial glare into any adjacent residential zone or use.*
- (10) *Proximity to Traffic: Parking areas for four or more vehicles shall be of sufficient size to allow the backing and maneuvering of vehicles entirely out of the flow of traffic.*
- (11) *School Driveway: A one-way driveway for loading and unloading children shall be located on the site of any school having a capacity of more than 25 students.*
- (12) *Off-Street Loading Areas: Activities that receive or distribute materials or merchandise by truck shall install and utilize loading docks in sufficient numbers and size to accommodate loading requirements without the disruption of nearby traffic. Parking areas required by this Ordinance may only be used for loading operations during periods of the day when not required for patron or customer parking.*
- (13) *Parking Space Requirements: Requirements for types of building and uses not specifically listed herein shall be determined by the Department, based upon the requirements for comparable uses either listed below or active elsewhere in the county.*
 - (a) *Residential:*

- i. *Single-family dwelling: Two spaces for each dwelling unit.*
- ii. *Accessory dwelling: One space for each dwelling unit.*
- iii. *Duplex, triplex, quadplex: One space for each dwelling unit.*
- iv. *Townhouse: One space for each dwelling unit.*
- v. *Cottage cluster: One space for each cottage.*
- vi. *Multifamily dwelling: One space for each dwelling unit.*
- (b) *Boarding, Lodging, or Rooming House: One space for each guest accommodation.*
- (c) *Motel, Hotel or Group Cottages: One space for every unit.*
- (d) *Hospital, Nursing Home or Similar Institution: One space for every three beds.*
- (e) *Church, Club, or Similar Place of Assembly: One space for every six seats, or one space for every 50 square feet of floor area used for assembly.*
- (f) *Library: One space for every 300 square feet of floor area.*
- (g) *Dance Hall or Skating Rink: One space for every 100 square feet of floor area.*
- (h) *Bowling Alley: Five spaces for each lane.*
- (i) *Eating and Drinking Establishment: One space for every 150 square feet of floor area.*
- (j) *Service or Repair Shop, Retail Store Handling Bulky Merchandise such as Automobiles and Furniture: One space for each 600 square feet of floor area.*
- (k) *Bank, Office: One space for each 500 square feet of floor area.*
- (l) *Retail Stores or Medical or Dental Clinic: One space for each 200 square feet of floor area.*
- (m) *Warehouse, Storage and Wholesale Business: One space for each 2,000 square feet of floor or storage area.*
- (n) *Manufacturing Establishment: One space for each 1,000 square feet of floor area.*

Response: The proposed development is classified as a “utility substation” and is not prescribed a specific parking calculation. As currently proposed, only one parking space will be constructed. The proposed building will not be accessible by the public or routinely occupied by employees. Parking will only be required for the occasional maintenance vehicle. Consequently, there is not a significant demand for more than one parking stall.

The single parking stall will be a paved 10-foot by 20-foot space. Therefore, to the extent applicable, these standards are met.

TCLUO 4.040 – General Provisions Regarding Accessory Uses

- (1) *An accessory use shall comply with all requirements for a principal use, except as this Ordinance specifically allows to the contrary, and shall comply with the following limitations:*
 - (a) *A guest house may be maintained as a dwelling, provided it contains no cooking facilities.*
 - (b) *An accessory structure that is separate from the main building may be located in the required rear and side yard, except in the required street side yard of a corner lot, provided that it is at no point located closer than three feet to a property line.*
 - (c) *Storage of recreation vehicles, boats, and utility trailers is permitted as an accessory use in any zone when stored in accordance with Section 5.040 4.040 (1) (b).*
- (2) *An accessory structure may be constructed on a lot or parcel that is neither the site of a primary residential use, nor contiguous with the site of the primary use, provided that the owner of the primary use secures approval for an accessory structure or use according to the provisions of Article 6.*

Response: No accessory uses are proposed to accompany this development. An accessory structure accompanying the primary structure and serving the same use. This structure will not be located within any required setback. Therefore, these standards are met.

TCLUO 4.060 – Access

Every lot and parcel shall abut a street other than an alley, an approved private way, or an approved private access easement, for at least 25 feet. Townhouses shall abut a street other than an alley, an approved private way, or an approved private access easement, for at least 20 feet, or the equivalent of the minimum lot width applicable in the zone, whichever is less.

Response: The subject property has 103 feet of frontage on Brooten Road, a public street. Therefore, this standard is met.

TCLUO 4.070 – Dual Use of Required Open Space

No lot area, yard, or off-street parking or loading area which is required by this Ordinance for one use shall be a required lot area, yard, or off-street parking or loading area for another use, unless otherwise specifically allowed by this Ordinance.

Response: The proposed development does not include the creation of open space. Therefore, this standard is not applicable to this project.

TCLUO 4.080 – Distance Between Buildings

A minimum distance of six feet shall be maintained between a building designed for dwelling purposes and any other freestanding buildings located on the same property.

Response: The proposed development does not include multiple free standing residential structures. Therefore, this standard is not applicable to the project.

TCLUO 4.100 – General Exception to Lot Size Requirements

- (1) *A lot or parcel, as recorded in the office of the County Clerk prior to the adoption of this Ordinance, which complies with the standards then in effect, but which does not now meet the dimensional lot standards of the zone in which the property is located, may nevertheless be occupied by a single-family dwelling if the lot or parcel meets all other applicable Ordinance requirements, including setbacks, provided that lots smaller than 3,000 square feet meet the following additional requirements.*
- (2) *A property survey of the lot shall be performed and all corners shall be monumented by a registered surveyor prior to submittal of a permit for construction/location and a copy of the survey shall be submitted with the application and other required material.*
- (3) *Prior to the County's issuance of any permits affecting the use of real property, an applicant owning a small lot shall combine all or part of an adjacent property with the small lot for any consideration of any applicable County permit or land use law. For purposes of this Section, the following definitions apply:*
 - (a) *"Applicant" means any legal person (or persons) who:*
 - i. *Owns a small lot in fee simple, and*
 - ii. *Also owns real property adjacent to the small lot.*
 - (b) *"Small lot" means any real property less than 3,000 square feet.*
 - (c) *This Section shall be interpreted liberally to carry its intent to require proposed buildable lots to meet as nearly as possible or exceed a particular zone's minimum lot size requirement based upon identical owners of adjacent real properties.*
- (4) *Not more than 50% of the lot area shall be covered with any structure of any height.*
- (5) *Front and rear setbacks in combination must be at least 30 feet, with each minimum of 10 feet.*
- (6) *No portion of a structure shall be located closer than six (6) feet to any structure on an adjacent lot.*
- (7) *The permitted living space as determined by the Building Official shall be no more than 50% of the square footage of the lot or 1,200 square feet, whichever is larger. Additionally, up to 600 square feet is permitted for an enclosed garage or storage area. This garage or storage area may be enlarged if there is an equivalent reduction in living space.*
- (8) *An approved Road Approach Permit must be obtained from the Tillamook County Public Works Department.*
- (9) *The proposed structure shall meet all other requirements of the County's Land Use Ordinances, including off-street parking; except where contradicted by other provisions of this Section.*
- (10) *A lot or parcel in a residential zone within the adopted unincorporated community boundaries of Barview/Twin Rocks/Watseco, Cloverdale, Hebo, Neahkahnie, Neskowin, Netarts, Oceanside or Pacific City/Woods, may be occupied by a single-family dwelling or duplex if the lot or parcel meets*

all other applicable Ordinance requirements, and demonstrates that the requirements of this section are met.

Response: This application does not require or propose any exceptions to the minimum lot size requirements. Therefore, these standards are not applicable to this project.

TCLUO 4.110 – Exceptions to Yard Setback Requirements

- (1) *Purpose: The purpose of the exceptions described in this Section is to provide a measure of ministerial relief from the requirements for yards in certain areas or zones when those requirements are unnecessarily restrictive.*
- (2) *Averaging front yards: The following exceptions to the front yard requirement for a single-family dwelling or duplex, mobile home or recreation vehicle are authorized for a lot or parcel in any zone. The required front yard for a dwelling need not exceed:*
 - (a) *The average depth of the front yards of all dwellings within 100 feet of both sides of the proposed dwelling; or*
 - (b) *The average of the depth of the front yard of the nearest dwelling within 100 feet on either side of the proposed dwelling, and the required front yard of the zone.*
- (3) *Side yards ten percent of lot width: The required width of a non-street side yard may be reduced to 10 percent of the width of the lot, but not to less than 3 feet, unless a Variance for a lesser distance is approved.*
- (4) *Hawk Creek Hills: Front yards in the Hawk Creek Hills and the First Addition to Hawk Creek Hills Subdivisions need not exceed 5 feet.*
- (5) *Small Lot Exceptions: In the RR, CSFR, RC, CC, CR-1, CR-2, CR-3, RMH and RMD zones and including those communities with adopted community growth boundaries, a front or rear yard, but not both, may be ten feet, provided the following apply to the subject parcel:*
 - (a) *The parcel is 7500 square feet or less in size.*
 - (b) *At least one side yard is ten feet or more wide.*
 - (c) *Required off-street parking is provided.*
 - (d) *The right-of-way width at the front of the lot is at least thirty feet. In the case of right-of-ways under 30 feet in width, a ten-foot yard may be approved if it is approved by the Public Works Department.*
 - (e) *The lot is not a corner lot. If the lot is a corner lot and meets the above criteria, the front yard may be 15 feet.*
- (7) *Projections from Buildings: Architectural features such as cornices, eaves, canopies, gutters, signs, chimneys, and flues shall not project more than 18 inches into a required yard unless evidence is presented to the Department that such projections increase the energy efficiency of the building,*

either by the capture of solar radiation or by providing shading for cooling, in which case they shall not project more than 24 inches into a required yard.

(8) *Decks, Porches, and Steps:*

(a) *Decks may be constructed within setback areas provided that the intruding portion:*

- i. *Of the floor does not exceed 30 inches in height above finished grade, and*
- ii. *Any fixed benches, railings or other attachments do not exceed 40 inches above finished grade, and*
- iii. *Maintains a minimum of half the required front yard setback, a minimum of 10 foot street side yard setback on a corner lot, and a minimum of 3 feet for rear yard and non street side yard setbacks.*

(b) *All other uncovered decks, porches, or steps shall not project more than 24 inches into a required yard.*

(c) *Decks which extend into the required setbacks shall not be enclosed, nor covered, without using the procedures set forth in Article 8. The existence of a deck within the required setbacks shall not be used as justification to extend a building into the required setbacks.*

(9) *Zero to Three foot Setback: Where a side or rear yard is not required, and a structure is not to be erected at the property line, it shall be set back at least three feet from the property line.*

(10) *Oceanfront Setbacks - See Section 3.530 3.085 (4) (a) (b).*

(11) *Water Quality Setbacks - See Section 4.080 4.140 (1) (2) and (3).*

(12) *Clear Vision: These provisions may not be interpreted to allow parking or structures.*

Response: The proposed development does not require or request an exception to any setback standards. Therefore, these standards are not applicable to this project.

TCLUO 4.120 – General Exceptions to Building Height Limitations

(1) *Projections such as chimneys, spires, elevator shaft housings, flagpoles, devices or structures for the capture of solar energy, towers for wind energy conversion systems and windmills, and other structures not used for human occupancy are not subject to the BUILDING HEIGHT LIMITATIONS of this Ordinance, unless such projection shades an existing solar energy system on an adjoining property to such an extent as to affect the efficiency of that system.*

(2) *In the airport overlay zone, no structure or tree shall exceed 150 feet in height.*

Response: The proposed development does not include any of the features exempt from building height limitations. Therefore, these standards are not applicable to this project.

TCLUO 4.130 – Development Requirements for Geologic Hazard Areas

(1) *Purpose*

The purpose of these Development Requirements for Geologic Hazard Areas is to protect people, lands and development in areas that have been identified as being subject to geologic hazards.

The provisions and requirements of this section are intended to provide for identification and assessment of risk from geologic hazards, and to establish standards that limit overall risk to the community from identified hazards to a level acceptable to the community. Development in identified hazard areas is subject to increased levels of risk, and these risks must be acknowledged and accepted by present and future property owners who proceed with development in these areas.

(2) *Applicability*

The following areas are considered potentially geologically hazardous and are therefore subject to the requirements of Section 4.130:

- (a) *All lands partially or completely within categories of “high” and “moderate” susceptibility to shallow landslides as mapped in Oregon Department of Geology and Mineral Industries (DOGAMI) Open File Report O-20-13, Landslide hazard and risk study of Tillamook County, Oregon;*
- (b) *All lands partially or completely within categories of “high” and “moderate” susceptibility to deep landslides as mapped in DOGAMI Open File Report O-20- 13, Landslide hazard and risk study of Tillamook County, Oregon;*
- (c) *All lands partially or completely within a “debris flow fan” as mapped in DOGAMI Open File Report O- 20-13, Landslide hazard and risk study of Tillamook County, Oregon;*
- (d) *All lands partially or completely within a rapidly moving landslide as mapped in DOGAMI IMS-22, GIS Overview Map of Potential Rapidly Moving Landslide Hazards in Western Oregon, 2002.*
- (e) *All lands along the oceanfront. An oceanfront lot is a lot or parcel that abuts the ocean shore state recreation area (as defined in OAR 736-021-0010) or a lot or parcel where there is no portion of a buildable lot between it and the ocean shore state recreation area. Lots or parcels that are fronted by roads, parks, beach accesses, or other minimal improvements are also considered oceanfront.*
- (f) *Lots or parcels where the average existing slopes are equal to or greater than 19 percent within or adjacent to hazard risk zones described in 4.130(2)(a) through (d) for any lot or parcel less than or equal to 20,000 square feet or lots or parcels where the average existing slopes are equal to or greater than 29 percent within or adjacent to hazard risk zones described in 4.130(2)(a) through (d) for any lot or parcel greater than 20,000 square feet.*
 1. *For the purpose of this section, slopes are determined by:*
 - *Lots or parcels less than 20,000 square feet where the average existing slopes are equal to or greater than 19% measured from the highest to lowest point of the property.*

- *The average existing slope of the building footprint or area to be disturbed measured from the highest to lowest point within the footprint or area to be disturbed is 29 percent or greater for properties 20,000 square feet or larger.*
- (g) *Any other documented geologic hazard area on file, at the time of inquiry, in the office of the Tillamook County Community Development Department. A “documented geologic hazard area” means an area of land that is shown by reasonable written evidence to contain geological characteristics or conditions which are hazardous or potentially hazardous for the improvement thereof.*

The publications referenced above are not intended to be used as a site-specific analysis tool. The County will use these publications to identify when a Geologic Hazard Assessment Review is needed on a property prior to development.

(3) *Geologic Hazard Assessment Review*

- (a) *Except for activities identified in Subsection 4.130(3)(b) as exempt, any new development or substantial improvement (as defined in Article 11) in an area subject to the provisions of this section shall require a Geologic Hazard Assessment Review.*
- (b) *The following development activities are exempt from the requirement for a Geologic Hazard Assessment Review:*
1. *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 Article 11.*
 2. *Exploratory excavations under the direction of a certified engineering geologist or registered geotechnical engineer;*
 3. *Construction of structures for which a building permit is not required;*
 4. *An excavation which is less than two feet in depth, or which involves less than twenty-five cubic yards of volume;*
 5. *Fill that is less than two feet in depth or that involves less than twenty-five cubic yards of volume;*
 6. *Yard area vegetation maintenance and other vegetation removal on slopes less than 20%;*
 7. *Removal of trees smaller than 8 inches dbh (diameter breast height);*
 8. *Removal of trees larger than 8 inches dbh (diameter breast height) provided the canopy area of the trees that are removed in any one-year period is less than 25% of the lot or parcel area;*
 9. *Forest operations subject to regulation under ORS 527 (the Oregon Forest Practices Act);*

10. *Maintenance and reconstruction of public and private roads, streets, parking lots, driveways, and utility lines, provided the work does not extend outside the existing right-of-way boundary;*
 11. *Maintenance and repair of utility lines, and the installation of individual utility service connections;*
 12. *Emergency response activities intended to reduce or eliminate an immediate danger to life, property, or flood or fire hazard; and*
 13. *Beachfront protective structures subject only to regulation by the Oregon Parks and Recreation Department under OAR Chapter 736, division 20.*
- (c) *Application, review, decisions, and appeals for a Geologic Hazard Assessment Review shall be a Type I procedure in accordance with Article 10. Applications for a Geologic Hazard Assessment Review may be made prior to or concurrently with any other type of application required for the proposed use or activity. Except for exempt activities listed under Section 4.130(3)(b), Geologic Hazard Assessment Review shall be completed prior to any ground disturbance.*
- (d) *All applications for Geologic Hazard Assessment Review shall be accompanied by a Geologic Hazard Report prepared by a qualified licensed geoprofessional (as defined in Article 11) that meets the content requirements of Section 4.130(4), at the applicant/property owner's expense.*
- (e) *For development activities that are subject both to this section and Section 3.530: Beach and Dune Overlay Zone, one complete Geologic Hazard Report can be submitted for meeting the requirements of this section and Section 3.530. The report shall include requirements for both sections as applicable.*
- (4) *Geologic Hazards Report Standards*
- (a) *For the purposes of Section 4.130, a Geologic Hazard Report refers to engineering geologic reports, geotechnical reports, and geotechnical engineering reports.*
- (b) *Geologic Hazard Reports required pursuant to this section shall be prepared consistent with standard geologic practices employing generally accepted scientific and engineering principles, and shall at a minimum contain the applicable provisions outlined in the Oregon State Board of Geologist Examiners publication "Guidelines for the Preparation of Engineering Geologic Reports," 2nd Edition, 5/30/2014 or other published best practice guidelines for engineering geologic or geotechnical engineering reports, consistent with current scientific and engineering principles. Reports shall reference the published guidelines upon which they are based.*
- (c) *For oceanfront property (lots or parcels abutting the ocean shore), Geologic Hazard Reports shall also address all the requirements of Section 3.530 (6)(f) to the extent applicable and based on best available information.*

- (d) *Geologic Hazard Reports required by this section shall include the following from the preparer(s) of the report:*
 - a. *A statement that all the applicable content requirements of subsection 4.130(4) have been addressed or are not applicable to the review. An explanation shall be accompanied with any requirement identified as not applicable;*
 - b. *A description of the qualifications of the professional(s) that prepared the report. If multiple licensed professionals contributed to the report, each professional shall individually sign and stamp their own work products; and*
 - c. *A statement by the preparer(s) that they have the appropriate qualifications to have completed the report and all its contents.*
- (e) *All Geologic Hazard Reports are valid for purposes of meeting the requirements of Section 4.130 for a period of five (5) years from the date of preparation. Such reports are valid only for the development plan addressed in the report. Tillamook County assumes no responsibility for the quality or accuracy of such reports. Within that five-year period, the Planning Director can require at their discretion an addendum by a qualified licensed geoprofessional certifying that site conditions have not changed from the original report. If site conditions have changed, a new Geologic Hazard Report shall be required.*

(5) *Decisions of Geological Assessment Reviews*

A decision on a Geologic Hazard Assessment Review shall be based on findings of compliance with the following standards:

- (a) *The Geologic Hazard Report shall meet the content standards set forth in Section 4.130(4).*
- (b) *In approving a Geologic Hazard 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 Tillamook County Land Use Ordinance.*
- (c) *The development plans for the application conform, or can be made to conform, with all the recommendations and specifications contained in the Geologic Hazard Report.*
- (d) *In the event the decision maker determines that additional review of the Geologic Hazard Report by a qualified licensed geoprofessional is necessary to determine compliance with this section, Tillamook 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 the decision of the Geologic Hazard Assessment Review.*

(6) *Development Standards for Uses Subject to Review*

In addition to the conditions, requirements and limitations imposed by a required Geologic Hazard Report, all uses subject to a Geologic Hazard Assessment Review shall conform to the following requirements:

- (a) *Hazard Disclosure Statement: All applications for new development or substantial improvements subject to Geologic Hazard Assessment Review shall provide a Hazard Disclosure Statement recorded with the Tillamook County Clerk's Office and signed by the property owner that acknowledges:*
 - 1. *The property is subject to potential natural hazards and that development thereon is subject to risk of damage from such hazards;*
 - 2. *The property owner has commissioned a Geologic Hazard Report for the subject property, a copy of which is on file with Tillamook County Department of Community Development, and that the property owner has reviewed the Geologic Hazard 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;*
 - 3. *The property owner accepts and assumes all risks of damage from natural hazards associated with the development of the subject property.*
 - 4. *The property owners shall refrain from interfering with mitigation measures or improvements on the site and shall maintain them.*
- (b) *Mitigation measures: Mitigation measures required to make the site suitable for the proposed development, including their design and construction specifications, shall be included in the Geologic Hazard Report and followed.*
- (c) *Safest site requirement: All new structures shall be limited to the recommendations contained in the Geologic Hazard Report; and*
 - 1. *Property owners should consider use of construction techniques that will render new buildings readily moveable in the event they need to be relocated; and*
 - 2. *Properties shall possess access of sufficient width and grade to permit new buildings to be relocated or dismantled and removed from the site.*
- (d) *Minimum Oceanfront Setbacks: For oceanfront lots or parcels, the building footprint of all new development or substantial improvement subject to a Geologic Hazard Assessment Review shall also comply with the requirements of Section 3.530(8) Oceanfront Setbacks.*
- (e) *Erosion Control Measures: All uses subject to a Geologic Hazard Assessment Review shall address the following erosion control measure requirements, designed by a qualified licensed geoprofessional:*
 - 1. *Stripping of vegetation, grading, or other soil disturbance shall be done in a manner which will minimize soil erosion, stabilize the soil as quickly as practicable, and expose the smallest practical area at any one-time during construction;*
 - 2. *Development plans shall minimize cut or fill operations so as to prevent off-site impacts;*

3. *Temporary vegetation and/or mulching shall be used to protect exposed critical areas during development;*
4. *Permanent plantings and any required structural erosion control and drainage measures shall be installed as soon as practical;*
5. *Provisions shall be made to effectively accommodate increased runoff caused by altered soil and surface conditions during and after development. The rate of surface water runoff shall be structurally retarded where necessary;*
6. *Provisions shall be made to prevent surface water from damaging the cut face of excavations or the sloping surface of fills by installation of temporary or permanent drainage across or above such areas, or by other suitable stabilization measures such as mulching, seeding, planting, or armoring with rolled erosion control products, stone, or other similar methods;*
7. *All drainage provisions shall be designed to adequately carry existing and potential surface runoff from the twenty-year frequency storm to suitable drainageways such as storm drains, natural watercourses, or drainage swales. In no case shall runoff be directed in such a way that it significantly decreases the stability of known landslides or areas identified as unstable slopes prone to earth movement, either by erosion or increase of groundwater pressure;*
8. *Where drainage swales are used to divert surface waters, they shall be vegetated or protected as necessary to prevent offsite erosion and sediment transport;*
9. *Erosion and sediment control devices shall be required where necessary to prevent polluting discharges from occurring. Control devices and measures which may be required include, but are not limited to:*
 - i. *Energy absorbing devices to reduce runoff water velocity;*
 - ii. *Sedimentation controls such as sediment or debris basins. Any trapped materials shall be removed to an approved disposal site on an approved schedule;*
 - iii. *Dispersal of water runoff from developed areas over large undisturbed areas.*
10. *Disposed spoil material or stockpiled topsoil shall be prevented from eroding into streams or drainageways by applying mulch or other protective covering; or by location at a sufficient distance from streams or drainageways; or by other sediment reduction measures; and*
11. *Such non-erosion pollution associated with construction such as pesticides, fertilizers, petrochemicals, solid wastes, construction chemicals, or wastewaters shall be prevented from leaving the construction site through proper handling, disposal, site monitoring and clean-up activities.*

- (f) *Certification of compliance: Permitted development shall comply with the recommendations in the required Geologic Hazard Report. Certification of compliance shall be provided as follows:*
 - a. *Plan Review Compliance: Building, construction or other development plans shall be accompanied by a written statement from a certified engineering geologist or licensed geotechnical engineer stating that the plans comply with the recommendations contained in the Geologic Hazard Report for the Geologic Hazard Assessment Review.*
 - b. *Inspection Compliance: Upon the completion of any development activity for which the Geologic Hazard Report recommends an inspection or observation by a certified engineering geologist or licensed geotechnical engineer, the certified engineering geologist or licensed geotechnical engineer shall provide a written statement indicating that the development activity has been completed in accordance with the applicable Geologic Hazard Report recommendations.*
 - c. *Final Compliance: No development requiring a Geologic Hazard Report shall receive final approval (e.g., certificate of occupancy, final inspection, etc.) until the department receives:*
 - i. *A written statement from a certified engineering geologist or licensed geotechnical engineer indicating that all performance, mitigation, and monitoring measures specified in the Geologic Hazard Report have been satisfied;*
 - ii. *If mitigation measures incorporate engineering solutions designed by a licensed professional engineer, a written statement of compliance by the design engineer;*
 - iii. *A written statement by the qualified licensed geoprofessional indicating that all erosion control measure requirements were met.*
- (g) *Restoration and replacement of existing structures:*
 - a. *Notwithstanding any other provisions of this ordinance, application of the provisions of this section to an existing use or structure shall not have the effect of rendering such use or structure nonconforming as defined in Article 7.*
 - b. *Replacement, repair or restoration of a lawfully established building or structure subject to this section that is damaged or destroyed by fire, other casualty or natural disaster shall be permitted, subject to all other applicable provisions of this ordinance, and subject to the following limitations:*
 - i. *Replacement authorized by this subsection is limited to a building or structure not larger than the damaged/destroyed building.*

- ii. *Structures replaced pursuant to this subsection along the oceanfront shall be located no further seaward than the damaged structure being replaced.*
- iii. *Replacement or restoration authorized by this subsection shall commence within one year of the occurrence of the fire or other casualty which necessitates such replacement or restoration.*
- c. *A building permit application for replacement, repair, or restoration of a structure under the provisions of this subsection shall be accompanied by a Geologic Hazard Report prepared by a qualified licensed geoprofessional that adheres to the Geologic Hazard Report Standards outlined in Section 4.130(4). All recommendations contained in the report shall be followed.*
- d. *A building permit application for replacement, repair, or restoration authorized by this subsection shall be processed and authorized as Type I review pursuant to Section 10.020.*

Response: The subject property does not contain an identified geological hazard area. Therefore, these standards are not applicable to this project.

TCLUO 4.140 – Requirements for Protection of Water Quality and Streambank Stabilization

(1) *The following areas of riparian vegetation are defined:*

- (a) *Fifty (50) feet from lakes and reservoirs of one acre or more, estuaries, and the main stems of the following rivers where the river channel is more than 15 feet in width; Nestucca, Little Nestucca, Three Rivers, Tillamook, Trask, Wilson, Kilchis, Miami, Nehalem and North and South Fork Nehalem River.*
- (b) *Twenty-five (25) feet from all other rivers and streams where the river or stream channel is greater than 15 feet in width.*
- (c) *Fifteen (15) feet from all perennial rivers and streams where the river or stream channel is 15 feet in width or less.*

For estuaries, all measurements are horizontal and perpendicular from the mean high water line or the line of non-aquatic vegetation, whichever is most landward. Setbacks for rivers, streams, and coastal lakes shall be measured horizontal and perpendicular from the ordinary high water line.

(2) *All development shall be located outside of areas listed in (1) above, unless:*

- (a) *For a bridge crossing; or*
- (b) *Direct water access is required in conjunction with a water dependent use; or*
- (c) *Because of natural features such as topography, a narrower riparian area protects equivalent habitat values; or*

- (d) *A minimal amount of riparian vegetation is present and dense development in the general vicinity significantly degrades riparian habitat values.*

Setbacks may be reduced under the provisions of (c) and (d) above only if the threat of erosion will not increase and a minimum 20 foot setback is maintained. Determinations of habitat values will be made by the Oregon Department of Fish and Wildlife.

- (3) *Exemptions from (2) above and from the applicable setback requirement for the front or rear yard that is opposite the riparian area may be granted without a variance for uses on:*

- (a) *Lots located in areas identified in the Comprehensive Plan's Goal 2 exception element as "built and committed" and which existed as of the date of adoption of this Ordinance, and single family residential "lots of record" as defined and used in Chapter 884 Oregon Laws 1981 as amended, with a depth measured according to (1) above that is;*

- i. *Less than 95 feet in places where the area of riparian vegetation is 50 feet wide; or*
- ii. *Less than 70 feet in places where the area of riparian vegetation is 25 feet wide.*

- (b) *Other lots in identified built and committed areas and other lots of record where the combination of setbacks required by this section result in a buildable lot depth of less than 45 feet.*

Exemptions from the riparian setback shall be the minimum necessary to accommodate the proposed use after the yard opposite the riparian area has been reduced to a width of no less than ten feet.

- (4) *All trees and at least 50 percent of the understory vegetation shall be retained within areas listed in (1) above, with the following exceptions:*

- (a) *Removal of trees that pose an erosion or safety hazard to existing uses allowed by the underlying zone.*
- (b) *The mowing, planting, or maintenance of existing lawn and pasture, including the control of noxious weeds.*
- (c) *Vegetation removal necessary in conjunction with an approved in-water project or to provide direct access for a water-dependent use.*
- (d) *Structural shoreland stabilization subject to the shoreline stabilization standards in Section 3.140.*
- (e) *Vegetation removal for new bridge construction or routine repair, operation, or maintenance of bridges and highways.*
- (f) *Vegetation removal necessary for maintenance of clear vision areas and the removal of roadside hazards.*

- (g) *Vegetation removal necessary for construction of a minor highway improvement within an existing right-of-way.*

Forest operations for which notification is required by ORS 527.670 (2) shall be governed by the Oregon Forest Practices Act.

Response: The subject property does not contain or abut any identified riparian corridors and is not adjacent to a waterway. Therefore, these standards are not applicable to the proposed project.

TCLUO 4.1450 – Demolitions or Alterations of Historic Structures

- (1) *Demolitions of historic structures identified in the Comprehensive Plan inventory of historic buildings:*
 - (a) *The Planning Department shall hold applications for demolition for 45 days before issuing the permit.*
 - (b) *During the 45 day period, the Planning Department shall take the following action: Notify the State Historic Preservation Office and the Pioneer Museum of the proposed demolition; advertise in a newspaper of general circulation the nature of the request and the historical values that would be lost; inform the applicant of the historic character of the building and the incentive associated with historic preservation.*
 - (c) *If after 45 days the Planning Department finds that there is no reasonable possibility for protecting the building, the demolition permit shall be issued.*
- (2) *Alterations of the following buildings identified in the Comprehensive Plan as having significant historic and architectural merit: Isom/Fox Cottage, Povey Cottage, Wentz Cottage, Doyle Cottage, Churchill Cottage, Tillamook Naval Air Station Blimp Hangars.*
 - (a) *Exterior alterations (except painting), additions, and construction of auxiliary buildings shall be reviewed by the Planning Department and the Curator of the Pioneer Museum.*
 - (b) *Alterations shall be approved if proposed exterior materials and details are consistent with the building's historical character and maintenance of the building's predominant architectural features.*

Response: The subject development does not include the demolition or alteration of an historic structure. Therefore, these standards are not applicable to this project.

TCLUO 4.160 – Protection of Archeological Sites

- (1) *The Planning Department shall review building permits and other land use actions that may affect known archaeological sites. If it is determined that the proposed action may affect the integrity of an archaeological site, the Planning Director shall consult with the State Historic Preservation Office on appropriate measures to preserve or protect the site and its contents. No permit shall be issued until either the State Historic Preservation Office determines that the proposed activity will not adversely affect the archaeological site, or the State Historic Preservation Office has developed a program for the preservation or excavation of the site.*

- (2) *Indian cairns, graves and other significant archaeological resources uncovered during construction or excavation shall be preserved intact until a plan for their excavation or reinterment has been developed by the State.*

Response: While the subject property does not contain any identified archeological sites, the applicant understands and acknowledges the responsibility of the Planning Director.

TCLUO 4.170 – Mixed Use Development (MUD)

- (1) *Purpose: The purpose of a mixed use development is to allow greater freedom, diversity and cohesiveness in the planning and integrated development of relatively large tracts of land for a range of uses which could not effectively be accommodated under the provisions of this Ordinance. The use of these provisions is dependent upon three conditions:*
- (a) *That a specific development proposal cannot effectively be reviewed under the provisions of the zone within which it is proposed;*
 - (b) *That the individual proposed uses are not incompatible with the established surrounding land uses; and*
 - (c) *That the proposal involves at least three different types of land use within a single site plan. For the purposes of a mixed use development review, a "type of land use" is one which differs in nature or character from other uses contained within a single development proposal.*
- (2) *Applicability: These provisions cannot be utilized without the submission of an acceptable plan, with satisfactory assurance that it can be carried out, and a preliminary determination by the Department that the three conditions listed in (1) above have been met. A MUD is considered a Conditional Use in the RR, CSFR, CR-1, CR-2, CR-3, RC, CC and RI and unincorporated community zones where permitted. However, in the RR zone, only parcels within a Community Growth Boundary will be considered for a MUD proposal. Additional RR zoned properties may be designated for a MUD through a Plan Amendment according to the provisions of Article 9 of this Ordinance. All permitted uses listed in the RR, CSFR, CR-1, CR-2, CR-3 and RC and unincorporated community zones are permitted in a MUD in any of these zones. All permitted uses in the CC and RI zones, as well as those in the RR, CSFR, CR-1, CR-2, CR-3 and RC and unincorporated community zones where permitted are permitted in a MUD in the CC and RI zones.*
- (3) *Standards: Standards pertaining to lot size, density, off-street parking, yards, building heights, or other aspects of development shall be governed by the standards of the underlying zone or zones in which the MUD is proposed. The requirements of all applicable overlay zones must be met by the proposed development. Where Variances from applicable standards are required, they shall be considered under the provisions of Article 8 at the time of Planning Commission review. Where applicable standards conflict, the more restrictive shall apply. Preliminary review of proposals involving the division of land shall take place, at the time of Planning Commission review, under the provisions of the Tillamook County Land Division Ordinance.*

All standards for use, as identified for RC, CC, RI, and CI shall apply where appropriate.

- (4) *Mixed Use Development Procedures and Criteria: The following procedures and criteria shall govern a request to review and approve a MUD proposal:*
- (a) *The applicant shall arrange a pre-application meeting with the Department so as to determine the standards, requirements, and procedures governing a MUD request, and to inform the Department of the nature of the proposed development.*
 - (b) *The applicant shall submit a complete preliminary development plan to the Department for review, along with six (6) copies of a report summarizing the proposal. The plan shall include the following information:*
 - i. *A map showing the entire parcel, the proposed land uses and building locations, and the vehicular and pedestrian circulation patterns. Such a map shall be of such detail to indicate that all applicable Ordinance standards and requirements can be met.*
 - ii. *A topographic map rendered in the same scale as the map in (1) above.*
 - iii. *Housing unit densities for areas of residential development.*
 - iv. *Proposed uses and ownership and maintenance arrangements for all areas to be left in open space, and the ownership status of all streets.*
 - v. *Proposed property lines upon the completion of the project.*
 - vi. *A preliminary grading and drainage plan.*
 - vii. *The method of water supply and sewage disposal.*
 - viii. *An outline of proposed deed restrictions, if any.*
 - ix. *A discussion of the economic justification for proposed land uses which are in conflict with the zoning on the parcel, and the relations of such uses to all other uses proposed within the MUD.*
 - x. *The proposed time frame for completion of the entire development.*
 - xi. *A Geologic Hazard report where required by the Land Use Ordinance.*
 - xii. *A map indicating flood hazard areas if required by this Ordinance.*
 - xiii. *Filing and review fees, which shall be established by order of the Board of County Commissioners, and which shall be non-refundable despite Planning Commission action. Such fees shall not be applied to any concurrent application.*
 - (c) *The Planning Department shall distribute the preliminary plan, for review and comment, to those agencies and departments which it deems necessary to determine the feasibility and adequacy of the plan. Such agencies and departments shall be given at least 21 days for review.*

- (d) *Following the preliminary review as described above, the Department shall notify the applicant of changes which have been suggested or would be required by the agencies and departments reviewing the plan.*
- (e) *After the Department's notification of what changes are considered necessary in order to meet the purposes of all applicable Ordinances and to protect the rights of property owners surrounding the proposed development, the developer shall submit, for Planning Commission review, a final proposal of the project. Planning Commission review will not take place until the complete plan is submitted.*
- (f) *The Commission shall apply the following criteria in the consideration of all MUD requests:*
 - i. *The proposed plan is internally cohesive and is consistent with Comprehensive Plan Policies for the vicinity.*
 - ii. *There are special development objectives that the project will satisfy which warrant review under these provisions.*
 - iii. *The parcel is suitable for the proposed use, considering its size, shape, location, topography, existence of improvements, and natural features.*
 - iv. *Proposed uses which are not otherwise permitted by the zoning on the parcel are accessory uses within the entire development.*
 - v. *The proposed use will not have a substantial impact upon adjacent uses, nor will it alter the character of the surrounding area in a manner which substantially limits, impairs, or prevents the use of surrounding properties for permitted uses listed in the underlying zone.*
 - vi. *The proposed use is timely, considering the adequacy of public facilities and services existing or planned for the area affected by the use.*
- (5) *In approving a MUD proposal, the Planning Commission may impose whatever conditions are necessary in order to ensure that the purposes of this Ordinance are met.*
- (6) *The approved site plan for a mixed use development cannot be substantially amended or altered unless approved by the Planning Commission under the provisions of Article 6 of this Ordinance. Determination of the substance of such changes or amendments shall be the responsibility of the Planning Director.*

Response: The proposed project is not classified as a mixed use development. Therefore, these standards are not applicable to this project.

TCLUO 4.180 – Home Occupation Performance Standards

- (1) *Purpose: To provide for occupational activities in residences or their accessory structure, as provided by ORS 215.448, while assuring compatibility with existing and permitted uses within the area affected by the home occupation.*

- (2) *Applicability: Home occupations are allowed outright or conditionally, depending upon the intensity of the use and the zone within which they are located. In the F-1, F and SFW-20 zones, a home occupation includes a "Foster Family Home" and a "Bed and Breakfast Enterprise".*
- (3) *Standards:*
- (a) *All home occupations shall meet the following standards or conditions in addition to other applicable ordinance requirements:*
- i. *The home occupation is operated by the resident of the property upon which the activity is located, within the residence or accessory structures.*
 - ii. *The home occupation will employ no more than five full- or part-time persons.*
 - iii. *The home occupation will not interfere with existing uses on nearby land or with other uses permitted in the zone in which the property is located.*
 - iv. *Where home occupations are allowed conditionally, conditions of approval shall limit retail sales, signs, traffic, noise, obnoxious odors, hazardous activities, and other identifiable adverse off-site impacts.*
 - v. *The existence of a home occupation shall not be used as justification for a zone change.*
- (b) *Home occupations permitted outright shall meet the following additional standards or requirements:*
- i. *Those employed in the home occupation must be members of the family residing on the premises.*
 - ii. *There shall be no activities that give the outward appearance or manifest the characteristics of a retail business, such as signs other than those permitted under Section 4.020, advertising of the dwelling as a business location, more than six customers daily entering the business premises, more than two customer vehicles at a time, noise that adversely affects neighbors, obnoxious odors, hazardous activities, or other adverse off- site impacts.*
 - iii. *Complaints from neighbors may be cause for requiring a Conditional Use review of the activity.*
- (4) *Review: The Director shall review all Conditional Use Permits approving home occupations every 12 months following the date of approval, and may allow the use to continue if the home occupation continues to comply with Ordinance requirements.*

Response: The proposed development does not include the creation of a home occupation. Therefore, these standards are not applicable to this project.

V. Article 6 – Conditional Use Procedures and Criteria

TCLUO 6.010 Purpose

The purpose of a conditional use is to provide for uses that are not allowed by right in a certain zone because of potentially adverse impacts on uses permitted by right in that zone. Such uses may be made or deemed compatible through the review process contained in this Article, which subjects the proposed conditional use activity to specific requirements, criteria, and conditions. The location and operation of any conditional use listed in this Ordinance shall only be permitted according to the provisions of this Article.

TCLUO 6.020 Procedure

The following procedure shall be observed in submitting and acting on a conditional use request:

- (1) A request may be initiated for a conditional use, or the modification of an approved conditional use, by filing an application with the Department. The Department may require any information necessary for a complete understanding of the proposed use and its relationship to surrounding properties.*
- (2) The Director shall act administratively according to the procedure set forth in Article 10, or shall refer the application to the Commission for a public hearing and decision. The application shall be referred to the Commission if the director determines that the proposed use would have significant impacts that extend beyond the abutting properties, and that those impacts are not likely to be adequately addressed by response to public notice required by Section 10.070. If the Director elects to refer the application to the Commission, it shall be heard at the next available Commission hearing, unless the applicant requests otherwise.*
- (3) No conditional use permit shall be invalidated because of failure to receive the notice provided for in Section 10.070.*

TCLUO 6.030 General Requirements

A conditional use shall be authorized, pursuant to the procedures set forth in Section 6.020, if the applicant adequately demonstrates that the proposed use satisfies all relevant requirements of this Ordinance, including the review criteria contained in Section 6.040 or the Health Hardship provisions contained in Section 6.050, and the following general requirements:

- (1) A conditional use shall be subject to the standards of the zone in which it is located, except as those standards have been modified in authorizing the conditional use. The size of a lot to be used for a public utility facility may be reduced below the minimum required, provided that it will have no adverse effect upon adjacent uses.*
- (2) A conditional use may be enlarged or altered pursuant to the following:*
 - (a) Major alterations of a conditional use, including changes to or deletion of any imposed conditions, shall be processed as a new conditional use application.*
 - (b) Minor alterations of a conditional use may be approved by the Director according to the procedures used for authorizing a building permit, if such alterations are requested prior to the issuance of a building permit for the conditional use. Minor alterations are those which may affect the siting and dimensions of structural and other improvements relating to the conditional use, and may include small changes in the use itself. Any change which*

would affect the basic type, character, arrangement, or intent of the approved conditional use shall be considered a major alteration.

(c) *The enlargement or alteration of a one-or two-family dwelling, mobile home, manufactured home, or recreational vehicle that is authorized as a CONDITIONAL USE under the provisions of this Ordinance shall not require further authorization, if all applicable standards and criteria are met.*

(3) *Where the approval of a conditional use request is contingent upon an amendment to this Ordinance, and an application for such amendment has been recommended for approval by the Commission, the conditional use request may be approved upon the condition that the Board approves the Ordinance Amendment.*

Response: The proposed development complies with the applicable standards of PCW-C1, and this application is not proposing any modifications or alterations of an existing approval.

TCLUO 6.040 Review Criteria

Any conditional use authorized according to this Article shall be subject to the following criteria, where applicable:

(1) *The use is listed as a conditional use in the underlying zone, or in an applicable overlying zone.*

Response: The proposed development is classified as a “utility substation,” which is considered a conditional use in the PCW-C1 zoning district. Therefore, this criterion is satisfied.

(2) *The use is consistent with the applicable goals and policies of the Comprehensive Plan.*

Response: The Tillamook County Land Use Ordinance functionally implements the goals and policies of the Comprehensive Plan; consequently, any proposal that satisfies the relevant standards and criteria of the land use ordinance is considered consistent with the goals and policies of the comprehensive plan. As demonstrated throughout this application narrative, the proposed development complies with the applicable standards and criteria of the land use ordinance. Therefore, the proposed development is considered consistent with the comprehensive plan, and this criterion is satisfied.

(3) *The parcel is suitable for the proposed use considering its size, shape, location, topography, existence of improvements and natural features.*

Response: The subject property is of an adequate size and shape for the proposed development because the structure can comply with all setbacks, be conveniently placed to reduce the amount of required earthwork, and all required supporting infrastructure (such as the driveway) can be conveniently located without impacts to adjacent properties. There is also very little variation in elevation near the southwest corner that will allow for construction of the proposed structure while minimizing earthwork to 0.04 cubic yards of cut. The proposed development does not rely heavily on nearby public improvements. Lastly, there are no significant natural features on the property that need to be preserved. Therefore, this criterion is satisfied.

- (4) *The proposed use will not alter the character of the surrounding area in a manner which substantially limits, impairs or prevents the use of surrounding properties for the permitted uses listed in the underlying zone.*

Response: As a conditional use, the proposed development is deemed potentially compatible with other approved uses in the PCW-C1 zoning district. Properties north and south are also zoned PCW-C1, properties west are zoned PCW-C2 (a similar district), and properties east are zoned PCW-R3 (a zone that shares uses with the PCW-C1 district). All surrounding properties have already been developed in accordance with those zones; consequently, construction of this project will not alter the character of the surrounding area.

Also, because the proposed development will not generate significant amounts of traffic or significantly impact water and sanitary sewer systems, it will not impair or prevent the surrounding uses from continuing to operate. Therefore, this criterion is satisfied.

- (5) *The proposed use will not have detrimental effect on existing solar energy systems, wind energy conversion systems or wind mills.*

Response: The proposed development is not located near any existing solar energy systems, wind energy conversion systems, or wind mills. Therefore, this criterion does not apply to this project.

- (6) *The proposed use is timely, considering the adequacy of public facilities and services existing or planned for the area affected by the use.*

Response: The proposed development does require connections to public facilities such as water or sanitary sewer. The project will have frontage on and access to Brooten Road; however, this development will not generate meaningful traffic, so there will be no impact on nearby transportation facilities. Therefore, this criterion is satisfied.

TCLUO 6.050 *Health Hardship Provisions*

A conditional use for a health hardship may be authorized according to the procedure set forth in Section 6.020, provided that the use is of a temporary nature. Approval of the health hardship permits the placement of a mobile home, manufactured home or recreational vehicle, subject to the following conditions in addition to the requirements of Section 5.010:

- (1) *The applicant can demonstrate that approval of the request would allow for the care of a seriously ill person in a manner that could not be achieved by any reasonable existing alternative.*
- (2) *The applicant has a medical doctor's written confirmation of a health hardship.*
- (3) *The approval is for a length of time not to exceed 24 months, or the duration of the health hardship, whichever is less. The Director may extend an approval for additional 24 month periods if a written request for renewal is submitted by the applicant before expiration, and written reconfirmation of the health hardship is provided by a medical doctor.*

Response: The proposed development does not include the creation of a health hardship dwelling. Therefore, these standards are not applicable to this project.

TCLUO 6.060 *Wetlands Restoration, Enhancement or Creation on Land Subject to Exclusive Farm Use Zoning Designation*

- (1) *Notwithstanding 6.040 or ORS 215.296(10), a conditional use for a wetland restoration, enhancement or creation located on land zoned Farm (F-1) and authorized according to this Article shall only be subject to the following criteria:*
- a. *The use will not force a significant change in accepted farm or forest practices on surrounding lands devoted to farm or forest use; and*
 - b. *The use will not significantly increase the cost of accepted farm or forest practices on surrounding lands devoted to farm or forest use.*
- (2) *Notwithstanding 10.070, 10.080 or ORS 215.416, prior to the approval or denial of a permit the Applicant may voluntarily waive his or her right to a final decision within the 150-day timeframe and enter into a Project-Specific Collaborative Process by providing written notice to the County.*
- a. *The following parties may enter into a Project-Specific Collaborative Process for settling disputes concerning the application:*
 - i. *The applicant;*
 - ii. *Any person whose use of the person's property may be adversely affected by the proposed use;*
 - iii. *Any person who is entitled to notice under ORS 215.416 (11)(c);*
 - iv. *Representatives of any state or federal agency that is involved in the project for which the application for the use was submitted or that has expertise related to issues raised by the application or by comments received by the governing body; and*
 - v. *For the purpose of assisting in the project-specific collaborative process, any person with technical expertise in:*
 - a. *Creating, restoring or enhancing wetlands in Tillamook County;*
 - b. *Creating, restoring or enhancing wetlands in areas with site characteristics similar to those identified in the application for the use; or*
 - c. *The impacts of wetlands on agricultural operations.*
 - b. *If Applicant has given notice of election of the Project-Specific Process, the timeline for the governing body to take final action on the application shall be extended up to 90 additional days.*
 - c. *At any time during the Project-Specific Collaborative Process the applicant may request that the Project-Specific Collaborative Process be discontinued and the governing body resume processing the permit application under the procedures required by TCLUO Article 10.*

- d. *On receiving a request by the Applicant to enter into a Project-Specific Collaborative Process:*
 - i. *Applicant shall mail notice conforming to the requirements of Article 10 Section 10.070 to all persons entitled to notice under ORS 215.416 (11)(c) within 3 days of requesting to enter into a Project-Specific Process. Applicant will provide the County with an Affidavit of Mailing.*
 - ii. *Persons or entities wishing to become a party to the Project-Specific Collaborative Process must notify the County in writing within 10 days of the notice of request to enter into the Project-Specific Collaborative Process.*
 1. *The Director will assign a Mediator with the following minimum qualifications to the case:*
 - *Qualifications and Minimum Training (30 hour Basic Mediation Training) as prescribed in Oregon Administrative Rules 137-005-0040. 100 hours during most recent 24 months performing case development or mediation activities.*
 - *Attended at least one continuing education workshop in each of the past two years. Assisting with Basic Mediation Training or other advanced mediation trainings can be substituted for the continuing education requirements.*
 - *16 hours of advanced training in Land Use issues and facilitation skill building.*
 2. *A meeting with all parties, County Community Development Planning Staff and a mediator will take place within 21 business days of the notice of request to enter into the Project Specific Collaborative Process.*
 3. *The mediator will record comments, questions, concerns and areas of agreement. Mediated settlements will be recorded and signed by the parties. The mediator will generate a meeting summary, including written agreements that were reached between the parties. Copies of the meeting summary and written agreement will be distributed to all of the parties to the mediation.*

Response: The subject property is not zoned Exclusive Farm Use, and the proposed development does not include the wetlands restoration, enhancement or creation. Therefore, these standards are not applicable to this project.

TCLUO 6.070 *Conditions of Approval*

In approving a conditional use or a modification of a conditional use, any conditions which are considered necessary to protect the area surrounding the proposed use, and to preserve the basic purpose and intent of the underlying zone, may be imposed. These may include, but are not limited to, the following:

- (1) *Increasing the required parcel area or yard dimensions.*
- (2) *Limiting the height, size, or location of buildings and structures.*
- (3) *Modifying the location and number of required off-street parking and loading spaces.*
- (4) *Controlling the location and number of vehicle access points.*
- (5) *Limiting the number, size and location of signs.*
- (6) *Requiring diking, fencing, screening, landscaping, or other measures to protect adjacent or nearby properties from the effects of the use.*
- (7) *Prescribing a time limit within which to fulfill any established conditions.*

Response: The applicant understands and acknowledges that conditions of approval may be imposed to ensure compliance with the relevant standards and criteria.

TCLUO 6.080 *Compliance with Conditions*

Adherence to the approved plot plan and compliance with the conditions imposed in approving a conditional use request shall be required. Any departure from the conditions of approval or approved plans constitutes a violation of this Ordinance.

Response: The applicant understands and acknowledges that compliance with the conditions of approval is required.

TCLUO 6.090 *Time Limit*

All conditional uses except those approved for a health hardship may be approved for a 24-month period. If construction has not begun on the approved development, such approvals may be extended beyond 24 months only if the Director determines that a review would be unlikely to reveal new information which could lead to different conclusions than those reflected in the original staff report. For the purposes of such a determination, the Director may rely on such things as:

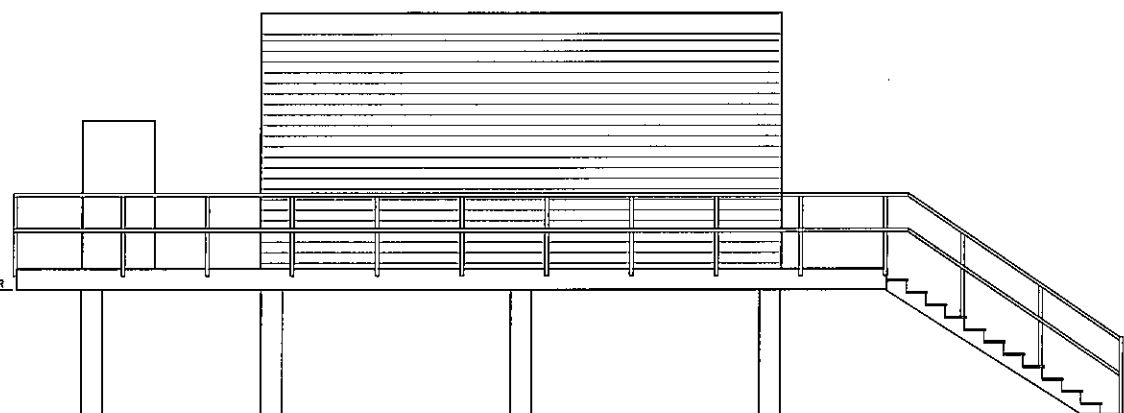
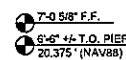
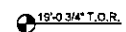
- (1) *Changes in Ordinance requirements or the requirements of State law;*
- (2) *The extent and character of new development in the vicinity of the request;*
- (3) *The adequacy of the review upon which the original was based;*
- (4) *Any other circumstances which could change the substance of the original staff report.*

If the Director determines that a new review is warranted, then the applicant shall provide all information and fees required by this Article.

Response: The applicant understands and acknowledges the standards of this section.

IV. Conclusion

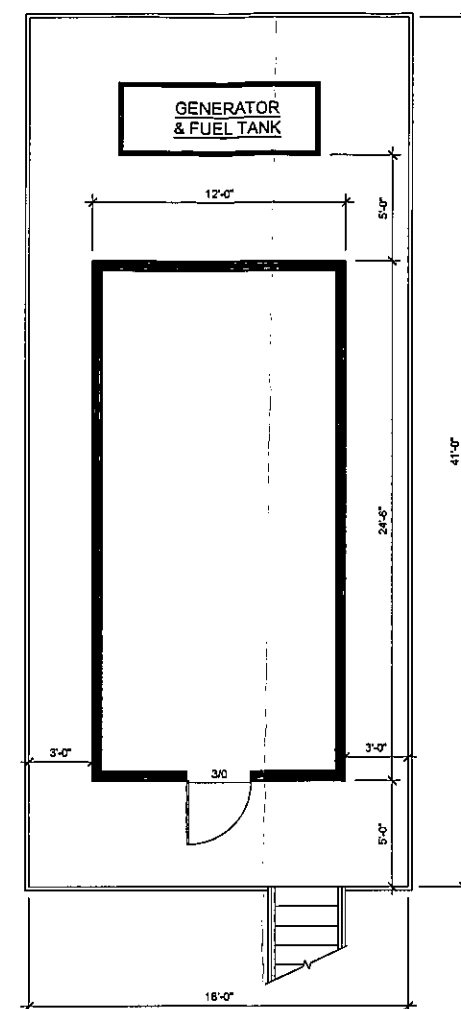
This application narrative and accompanying plan set demonstrate that all applicable provisions of the Tillamook County Land Use Ordinance are satisfied.



1 RIGHT ELEVATION
D1.0 1/4" = 1'-0"

2 FRONT ELEVATION
D1.0 1/4" = 1'-0"

4 REAR ELEVATION
D1.0 1/4" = 1'-0"



5 FLOOR PLAN
D1.0 1/4" = 1'-0"

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34955 BROOTEN RD. - PACIFIC CITY

FOR:

FOR:

DATE: 04/23/26

JQB NO: 2753-002

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503.530.8076

August 14, 2025
Project No. 25-3406

Nydeen Jordan
Annie Reyer
BLUECORE Power
3028 SE 59th Court, Suite 600
Hillsboro, Oregon 97123

Nydeen.Jordan@bluecorepower.com
510-908-0451

Annie.Reyer@bluecorepower.com
406-839-3630

**Subject: Geotechnical Engineering and Slope Stability Report
 Zipty Fiber Telcom Shelter Building
 Property North of 34955 Brooten Road (Parcel 4S1030BA04600)
 Pacific City, Oregon**

This report presents the results of a geotechnical engineering study conducted by Hardman Geotechnical Services Inc. (HGS) for proposed shelter building on the vacant parcel (4S1030BA04600) north of 34955 Brooten Road in Pacific City, Oregon, see attached Figure 1. The purpose of this study was to evaluate subsurface conditions at the site and to provide geotechnical recommendations for site development. This geotechnical study was performed in accordance with HGS Proposal No. 25-530, dated July 29, 2025, and your subsequent authorization of our proposal and *General Conditions for Geotechnical Services*.

SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The total development area is comprised of a single rectangular tax lot, totaling approximately 0.15 acres located just north of 34955 Brooten Road, Pacific City, Oregon. The topography on-site is relatively flat in the southern portions of the property. A slope trends moderately upward to the northeast and slopes offsite to the north and east. Grades are steepest immediately east of the property trending upward at roughly 1.5 horizontals to 1 vertical (1.5H:1V) as determined by bare earth light detection and ranging (LIDAR) topographic mapping. The site is otherwise flat to gently sloping downward to the west with an overall elevation change across the lot of less than 5 feet. Vegetation consists of grass, bark dust, and weeds around the existing structure and paved driveway.

Plans are preliminary and have been defined herein based on correspondence with the client and documentation provided by Cushing Terrell dated July 28, 2025. The planned development consists of a single-story new telecom shelter and a nearby generator pad. The shelter will be built with conventional wood framing, plywood, and relatively light finishes with expected perimeter loads of less than 500 pound per linear foot. Other appurtenances such as hardscape, landscape, underground utilities, and pavements are proposed as part of the development as well.

REGIONAL GEOLOGY AND SEISMIC SETTING

The subject site lies within the Oregon Coast Range geologic province, an area that has been uplifted due to the nearby subduction zone. Pacific City lies within the Nestucca River and Pacific Ocean depositional area; therefore, it is covered in fluvial and alluvial fine-grained sediments. This province has a basement of oceanic and volcanic islands, that is overlain by massive beds of Oligocene and Miocene sedimentary rocks, which is overlain by alluvial and fluvial sands and silts. The area has outcrops of bedrock along with coastal plains that can contain over 150 feet of fine-grained sediments. Multiple sand spits and sand dunes are found throughout the province. These areas can contain abundant shallow fresh water.

The subject site is underlain by Quaternary age (last 1.6 million years) fluvial and alluvial deposits, a windblown or water deposited silty sand to sand deposit that mantles older sedimentary and basalt deposits. The fluvial and alluvial deposits generally consist of varying thickness of medium- to fine-grained sands and silts. Underlying those are the sedimentary and basaltic oceanic island accreted terranes.

The region contains at least one major seismic source zone capable of generating damaging earthquakes – the Cascadia Subduction Zone. In addition, several shallow crustal faults may contribute to regional seismicity. These potential earthquake sources are included in the determination of seismic design values for structures, as presented in the *Seismic Design* section.

FIELD EXPLORATION

Exploratory Test Pit Excavations

The site-specific exploration for this study was conducted on August 5, 2025, and consisted of four test pits (designated TP-1 through TP-4), excavate to a maximum depth of 11 feet below ground surface (bgs), measured from the flat ground surface and not hillsides. Figure 2 shows the approximate locations of the excavations. It should be noted that exploration locations were determined in the field by pacing or taping distances from apparent property corners and other site features shown on the plans provided. As such, the locations of the explorations should be considered approximate.

All explorations were conducted under the full-time observation of HGSI personnel. Soil samples obtained from the explorations were classified in the field and representative portions were placed in relatively air-tight plastic bags. These soil samples were then returned to the HGSI laboratory for further examination. Pertinent information including soil sample depths, stratigraphy, soil engineering characteristics, and groundwater occurrence was recorded on the boring logs. Soils were classified in general accordance with the Unified Soil Classification System (USCS).

Summary exploration logs are attached to this report. The stratigraphic contacts shown on the individual logs represent the approximate boundaries between soil types. The actual transitions may be more gradual. The soil and groundwater conditions depicted are only for the specific dates and locations reported, and therefore, are not necessarily representative of other locations and times.

LABORATORY TESTING

Soil Classification

Several samples collected during boring exploration were returned to the HGSI laboratory for testing to classify soils in accordance with the Unified Soil Classification System (USCS). To this end, some samples collected underwent a combination of grain size analysis by mechanical gradation analysis and Moisture Content testing (Table 1). These tests were performed in accordance with ASTM D6913/D6913M and ASTM D2216. Moisture content determinations were made for various samples, measured as the weight of

water divided by the weight of dry soil, expressed as a percentage. The information collected during the laboratory testing was used to classify the soils as shown in the attached boring logs and lab data sheets.

Table 1. Grain Size Test and Moisture Content Results

Sample ID	Sample Depth (ft)	Moisture Content (%)	% Gravel		% Sand (Coarse)			% Fines		USCS Soil Classification
			Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
1-2	5	1.6	0	0	0	0	99.3	0.7		Poorly Graded Sand (SP)
2-1	3.5	9.1	9.4	0.7	20.5	40.9	27.7	0.8		Poorly Graded Sand (SP)
2-2	6.5	21	0	0	22.8	45.5	30.8	0.9		Poorly Graded Sand (SP)
3-3	10.5	16.3	0	0	0	0	75.5	24.5		Silty Sand (SM)
4-1	3	3.6	-	-	-	-	-	-		*Poorly Graded Sand (SP)
4-3	9	23.3	0	0	0	.1	99.8	0.1		Poorly Graded Sand (SP)

*Classifications are based on qualitative assessment and stratigraphy

Resistivity and Water-Soluble Sulfate Testing

Two soil samples were delivered to Specialty Analytical in Clackamas, Oregon for testing. The report provided by Specialty Analytical is attached in Appendix B.

Soil resistivity testing was performed on a sample collected from TP-4 at a depth of 3 feet using the Wenner four-pin method as given by ASTM G57-06. Results indicated a resistivity of 84000 ohm-cm. This result indicates that near surface soils are highly resistive and have poor grounding potential for electrical grounding systems. This also indicates that soils have very low corrosivity potential.

Water-soluble sulfate testing was performed on a sample collected from TP-2 at a depth of 3.5 feet in general accordance with ASTM C1580-20. Results indicate that the sample contained 0.726 mg/Kg (0.000072 %) of water-soluble sulfates. This is a negligible amount of sulfates according to the American Concrete Association (ACI) 318-19 Sulfate Exposure Class and falls under classification "S0-Negligible". For reference, "S1-Moderate" exposure class has a minimum threshold of 1000 mg/Kg (0.1 %). Based on this testing, we do not anticipate corrosion to govern concrete design parameters.

SUBSURFACE CONDITIONS

The following discussion is a summary of subsurface conditions encountered in our explorations. For more detailed information regarding subsurface conditions at specific exploration locations, refer to the attached exploration logs. Also, please note that subsurface conditions can vary between exploration locations, as discussed in the *Uncertainty and Limitations* section below.

Soil

Near surface soils consisted primarily of topsoil, isolated undocumented fill, native fluvial/alluvial deposits, and possible weathered bedrock.

Topsoil – At the surface of all test pits, materials consisted of a loose, dry, dark gray, medium-grained, organic sand. This layer was 6-8 inches thick in TP-2, TP-3, and TP-4. It was 18 inches thick in TP-1. This layer was full of roots, decaying organic debris, and covered in vegetation.

Undocumented Fill – This layer was only found in TP-2 and consisted of stiff, rounded gravels in a silty, sandy matrix and was approximately 10 inches thick.

Alluvial/Fluvial Deposits – (Native Formation) – Underlying the topsoil and undocumented fill, the soils encountered consisted of fine-grained, slightly micaceous sand ranging from fine to medium grained. This layer exhibited increasing moisture content with depth and multiple color variations, including; brown, gray, dark brown, reddish brown, yellowish brown, dark grayish brown, and black. Black sand lenses were intermingled at depth in all test pits. In TP-2, sporadic gravels were observed within the black sand between approximately 3 and 6 feet bgs. In TP-3 and TP-4, the sand became noticeably denser at around 10 feet bgs, and scraping sounds were detected at approximately 11 feet, suggesting the presence of rock. However, due to significant caving of the sands, the rock was not visually confirmed. All four test pits were terminated within this layer due to significant caving: TP-1 and TP-2 at 9 feet bgs, and TP-3 and TP-4 at 11 feet bgs.

Groundwater

Groundwater was encountered in four of the test pits; TP-1 and TP-2 at 8 feet bgs, and TP-3 and TP-4 at 11 feet bgs. There is limited information about the depth of groundwater in the area, according to the Engineering Hazard Map of the Hebo Quadrangle (Schlicker, et.al., 1972), depth to the seasonal high groundwater is mapped at approximately 6 feet. Groundwater levels are subject to significant fluctuation and may vary depending on the season, elevation, local subsurface conditions, changes in site utilization, and other factors. The project team should expect static groundwater at or near 6 feet bgs. Implications of this are described in the conclusions and recommendations section of this report.

POTENTIAL GEOLOGICAL AND GEOTECHNICAL HAZARDS

The Pacific Northwest and especially the Oregon Coast are geologically and geotechnically active zones with many potential hazards. We have provided commentary herein on the most common hazards encountered in the area, and the potential that each may or may not have for the proposed development. Unless otherwise indicated, this commentary is based on qualitative assessment. This should not be construed as a robust analysis of any of the hazards mentioned herein.

The Oregon Department of Geology and Mineral Industry (DOGAMI) has provided a statewide geohazards viewer (HazVu) which provides some insight as to potential hazards that may exist in a given area. HazVu has been reviewed as part of this commentary and relevant maps included in the attachments.

Earthquake and Liquefaction

The Cascadia Subduction Zone, along with other local shallow crustal faults, may be prone to rupture. A megathrust or other rupture could produce significant seismic accelerations – a known hazard already accounted for in building codes. ASCE 7-16 parameters provided herein should be considered during the design and construction of the proposed development. HazVu has mapped the project area as expecting “Severe” shaking in the event of a Cascadia earthquake.

Liquefaction is a phenomenon associated with seismic accelerations wherein loose saturated sands or low plastic silts lose nearly all shear strength during and immediately after shaking. This short-term loss in strength can potentially lead to large differential settlements of structures bearing on those soils.

HazVu has liquefaction susceptibility on the site mapped as “Moderate”. We do not believe that soils encountered on site is liquefiable, as soils below the water table are generally very dense, or lithified.

Expansion, Consolidation, or Compression of Bearing Soils

Expansion, consolidation, or compression is a change in volume of the soil. Any change in volume can lead to settlement induced distress of structures, roadways, etc.

Expansion occurs in a specific mineralogy of clay. This mineralogy causes the clays to be highly plastic and elastic, and the volume can increase and decrease with the moisture content of the material. These materials were not encountered in our explorations. Therefore, we do not anticipate on-site soils to be expansive.

Consolidation occurs when loaded clay loses moisture over a long period of time. As the moisture is expelled from the pores between the grains, the soil segment compresses and decreases in volume. This consolidation occurs over a long period of time and is a consideration when provided foundation parameters and recommendations as provided herein. Compressible soils similarly decrease in volume under an applied load, however this reduction in volume is due to the lack of compaction or consolidation of the soil segment. Topsoil or undocumented fill may be highly compressible.

Landslide and Global Stability

Landslides are a known hazard on-sites where steep slopes typically in excess of 2 horizontal to 1 vertical (2H:1V or 50%) are present on a given site. This site itself is relatively flat, but it is abutting a slope that is greater than 50%, therefore, stability of the adjacent slope could be a concern for this project. HGSI has performed global stability analysis and recommendations as provided herein.

Mobile Dune Hazard

Some areas along the coast are mapped as mobile dune hazard areas, and in these areas a special dune hazard study must be performed. This site is well outside of the Tillamook County Dune Hazard Zone.

Tsunami and Flood Hazard

Tsunamis can occur when offshore seismic events occur displacing columns of water and translating the water onto the landmass. This site is mapped as within the tsunami evacuation zone, and the site is prone to tsunami inundation, however it is not anymore prone than other developments along the Oregon Coast.

SLOPE STABILITY ANALYSIS

Due to the presence of the existing steep slope immediately east of the proposed development location, slope stability was performed on the "critical cross section" defined approximately as A-A' in Figure 2. This critical cross section is the location at which the geometry of the slope is the most likely to fail in the event of mobilization. LIDAR data provided by DOGAMI shows that the total change in elevation from A to A' is approximately 30 feet vertically over a horizontal distance of 45 feet which gives a slope ratio of approximately 1.5H:1V. The slope is surcharged by the residential structure on top of the slope.

HGSI performed slope stability calculations using the SLIDE2 computer program by RocScience of Toronto, Ontario, Canada. The slope stability analyses were performed for numerous circular surfaces through the using a search routine to identify the most critical potential failure surfaces. Factors of safety were calculated using the Spencer method of slices as well as other methods. Thousands of potential failure surfaces were analyzed for the static and seismic cases each, with the search limits as identified on the attached SLIDE2 output plots. The most critical potential slip surface for each case is shown. In addition, we have included a plot that shows all of the potential failure surfaces analyzed to visually indicate the robust nature of the search routine used. Strength parameters, slope geometry, and other conditions modeled in each case are indicated on the output figures.

Subsurface conditions and shear strength parameters used in design were selected based on results of the subsurface exploration and our experience with similar soil and geologic conditions. Slope stability analyses were conducted under static and seismic conditions. The slope geometry and other conditions modeled in the analyses are shown on the attached figures.

Table 2 summarizes soil/rock strength parameters used in the analysis. Groundwater levels were incorporated in the slope stability model consistent with perched groundwater conditions encountered in the test pits.

Table 2. Summary of Assumed Soil Strength Parameters

Geologic Unit	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)
Medium Dense Poorly Graded Sand	105	0	35
Very Dense Poorly Graded Sand	110	0	40
Weathered Bedrock	120	1500	20

Results of the global stability analysis are attached. Factors of safety are determined by taking the ratio of resisting forces against the sum of mobilizing forces. For instance, a factor of safety of 1 indicates that the slope has equal mobilizing and resisting forces and is on the verge of mobilization. Typically, safety factors of 1.5 for static and 1.1 for seismic are considered suitably stable. Limiting factors of safety for static and seismic cases are summarized in Table 3 below:

Table 3. Summary of Slope Stability Analysis Results

Method Name	Static/Seismic	Limiting Factor of Safety
Bishop Simplified	Static	1.11
	Seismic	0.57
Janbu Simplified	Static	1.08
	Seismic	0.55
Spencer Method	Static	1.11
	Seismic	0.58
GLE / Morgenstern - Price	Static	1.10
	Seismic	0.58

As shown, the factors of safety calculated based on the model and assumptions made herein indicate that while the slope has sufficient support to maintain static condition, changes in condition may demobilize the area. Additionally, if seismic accelerations are applied to the hillside, the slope should be expected to mobilize. While this analysis shows that the slope may be prone to mobilization, assessment of the slope in the field did not show signs of imminent failure. In addition, this analysis was based on assumptions which were conservative in nature.

The primary risk to the development would be the mobilized landslide debris impacting the development downhill of the landslide failure. The simplest way to reduce the risk to the proposed development is to provide adequate setback between the toe of the existing slope, and any critical structures. This and other options are discussed in the "global stabilization" section below.

CONCLUSIONS AND RECOMMENDATIONS

Results of this study indicate that the proposed development is geotechnically feasible, provided that the recommendations of this report are incorporated into the design and construction phases of the project. Recommendations are presented below regarding: global stabilization, site preparation and unsuitable soil removal, engineered fill, wet weather earthwork, spread footing foundations, deep foundation recommendations, below-grade structural retaining walls, concrete slabs-on-grade, perimeter footing drains, seismic design, excavating conditions and utility trench backfill, frost considerations, and erosion control considerations.

In all applicable cases, the analysis and recommendations provided herein are in compliance with or exceed specifications given by the 2022 Oregon Structural Specialty Code (OSSC). This code is based on the 2021 International Building Code (IBC) as the Oregon Building Codes Division (BCD) has not yet adopted IBC 2024 into the OSSC. Where the code does not directly apply, HGSI has followed proven industry standards of practice in providing these conclusions and recommendations.

Global Stabilization Options

As indicated above, there is some risk to the proposed development of the uphill slope east of the project. While the slope is currently stable, and shows no signs of imminent failure, modeling and calculations do not provide the industry standard factor of safety of 1.5 for the static condition and 1.1 for the seismic condition. As such, the client should consider possible mobilization of the slope existing offsite.

The simplest method to reduce risk would be to construct critical structures or permanently occupied spaces as far away from the toe of the slope as possible and put less critical elements of the development such as landscaping, stormwater facilities, etc. closer to the slope. If this is not possible or preferred there are methods for increasing the factor of safety of the slope itself to reduce the risk to the proposed development. Some of these options would be: regrade the existing slope to a 2H:1V, create a buttress of gravel or other strong material at the toe of the slope, construct a soldier pile wall, or other retaining structure, etc. HGSI can provide further input and design of these options at the request of the project team.

Care should be taken to avoid any action that may destabilize the slope such as: remove vegetation from the slope face, cut away the toe of the existing slope, surcharge the existing slope from above, etc.

Site Preparation and Unsuitable Soil Removal

The development area of the site to be graded should first be cleared of vegetation and any loose debris, and debris from clearing should be removed from the site. Once cleared, the topsoil layer should be removed beneath any structural areas of the project or areas which are to receive engineered fill. We anticipate the organic topsoil layer to be roughly 6 inches across the majority of the site. This topsoil should be stockpiled separately or hauled offsite, and should not be used in structural areas of the proposed development. It may be suitable for use as backfill around non-retaining foundation walls, landscaping, or other non-structural elements of the project.

Undocumented fill material was only encountered in TP-2 to an estimated depth of 16 inches bgs. It is possible for undocumented fill or other variable soil conditions to be present beyond the discrete points and depths of exploration. If undocumented fill is encountered during the construction phase of the operation, HGSI should be contacted to provide recommendations. Typical practice is to remove all undocumented fill material from the construction area prior to proceeding with the development.

If engineered fill using fine grained soils is required to establish the desired grades on-site, the exposed subgrade soils should first be ripped or tilled to a depth of approximately 12 inches, moisture treated, and then recompacted in-place prior to the installation of material as recommended in the *Engineered Fill* section

which follows. Engineered fill should be placed to reestablish desired grades on-site as prescribed herein. Imported material will need to be approved by HGSI prior to production of the fill operation. Tilling, moisture conditioning, and recompacting is not necessary prior to the installation of concrete foundations, or placement of aggregate fills such as crushed rock. In each instance, it is preferable that the subgrade soils remain as undisturbed as possible.

Once undocumented fill, and topsoils have been removed, the area should be ripped or tilled to a depth of 12 inches, moisture conditioned, and compacted in-place prior to the placement of engineered fill if required to establish desired grades. Exposed subgrade soils should be evaluated by HGSI. For large areas, this evaluation is normally performed by proof-rolling the exposed subgrade with a fully loaded scraper or dump truck. For smaller areas where access is restricted, the subgrade should be evaluated by probing the soil with a steel probe. Soft/loose soils identified during subgrade preparation should be compacted to a firm and unyielding condition or over-excavated and replaced with engineered fill, as described below. The depth of over-excavation, if required, should be evaluated by HGSI at the time of construction.

Engineered Fill

Native on-site soils are expected to be suitable for use as engineered fill if required to establish the desired grades on-site. If imported material is required, it must be approved by the geotechnical engineer prior to being imported to the site. Oversize material greater than 6 inches in size should not be used within 3 feet of foundation footings, and material greater than 12 inches in diameter should not be used in engineered fill. Additionally, any material used as fill should be free of organics and debris regardless of the source.

Prior to the placement of engineered fill, HGSI should be contacted to observe that the subgrade soils are suitable prepared as recommended herein. Engineered fill should be compacted in horizontal lifts not exceeding 8 inches using standard compaction equipment. We recommend that engineered fill be compacted to at least 90 percent of the maximum dry density determined by ASTM D1557 (Modified Proctor) or equivalent. On-site soils may be wet or dry of optimum; therefore, we anticipate that moisture conditioning of native soil will be necessary for compaction operations as discussed above.

Proper test frequency and earthwork documentation usually requires daily observation and testing during stripping, rough grading, and placement of engineered fill. Field density testing should conform to ASTM D2922 and D3017, or D1556. Engineered fill should be periodically observed and tested by HGSI. Typically, one density test is performed for at least every 2 vertical feet of fill placed or every 50 yd³, whichever requires more testing.

Wet Weather Earthwork

The on-site soils are moisture sensitive and may be difficult to handle or traverse with construction equipment during periods of wet weather. Earthwork is typically most economical when performed under dry weather conditions. Earthwork performed during the wet-weather season will probably require expensive measures such as cement treatment or imported granular material to compact fill to the recommended engineering specifications. If earthwork is to be performed or fill is to be placed in wet weather or under wet conditions when soil moisture content is difficult to control, HGSI should be contacted for additional recommendations.

Under wet weather, the construction area will unavoidably become wet, and the condition of exposed fill and native soils will degrade. To limit the impacts of wet weather on the finished building pad surface, consideration may be given to placement of a crushed aggregate pad. Where used, we recommend the working pad be constructed using 1½-inch-0 crushed aggregate and should have minimum thickness of at least 12 inches. This thickness is considered adequate to support light construction traffic but will not be sufficient to support heavy traffic such as loaded dump trucks or other heavy rubber-tired equipment.

Spread Footing Foundations

Shallow, conventional isolated or continuous spread footings may be used to support the proposed structures, provided they are founded on competent native soils, or compacted engineered fill placed directly upon the competent native soils as recommended herein. We anticipate that this foundation type will be suitable and economical for the proposed development.

We recommend a maximum allowable bearing pressure of 2,000 pounds per square foot (psf) for designing spread footings bearing on stiff native soils or engineered fill. The recommended maximum allowable bearing pressure may be increased by a factor of 1.33 for short term transient conditions such as wind and seismic loading. Exterior footings should be founded at least 18 inches below the lowest adjacent finished grade. Minimum footing widths should be determined by the project engineer/architect in accordance with applicable design codes.

Assuming construction is accomplished as recommended herein, and for the foundation loads anticipated, we estimate total settlement of spread foundations of less than about 1 inch and differential settlement between two adjacent load-bearing components or 50 linear feet supported on competent soil of less than about ½ inch. We anticipate that most of the estimated settlement will occur during construction, as loads are applied.

Wind, earthquakes, and unbalanced earth loads will subject the proposed structure to lateral forces, which will be resisted by the sliding resistance of the base or footing on the underlying soil and passive earth pressure against the buried portions of the structure. For design purposes, a coefficient of friction of 0.5 may be assumed along the interface between the base of the footing and subgrade soils. Passive earth pressure for buried portions of structures may be calculated using an equivalent fluid weight of 390 pounds per cubic foot (pcf), assuming footings are cast against dense, natural soils or engineered fill. The recommended coefficient of friction and passive earth pressure values exclude a safety factor, which should be considered in the design. The upper 12 inches of soil should be excluded from passive pressure computations unless it is protected by pavement or slabs on grade.

Footing excavations should be trimmed neatly, and the bottom of the excavation should be carefully prepared. Loose, wet, or otherwise softened soil should be removed from the footing excavation prior to placing reinforcing steel bars. HGSI should observe foundation excavations prior to placing crushed rock, to verify that adequate bearing soils have been reached. Due to the high moisture sensitivity of on-site soils, construction during wet weather may require over-excavation of footings and backfill with compacted, crushed aggregate.

Footing dimensions have been assumed and modeled using Settle 3 software. This software has been used to provide estimated immediate and long-term settlement of a strip footing which is 3 feet wide and loaded to 1,500 psf. This analysis and our interpretation of the data are provided in the attachments.

Below-Grade Structural Retaining Walls

We do not anticipate the proposed development to require below-grade structural retaining walls; however, these parameters have been provided if required by the project team. Foundations for below-grade retaining walls may be designed using the recommendations of the prior report section, with 2,000 psf allowable soil bearing pressure and a 1/3 increase under seismic loading.

Lateral earth pressures against below-grade retaining walls depend on factors such as the inclination of any adjacent slopes, type of backfill, degree of wall restraint, method of backfill placement, degree of backfill compaction, drainage provisions, and magnitude and location of any adjacent surcharge loads. At-rest soil pressure is exerted on a retaining wall when it is restrained against rotation. In contrast, active soil pressure will be exerted on a wall if its top is allowed to rotate or yield roughly 0.001 times its height or greater.

If the subject retaining walls will be free to rotate at the top, they should be designed for an active earth pressure equivalent to that generated by a fluid weighing 35 pcf for level backfill against the wall. For restrained walls, an at-rest equivalent fluid pressure of 54 pcf should be used in design, again assuming level backfill against the wall. These values assume that the recommended drainage provisions are incorporated, and hydrostatic pressures are not allowed to develop against the wall.

During a seismic event, lateral earth pressures acting on below-grade structural walls will increase incrementally, corresponding to the earthquake loading. Based on the Mononobe-Okabe equation and peak horizontal accelerations appropriate for the site location, seismic loading should be modeled using the active or at-rest earth pressures recommended above, plus an incremental rectangular-shaped seismic load of magnitude $6H$, where H is the total height of the wall.

We assume a relatively level ground surface beneath the base of the walls. As such, we recommend passive earth pressure of 390 pcf for use in design, assuming wall footings are cast against competent native soils or engineered fill. If the ground surface slopes down and away from the base of any of the walls, a lower passive earth pressure should be used and HGSI should be contacted for additional recommendations.

A coefficient of friction of 0.5 may be assumed along the interface between the base of the wall footing and subgrade soils. The recommended coefficient of friction and passive earth pressure values do not include a safety factor, and an appropriate safety factor should be included in the design. The upper 12 inches of soil should be neglected in passive pressure computations unless it is protected by pavement or slabs on grade. The above recommendations for lateral earth pressures assume that the backfill behind the subsurface walls will consist of properly compacted structural fill, and no adjacent surcharge loading. If the walls will be subjected to the influence of surcharge loading within a horizontal distance equal to or less than the height of the wall, the walls should be designed for the additional horizontal pressure. For uniform surcharge pressures, a uniformly distributed lateral pressure of 0.3 times the surcharge pressure should be added.

The recommended equivalent fluid densities assume a free-draining condition behind the walls, preventing the buildup of hydrostatic pressures. This can be accomplished by placing a 12-inch-wide zone of crushed drain rock containing less than 3 percent fines against the walls. A 3-inch minimum diameter perforated, plastic drainpipe should be installed at the base of the walls and connected to a sump to remove water from the crushed drain rock zone. The drainpipe should be wrapped in filter fabric (Mirafi 140N or other as approved by the geotechnical engineer) to minimize clogging. The above drainage measures are intended to remove water from behind the wall to prevent hydrostatic pressures from building up. Additional drainage measures may be specified by the project architect or structural engineer, for damp-proofing or other reasons.

HGSI should be contacted during construction to verify subgrade strength in wall keyway excavations, to verify that backslope soils are in accordance with our assumptions, and to take density tests on the wall backfill materials.

Concrete Slabs-on-Grade

Preparation of areas beneath concrete slab-on-grade floors should be performed as recommended in the *Site Preparation* section. Care should be taken during excavation for foundations and floor slabs, to avoid disturbing subgrade soils. If subgrade soils have been adversely impacted by wet weather or otherwise disturbed, the surficial soils should be scarified to a minimum depth of 8 inches, moisture conditioned to roughly 3 percent of optimum moisture content, and compacted to engineered fill specifications.

Alternatively, disturbed soils may be removed, and the removal zone backfilled with additional crushed rock. For evaluation of the concrete slab-on-grade floors using the beam on elastic foundation method, a modulus of subgrade reaction of 200 kcf (115 pci) should be assumed for the soils anticipated at subgrade depth. This value assumes the concrete slab system is designed and constructed as recommended herein, with a minimum thickness of crushed rock of 8 inches beneath the slab.

Interior slab-on-grade floors should be provided with an adequate moisture break. The capillary break material should consist of ODOT open graded aggregate per ODOT Standard Specifications 02630-2. The minimum recommended thickness of capillary break materials on re-compacted soil subgrade is 8 inches. The total thickness of crushed aggregate will be dependent on the subgrade conditions at the time of construction, and should be verified visually by proof-rolling. Under-slab aggregate should be compacted to at least 90% of its maximum dry density as determined by ASTM D1557 or equivalent.

In areas where moisture will be detrimental to floor coverings or equipment inside the proposed structure, appropriate vapor barrier and damp-proofing measures should be implemented. A commonly applied vapor barrier system consists of a 10-mil polyethylene vapor barrier placed directly over the capillary break material. Other damp/vapor barrier systems may also be feasible. Appropriate design professionals should be consulted regarding vapor barrier and damp proofing systems, ventilation, building material selection, radon, and mold prevention issues, which are outside HGSI's area of expertise.

Perimeter Footing Drains

We recommend the outside edge of perimeter footings be provided with a drainage system consisting of 4-inch minimum diameter perforated PVC pipe embedded in a minimum of 1 ft³ per linear foot of clean, free-draining crushed drain rock. The drain pipe and surrounding drain rock should be wrapped in non-woven geotextile (e.g., Mirafi 140N, or approved equivalent) to minimize the potential for clogging and/or ground loss due to piping. Water collected from the footing drains should be directed into the local storm drain system or another suitable outlet. A minimum 0.5 percent fall should be maintained throughout the drain and non-perforated pipe outlet. The footing drains should include clean-outs to allow periodic maintenance and inspection.

Down spouts and roof drains should collect roof water in a system separate from the footing drains to reduce the potential for clogging. Roof drain water should be directed to an appropriate discharge point well away from structural foundations. Grades should be sloped downward and away from buildings to reduce the potential for ponded water near structures.

Seismic Design

Structures should be designed to resist earthquake loading in accordance with the methodology described in the 2022 Oregon Structural Specialty Code (OSSC). We recommend Site Class D (Stiff Soil) be used for design per ASCE 7-16, Chapter 20. Design values determined for the site using the ASCE *Seismic Hazard Tool* utility are summarized below in Table 4.

Table 4. Recommended Earthquake Ground Motion Parameters (ASCE 7-16)

Parameter	Value
Location (Lat, Long), degrees	45.202336, -123.961458
Mapped Spectral Acceleration Values (MCE, Site Class D):	
Short Period, S_s	1.281g
1.0 Sec Period, S_1	0.668g
Design Values for Site Class D (Stiff Soils):	
F_a	1.2
$SD_s = 2/3 \times F_a \times S_s$	1.025g
Seismic Design Category	D ₂

Soil liquefaction is a phenomenon wherein saturated soil deposits temporarily lose strength and behave as a liquid when subjected to earthquake shaking and typically occurs in loose, granular soils situated below the water table. As previously stated, all soils below the water table were very dense, or were weathered bedrock or otherwise lithified sands which have not been shown to be liquefiable.

Excavating Conditions and Utility Trench Backfill

We anticipate that on-site soils can be excavated to depths of at least 8 feet using conventional heavy equipment such as track hoes. For excavations deeper than 8 feet, caving of the sidewalls may occur. Shallow groundwater present on-site could undermine any vertical cuts.

Additionally, the project team should be prepared for dewatering excavations which extend deeper than 10 feet. Conventional pumping methods should be sufficient depending on the depth of the excavation and time required for construction. If very deep excavations are required, cutoff sheet pile walls, or wellpoints should be considered, however we do not anticipate this to be necessary for the development as proposed.

Maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. Actual slope inclinations at the time of construction should be determined based on safety requirements and actual soil and groundwater conditions. All temporary cuts in excess of 4 feet in height should be sloped in accordance with U.S. Occupational Safety and Health Administration (OSHA) regulations (29 CFR Part 1926) or be shored. The existing native soils classify as Type B Soil and temporary excavation side slope inclinations as steep as 1H:1V may be assumed for planning purposes. This cut slope inclination is applicable to excavations above the water table only. Flatter temporary excavation slopes will be needed if groundwater is present, or if significant thicknesses of sandy soils are present in excavation sidewalls.

Groundwater was encountered at depths as shallow as 8 feet. Additionally, perched groundwater may occur especially during the wet season. If excavations extend below the perched or static groundwater levels, the project team should be prepared for dewatering. At this time, we anticipate that dewatering systems consisting of ditches, sumps and pumps will be adequate for controlling groundwater encountered during construction in the dry season. Regardless of the dewatering system used, it should be installed and operated such that in-place soils are prevented from being removed along with the groundwater.

Vibrations from traffic and construction equipment may cause caving and raveling of excavation walls. In such an event, lateral support for the excavation walls should be provided by the contractor to prevent loss of ground support and possible distress to existing or previously constructed structural improvements.

Utility trench backfill should consist of $\frac{3}{4}$ -inch-0 crushed rock, compacted to at least 90% of the maximum dry density, as determined by Modified Proctor (ASTM D1557) or equivalent. Initial backfill lift thicknesses for a $\frac{3}{4}$ -inch - 0 crushed aggregate base may need to be as great as 4 feet to reduce the risk of flattening underlying flexible pipe. Subsequent lift thickness should not exceed 1 foot. If imported granular fill material is used, then the lifts for large vibrating plate-compaction equipment (e.g., hoe compactor attachments) may be up to 2 feet, provided that proper compaction is being achieved and each lift is tested. Use of large vibrating compaction equipment should be carefully monitored near existing structures and improvements due to the potential for vibration-induced damage.

Adequate density testing should be conducted during construction to verify that the recommended relative compaction has been achieved. Typically, one density test is taken for every 4 vertical feet of backfill on each 200-lineal-foot section of trench.

Frost Considerations

Frost depth in the area is 12 inches (ORSC) which is shallower than the recommended shallow foundation depth provided above. Additionally, due to the temperate climate in the region and relatively mild winters, frost heave does not pose a significant risk to the development, and other specifications and parameters govern the design of foundations.

Erosion Control Considerations

Loose, unprotected sand, as found in our excavations, is considered highly susceptible to erosion from water or wind. Erosion during construction can be minimized by implementing the project erosion control plan, which should include judicious use of bio-bags, silt fences, or other appropriate technology. Where bio-bags or other technologies are used, these devices should be properly installed and maintained throughout site preparation and construction.

Erosion and sedimentation of exposed soils can also be minimized by quickly re-vegetating exposed areas of soil, and by staging construction such that large areas of the project site are not denuded and exposed at the same time. Areas of exposed soil requiring immediate and/or temporary protection against exposure should be covered with either mulch or erosion control netting/blankets.

UNCERTAINTIES AND LIMITATIONS

We have prepared this report for the owner and his/her consultants for use in design of this project only. This report should be provided in its entirety to prospective contractors for bidding and estimating purposes. However, the conclusions and interpretations presented in this report should not be construed as a warranty of the subsurface conditions. Experience has shown that soil and groundwater conditions can vary significantly over short distances. Inconsistent conditions may occur between exploration points and dates, which might not be detected during the geotechnical study. If, during future site operations, subsurface conditions are encountered which vary appreciably from those described herein, HGSI should be notified for review of the recommendations of this report, and revision of such if necessary.

Sufficient geotechnical monitoring, testing and consultation should be provided during construction to confirm that the conditions encountered are consistent with those indicated by explorations. Recommendations for design changes will be provided should conditions revealed during construction differ from those anticipated, and to verify that the geotechnical aspects of construction comply with the contract plans and specifications.

Within the limitations of scope, schedule and budget, HGSI executed these services in accordance with generally accepted professional principles and practices in the field of geotechnical engineering at the time the report was prepared. No warranty, expressed or implied, is made. The scope of our work did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous or toxic substances in the soil, surface water, or groundwater at this site.

We appreciate this opportunity to be of service.

Sincerely,

HARDMAN GEOTECHNICAL SERVICES INC.

Christi Stevens

Christi Stevens
Staff Geologist



RENEWS: 06/30/27

Digitally signed by
Chad S Hardman
Date: 2025.08.14
17:49:58-07'00'

Chad S. Hardman, P.E.
Principal Professional Engineer

August 14, 2025

HGSI Project No. 25-3406

Attachments: References

Appendix A: Site Information

Figure 1 – Vicinity Map

Figure 2 – Site Map

Test Pit Logs (4 pages)

Figure 3 – Liquefaction Susceptibility HazVu Map

Figure 4 – Tsunami and Flood Susceptibility HazVu Map

Figure 5 – Landslide Susceptibility HazVu Map

ASCE 7-16 Seismic Hazards Report (3 pages)

Appendix B: Laboratory Results

HGSI Laboratory Results (3 pages)

Specialty Analytics Laboratory Report (13 pages)

Appendix C: Slope Stability Analysis

Figure 6 – Slope Stability Analysis Profile

Figure 7 – Slope Stability Analysis Profile – All Surfaces

Slide 2 Full Calculations Output (51 Pages)



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APPENDIX A: Site Information



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VICINITY MAP



Project: N of 34955 Brooten Rd
Pacific City, Oregon

Project No. 25-3409

FIGURE 1



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SITE PLAN



Legend



Site Boundary

TP-# Test Pit Designation and
Approximate Location



Critical Slope Cross
Section A-A'

Project: N of 34955 Brooten Rd
Pacific City, Oregon

Project No. 25-3406

FIGURE 2

TEST PIT LOG

Project: N of 34955 Brooten Rd
Pacific City, OR

Project No. 25-3406

Test Pit No.: TP- 1

Depth (ft)	Sample Interval	Sample Designation	Pocket Penetrometer (tons/ft²)	Moisture Content (%)	Groundwater	Material Description
1		1-1				Loose, dry, dark gray, Poorly Graded SAND (SP), fine to medium grained , organic 18" [Top Soil]
2						Medium dense, slightly moist, reddish brown, Poorly Graded SAND (SP) [Native]
3						
4		1-2		1.6		
5						Grades increasingly dense and moist with depth
6		1-3				Color becomes a dark grayish brown with oxidized reddish brown sand veins
7						
8		1-4				Difficult to excavate
9						Terminated at 9 feet due to caving of sand Caving at all depths, significant caving at 9 feet Significant water encountered at 8 feet
10						
11						Grain size test results: 1-2: 0% Gravel, 99.3% Fine Sand, 0.7% Fines
12						



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LEGEND



Soil Sample Depth
Interval and Designation

#-#



Water Level at
Time of Exploration

Date Excavated: 8/5/2025

Logged By: Christi S.

TEST PIT LOG

Project: N of 34955 Brooten Rd
Pacific City, OR

Project No. 25-3406

Test Pit No.: TP- 2

Depth (ft)	Sample Interval	Sample Designation	Pocket Penetrometer (tons/ft²)	Moisture Content (%)	Groundwater	Material Description
1			1			Loose, dry, dark gray, Poorly Graded SAND (SP), medium grained, organic 6" [Top Soil] Stiff rounded gravels in sand and silt 10" [Undocumented Fill]
2			3			Dense, dry, dark brown and grayish brown, Poorly Graded SAND (SP) 8"
3			3.5			Dense, dry, gray, Poorly Graded SAND (SP) 1" thin brown sand layer at top and bottom 10"
4	X	2-1		9.1		Loose, moist, black, Poorly Graded SAND with Gravel (SP) 2-4 feet in thickness Gravel content lessens with depth Moisture increase with depth
5						Twice as thick on the eastern wall Loose, wet, dark grayish brown, Poorly Graded SAND (SP) with black sand veins [Native]
6	X	2-2		21		
7						
8					▽	
9	X	2-3				
10						Terminated at 9 feet due to caving of sand Caving at all depths, significant caving at 9 feet Significant water encountered at 8 feet
11						Grain size test results: 2-1: 9.4% Coarse Gravel, 0.7% Fine Gravel, 20.5% Coarse Sand, 40.9% Medium Sand, 27.7% Fine Sand, 0.8% Fines 2-2: 0% Gravels, 22.8% Coarse Sand, 45.5% Medium Sand, 30.8% Fine Sand, 0.9% Fines
12						



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LEGEND



Soil Sample Depth
Interval and Designation

#-#



Water Level at
Time of Exploration

Date Excavated: 8/5/2025

Logged By: Christi S.

TEST PIT LOG

Project: N of 34955 Brooten Rd
Pacific City, OR

Project No. 25-3406

Test Pit No.: TP- 3

Depth (ft)	Sample Interval	Sample Designation	Pocket Penetrometer (tons/ft²)	Moisture Content (%)	Groundwater	Material Description
1						Loose, dry, dark gray, Poorly Graded SAND (SP), medium grained , organic 6-8" [Top Soil]
2						Medium dense, slightly moist, reddish brown, Poorly Graded SAND (SP) [Native]
3						
4						
5						
6		3-1				Color becomes a yellowish brown with oxidized sections and mica
7		3-2				Grading increasingly dense and moist with depth
8						Very dense
9						
10		3-3		16.3		Very difficult to excavate
11						Very dense, wet, gray and black, Silty SAND (SM) [Native]
12						Scoop making sounds like rock is below it, but can't get to it due to caving
						Terminated at 11 feet due to caving of sand Caving at all depths, significant caving at 11 feet Significant water encountered at 11 feet
						Grain size test results: 3-3: 0% Gravels, 75.5% Fine Sand, 24.5% Fines



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LEGEND



Soil Sample Depth
Interval and Designation

#-#



Water Level at
Time of Exploration

Date Excavated: 8/5/2025

Logged By: Christi S.

TEST PIT LOG

Project: N of 34955 Brooten Rd
Pacific City, OR

Project No. 25-3406

Test Pit No.: TP- 4

Depth (ft)	Sample Interval	Sample Designation	Pocket Penetrometer (tons/ft ²)	Moisture Content (%)	Groundwater	Material Description
1						Loose, dry, dark brown and gray, Poorly Graded SAND (SP), medium grained , organic_6-8" [Top Soil]
2						Medium dense, slightly moist, brown and grayish brown, Poorly Graded SAND (SP) [Native]
3	X	4-1		3.6		Proctor sample at 3'
4						
5						
6	X	4-2				Color changes to a brown and light yellowish brown
7						
8						Grading to very dense and increasingly moist
9	X	4-3				Color becomes a dark grayish brown with black veins
10						Very difficult to excavate
11	X	4-4			▽	Water at 11' on shallow end and 16' up hill
12						Terminated at 11 feet due to caving of sand Caving at all depths, significant caving at 11 feet Significant water encountered at 11 feet



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LEGEND



Soil Sample Depth
Interval and Designation

#-#



Water Level at
Time of Exploration

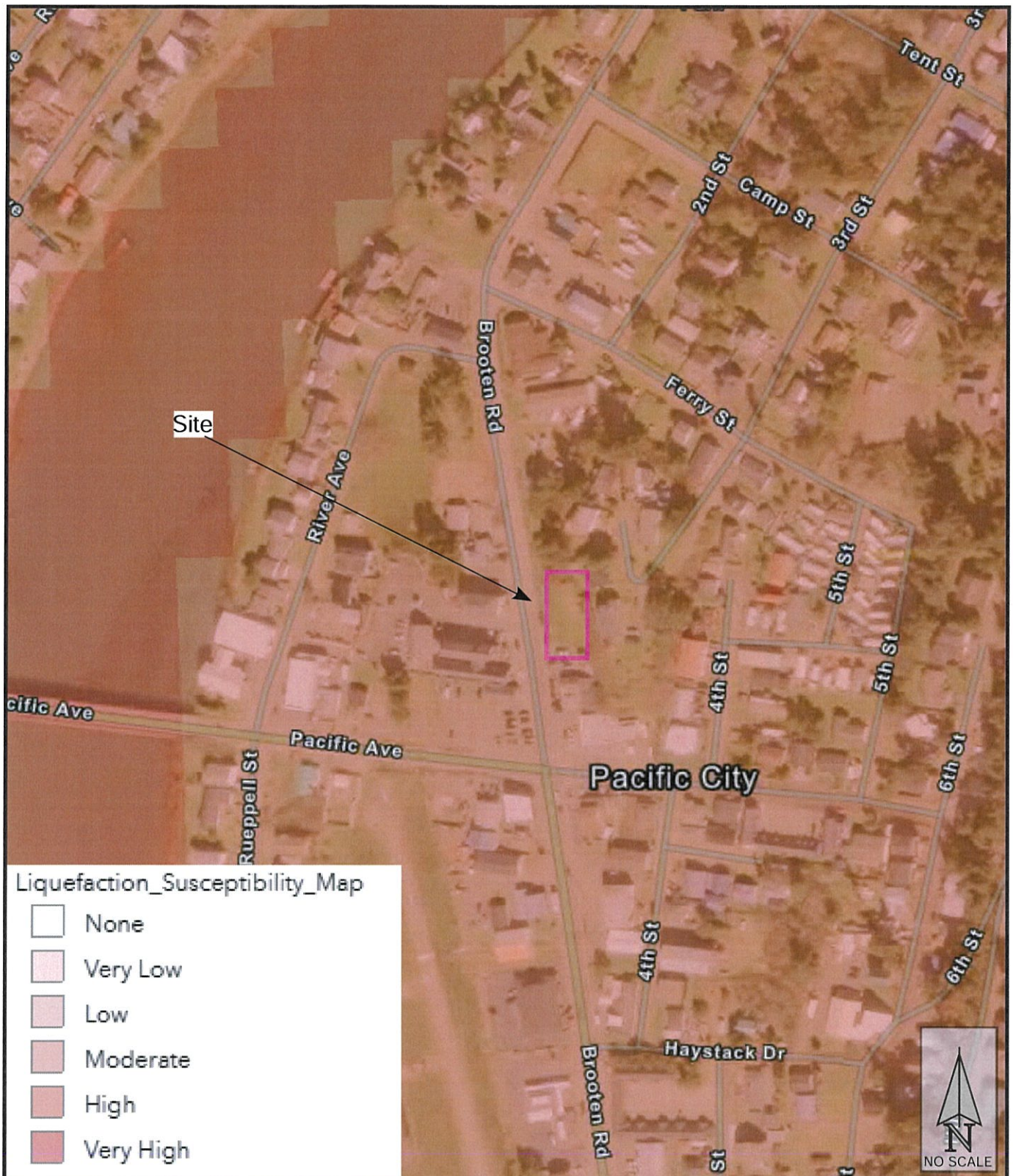
Date Excavated: 8/5/2025

Logged By: Christi S.



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LIQUEFACTION SUSCEPTIBILITY MAP

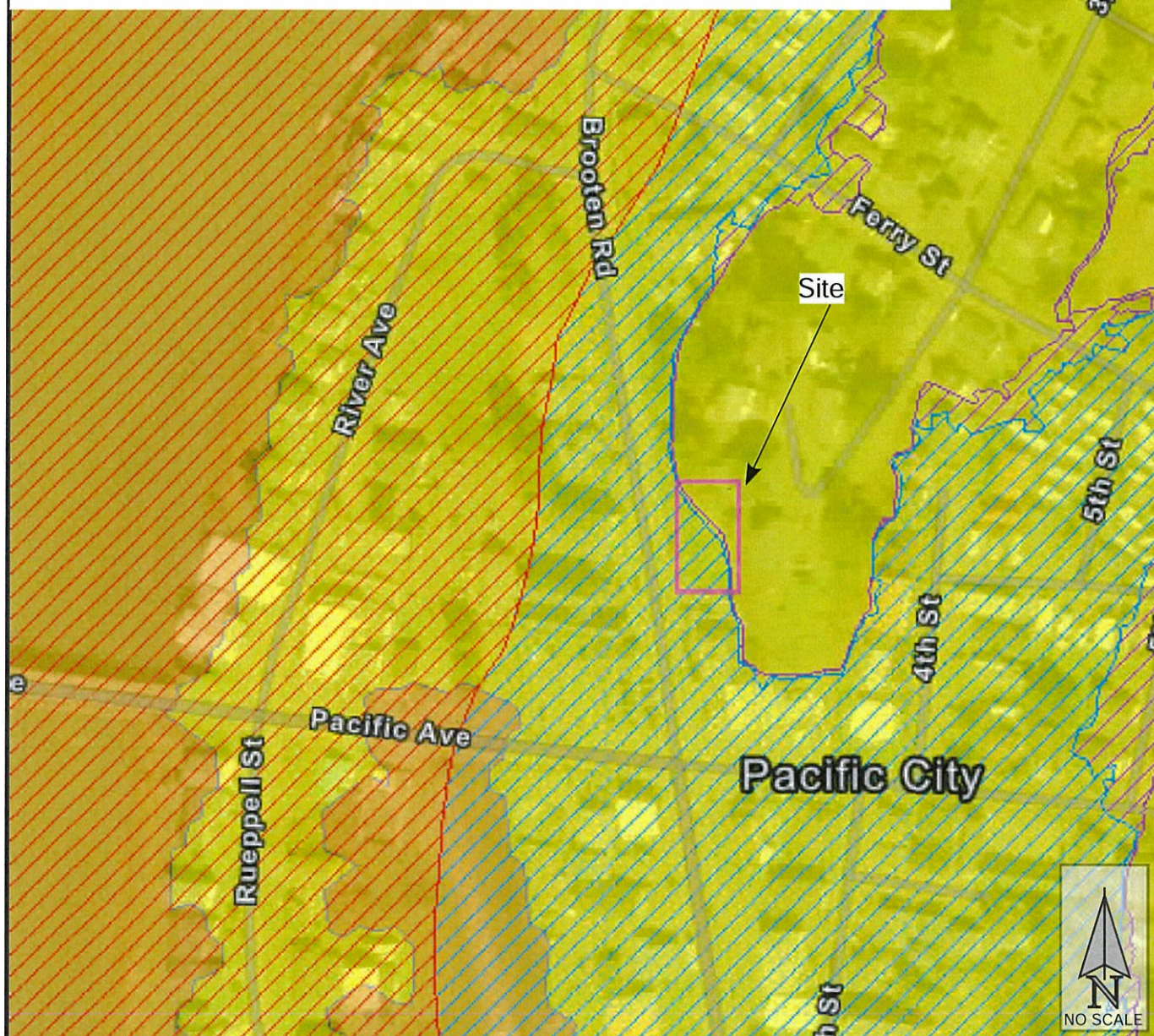




TSUNAMI and FLOOD SUSCEPTIBILITY MAP

August 13, 2025

- | | |
|----------------------------|---------------------------------------|
| Floodway | Tsunami Evacuation Zones |
| 100-Year Floodplain | AKmax Distant Tsunami Evacuation Zone |
| 500-Year Floodplain | XXL1 Local Tsunami Evacuation Zone |
| 2015 FEMA Q3 Flood | OPTIONAL - Outside Hazard Area |
| 2015 State Digitized Flood | Outside Hazard Area |



Project: Ziply Fiber - Brooten Road
Pacific City, OR

Project No. 25-3406

FIGURE 4



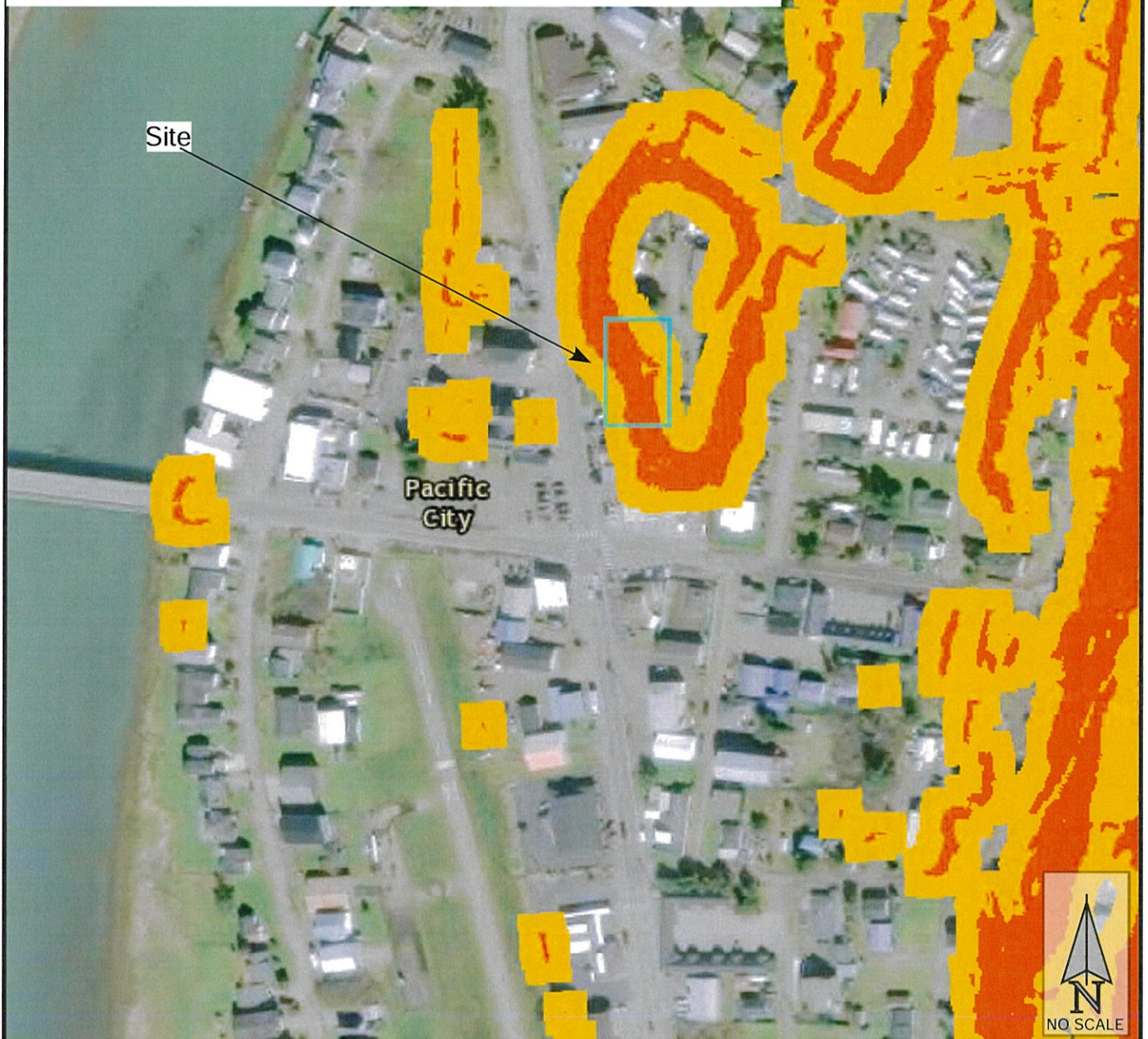
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LANDSLIDE SUSCEPTIBILITY MAP

Landslide Susceptibility

Susceptibility to Shallow Landslides (less than 15 feet below ground surface; available only for areas mapped in detail)

-  Low susceptibility to shallow landslides
-  Moderate susceptibility to shallow landslides
-  High susceptibility to shallow landslides



Project: Ziplly Fiber - Brooten Road
Pacific City, OR

Project No. 25-3406

FIGURE 5

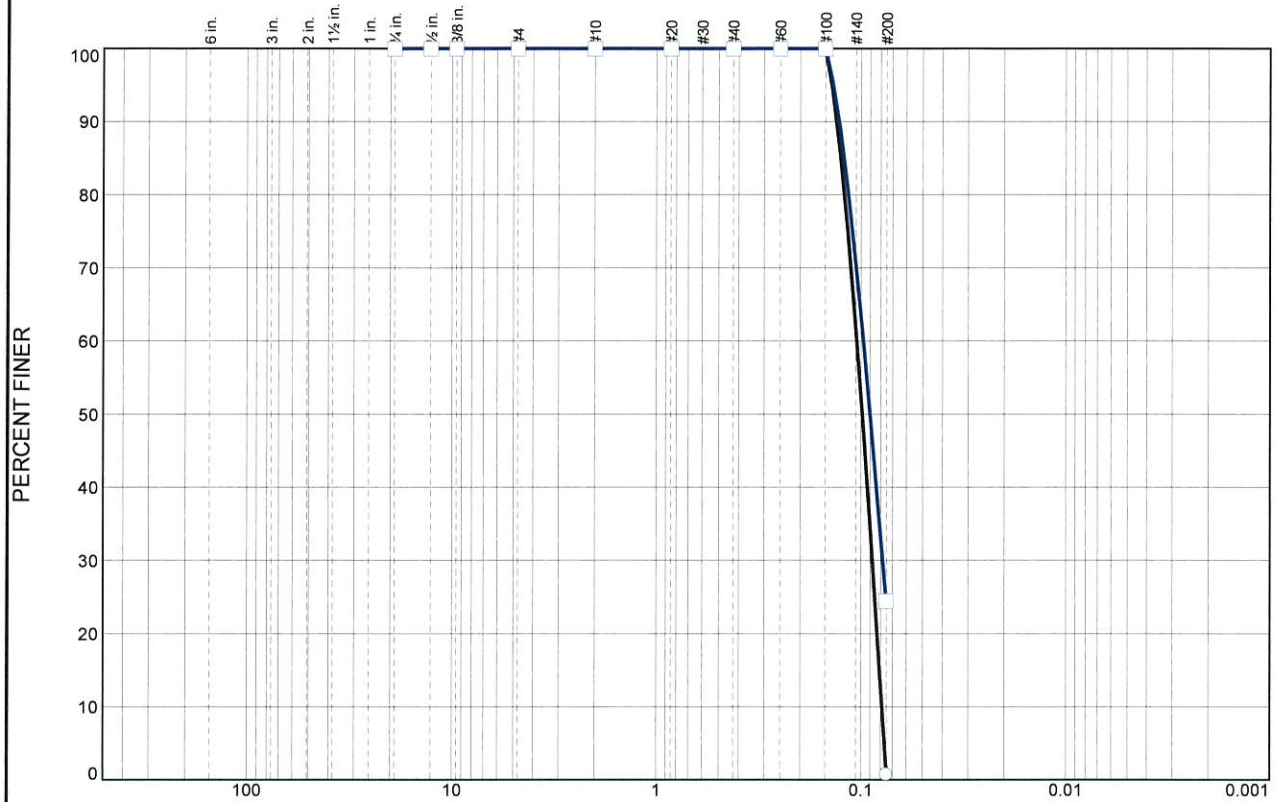


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APPENDIX B: Laboratory Results

Particle Size Distribution Report



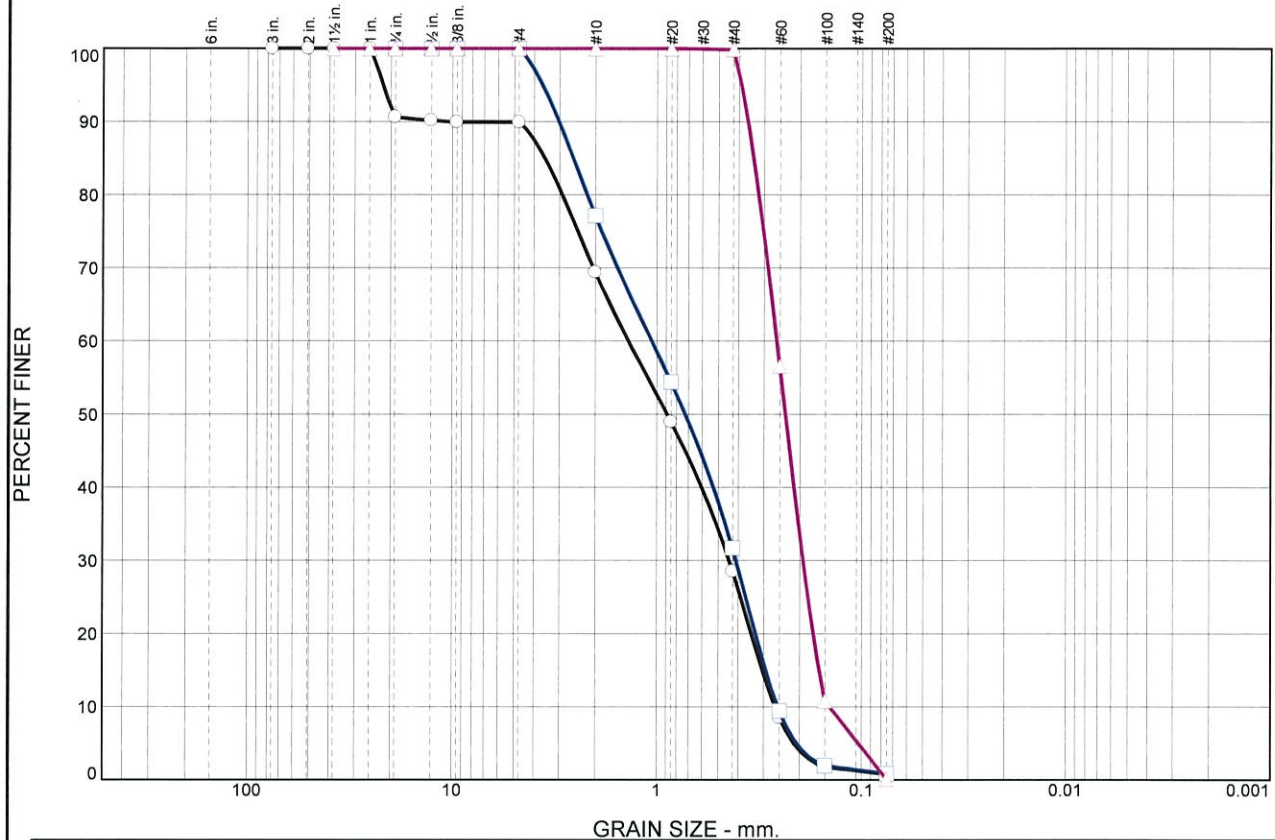
GRAIN SIZE - mm.									
	% +3"	% Gravel		% Sand			% Fines		
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
☐	0.0	0.0	0.0	0.0	0.0	99.3	0.7		
☐	0.0	0.0	0.0	0.0	0.0	75.5	24.5		
☐									
☐	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c
☐	NV	NP	0.1260	0.1049	0.0986	0.0879	0.0810	0.0788	0.93
☐	NV	NP	0.1211	0.0971	0.0900	0.0780			1.33
☐									

MATERIAL DESCRIPTION				TEST DATE	USCS	NM
☐ Poorly Graded Sand (SP)				08-08-2025	SP	1.6
☐ Silty Sand (SM)				08-11-2025	SM	16.3
☐				08-11-2025		3.6

Project No. 25-3406 Client: Nydeen Jordan Project: Ziply Fiber - Pacific City				Remarks: Figure
☐ Source of Sample: Test Pit 1 ☐ Source of Sample: Test Pit 3 ☐ Source of Sample: Test Pit 4	Depth: 5' Depth: 10.5' Depth: 3'	Sample Number: 1-2 Sample Number: 3-3 Sample Number: 4-1		
				

Tested By: Christi

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"			% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		9.4	0.7	20.5	40.9	27.7	0.8		
□	0.0		0.0	0.0	22.8	45.5	30.8	0.9		
△	0.0		0.0	0.0	0.0	0.1	99.8	0.1		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○	NV	NP	3.5403	1.3753	0.8898	0.4422	0.3037	0.2631	0.54	5.23
□	NV	NP	2.5668	1.0556	0.7233	0.4086	0.2916	0.2544	0.62	4.15
△	NV	NP	0.3369	0.2584	0.2345	0.1918	0.1600	0.1424	1.00	1.82

MATERIAL DESCRIPTION						TEST DATE	USCS	NM
○ Poorly Graded Sand with Gravel(SP)						08-08-2025	SP	9.1
□ Poorly graded Sand (SP)						08-11-2025	SP	21.0
△ Poorly Graded Sand (SP)						08-11-2025	SP	23.3

Project No. 25-3406		Client: Nydeen Jordan		Remarks: ☐ Charcoal and organics Magnetic ☐ Charcoal and organics Magnetic	
Project: Ziply Fiber - Pacific City					
☐	Source of Sample: Test Pit 2	Depth: 3.5'	Sample Number: 2-1		
☐	Source of Sample: Test Pit 2	Depth: 6.5'	Sample Number: 2-2		
☐	Source of Sample: Test Pit 4	Depth: 9'	Sample Number: 4-3		
 HARDMAN GEOTECHNICAL SERVICES INC. Precision. Cost Effective. Engineering Solutions.					

Figure

Figure

Tested By: Christi

Moisture - Density Relationship

Project: Ziply Pacific City - Property N of 34955 Brooten
Client: Bluecore Power
Material Source: On Site
Material: Native Poorly Graded Sand
Sample ID: 4-3
Test Specification: ASTM D1557 Modified Proctor AASHTO T-180

Project No.: 25-3406
Sample Date: 8/5/2025
Sampled By: CS
Test Date: 8/3/2025
Tested By: AC

Percent Coarse (%): **Gsb:** **Mold Volume (ft³):** 0.033

TESTING DATA

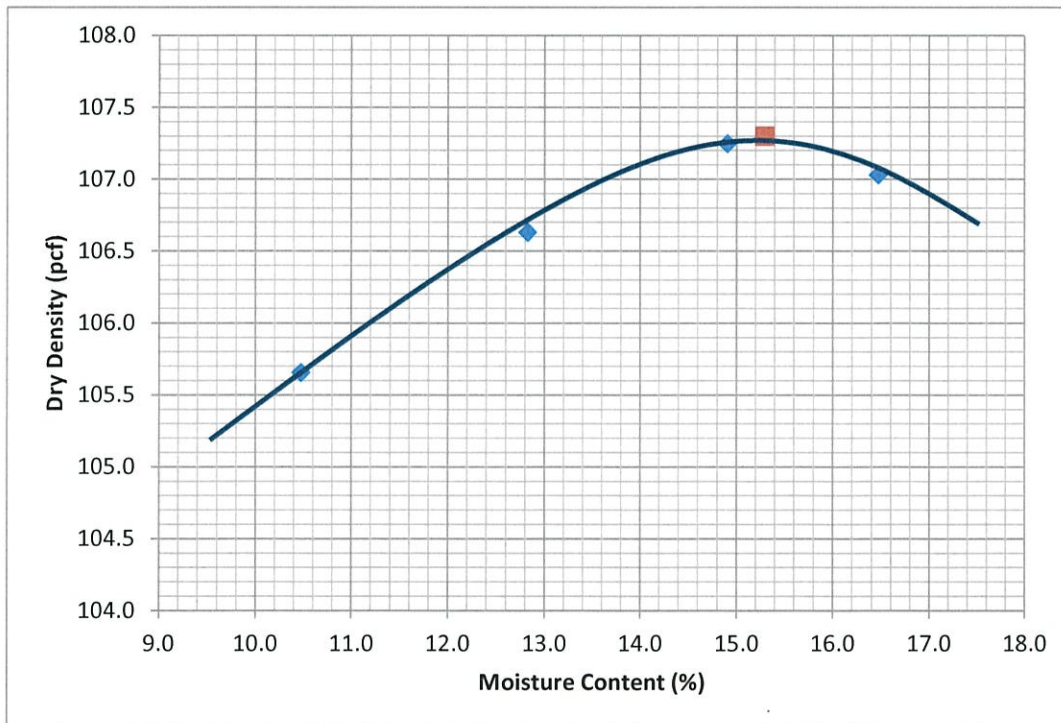
1	2	3	4	5	6
---	---	---	---	---	---

Density Determination

Wt. of Soil + Mold (gm):	6014	6068	6112	6133.9		
Wt. of Mold (gm):	4249.0	4249.0	4249.0	4249.0		
Wet Density (pcf):	116.7	120.3	123.2	124.7		
Dry Density (pcf):	105.7	106.6	107.2	107.0		

Moisture Determination

Tare Pan No:						
Tare Weight (gm):	296.7	298.7	314.1	298.3		
Wt. of Pan + Wet Soil:	2042	2092.2	2114.1	2148.8		
Wt. of Pan + Dry Soil:	1876.5	1888.3	1880.6	1887.1		
Water Content (%):	10.5	12.8	14.9	16.5		



Max Dry Density (pcf): 107.3
Optimum Moisture Content (%): 15.3



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Specialty Analytical

9011 SE Jannsen Rd
Clackamas, OR 97015
TEL: (503) 607-1331

Website: www.specialtyanalytical.com

August 14, 2025

Chad Hardman
Hardman Geotechnical Services
10110 SW Nimbus Ave
Portland, OR 97223
TEL: (503) 822-8019
FAX:

RE: Bluecore Pacific City/ 25-3406

Order No.: 2508056

Dear Chad Hardman:

There were no problems with the analysis and all data for associated QC met EPA or laboratory specifications, except where noted in the Case Narrative, or as qualified with flags. Results apply only to the samples analyzed. Without approval of the laboratory, the reproduction of this report is only permitted in its entirety.

If you have any questions regarding these tests, please feel free to call.

Sincerely,

Marty French
Lab Director



DEPARTMENT OF
ECOLOGY
State of Washington

Specialty Analytical Certifications

Accrediting Authority	Laboratory Number
Oregon Laboratory Accreditation Program	4164
Washington Department of Ecology	C804

Current certificates and lists of licensed parameters can be found at specialtyanalytical.com



DEPARTMENT OF
ECOLOGY
State of Washington

Specialty Analytical

WO#: 2508056

Date Reported: 8/14/2025

CLIENT: Hardman Geotechnical Services

Collection Date: 8/6/2025 10:30:00 AM

Project: Bluecore Pacific City/ 25-3406

Lab ID: 2508056-001

Matrix: SOLID

Client Sample ID: 2-1; 3.5'; Pac City

Analyses	CAS	Result	RL	Qual	Units	DF	Date Analyze
WATER SOLUBLE SULFATE					C1580	SW9056PR	Analyst: AM
Water Soluble Sulfate		0.726	0.588		mg/Kg	1	08/13/2025 11:53

Specialty Analytical

WO#: 2508056

Date Reported: 8/14/2025

CLIENT: Hardman Geotechnical Services

Collection Date: 8/6/2025 12:00:00 PM

Project: Bluecore Pacific City/ 25-3406

Lab ID: 2508056-002

Matrix: SOLID

Client Sample ID: 4-1; 3'; Pac City

Analyses	CAS	Result	RL	Qual	Units	DF	Date Analyze
SOIL RESISTIVITY-WENNER					G57		Analyst: AM
Soil Resistivity		84000	1.00		ohm-cm	1	08/13/2025 10:15

Specialty Analytical

QC SUMMARY REPORT

WO#: 2508056
8/14/2025

Client: Hardman Geotechnical Services
Project: Bluecore Pacific City/ 25-3406

TestCode: C1580

Sample ID: CCV1	SampType: CCV	TestCode: C1580	Units: mg/Kg	Prep Date:	RunNo: 60057
Client ID: CCV	Batch ID: 26660	TestNo: C1580	SW9056PR	Analysis Date: 8/13/2025	SeqNo: 784308
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Water Soluble Sulfate	21.2	0.200	20.00	0	106 70 130

Sample ID: CCV2	SampType: CCV	TestCode: C1580	Units: mg/Kg	Prep Date:	RunNo: 60057
Client ID: CCV	Batch ID: 26660	TestNo: C1580	SW9056PR	Analysis Date: 8/13/2025	SeqNo: 784312
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Water Soluble Sulfate	21.3	0.200	20.00	0	107 70 130

Sample ID: MBLK	SampType: MBLK	TestCode: C1580	Units: mg/Kg	Prep Date:	RunNo: 60057
Client ID: PBS	Batch ID: 26660	TestNo: C1580	SW9056PR	Analysis Date: 8/13/2025	SeqNo: 784327
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Water Soluble Sulfate	ND	0.200			

Sample ID: LCS	SampType: LCS	TestCode: C1580	Units: mg/Kg	Prep Date:	RunNo: 60057
Client ID: LCSS	Batch ID: 26660	TestNo: C1580	SW9056PR	Analysis Date: 8/13/2025	SeqNo: 784334
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Water Soluble Sulfate	10.3	0.200	10.00	0	103 70 130

Qualifiers: H Holding times for preparation or analysis exceeded

QC SUMMARY REPORT

WO#: 2508056
8/14/2025

Specialty Analytical

Client: Hardman Geotechnical Services
Project: Bluecore Pacific City/ 25-3406

TestCode: C1580

Sample ID: LCS	SampType: LCS	TestCode: C1580	Units: mg/Kg	Prep Date:	RunNo: 60057						
Client ID: LCSS	Batch ID: 26660	TestNo: C1580	SW9056PR	Analysis Date: 8/13/2025	SeqNo: 784334						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: 2508056-001ADUP	SampType: DUP	TestCode: C1580	Units: mg/Kg	Prep Date: 8/12/2025	RunNo: 60057						
Client ID: 2-1; 3.5'; Pac City	Batch ID: 26660	TestNo: C1580	SW9056PR	Analysis Date: 8/13/2025	SeqNo: 784336						
Analyte	Result	PQL	SPK value	SPK RefVal	%REC	LowLimit	HighLimit	RPD RefVal	%RPD	RPDLimit	Qual
Water Soluble Sulfate	0.795	0.594						0.7265	9.06	20	

Qualifiers: H Holding times for preparation or analysis exceeded

QC SUMMARY REPORT

WO#: 2508056
8/14/2025

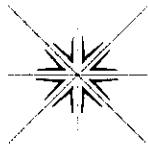
Specialty Analytical

Client: Hardman Geotechnical Services
Project: Bluecore Pacific City/ 25-3406

TestCode: RESIST_ASTMG57

Sample ID: A2508070-004ADUP	SampType: DUP	TestCode: RESIST_AST	Units: ohm-cm	Prep Date:	RunNo: 60073						
Client ID: BatchQC	Batch ID: R60073	TestNo: G57		Analysis Date: 8/13/2025	SeqNo: 784563						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Soil Resistivity	1150	1.00						1200	4.26	20	

Qualifiers: H Holding times for preparation or analysis exceeded



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9011 SE Jannsen Rd
Clackamas, Oregon 97015
TEL: 503-607-1331 FAX: 503-607-1336
Website: www.specialtyanalytical.com

Sample Receipt Checklist

Client Name: HARDMAN

Work Order Number 2508056

RcptNo: 1

Date and Time Received 8/6/2025 1:05:21 PM

Received by: Mandy Wehe

Completed by

Reviewed by:

Completed Date:

8/6/2025

Reviewed Date:

8/6/2025 1:18:26 PM

Carrier name: Client

Chain of custody present?	Yes ☒	No ☐	
Chain of custody signed when relinquished and received?	Yes ☒	No ☐	
Chain of custody agrees with sample labels?	Yes ☒	No ☐	Not Present ☐
Are matrices correctly identified on Chain of custody?	Yes ☒	No ☐	
Is it clear what analyses were requested?	Yes ☒	No ☐	
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☒
Samples in proper container/bottle?	Yes ☒	No ☐	
Were correct preservatives used and noted?	Yes ☒	No ☐	NA ☐
Sample containers intact?	Yes ☒	No ☐	
Sufficient sample volume for indicated test?	Yes ☒	No ☐	
Were container labels complete (ID, Pres, Date)?	Yes ☒	No ☐	
All samples received within holding time?	Yes ☒	No ☐	
Was an attempt made to cool the samples?	Yes ☐	No ☐	NA ☒
All samples received at a temp. of > 0° C to 6.0° C?	Yes ☐	No ☐	NA ☒
Response when temperature is outside of range:			
Preservative added to bottles:			
Sample Temp. taken and recorded upon receipt?	Yes ☒	No ☐	To 24.5°C
Water - Were bubbles absent in VOC vials?	Yes ☐	No ☐	No Vials ☒
Water - Was there Chlorine Present?	Yes ☐	No ☐	NA ☒
Water - pH acceptable upon receipt?	Yes ☐	No ☐	NA ☒
Are Samples considered acceptable?	Yes ☒	No ☐	
Custody Seals present?	Yes ☐	No ☒	
Traffic Report or Packing Lists present?	Yes ☐	No ☒	
Airbill or Sticker?	Air Bill ☐	Sticker ☐	Not Present ☒
Airbill No:			
Sample Tags Present?	Yes ☐	No ☒	
Sample Tags Listed on COC?	Yes ☐	No ☒	
Tag Numbers:			
Sample Condition?	Intact ☒	Broken ☐	Leaking ☐

Case Number:

SDG:

SAS:

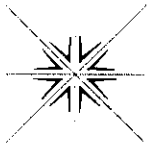
Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
-----------	---------	-----------	-------------	---------	-----------	-----------

Assets Information

Adjusted? _____ Checked by _____

Any No and/or NA (not applicable) response must be detailed in the comments section be



Specialty Analytical
9011 SE Jannsen Rd
Clackamas, Oregon 97015
TEL: 503-607-1331 FAX: 503-607-1336
Website: www.specialtyanalytical.com

Sample Receipt Checklist

Client Name: HARDMAN

Work Order Number 2508056

Client Contacted? ☐ Yes ☒ No ☐ NA Person Contacted: _____ Comments: _____

Contact Mode: ☐ Phone: ☐ Fax: ☐ Email: ☐ In Person: _____

Client Instructions: _____

Date Contacted: _____ Contacted By: _____

Regarding: _____

CorrectiveAction: _____

Sample Details

SampID	ClientSampID	ContainerID	Type	Org pH	Temp.	ReptNo	Cooler No	Comments
2508056-001A	2-1; 3.5'; Pac City	Container-01 of 01	Bottle					
2508056-002A	4-1; 3'; Pac City	Container-01 of 01	Bottle					

 Specialty Analytical		9011 SE Janssen Rd Clackamas, OR 97015 Phone: 503-607-1331 Fax: 503-607-1336		Chain of Custody Record	
Client: Hardman Geotech (HGSII) Address: 10110 SW Nimbus Ave City/State/Zip: Portland, OR 9723 Telephone: 503-822-8019 AP Email: accounts@hgsigeteach.com		Date: 8-6-2025 Page: 1 of 1 Project Name: (Business Park City) Project No: 25-3406 PO No: 77795 Collected by: Christi State Collected: OR ☒ WA ☐ OTHER ☐ Report To (PM): Chad Hardman or Christi Stevens PM Email: christipinge@hgsigeteach.com or chardhardman@hgsigeteach.com			
Laboratory Project No (Internal): 2508054 Temperature on Receipt: 24.5 °C Cooling: n/a Shipped Via: <i>air</i> Custody Seal: Y ☒ Intact / Broken Cooler / Bottle MDL ☐ TIER IV ☐ EDD ☐ Sample Disposal: ☐ Return to client ☒ Disposal by lab (after 60 days)					

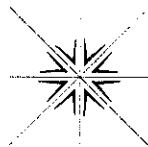
Sample Name	Sample Date	Sample Time	Sample Matrix*	# of Containers	C1580	ASTM G57	Requested Tests	Comments
1 2-1; 3.5"; Pac City	8-6-25	10:30	SM	1	✓			Water Soluble Sulfate
2 4-1; 3"; Pac City	8-6-25	12:00	SM	1	✓			Electrical Resistivity
3								
4								
5								
6								
7								
8								
9								
10								

* Matrix: A = Air, AQ = Aqueous, L = Liquid, O = Oil, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water, M = Miscellaneous

Turn-around Time: Standard (5-7 Business): ☒ 3 Day: ☐ 2 Day: ☐ Next Day: ☐ Same Day: ☐
 Expedited turn-around requests should be coordinated in advance

Relinquished *Christi* Date/Time *8/10/25 1300*
 Relinquished *Chad* Date/Time *8/10/25 1300*
 Relinquished *Chad* Date/Time *8/10/25 1300*

Date/Time ☐ Page 10 of 13



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Clackamas, Oregon 97015
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Website: www.specialtyanalytical.com

Definition Only

WO#: 2508056
Date: 8/14/2025

Definitions:

KEY TO FLAGS

A: This sample contains a Gasoline Range Organic not identified as a specific hydrocarbon product. The result was qualified against gasoline calibration standards.

A1: This sample contains a Diesel Range Organic not identified as a specific hydrocarbon product. The result was qualified against diesel calibration standards.

A2: This sample contains a Lube Oil Range Organic not identified as a specific hydrocarbon product. The result was qualified against lube oil calibration standards.

A3: The results was determined to be Non-Detect based on hydrocarbon pattern recognition. The product was carry-over from another hydrocarbon type.

A4: The product appears to be aged or degraded.

B: The blank exhibited a positive result greater than the reporting limit for this compound.

BC: Sample concentration is >10x positive result in blank. Data is considered acceptable.

CL: Sample was found to contain chlorine and was treated with sodium thiosulfate.

CN: See Case Narrative.

E: Result exceeds the calibration range for this compound. The result should be considered an estimate.

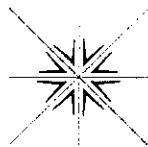
F: The positive result for this hydrocarbon is due to single component contamination. The product does not match any hydrocarbon in the fuels library.

FS: Follow-up testing is suggested.

G: Result may be biased high due to biogenic interferences. Clean up is recommended.

H: Sample was analyzed outside recommended holding time.

HT: ☐ At client's request, samples was analyzed outside of recommended holding time.



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Definition Only

WO#: 2508056
Date: 8/14/2025

Definitions:

HP: Sample was analyzed outside recommended holding time due to VOA having pH >2.

J: The results for this analyte is between the MDL and the PQL and should be considered an estimated concentration.

K: Diesel result is biased high due to amount of Oil contained in the sample.

L: Diesel result is biased high due to amount of Gasoline contained in the sample.

M: Oil result is biased high due to amount of Diesel contained in the sample.

N Gasoline result is biased high due to amount of Diesel contained in the sample.

MC: Sample concentration is greater than 4x the spiked value, the spiked value is considered insignificant.

MI Result is outside control limits due to matrix interference.

NH: Sample matrix is non-homogeneous

MSA: Value determined by Method of Standard Addition.

O: Laboratory Control Standard (LCS) exceeded laboratory control limits but meets CCV criteria. Data meets EPA requirements.

Q: Detection levels elevated due to sample matrix.

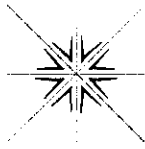
R: RPD control limits were exceeded

RF Duplicate failed due to result being at or near the method-reporting limit.

RP: Matrix spike values exceed established QC limits; post digestion spike is in control.

S: Recovery is outside control limits.

SC: CCV or LCS exceeded high recovery control limits, but associated samples are non-detect. Data



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Definition Only

WO#: 2508056

Date: 8/14/2025

Definitions:

meets EPA requirements.

SL: LCS exceeded recovery control limits, but associated MS/MSD passing. Data meets EPA requirements.

SV: CCV exceeded low recovery control limits. ND as reported evaluated using EPA method 8260D section 11.4.3.2

TA: Sample treated with ascorbic acid for the removal of thiocyanates.

TS: Sample treated with Sodium Sulfite for the removal of chlorine.



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HGSgeotech.com

503.530.8076

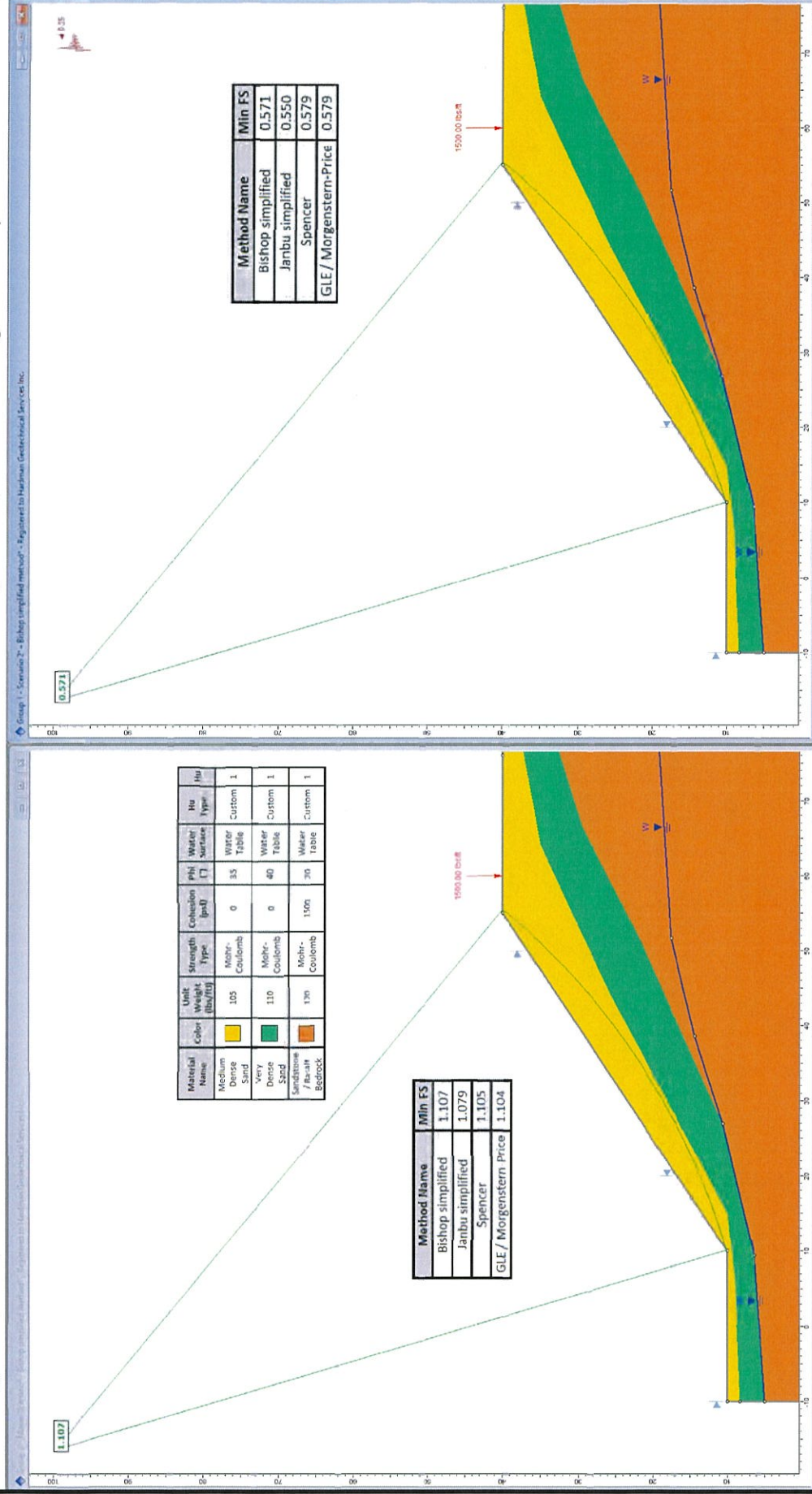
APPENDIX C: Slope Stability Analysis



SLOPE STABILITY ANALYSIS

Static Condition: FS is approximately 1.1 indicating sufficient resisting force, but potential for destabilization.

Seismic Condition: FS is approximately 0.57 indicating that the modeled slope would mobilize during an earthquake.

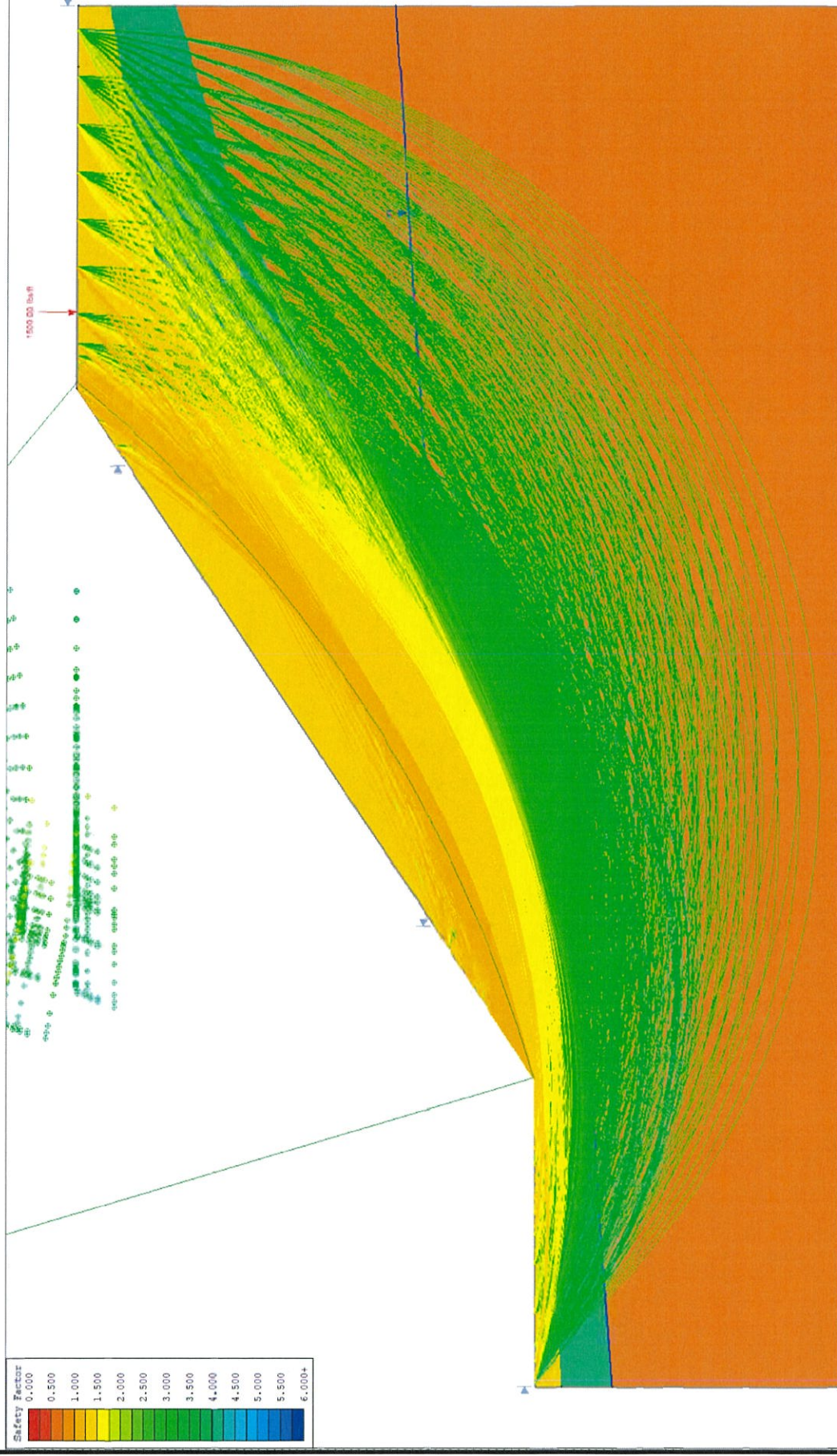




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SLOPE STABILITY ANALYSIS

Static Condition: All calculated potential failure surfaces shown.



Project: Ziplly Fiber - Telecom Shelter Building
Pacific City, Oregon

Project No. 25-3406

FIGURE 7



Ziply Slope Stability
Slide2 - An Interactive Slope Stability Program
Date Created: 8/14/2025, 10:27:42 AM
Software Version: 9.036

Table of Contents

Project Summary	4
Currently Open Scenarios	4
General Settings	5
Analysis Options	6
All Open Scenarios	6
Groundwater Analysis	7
All Open Scenarios	7
Random Numbers	8
All Open Scenarios	8
Surface Options	9
All Open Scenarios	9
Seismic Loading	10
All Open Scenarios	10
Loading	11
All Open Scenarios	11
Materials	12
Materials In Use	12
Global Minimums	13
Group 1 - Master Scenario	13
Method: bishop simplified	13
Method: janbu simplified	13
Method: spencer	13
Method: gle/morgenstern-price	13
Group 1 - Scenario 2	14
Method: bishop simplified	14
Method: janbu simplified	14
Method: spencer	14
Method: gle/morgenstern-price	15
Global Minimum Support Data	16
All Open Scenarios	16
Valid and Invalid Surfaces	17
Group 1 - Master Scenario	17
Method: bishop simplified	17
Method: janbu simplified	17
Method: spencer	17
Method: gle/morgenstern-price	17
Group 1 - Scenario 2	17
Method: bishop simplified	17
Method: janbu simplified	17
Method: spencer	17
Method: gle/morgenstern-price	17
Error Code Descriptions	18

Slice Data	19
Group 1 - Master Scenario	19
Global Minimum Query (bishop simplified) - Safety Factor: 1.1065	19
Global Minimum Query (janbu simplified) - Safety Factor: 1.07864	22
Global Minimum Query (spencer) - Safety Factor: 1.10543	25
Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.10432	28
Group 1 - Scenario 2	31
Global Minimum Query (bishop simplified) - Safety Factor: 1.1065	31
Global Minimum Query (janbu simplified) - Safety Factor: 1.07864	34
Global Minimum Query (spencer) - Safety Factor: 1.10543	37
Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.10432	40
Interslice Data	43
Group 1 - Master Scenario	43
Global Minimum Query (bishop simplified) - Safety Factor: 1.1065	43
Global Minimum Query (janbu simplified) - Safety Factor: 1.07864	44
Global Minimum Query (spencer) - Safety Factor: 1.10543	45
Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.10432	46
Group 1 - Scenario 2	47
Global Minimum Query (bishop simplified) - Safety Factor: 1.1065	47
Global Minimum Query (janbu simplified) - Safety Factor: 1.07864	48
Global Minimum Query (spencer) - Safety Factor: 1.10543	49
Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.10432	50
Entity Information	51
Group 1	51
Shared Entities	51
Scenario-based Entities	51

Slide2 Analysis Information

Ziply Slope Stability

Project Summary

File Name:	Ziply Slope Stability.slmd
Slide2 Modeler Version:	9.036
Project Title:	Slide2 - An Interactive Slope Stability Program
Date Created:	8/14/2025, 10:27:42 AM

Currently Open Scenarios

Group Name	Scenario Name	Global Minimum	Compute Time
Group 1 	Master Scenario	Bishop Simplified: 1.106500 Janbu Simplified: 1.078640 Spencer: 1.105430 Gle/morgenstern-price: 1.104320	00h:00m:01.717s
	Scenario 2	Bishop Simplified: 1.106500 Janbu Simplified: 1.078640 Spencer: 1.105430 Gle/morgenstern-price: 1.104320	00h:00m:01.66s

General Settings

Units of Measurement:

Time Units:

Permeability Units:

Data Output:

Failure Direction:

Imperial Units

days

feet/second

Standard

Right to Left

Analysis Options

All Open Scenarios

Slices Type:	Vertical
	Analysis Methods Used
	Bishop simplified
	GLE/Morgenstern-Price with interslice force function (Half Sine)
	Janbu simplified
	Spencer
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

All Open Scenarios

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft ³]:	62.4
Advanced Groundwater Method:	None

Random Numbers

All Open Scenarios

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

All Open Scenarios

Surface Type:	Circular
Search Method:	Auto Refine Search
Divisions along slope:	20
Circles per division:	10
Number of iterations:	10
Divisions to use in next iteration:	50%
Composite Surfaces:	Disabled
Minimum Elevation:	Not Defined
Minimum Depth [ft]:	5
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic Loading

All Open Scenarios

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Loading

All Open Scenarios

1 Line Load present

Line Load #1

Angle from horizontal [deg]:

270

Magnitude:

1500

Materials

Medium Dense Sand

Color	
Strength Type	Mohr-Coulomb
Unit Weight	105 lbs/ft3
Cohesion	0 psf
Phi	35 °
Water Surface	Assigned per scenario
Hu Type	Custom
Hu	1
Specify alternate strength type above water surface	No

Very Dense Sand

Color	
Strength Type	Mohr-Coulomb
Unit Weight	110 lbs/ft3
Cohesion	0 psf
Phi	40 °
Water Surface	Assigned per scenario
Hu Type	Custom
Hu	1
Specify alternate strength type above water surface	No

Sandstone / Basalt Bedrock

Color	
Strength Type	Mohr-Coulomb
Unit Weight	120 lbs/ft3
Cohesion	1500 psf
Phi	20 °
Water Surface	Assigned per scenario
Hu Type	Custom
Hu	1
Specify alternate strength type above water surface	No

Materials In Use

Material		Group 1	Scenario 2
Medium Dense Sand		✓	✓
Very Dense Sand		✓	✓
Sandstone / Basalt Bedrock		✓	✓

Global Minimums

◆ Group 1 - Master Scenario

Method: bishop simplified

	FS	1.106500
Center:	-16.414, 99.612	
Radius:	93.374	
Left Slip Surface Endpoint:	10.139, 10.093	
Right Slip Surface Endpoint:	55.455, 40.000	
Resisting Moment:	897956 lb-ft	
Driving Moment:	811530 lb-ft	
Total Slice Area:	153.385 ft ²	
Surface Horizontal Width:	45.3156 ft	
Surface Average Height:	3.38482 ft	

Method: janbu simplified

	FS	1.078640
Center:	-16.414, 99.612	
Radius:	93.374	
Left Slip Surface Endpoint:	10.139, 10.093	
Right Slip Surface Endpoint:	55.455, 40.000	
Resisting Horizontal Force:	7937.11 lb	
Driving Horizontal Force:	7358.43 lb	
Total Slice Area:	153.385 ft ²	
Surface Horizontal Width:	45.3156 ft	
Surface Average Height:	3.38482 ft	

Method: spencer

	FS	1.105430
Center:	-16.414, 99.612	
Radius:	93.374	
Left Slip Surface Endpoint:	10.139, 10.093	
Right Slip Surface Endpoint:	55.455, 40.000	
Resisting Moment:	897089 lb-ft	
Driving Moment:	811530 lb-ft	
Resisting Horizontal Force:	8048.29 lb	
Driving Horizontal Force:	7280.69 lb	
Total Slice Area:	153.385 ft ²	
Surface Horizontal Width:	45.3156 ft	
Surface Average Height:	3.38482 ft	

Method: gle/morgenstern-price

	FS	1.104320
Center:	-16.414, 99.612	
Radius:	93.374	
Left Slip Surface Endpoint:	10.139, 10.093	
Right Slip Surface Endpoint:	55.455, 40.000	
Resisting Moment:	896185 lb-ft	
Driving Moment:	811530 lb-ft	
Resisting Horizontal Force:	8043.18 lb	
Driving Horizontal Force:	7283.4 lb	
Total Slice Area:	153.385 ft ²	
Surface Horizontal Width:	45.3156 ft	
Surface Average Height:	3.38482 ft	

◆ **Group 1 - Scenario 2**

Method: bishop simplified

	FS	1.106500
Center:	-16.414, 99.612	
Radius:	93.374	
Left Slip Surface Endpoint:	10.139, 10.093	
Right Slip Surface Endpoint:	55.455, 40.000	
Resisting Moment:	897956 lb-ft	
Driving Moment:	811530 lb-ft	
Total Slice Area:	153.385 ft ²	
Surface Horizontal Width:	45.3156 ft	
Surface Average Height:	3.38482 ft	

Method: janbu simplified

	FS	1.078640
Center:	-16.414, 99.612	
Radius:	93.374	
Left Slip Surface Endpoint:	10.139, 10.093	
Right Slip Surface Endpoint:	55.455, 40.000	
Resisting Horizontal Force:	7937.11 lb	
Driving Horizontal Force:	7358.43 lb	
Total Slice Area:	153.385 ft ²	
Surface Horizontal Width:	45.3156 ft	
Surface Average Height:	3.38482 ft	

Method: spencer

	FS	1.105430
Center:	-16.414, 99.612	
Radius:	93.374	
Left Slip Surface Endpoint:	10.139, 10.093	
Right Slip Surface Endpoint:	55.455, 40.000	
Resisting Moment:	897089 lb-ft	
Driving Moment:	811530 lb-ft	
Resisting Horizontal Force:	8048.29 lb	
Driving Horizontal Force:	7280.69 lb	
Total Slice Area:	153.385 ft ²	
Surface Horizontal Width:	45.3156 ft	
Surface Average Height:	3.38482 ft	

Method: gle/morgenstern-price

	FS	1.104320
Center:	-16.414, 99.612	
Radius:	93.374	
Left Slip Surface Endpoint:	10.139, 10.093	
Right Slip Surface Endpoint:	55.455, 40.000	
Resisting Moment:	896185 lb-ft	
Driving Moment:	811530 lb-ft	
Resisting Horizontal Force:	8043.18 lb	
Driving Horizontal Force:	7283.4 lb	
Total Slice Area:	153.385 ft ²	
Surface Horizontal Width:	45.3156 ft	
Surface Average Height:	3.38482 ft	

Global Minimum Support Data

All Open Scenarios

No Supports Present

Valid and Invalid Surfaces

◆ **Group 1 - Master Scenario**

Method: bishop simplified

Number of Valid Surfaces: 5666

Number of Invalid Surfaces: 1

Error Codes

Error Code -112 reported for 1 surface

Method: janbu simplified

Number of Valid Surfaces: 5667

Number of Invalid Surfaces: 0

Method: spencer

Number of Valid Surfaces: 3645

Number of Invalid Surfaces: 2022

Error Codes

Error Code -108 reported for 1 surface

Error Code -111 reported for 2019 surfaces

Error Code -112 reported for 2 surfaces

Method: gle/morgenstern-price

Number of Valid Surfaces: 5666

Number of Invalid Surfaces: 1

Error Codes

Error Code -112 reported for 1 surface

◆ **Group 1 - Scenario 2**

Method: bishop simplified

Number of Valid Surfaces: 5666

Number of Invalid Surfaces: 1

Error Codes

Error Code -112 reported for 1 surface

Method: janbu simplified

Number of Valid Surfaces: 5667

Number of Invalid Surfaces: 0

Method: spencer

Number of Valid Surfaces: 3645

Number of Invalid Surfaces: 2022

Error Codes

Error Code -108 reported for 1 surface

Error Code -111 reported for 2019 surfaces

Error Code -112 reported for 2 surfaces

Method: gle/morgenstern-price

Number of Valid Surfaces:	5666
Number of Invalid Surfaces:	1
Error Codes	
Error Code -112 reported for 1 surface	

Error Code Descriptions

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1 . This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).

-111 = Safety factor equation did not converge

-112 = The coefficient $M\text{-}\alpha = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F) < 0.2$ for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

Slice Data

◆ Group 1 - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 1.1065

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.906311	15.7194	16.8119	Medium Dense Sand	0	35	9.215	10.1964	14.562	0	14.562	17.3463	17.3463
2	0.906311	46.6789	17.3938	Medium Dense Sand	0	35	27.2034	30.1006	42.9882	0	42.9882	51.51	51.51
3	0.906311	76.675	17.9775	Medium Dense Sand	0	35	44.4213	49.1522	70.1966	0	70.1966	84.6107	84.6107
4	0.906311	105.698	18.5632	Medium Dense Sand	0	35	60.8737	67.3567	96.1954	0	96.1954	116.638	116.638
5	0.906311	133.739	19.1509	Medium Dense Sand	0	35	76.5653	84.7195	120.992	0	120.992	147.582	147.582
6	0.906311	160.786	19.7407	Medium Dense Sand	0	35	91.5002	101.245	144.593	0	144.593	177.429	177.429
7	0.906311	186.829	20.3326	Medium Dense Sand	0	35	105.684	116.939	167.006	0	167.006	206.168	206.168
8	0.906311	211.857	20.9269	Medium Dense Sand	0	35	119.119	131.805	188.237	0	188.237	233.788	233.788
9	0.906311	235.857	21.5235	Medium Dense Sand	0	35	131.808	145.846	208.29	0	208.29	260.273	260.273
10	0.906311	258.817	22.1226	Medium Dense Sand	0	35	143.757	159.067	227.171	0	227.171	285.611	285.611
11	0.906311	280.725	22.7242	Medium Dense Sand	0	35	154.967	171.471	244.886	0	244.886	309.787	309.787
12	0.906311	301.565	23.3285	Medium Dense Sand	0	35	165.441	183.061	261.438	0	261.438	332.786	332.786
13	0.906311	321.324	23.9355	Medium Dense Sand	0	35	175.183	193.84	276.831	0	276.831	354.592	354.592
14	0.906311	339.986	24.5455	Medium Dense Sand	0	35	184.192	203.809	291.07	0	291.07	375.187	375.187
15	0.906311	357.536	25.1584	Medium Dense Sand	0	35	192.474	212.972	304.156	0	304.156	394.557	394.557
16	0.906311	373.957	25.7744	Medium Dense Sand	0	35	200.027	221.33	316.092	0	316.092	412.678	412.678
17	0.906311	389.232	26.3936	Medium Dense Sand	0	35	206.855	228.885	326.881	0	326.881	429.536	429.536
18	0.906311	403.341	27.0161	Medium Dense Sand	0	35	212.958	235.638	336.525	0	336.525	445.108	445.108
19	0.906311	416.267	27.6421	Medium Dense Sand	0	35	218.336	241.589	345.026	0	345.026	459.374	459.374
20	0.906311	427.988	28.2718	Medium Dense Sand	0	35	222.992	246.741	352.383	0	352.383	472.31	472.31

21	0.906311	438.483	28.9051	Medium Dense Sand	0	35	226.925	251.093	358.598	0	358.598	483.894	483.894
22	0.906311	447.73	29.5424	Medium Dense Sand	0	35	230.136	254.645	363.671	0	363.671	494.1	494.1
23	0.906311	455.706	30.1837	Medium Dense Sand	0	35	232.624	257.398	367.602	0	367.602	502.904	502.904
24	0.906311	462.385	30.8292	Medium Dense Sand	0	35	234.389	259.351	370.391	0	370.391	510.276	510.276
25	0.906311	467.742	31.4791	Medium Dense Sand	0	35	235.43	260.503	372.037	0	372.037	516.19	516.19
26	0.906311	471.75	32.1335	Medium Dense Sand	0	35	235.747	260.854	372.538	0	372.538	520.614	520.614
27	0.906311	474.378	32.7926	Medium Dense Sand	0	35	235.339	260.403	371.894	0	371.894	523.517	523.517
28	0.906311	475.597	33.4567	Medium Dense Sand	0	35	234.205	259.148	370.101	0	370.101	524.863	524.863
29	0.906311	475.373	34.1259	Medium Dense Sand	0	35	232.343	257.087	367.158	0	367.158	524.619	524.619
30	0.906311	473.674	34.8004	Medium Dense Sand	0	35	229.751	254.219	363.062	0	363.062	522.746	522.746
31	0.906311	470.462	35.4805	Medium Dense Sand	0	35	226.427	250.541	357.81	0	357.81	519.202	519.202
32	0.906311	465.7	36.1665	Medium Dense Sand	0	35	222.37	246.052	351.399	0	351.399	513.949	513.949
33	0.906311	459.346	36.8584	Medium Dense Sand	0	35	217.576	240.748	343.824	0	343.824	506.938	506.938
34	0.906311	451.357	37.5567	Medium Dense Sand	0	35	212.044	234.627	335.083	0	335.083	498.124	498.124
35	0.906311	441.687	38.2616	Medium Dense Sand	0	35	205.771	227.686	325.169	0	325.169	487.454	487.454
36	0.906311	430.288	38.9734	Medium Dense Sand	0	35	198.754	219.921	314.08	0	314.08	474.875	474.875
37	0.906311	417.106	39.6925	Medium Dense Sand	0	35	190.989	211.329	301.809	0	301.809	460.328	460.328
38	0.906311	402.086	40.4191	Medium Dense Sand	0	35	182.474	201.907	288.352	0	288.352	443.754	443.754
39	0.906311	385.168	41.1536	Medium Dense Sand	0	35	173.204	191.65	273.704	0	273.704	425.085	425.085
40	0.906311	366.288	41.8965	Medium Dense Sand	0	35	163.176	180.554	257.858	0	257.858	404.249	404.249
41	0.906311	345.377	42.6481	Medium Dense Sand	0	35	152.388	168.617	240.809	0	240.809	381.173	381.173
42	0.906311	322.362	43.4089	Medium Dense Sand	0	35	140.834	155.833	222.552	0	222.552	355.774	355.774
43	0.906311	297.162	44.1794	Medium Dense Sand	0	35	128.512	142.198	203.081	0	203.081	327.963	327.963
44	0.906311	269.69	44.9601	Medium Dense Sand	0	35	115.418	127.71	182.388	0	182.388	297.646	297.646
45	0.906311	239.855	45.7516	Medium Dense Sand	0	35	101.548	112.363	160.471	0	160.471	264.718	264.718

46	0.906311	207.554	46.5545	Medium Dense Sand	0	35	86.8995	96.1543	137.323	0	137.323	229.07	229.07
47	0.906311	172.676	47.3694	Medium Dense Sand	0	35	71.4691	79.0806	112.939	0	112.939	190.578	190.578
48	0.906311	135.102	48.1971	Medium Dense Sand	0	35	55.2546	61.1392	87.3156	0	87.3156	149.108	149.108
49	0.906311	94.6981	49.0385	Medium Dense Sand	0	35	38.254	42.3281	60.4507	0	60.4507	104.517	104.517
50	0.906311	44.0731	49.8943	Medium Dense Sand	0	35	17.5762	19.4481	27.7747	0	27.7747	48.643	48.643

Global Minimum Query (Janbu Simplified) - Safety Factor: 1.07864

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.906311	15.7194	16.8119	Medium Dense Sand	0	35	9.41519	10.1556	14.5037	0	14.5037	17.3485	17.3485
2	0.906311	46.6789	17.3938	Medium Dense Sand	0	35	27.7909	29.9764	42.8107	0	42.8107	51.5166	51.5166
3	0.906311	76.675	17.9775	Medium Dense Sand	0	35	45.375	48.9433	69.8983	0	69.8983	84.6219	84.6219
4	0.906311	105.698	18.5632	Medium Dense Sand	0	35	62.173	67.0623	95.7748	0	95.7748	116.654	116.654
5	0.906311	133.739	19.1509	Medium Dense Sand	0	35	78.1899	84.3388	120.448	0	120.448	147.602	147.602
6	0.906311	160.786	19.7407	Medium Dense Sand	0	35	93.4306	100.778	143.927	0	143.927	177.455	177.455
7	0.906311	186.829	20.3326	Medium Dense Sand	0	35	107.9	116.385	166.215	0	166.215	206.199	206.199
8	0.906311	211.857	20.9269	Medium Dense Sand	0	35	121.601	131.164	187.322	0	187.322	233.823	233.823
9	0.906311	235.857	21.5235	Medium Dense Sand	0	35	134.54	145.12	207.253	0	207.253	260.313	260.313
10	0.906311	258.817	22.1226	Medium Dense Sand	0	35	146.718	158.256	226.013	0	226.013	285.657	285.657
11	0.906311	280.725	22.7242	Medium Dense Sand	0	35	158.14	170.576	243.608	0	243.608	309.837	309.837
12	0.906311	301.565	23.3285	Medium Dense Sand	0	35	168.808	182.083	260.042	0	260.042	332.842	332.842
13	0.906311	321.324	23.9355	Medium Dense Sand	0	35	178.726	192.781	275.319	0	275.319	354.652	354.652
14	0.906311	339.986	24.5455	Medium Dense Sand	0	35	187.895	202.671	289.444	0	289.444	375.252	375.252
15	0.906311	357.536	25.1584	Medium Dense Sand	0	35	196.319	211.757	302.42	0	302.42	394.627	394.627
16	0.906311	373.957	25.7744	Medium Dense Sand	0	35	203.998	220.04	314.25	0	314.25	412.753	412.753
17	0.906311	389.232	26.3936	Medium Dense Sand	0	35	210.935	227.523	324.936	0	324.936	429.616	429.616
18	0.906311	403.341	27.0161	Medium Dense Sand	0	35	217.131	234.206	334.481	0	334.481	445.191	445.191
19	0.906311	416.267	27.6421	Medium Dense Sand	0	35	222.588	240.092	342.887	0	342.887	459.462	459.462
20	0.906311	427.988	28.2718	Medium Dense Sand	0	35	227.306	245.181	350.156	0	350.156	472.403	472.403
21	0.906311	438.483	28.9051	Medium Dense Sand	0	35	231.287	249.475	356.286	0	356.286	483.99	483.99
22	0.906311	447.73	29.5424	Medium Dense Sand	0	35	234.529	252.972	361.281	0	361.281	494.2	494.2
23	0.906311	455.706	30.1837	Medium Dense Sand	0	35	237.035	255.675	365.142	0	365.142	503.009	503.009

Ziply Slope Stability

Thursday, August 14, 2025

24	0.906311	462.385	30.8292	Medium Dense Sand	0	35	238.803	257.582	367.865	0	367.865	510.385	510.385
25	0.906311	467.742	31.4791	Medium Dense Sand	0	35	239.833	258.693	369.452	0	369.452	516.301	516.301
26	0.906311	471.75	32.1335	Medium Dense Sand	0	35	240.126	259.009	369.902	0	369.902	520.728	520.728
27	0.906311	474.378	32.7926	Medium Dense Sand	0	35	239.679	258.527	369.215	0	369.215	523.634	523.634
28	0.906311	475.597	33.4567	Medium Dense Sand	0	35	238.492	257.247	367.387	0	367.387	524.982	524.982
29	0.906311	475.373	34.1259	Medium Dense Sand	0	35	236.565	255.168	364.418	0	364.418	524.74	524.74
30	0.906311	473.674	34.8004	Medium Dense Sand	0	35	233.895	252.288	360.304	0	360.304	522.868	522.868
31	0.906311	470.462	35.4805	Medium Dense Sand	0	35	230.48	248.605	355.045	0	355.045	519.327	519.327
32	0.906311	465.7	36.1665	Medium Dense Sand	0	35	226.32	244.118	348.636	0	348.636	514.074	514.074
33	0.906311	459.346	36.8584	Medium Dense Sand	0	35	221.411	238.823	341.075	0	341.075	507.064	507.064
34	0.906311	451.357	37.5567	Medium Dense Sand	0	35	215.752	232.719	332.357	0	332.357	498.249	498.249
35	0.906311	441.687	38.2616	Medium Dense Sand	0	35	209.34	225.802	322.48	0	322.48	487.579	487.579
36	0.906311	430.288	38.9734	Medium Dense Sand	0	35	202.172	218.071	311.438	0	311.438	474.998	474.998
37	0.906311	417.106	39.6925	Medium Dense Sand	0	35	194.246	209.521	299.228	0	299.228	460.451	460.451
38	0.906311	402.086	40.4191	Medium Dense Sand	0	35	185.558	200.15	285.845	0	285.845	443.873	443.873
39	0.906311	385.168	41.1536	Medium Dense Sand	0	35	176.106	189.955	271.284	0	271.284	425.201	425.201
40	0.906311	366.288	41.8965	Medium Dense Sand	0	35	165.886	178.931	255.54	0	255.54	404.362	404.362
41	0.906311	345.377	42.6481	Medium Dense Sand	0	35	154.894	167.075	238.608	0	238.608	381.281	381.281
42	0.906311	322.362	43.4089	Medium Dense Sand	0	35	143.128	154.384	220.484	0	220.484	355.876	355.876
43	0.906311	297.162	44.1794	Medium Dense Sand	0	35	130.586	140.855	201.161	0	201.161	328.059	328.059
44	0.906311	269.69	44.9601	Medium Dense Sand	0	35	117.262	126.483	180.636	0	180.636	297.734	297.734
45	0.906311	239.855	45.7516	Medium Dense Sand	0	35	103.153	111.265	158.903	0	158.903	264.799	264.799
46	0.906311	207.554	46.5545	Medium Dense Sand	0	35	88.2583	95.1989	135.958	0	135.958	229.14	229.14
47	0.906311	172.676	47.3694	Medium Dense Sand	0	35	72.5744	78.2816	111.798	0	111.798	190.637	190.637
48	0.906311	135.102	48.1971	Medium Dense Sand	0	35	56.0993	60.5109	86.4184	0	86.4184	149.156	149.156

49	0.906311	94.6981	49.0385	Medium Dense Sand	0	35	38.8319	41.8856	59.8188	0	59.8188	104.55	104.55
50	0.906311	44.0731	49.8943	Medium Dense Sand	0	35	17.8384	19.2412	27.4793	0	27.4793	48.6588	48.6588

Global Minimum Query (spencer) - Safety Factor: 1.10543

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.906311	15.7194	16.8119	Medium Dense Sand	0	35	11.1648	12.3419	17.626	0	17.626	20.9994	20.9994
2	0.906311	46.6789	17.3938	Medium Dense Sand	0	35	32.7011	36.1488	51.6259	0	51.6259	61.8699	61.8699
3	0.906311	76.675	17.9775	Medium Dense Sand	0	35	52.9825	58.5684	83.6443	0	83.6443	100.836	100.836
4	0.906311	105.698	18.5632	Medium Dense Sand	0	35	72.0422	79.6376	113.734	0	113.734	137.928	137.928
5	0.906311	133.739	19.1509	Medium Dense Sand	0	35	89.9127	99.3922	141.947	0	141.947	173.172	173.172
6	0.906311	160.786	19.7407	Medium Dense Sand	0	35	106.625	117.866	168.331	0	168.331	206.594	206.594
7	0.906311	186.829	20.3326	Medium Dense Sand	0	35	122.209	135.093	192.934	0	192.934	238.219	238.219
8	0.906311	211.857	20.9269	Medium Dense Sand	0	35	136.693	151.104	215.8	0	215.8	268.071	268.071
9	0.906311	235.857	21.5235	Medium Dense Sand	0	35	150.104	165.93	236.972	0	236.972	296.171	296.171
10	0.906311	258.817	22.1226	Medium Dense Sand	0	35	162.471	179.6	256.495	0	256.495	322.542	322.542
11	0.906311	280.725	22.7242	Medium Dense Sand	0	35	173.817	192.142	274.407	0	274.407	347.202	347.202
12	0.906311	301.565	23.3285	Medium Dense Sand	0	35	184.166	203.583	290.747	0	290.747	370.17	370.17
13	0.906311	321.324	23.9355	Medium Dense Sand	0	35	193.545	213.95	305.553	0	305.553	391.464	391.464
14	0.906311	339.986	24.5455	Medium Dense Sand	0	35	201.974	223.268	318.86	0	318.86	411.098	411.098
15	0.906311	357.536	25.1584	Medium Dense Sand	0	35	209.477	231.562	330.705	0	330.705	429.091	429.091
16	0.906311	373.957	25.7744	Medium Dense Sand	0	35	216.073	238.854	341.118	0	341.118	445.452	445.452
17	0.906311	389.232	26.3936	Medium Dense Sand	0	35	221.784	245.167	350.134	0	350.134	460.198	460.198
18	0.906311	403.341	27.0161	Medium Dense Sand	0	35	226.63	250.524	357.785	0	357.785	473.339	473.339
19	0.906311	416.267	27.6421	Medium Dense Sand	0	35	230.63	254.945	364.099	0	364.099	484.886	484.886
20	0.906311	427.988	28.2718	Medium Dense Sand	0	35	233.801	258.451	369.107	0	369.107	494.847	494.847
21	0.906311	438.483	28.9051	Medium Dense Sand	0	35	236.163	261.062	372.836	0	372.836	503.233	503.233
22	0.906311	447.73	29.5424	Medium Dense Sand	0	35	237.733	262.797	375.314	0	375.314	510.049	510.049
23	0.906311	455.706	30.1837	Medium Dense Sand	0	35	238.527	263.675	376.567	0	376.567	515.302	515.302

Ziply Slope Stability

Thursday, August 14, 2025

24	0.906311	462.385	30.8292	Medium Dense Sand	0	35	238.561	263.713	376.62	0	376.62	518.996	518.996
25	0.906311	467.742	31.4791	Medium Dense Sand	0	35	237.851	262.928	375.501	0	375.501	521.137	521.137
26	0.906311	471.75	32.1335	Medium Dense Sand	0	35	236.414	261.339	373.23	0	373.23	521.725	521.725
27	0.906311	474.378	32.7926	Medium Dense Sand	0	35	234.262	258.96	369.834	0	369.834	520.762	520.762
28	0.906311	475.597	33.4567	Medium Dense Sand	0	35	231.411	255.809	365.333	0	365.333	518.25	518.25
29	0.906311	475.373	34.1259	Medium Dense Sand	0	35	227.875	251.9	359.75	0	359.75	514.184	514.184
30	0.906311	473.674	34.8004	Medium Dense Sand	0	35	223.667	247.248	353.107	0	353.107	508.562	508.562
31	0.906311	470.462	35.4805	Medium Dense Sand	0	35	218.801	241.869	345.425	0	345.425	501.382	501.382
32	0.906311	465.7	36.1665	Medium Dense Sand	0	35	213.289	235.776	336.723	0	336.723	492.636	492.636
33	0.906311	459.346	36.8584	Medium Dense Sand	0	35	207.145	228.984	327.023	0	327.023	482.317	482.317
34	0.906311	451.357	37.5567	Medium Dense Sand	0	35	200.38	221.506	316.343	0	316.343	470.415	470.415
35	0.906311	441.687	38.2616	Medium Dense Sand	0	35	193.006	213.355	304.702	0	304.702	456.919	456.919
36	0.906311	430.288	38.9734	Medium Dense Sand	0	35	185.037	204.545	292.12	0	292.12	441.818	441.818
37	0.906311	417.106	39.6925	Medium Dense Sand	0	35	176.482	195.088	278.614	0	278.614	425.093	425.093
38	0.906311	402.086	40.4191	Medium Dense Sand	0	35	167.353	184.997	264.203	0	264.203	406.728	406.728
39	0.906311	385.168	41.1536	Medium Dense Sand	0	35	157.663	174.285	248.905	0	248.905	386.703	386.703
40	0.906311	366.288	41.8965	Medium Dense Sand	0	35	147.421	162.964	232.736	0	232.736	364.994	364.994
41	0.906311	345.377	42.6481	Medium Dense Sand	0	35	136.64	151.046	215.716	0	215.716	341.575	341.575
42	0.906311	322.362	43.4089	Medium Dense Sand	0	35	125.33	138.543	197.859	0	197.859	316.414	316.414
43	0.906311	297.162	44.1794	Medium Dense Sand	0	35	113.501	125.467	179.186	0	179.186	289.481	289.481
44	0.906311	269.69	44.9601	Medium Dense Sand	0	35	101.165	111.831	159.712	0	159.712	260.736	260.736
45	0.906311	239.855	45.7516	Medium Dense Sand	0	35	88.3337	97.6467	139.454	0	139.454	230.136	230.136
46	0.906311	207.554	46.5545	Medium Dense Sand	0	35	75.0174	82.9265	118.431	0	118.431	197.634	197.634
47	0.906311	172.676	47.3694	Medium Dense Sand	0	35	61.2276	67.6828	96.6607	0	96.6607	163.174	163.174
48	0.906311	135.102	48.1971	Medium Dense Sand	0	35	46.9759	51.9286	74.1617	0	74.1617	126.696	126.696

49	0.906311	94.6981	49.0385	Medium Dense Sand	0	35	32.2744	35.6771	50.9522	0	50.9522	88.13	88.13
50	0.906311	44.0731	49.8943	Medium Dense Sand	0	35	15.0136	16.5965	23.7022	0	23.7022	41.5279	41.5279

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.10432

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.906311	15.7194	16.8119	Medium Dense Sand	0	35	9.35019	10.3256	14.7464	0	14.7464	17.5716	17.5716
2	0.906311	46.6789	17.3938	Medium Dense Sand	0	35	28.061	30.9883	44.2559	0	44.2559	53.0463	53.0463
3	0.906311	76.675	17.9775	Medium Dense Sand	0	35	46.6073	51.4694	73.5059	0	73.5059	88.6294	88.6294
4	0.906311	105.698	18.5632	Medium Dense Sand	0	35	64.8886	71.6578	102.338	0	102.338	124.129	124.129
5	0.906311	133.739	19.1509	Medium Dense Sand	0	35	82.7951	91.4323	130.579	0	130.579	159.331	159.331
6	0.906311	160.786	19.7407	Medium Dense Sand	0	35	100.212	110.666	158.047	0	158.047	194.008	194.008
7	0.906311	186.829	20.3326	Medium Dense Sand	0	35	117.02	129.228	184.557	0	184.557	227.92	227.92
8	0.906311	211.857	20.9269	Medium Dense Sand	0	35	133.107	146.993	209.927	0	209.927	260.828	260.828
9	0.906311	235.857	21.5235	Medium Dense Sand	0	35	148.36	163.837	233.983	0	233.983	292.494	292.494
10	0.906311	258.817	22.1226	Medium Dense Sand	0	35	162.678	179.649	256.564	0	256.564	322.696	322.696
11	0.906311	280.725	22.7242	Medium Dense Sand	0	35	175.969	194.326	277.526	0	277.526	351.223	351.223
12	0.906311	301.565	23.3285	Medium Dense Sand	0	35	188.156	207.784	296.747	0	296.747	377.891	377.891
13	0.906311	321.324	23.9355	Medium Dense Sand	0	35	199.176	219.954	314.126	0	314.126	402.537	402.537
14	0.906311	339.986	24.5455	Medium Dense Sand	0	35	208.982	230.783	329.592	0	329.592	425.031	425.031
15	0.906311	357.536	25.1584	Medium Dense Sand	0	35	217.545	240.239	343.097	0	343.097	445.272	445.272
16	0.906311	373.957	25.7744	Medium Dense Sand	0	35	224.851	248.308	354.621	0	354.621	463.194	463.194
17	0.906311	389.232	26.3936	Medium Dense Sand	0	35	230.907	254.995	364.171	0	364.171	478.762	478.762
18	0.906311	403.341	27.0161	Medium Dense Sand	0	35	235.731	260.322	371.778	0	371.778	491.972	491.972
19	0.906311	416.267	27.6421	Medium Dense Sand	0	35	239.355	264.324	377.494	0	377.494	502.85	502.85
20	0.906311	427.988	28.2718	Medium Dense Sand	0	35	241.828	267.055	381.394	0	381.394	511.451	511.451
21	0.906311	438.483	28.9051	Medium Dense Sand	0	35	243.204	268.575	383.566	0	383.566	517.85	517.85
22	0.906311	447.73	29.5424	Medium Dense Sand	0	35	243.551	268.958	384.112	0	384.112	522.145	522.145
23	0.906311	455.706	30.1837	Medium Dense Sand	0	35	242.939	268.282	383.146	0	383.146	524.447	524.447

24	0.906311	462.385	30.8292	Medium Dense Sand	0	35	241.441	266.628	380.785	0	380.785	524.879	524.879
25	0.906311	467.742	31.4791	Medium Dense Sand	0	35	239.135	264.082	377.147	0	377.147	523.57	523.57
26	0.906311	471.75	32.1335	Medium Dense Sand	0	35	236.096	260.725	372.354	0	372.354	520.649	520.649
27	0.906311	474.378	32.7926	Medium Dense Sand	0	35	232.396	256.639	366.519	0	366.519	516.245	516.245
28	0.906311	475.597	33.4567	Medium Dense Sand	0	35	228.101	251.897	359.746	0	359.746	510.476	510.476
29	0.906311	475.373	34.1259	Medium Dense Sand	0	35	223.277	246.569	352.137	0	352.137	503.454	503.454
30	0.906311	473.674	34.8004	Medium Dense Sand	0	35	217.975	240.714	343.776	0	343.776	495.275	495.275
31	0.906311	470.462	35.4805	Medium Dense Sand	0	35	212.245	234.386	334.737	0	334.737	486.021	486.021
32	0.906311	465.7	36.1665	Medium Dense Sand	0	35	206.122	227.625	325.082	0	325.082	475.755	475.755
33	0.906311	459.346	36.8584	Medium Dense Sand	0	35	199.638	220.464	314.856	0	314.856	464.522	464.522
34	0.906311	451.357	37.5567	Medium Dense Sand	0	35	192.813	212.927	304.092	0	304.092	452.346	452.346
35	0.906311	441.687	38.2616	Medium Dense Sand	0	35	185.659	205.027	292.809	0	292.809	439.232	439.232
36	0.906311	430.288	38.9734	Medium Dense Sand	0	35	178.178	196.766	281.011	0	281.011	425.16	425.16
37	0.906311	417.106	39.6925	Medium Dense Sand	0	35	170.366	188.139	268.69	0	268.69	410.093	410.093
38	0.906311	402.086	40.4191	Medium Dense Sand	0	35	162.209	179.131	255.825	0	255.825	393.969	393.969
39	0.906311	385.168	41.1536	Medium Dense Sand	0	35	153.686	169.718	242.383	0	242.383	376.704	376.704
40	0.906311	366.288	41.8965	Medium Dense Sand	0	35	144.765	159.867	228.315	0	228.315	358.189	358.189
41	0.906311	345.377	42.6481	Medium Dense Sand	0	35	135.412	149.538	213.562	0	213.562	338.289	338.289
42	0.906311	322.362	43.4089	Medium Dense Sand	0	35	125.577	138.677	198.051	0	198.051	316.84	316.84
43	0.906311	297.162	44.1794	Medium Dense Sand	0	35	115.205	127.223	181.693	0	181.693	293.644	293.644
44	0.906311	269.69	44.9601	Medium Dense Sand	0	35	104.229	115.102	164.383	0	164.383	268.467	268.467
45	0.906311	239.855	45.7516	Medium Dense Sand	0	35	92.571	102.228	145.996	0	145.996	241.029	241.029
46	0.906311	207.554	46.5545	Medium Dense Sand	0	35	80.1394	88.4995	126.39	0	126.39	211.001	211.001
47	0.906311	172.676	47.3694	Medium Dense Sand	0	35	66.8274	73.7988	105.396	0	105.396	177.992	177.992
48	0.906311	135.102	48.1971	Medium Dense Sand	0	35	52.5119	57.9899	82.8182	0	82.8182	141.544	141.544

49	0.906311	94.6981	49.0385	Medium Dense Sand	0	35	37.0512	40.9164	58.4346	0	58.4346	101.115	101.115
50	0.906311	44.0731	49.8943	Medium Dense Sand	0	35	17.3911	19.2053	27.428	0	27.428	48.0764	48.0764

◆ Group 1 - Scenario 2

Global Minimum Query (bishop simplified) - Safety Factor: 1.1065

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.906311	15.7194	16.8119	Medium Dense Sand	0	35	9.215	10.1964	14.562	0	14.562	17.3463	17.3463
2	0.906311	46.6789	17.3938	Medium Dense Sand	0	35	27.2034	30.1006	42.9882	0	42.9882	51.51	51.51
3	0.906311	76.675	17.9775	Medium Dense Sand	0	35	44.4213	49.1522	70.1966	0	70.1966	84.6107	84.6107
4	0.906311	105.698	18.5632	Medium Dense Sand	0	35	60.8737	67.3567	96.1954	0	96.1954	116.638	116.638
5	0.906311	133.739	19.1509	Medium Dense Sand	0	35	76.5653	84.7195	120.992	0	120.992	147.582	147.582
6	0.906311	160.786	19.7407	Medium Dense Sand	0	35	91.5002	101.245	144.593	0	144.593	177.429	177.429
7	0.906311	186.829	20.3326	Medium Dense Sand	0	35	105.684	116.939	167.006	0	167.006	206.168	206.168
8	0.906311	211.857	20.9269	Medium Dense Sand	0	35	119.119	131.805	188.237	0	188.237	233.788	233.788
9	0.906311	235.857	21.5235	Medium Dense Sand	0	35	131.808	145.846	208.29	0	208.29	260.273	260.273
10	0.906311	258.817	22.1226	Medium Dense Sand	0	35	143.757	159.067	227.171	0	227.171	285.611	285.611
11	0.906311	280.725	22.7242	Medium Dense Sand	0	35	154.967	171.471	244.886	0	244.886	309.787	309.787
12	0.906311	301.565	23.3285	Medium Dense Sand	0	35	165.441	183.061	261.438	0	261.438	332.786	332.786
13	0.906311	321.324	23.9355	Medium Dense Sand	0	35	175.183	193.84	276.831	0	276.831	354.592	354.592
14	0.906311	339.986	24.5455	Medium Dense Sand	0	35	184.192	203.809	291.07	0	291.07	375.187	375.187
15	0.906311	357.536	25.1584	Medium Dense Sand	0	35	192.474	212.972	304.156	0	304.156	394.557	394.557
16	0.906311	373.957	25.7744	Medium Dense Sand	0	35	200.027	221.33	316.092	0	316.092	412.678	412.678
17	0.906311	389.232	26.3936	Medium Dense Sand	0	35	206.855	228.885	326.881	0	326.881	429.536	429.536
18	0.906311	403.341	27.0161	Medium Dense Sand	0	35	212.958	235.638	336.525	0	336.525	445.108	445.108
19	0.906311	416.267	27.6421	Medium Dense Sand	0	35	218.336	241.589	345.026	0	345.026	459.374	459.374
20	0.906311	427.988	28.2718	Medium Dense Sand	0	35	222.992	246.741	352.383	0	352.383	472.31	472.31
21	0.906311	438.483	28.9051	Medium Dense Sand	0	35	226.925	251.093	358.598	0	358.598	483.894	483.894
22	0.906311	447.73	29.5424	Medium Dense Sand	0	35	230.136	254.645	363.671	0	363.671	494.1	494.1

23	0.906311	455.706	30.1837	Medium Dense Sand	0	35	232.624	257.398	367.602	0	367.602	502.904	502.904
24	0.906311	462.385	30.8292	Medium Dense Sand	0	35	234.389	259.351	370.391	0	370.391	510.276	510.276
25	0.906311	467.742	31.4791	Medium Dense Sand	0	35	235.43	260.503	372.037	0	372.037	516.19	516.19
26	0.906311	471.75	32.1335	Medium Dense Sand	0	35	235.747	260.854	372.538	0	372.538	520.614	520.614
27	0.906311	474.378	32.7926	Medium Dense Sand	0	35	235.339	260.403	371.894	0	371.894	523.517	523.517
28	0.906311	475.597	33.4567	Medium Dense Sand	0	35	234.205	259.148	370.101	0	370.101	524.863	524.863
29	0.906311	475.373	34.1259	Medium Dense Sand	0	35	232.343	257.087	367.158	0	367.158	524.619	524.619
30	0.906311	473.674	34.8004	Medium Dense Sand	0	35	229.751	254.219	363.062	0	363.062	522.746	522.746
31	0.906311	470.462	35.4805	Medium Dense Sand	0	35	226.427	250.541	357.81	0	357.81	519.202	519.202
32	0.906311	465.7	36.1665	Medium Dense Sand	0	35	222.37	246.052	351.399	0	351.399	513.949	513.949
33	0.906311	459.346	36.8584	Medium Dense Sand	0	35	217.576	240.748	343.824	0	343.824	506.938	506.938
34	0.906311	451.357	37.5567	Medium Dense Sand	0	35	212.044	234.627	335.083	0	335.083	498.124	498.124
35	0.906311	441.687	38.2616	Medium Dense Sand	0	35	205.771	227.686	325.169	0	325.169	487.454	487.454
36	0.906311	430.288	38.9734	Medium Dense Sand	0	35	198.754	219.921	314.08	0	314.08	474.875	474.875
37	0.906311	417.106	39.6925	Medium Dense Sand	0	35	190.989	211.329	301.809	0	301.809	460.328	460.328
38	0.906311	402.086	40.4191	Medium Dense Sand	0	35	182.474	201.907	288.352	0	288.352	443.754	443.754
39	0.906311	385.168	41.1536	Medium Dense Sand	0	35	173.204	191.65	273.704	0	273.704	425.085	425.085
40	0.906311	366.288	41.8965	Medium Dense Sand	0	35	163.176	180.554	257.858	0	257.858	404.249	404.249
41	0.906311	345.377	42.6481	Medium Dense Sand	0	35	152.388	168.617	240.809	0	240.809	381.173	381.173
42	0.906311	322.362	43.4089	Medium Dense Sand	0	35	140.834	155.833	222.552	0	222.552	355.774	355.774
43	0.906311	297.162	44.1794	Medium Dense Sand	0	35	128.512	142.198	203.081	0	203.081	327.963	327.963
44	0.906311	269.69	44.9601	Medium Dense Sand	0	35	115.418	127.71	182.388	0	182.388	297.646	297.646
45	0.906311	239.855	45.7516	Medium Dense Sand	0	35	101.548	112.363	160.471	0	160.471	264.718	264.718
46	0.906311	207.554	46.5545	Medium Dense Sand	0	35	86.8995	96.1543	137.323	0	137.323	229.07	229.07
47	0.906311	172.676	47.3694	Medium Dense Sand	0	35	71.4691	79.0806	112.939	0	112.939	190.578	190.578

48	0.906311	135.102	48.1971	Medium Dense Sand	0	35	55.2546	61.1392	87.3156	0	87.3156	149.108	149.108
49	0.906311	94.6981	49.0385	Medium Dense Sand	0	35	38.254	42.3281	60.4507	0	60.4507	104.517	104.517
50	0.906311	44.0731	49.8943	Medium Dense Sand	0	35	17.5762	19.4481	27.7747	0	27.7747	48.643	48.643

Global Minimum Query (janbu simplified) - Safety Factor: 1.07864

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.906311	15.7194	16.8119	Medium Dense Sand	0	35	9.41519	10.1556	14.5037	0	14.5037	17.3485	17.3485
2	0.906311	46.6789	17.3938	Medium Dense Sand	0	35	27.7909	29.9764	42.8107	0	42.8107	51.5166	51.5166
3	0.906311	76.675	17.9775	Medium Dense Sand	0	35	45.375	48.9433	69.8983	0	69.8983	84.6219	84.6219
4	0.906311	105.698	18.5632	Medium Dense Sand	0	35	62.173	67.0623	95.7748	0	95.7748	116.654	116.654
5	0.906311	133.739	19.1509	Medium Dense Sand	0	35	78.1899	84.3388	120.448	0	120.448	147.602	147.602
6	0.906311	160.786	19.7407	Medium Dense Sand	0	35	93.4306	100.778	143.927	0	143.927	177.455	177.455
7	0.906311	186.829	20.3326	Medium Dense Sand	0	35	107.9	116.385	166.215	0	166.215	206.199	206.199
8	0.906311	211.857	20.9269	Medium Dense Sand	0	35	121.601	131.164	187.322	0	187.322	233.823	233.823
9	0.906311	235.857	21.5235	Medium Dense Sand	0	35	134.54	145.12	207.253	0	207.253	260.313	260.313
10	0.906311	258.817	22.1226	Medium Dense Sand	0	35	146.718	158.256	226.013	0	226.013	285.657	285.657
11	0.906311	280.725	22.7242	Medium Dense Sand	0	35	158.14	170.576	243.608	0	243.608	309.837	309.837
12	0.906311	301.565	23.3285	Medium Dense Sand	0	35	168.808	182.083	260.042	0	260.042	332.842	332.842
13	0.906311	321.324	23.9355	Medium Dense Sand	0	35	178.726	192.781	275.319	0	275.319	354.652	354.652
14	0.906311	339.986	24.5455	Medium Dense Sand	0	35	187.895	202.671	289.444	0	289.444	375.252	375.252
15	0.906311	357.536	25.1584	Medium Dense Sand	0	35	196.319	211.757	302.42	0	302.42	394.627	394.627
16	0.906311	373.957	25.7744	Medium Dense Sand	0	35	203.998	220.04	314.25	0	314.25	412.753	412.753
17	0.906311	389.232	26.3936	Medium Dense Sand	0	35	210.935	227.523	324.936	0	324.936	429.616	429.616
18	0.906311	403.341	27.0161	Medium Dense Sand	0	35	217.131	234.206	334.481	0	334.481	445.191	445.191
19	0.906311	416.267	27.6421	Medium Dense Sand	0	35	222.588	240.092	342.887	0	342.887	459.462	459.462
20	0.906311	427.988	28.2718	Medium Dense Sand	0	35	227.306	245.181	350.156	0	350.156	472.403	472.403
21	0.906311	438.483	28.9051	Medium Dense Sand	0	35	231.287	249.475	356.286	0	356.286	483.99	483.99
22	0.906311	447.73	29.5424	Medium Dense Sand	0	35	234.529	252.972	361.281	0	361.281	494.2	494.2
23	0.906311	455.706	30.1837	Medium Dense Sand	0	35	237.035	255.675	365.142	0	365.142	503.009	503.009

24	0.906311	462.385	30.8292	Medium Dense Sand	0	35	238.803	257.582	367.865	0	367.865	510.385	510.385
25	0.906311	467.742	31.4791	Medium Dense Sand	0	35	239.833	258.693	369.452	0	369.452	516.301	516.301
26	0.906311	471.75	32.1335	Medium Dense Sand	0	35	240.126	259.009	369.902	0	369.902	520.728	520.728
27	0.906311	474.378	32.7926	Medium Dense Sand	0	35	239.679	258.527	369.215	0	369.215	523.634	523.634
28	0.906311	475.597	33.4567	Medium Dense Sand	0	35	238.492	257.247	367.387	0	367.387	524.982	524.982
29	0.906311	475.373	34.1259	Medium Dense Sand	0	35	236.565	255.168	364.418	0	364.418	524.74	524.74
30	0.906311	473.674	34.8004	Medium Dense Sand	0	35	233.895	252.288	360.304	0	360.304	522.868	522.868
31	0.906311	470.462	35.4805	Medium Dense Sand	0	35	230.48	248.605	355.045	0	355.045	519.327	519.327
32	0.906311	465.7	36.1665	Medium Dense Sand	0	35	226.32	244.118	348.636	0	348.636	514.074	514.074
33	0.906311	459.346	36.8584	Medium Dense Sand	0	35	221.411	238.823	341.075	0	341.075	507.064	507.064
34	0.906311	451.357	37.5567	Medium Dense Sand	0	35	215.752	232.719	332.357	0	332.357	498.249	498.249
35	0.906311	441.687	38.2616	Medium Dense Sand	0	35	209.34	225.802	322.48	0	322.48	487.579	487.579
36	0.906311	430.288	38.9734	Medium Dense Sand	0	35	202.172	218.071	311.438	0	311.438	474.998	474.998
37	0.906311	417.106	39.6925	Medium Dense Sand	0	35	194.246	209.521	299.228	0	299.228	460.451	460.451
38	0.906311	402.086	40.4191	Medium Dense Sand	0	35	185.558	200.15	285.845	0	285.845	443.873	443.873
39	0.906311	385.168	41.1536	Medium Dense Sand	0	35	176.106	189.955	271.284	0	271.284	425.201	425.201
40	0.906311	366.288	41.8965	Medium Dense Sand	0	35	165.886	178.931	255.54	0	255.54	404.362	404.362
41	0.906311	345.377	42.6481	Medium Dense Sand	0	35	154.894	167.075	238.608	0	238.608	381.281	381.281
42	0.906311	322.362	43.4089	Medium Dense Sand	0	35	143.128	154.384	220.484	0	220.484	355.876	355.876
43	0.906311	297.162	44.1794	Medium Dense Sand	0	35	130.586	140.855	201.161	0	201.161	328.059	328.059
44	0.906311	269.69	44.9601	Medium Dense Sand	0	35	117.262	126.483	180.636	0	180.636	297.734	297.734
45	0.906311	239.855	45.7516	Medium Dense Sand	0	35	103.153	111.265	158.903	0	158.903	264.799	264.799
46	0.906311	207.554	46.5545	Medium Dense Sand	0	35	88.2583	95.1989	135.958	0	135.958	229.14	229.14
47	0.906311	172.676	47.3694	Medium Dense Sand	0	35	72.5744	78.2816	111.798	0	111.798	190.637	190.637
48	0.906311	135.102	48.1971	Medium Dense Sand	0	35	56.0993	60.5109	86.4184	0	86.4184	149.156	149.156

49	0.906311	94.6981	49.0385	Medium Dense Sand	0	35	38.8319	41.8856	59.8188	0	59.8188	104.55	104.55
50	0.906311	44.0731	49.8943	Medium Dense Sand	0	35	17.8384	19.2412	27.4793	0	27.4793	48.6588	48.6588

Global Minimum Query (spencer) - Safety Factor: 1.10543

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.906311	15.7194	16.8119	Medium Dense Sand	0	35	11.1648	12.3419	17.626	0	17.626	20.9994	20.9994
2	0.906311	46.6789	17.3938	Medium Dense Sand	0	35	32.7011	36.1488	51.6259	0	51.6259	61.8699	61.8699
3	0.906311	76.675	17.9775	Medium Dense Sand	0	35	52.9825	58.5684	83.6443	0	83.6443	100.836	100.836
4	0.906311	105.698	18.5632	Medium Dense Sand	0	35	72.0422	79.6376	113.734	0	113.734	137.928	137.928
5	0.906311	133.739	19.1509	Medium Dense Sand	0	35	89.9127	99.3922	141.947	0	141.947	173.172	173.172
6	0.906311	160.786	19.7407	Medium Dense Sand	0	35	106.625	117.866	168.331	0	168.331	206.594	206.594
7	0.906311	186.829	20.3326	Medium Dense Sand	0	35	122.209	135.093	192.934	0	192.934	238.219	238.219
8	0.906311	211.857	20.9269	Medium Dense Sand	0	35	136.693	151.104	215.8	0	215.8	268.071	268.071
9	0.906311	235.857	21.5235	Medium Dense Sand	0	35	150.104	165.93	236.972	0	236.972	296.171	296.171
10	0.906311	258.817	22.1226	Medium Dense Sand	0	35	162.471	179.6	256.495	0	256.495	322.542	322.542
11	0.906311	280.725	22.7242	Medium Dense Sand	0	35	173.817	192.142	274.407	0	274.407	347.202	347.202
12	0.906311	301.565	23.3285	Medium Dense Sand	0	35	184.166	203.583	290.747	0	290.747	370.17	370.17
13	0.906311	321.324	23.9355	Medium Dense Sand	0	35	193.545	213.95	305.553	0	305.553	391.464	391.464
14	0.906311	339.986	24.5455	Medium Dense Sand	0	35	201.974	223.268	318.86	0	318.86	411.098	411.098
15	0.906311	357.536	25.1584	Medium Dense Sand	0	35	209.477	231.562	330.705	0	330.705	429.091	429.091
16	0.906311	373.957	25.7744	Medium Dense Sand	0	35	216.073	238.854	341.118	0	341.118	445.452	445.452
17	0.906311	389.232	26.3936	Medium Dense Sand	0	35	221.784	245.167	350.134	0	350.134	460.198	460.198
18	0.906311	403.341	27.0161	Medium Dense Sand	0	35	226.63	250.524	357.785	0	357.785	473.339	473.339
19	0.906311	416.267	27.6421	Medium Dense Sand	0	35	230.63	254.945	364.099	0	364.099	484.886	484.886
20	0.906311	427.988	28.2718	Medium Dense Sand	0	35	233.801	258.451	369.107	0	369.107	494.847	494.847
21	0.906311	438.483	28.9051	Medium Dense Sand	0	35	236.163	261.062	372.836	0	372.836	503.233	503.233
22	0.906311	447.73	29.5424	Medium Dense Sand	0	35	237.733	262.797	375.314	0	375.314	510.049	510.049
23	0.906311	455.706	30.1837	Medium Dense Sand	0	35	238.527	263.675	376.567	0	376.567	515.302	515.302

Ziply Slope Stability

Thursday, August 14, 2025

24	0.906311	462.385	30.8292	Medium Dense Sand	0	35	238.561	263.713	376.62	0	376.62	518.996	518.996
25	0.906311	467.742	31.4791	Medium Dense Sand	0	35	237.851	262.928	375.501	0	375.501	521.137	521.137
26	0.906311	471.75	32.1335	Medium Dense Sand	0	35	236.414	261.339	373.23	0	373.23	521.725	521.725
27	0.906311	474.378	32.7926	Medium Dense Sand	0	35	234.262	258.96	369.834	0	369.834	520.762	520.762
28	0.906311	475.597	33.4567	Medium Dense Sand	0	35	231.411	255.809	365.333	0	365.333	518.25	518.25
29	0.906311	475.373	34.1259	Medium Dense Sand	0	35	227.875	251.9	359.75	0	359.75	514.184	514.184
30	0.906311	473.674	34.8004	Medium Dense Sand	0	35	223.667	247.248	353.107	0	353.107	508.562	508.562
31	0.906311	470.462	35.4805	Medium Dense Sand	0	35	218.801	241.869	345.425	0	345.425	501.382	501.382
32	0.906311	465.7	36.1665	Medium Dense Sand	0	35	213.289	235.776	336.723	0	336.723	492.636	492.636
33	0.906311	459.346	36.8584	Medium Dense Sand	0	35	207.145	228.984	327.023	0	327.023	482.317	482.317
34	0.906311	451.357	37.5567	Medium Dense Sand	0	35	200.38	221.506	316.343	0	316.343	470.415	470.415
35	0.906311	441.687	38.2616	Medium Dense Sand	0	35	193.006	213.355	304.702	0	304.702	456.919	456.919
36	0.906311	430.288	38.9734	Medium Dense Sand	0	35	185.037	204.545	292.12	0	292.12	441.818	441.818
37	0.906311	417.106	39.6925	Medium Dense Sand	0	35	176.482	195.088	278.614	0	278.614	425.093	425.093
38	0.906311	402.086	40.4191	Medium Dense Sand	0	35	167.353	184.997	264.203	0	264.203	406.728	406.728
39	0.906311	385.168	41.1536	Medium Dense Sand	0	35	157.663	174.285	248.905	0	248.905	386.703	386.703
40	0.906311	366.288	41.8965	Medium Dense Sand	0	35	147.421	162.964	232.736	0	232.736	364.994	364.994
41	0.906311	345.377	42.6481	Medium Dense Sand	0	35	136.64	151.046	215.716	0	215.716	341.575	341.575
42	0.906311	322.362	43.4089	Medium Dense Sand	0	35	125.33	138.543	197.859	0	197.859	316.414	316.414
43	0.906311	297.162	44.1794	Medium Dense Sand	0	35	113.501	125.467	179.186	0	179.186	289.481	289.481
44	0.906311	269.69	44.9601	Medium Dense Sand	0	35	101.165	111.831	159.712	0	159.712	260.736	260.736
45	0.906311	239.855	45.7516	Medium Dense Sand	0	35	88.3337	97.6467	139.454	0	139.454	230.136	230.136
46	0.906311	207.554	46.5545	Medium Dense Sand	0	35	75.0174	82.9265	118.431	0	118.431	197.634	197.634
47	0.906311	172.676	47.3694	Medium Dense Sand	0	35	61.2276	67.6828	96.6607	0	96.6607	163.174	163.174
48	0.906311	135.102	48.1971	Medium Dense Sand	0	35	46.9759	51.9286	74.1617	0	74.1617	126.696	126.696

49	0.906311	94.6981	49.0385	Medium Dense Sand	0	35	32.2744	35.6771	50.9522	0	50.9522	88.13	88.13
50	0.906311	44.0731	49.8943	Medium Dense Sand	0	35	15.0136	16.5965	23.7022	0	23.7022	41.5279	41.5279

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.10432

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [deg]	Base Material	Base Cohesion [psf]	Base Friction Angle [deg]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.906311	15.7194	16.8119	Medium Dense Sand	0	35	9.35019	10.3256	14.7464	0	14.7464	17.5716	17.5716
2	0.906311	46.6789	17.3938	Medium Dense Sand	0	35	28.061	30.9883	44.2559	0	44.2559	53.0463	53.0463
3	0.906311	76.675	17.9775	Medium Dense Sand	0	35	46.6073	51.4694	73.5059	0	73.5059	88.6294	88.6294
4	0.906311	105.698	18.5632	Medium Dense Sand	0	35	64.8886	71.6578	102.338	0	102.338	124.129	124.129
5	0.906311	133.739	19.1509	Medium Dense Sand	0	35	82.7951	91.4323	130.579	0	130.579	159.331	159.331
6	0.906311	160.786	19.7407	Medium Dense Sand	0	35	100.212	110.666	158.047	0	158.047	194.008	194.008
7	0.906311	186.829	20.3326	Medium Dense Sand	0	35	117.02	129.228	184.557	0	184.557	227.92	227.92
8	0.906311	211.857	20.9269	Medium Dense Sand	0	35	133.107	146.993	209.927	0	209.927	260.828	260.828
9	0.906311	235.857	21.5235	Medium Dense Sand	0	35	148.36	163.837	233.983	0	233.983	292.494	292.494
10	0.906311	258.817	22.1226	Medium Dense Sand	0	35	162.678	179.649	256.564	0	256.564	322.696	322.696
11	0.906311	280.725	22.7242	Medium Dense Sand	0	35	175.969	194.326	277.526	0	277.526	351.223	351.223
12	0.906311	301.565	23.3285	Medium Dense Sand	0	35	188.156	207.784	296.747	0	296.747	377.891	377.891
13	0.906311	321.324	23.9355	Medium Dense Sand	0	35	199.176	219.954	314.126	0	314.126	402.537	402.537
14	0.906311	339.986	24.5455	Medium Dense Sand	0	35	208.982	230.783	329.592	0	329.592	425.031	425.031
15	0.906311	357.536	25.1584	Medium Dense Sand	0	35	217.545	240.239	343.097	0	343.097	445.272	445.272
16	0.906311	373.957	25.7744	Medium Dense Sand	0	35	224.851	248.308	354.621	0	354.621	463.194	463.194
17	0.906311	389.232	26.3936	Medium Dense Sand	0	35	230.907	254.995	364.171	0	364.171	478.762	478.762
18	0.906311	403.341	27.0161	Medium Dense Sand	0	35	235.731	260.322	371.778	0	371.778	491.972	491.972
19	0.906311	416.267	27.6421	Medium Dense Sand	0	35	239.355	264.324	377.494	0	377.494	502.85	502.85
20	0.906311	427.988	28.2718	Medium Dense Sand	0	35	241.828	267.055	381.394	0	381.394	511.451	511.451
21	0.906311	438.483	28.9051	Medium Dense Sand	0	35	243.204	268.575	383.566	0	383.566	517.85	517.85
22	0.906311	447.73	29.5424	Medium Dense Sand	0	35	243.551	268.958	384.112	0	384.112	522.145	522.145
23	0.906311	455.706	30.1837	Medium Dense Sand	0	35	242.939	268.282	383.146	0	383.146	524.447	524.447

24	0.906311	462.385	30.8292	Medium Dense Sand	0	35	241.441	266.628	380.785	0	380.785	524.879	524.879
25	0.906311	467.742	31.4791	Medium Dense Sand	0	35	239.135	264.082	377.147	0	377.147	523.57	523.57
26	0.906311	471.75	32.1335	Medium Dense Sand	0	35	236.096	260.725	372.354	0	372.354	520.649	520.649
27	0.906311	474.378	32.7926	Medium Dense Sand	0	35	232.396	256.639	366.519	0	366.519	516.245	516.245
28	0.906311	475.597	33.4567	Medium Dense Sand	0	35	228.101	251.897	359.746	0	359.746	510.476	510.476
29	0.906311	475.373	34.1259	Medium Dense Sand	0	35	223.277	246.569	352.137	0	352.137	503.454	503.454
30	0.906311	473.674	34.8004	Medium Dense Sand	0	35	217.975	240.714	343.776	0	343.776	495.275	495.275
31	0.906311	470.462	35.4805	Medium Dense Sand	0	35	212.245	234.386	334.737	0	334.737	486.021	486.021
32	0.906311	465.7	36.1665	Medium Dense Sand	0	35	206.122	227.625	325.082	0	325.082	475.755	475.755
33	0.906311	459.346	36.8584	Medium Dense Sand	0	35	199.638	220.464	314.856	0	314.856	464.522	464.522
34	0.906311	451.357	37.5567	Medium Dense Sand	0	35	192.813	212.927	304.092	0	304.092	452.346	452.346
35	0.906311	441.687	38.2616	Medium Dense Sand	0	35	185.659	205.027	292.809	0	292.809	439.232	439.232
36	0.906311	430.288	38.9734	Medium Dense Sand	0	35	178.178	196.766	281.011	0	281.011	425.16	425.16
37	0.906311	417.106	39.6925	Medium Dense Sand	0	35	170.366	188.139	268.69	0	268.69	410.093	410.093
38	0.906311	402.086	40.4191	Medium Dense Sand	0	35	162.209	179.131	255.825	0	255.825	393.969	393.969
39	0.906311	385.168	41.1536	Medium Dense Sand	0	35	153.686	169.718	242.383	0	242.383	376.704	376.704
40	0.906311	366.288	41.8965	Medium Dense Sand	0	35	144.765	159.867	228.315	0	228.315	358.189	358.189
41	0.906311	345.377	42.6481	Medium Dense Sand	0	35	135.412	149.538	213.562	0	213.562	338.289	338.289
42	0.906311	322.362	43.4089	Medium Dense Sand	0	35	125.577	138.677	198.051	0	198.051	316.84	316.84
43	0.906311	297.162	44.1794	Medium Dense Sand	0	35	115.205	127.223	181.693	0	181.693	293.644	293.644
44	0.906311	269.69	44.9601	Medium Dense Sand	0	35	104.229	115.102	164.383	0	164.383	268.467	268.467
45	0.906311	239.855	45.7516	Medium Dense Sand	0	35	92.571	102.228	145.996	0	145.996	241.029	241.029
46	0.906311	207.554	46.5545	Medium Dense Sand	0	35	80.1394	88.4995	126.39	0	126.39	211.001	211.001
47	0.906311	172.676	47.3694	Medium Dense Sand	0	35	66.8274	73.7988	105.396	0	105.396	177.992	177.992
48	0.906311	135.102	48.1971	Medium Dense Sand	0	35	52.5119	57.9899	82.8182	0	82.8182	141.544	141.544

49	0.906311	94.6981	49.0385	Medium Dense Sand	0	35	37.0512	40.9164	58.4346	0	58.4346	101.115	101.115
50	0.906311	44.0731	49.8943	Medium Dense Sand	0	35	17.3911	19.2053	27.428	0	27.428	48.0764	48.0764

Interslice Data

◆ Group 1 - Master Scenario

Global Minimum Query (bishop simplified) - Safety Factor: 1.1065

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	10.1395	10.093	0	0	0
2	11.0458	10.3668	4.35851	0	0
3	11.9521	10.6507	16.7921	0	0
4	12.8584	10.9448	36.3811	0	0
5	13.7647	11.2492	62.237	0	0
6	14.671	11.5639	93.5019	0	0
7	15.5773	11.8892	129.348	0	0
8	16.4837	12.225	168.98	0	0
9	17.39	12.5716	211.628	0	0
10	18.2963	12.929	256.559	0	0
11	19.2026	13.2974	303.064	0	0
12	20.1089	13.677	350.468	0	0
13	21.0152	14.0679	398.126	0	0
14	21.9215	14.4702	445.423	0	0
15	22.8278	14.8841	491.775	0	0
16	23.7341	15.3097	536.629	0	0
17	24.6405	15.7474	579.465	0	0
18	25.5468	16.1971	619.794	0	0
19	26.4531	16.6592	657.16	0	0
20	27.3594	17.1339	691.141	0	0
21	28.2657	17.6213	721.348	0	0
22	29.172	18.1217	747.428	0	0
23	30.0783	18.6354	769.064	0	0
24	30.9846	19.1625	785.976	0	0
25	31.891	19.7034	797.921	0	0
26	32.7973	20.2584	804.696	0	0
27	33.7036	20.8276	806.141	0	0
28	34.6099	21.4115	802.137	0	0
29	35.5162	22.0104	792.609	0	0
30	36.4225	22.6246	777.529	0	0
31	37.3288	23.2545	756.919	0	0
32	38.2351	23.9005	730.85	0	0
33	39.1414	24.5631	699.449	0	0
34	40.0478	25.2425	662.899	0	0
35	40.9541	25.9394	621.443	0	0
36	41.8604	26.6541	575.389	0	0
37	42.7667	27.3874	525.113	0	0
38	43.673	28.1396	471.062	0	0
39	44.5793	28.9114	413.765	0	0
40	45.4856	29.7036	353.83	0	0
41	46.3919	30.5167	291.96	0	0
42	47.2982	31.3515	228.95	0	0
43	48.2046	32.2088	165.706	0	0
44	49.1109	33.0895	103.244	0	0
45	50.0172	33.9945	42.7083	0	0
46	50.9235	34.925	-14.6218	0	0
47	51.8298	35.8818	-67.3163	0	0
48	52.7361	36.8664	-113.78	0	0
49	53.6424	37.8799	-152.235	0	0
50	54.5487	38.9239	-180.698	0	0
51	55.455	40	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.07864

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	10.1395	10.093	0	0	0
2	11.0458	10.3668	4.54941	0	0
3	11.9521	10.6507	17.5466	0	0
4	12.8584	10.9448	38.0565	0	0
5	13.7647	11.2492	65.1753	0	0
6	14.671	11.5639	98.03	0	0
7	15.5773	11.8892	135.779	0	0
8	16.4837	12.225	177.61	0	0
9	17.39	12.5716	222.743	0	0
10	18.2963	12.929	270.426	0	0
11	19.2026	13.2974	319.941	0	0
12	20.1089	13.677	370.598	0	0
13	21.0152	14.0679	421.737	0	0
14	21.9215	14.4702	472.73	0	0
15	22.8278	14.8841	522.981	0	0
16	23.7341	15.3097	571.924	0	0
17	24.6405	15.7474	619.024	0	0
18	25.5468	16.1971	663.781	0	0
19	26.4531	16.6592	705.725	0	0
20	27.3594	17.1339	744.421	0	0
21	28.2657	17.6213	779.468	0	0
22	29.172	18.1217	810.498	0	0
23	30.0783	18.6354	837.182	0	0
24	30.9846	19.1625	859.226	0	0
25	31.891	19.7034	876.374	0	0
26	32.7973	20.2584	888.41	0	0
27	33.7036	20.8276	895.158	0	0
28	34.6099	21.4115	896.487	0	0
29	35.5162	22.0104	892.306	0	0
30	36.4225	22.6246	882.574	0	0
31	37.3288	23.2545	867.296	0	0
32	38.2351	23.9005	846.529	0	0
33	39.1414	24.5631	820.384	0	0
34	40.0478	25.2425	789.025	0	0
35	40.9541	25.9394	752.681	0	0
36	41.8604	26.6541	711.641	0	0
37	42.7667	27.3874	666.261	0	0
38	43.673	28.1396	616.972	0	0
39	44.5793	28.9114	564.279	0	0
40	45.4856	29.7036	508.771	0	0
41	46.3919	30.5167	451.128	0	0
42	47.2982	31.3515	392.122	0	0
43	48.2046	32.2088	332.633	0	0
44	49.1109	33.0895	273.651	0	0
45	50.0172	33.9945	216.292	0	0
46	50.9235	34.925	161.805	0	0
47	51.8298	35.8818	111.587	0	0
48	52.7361	36.8664	67.1988	0	0
49	53.6424	37.8799	30.3809	0	0
50	54.5487	38.9239	3.07381	0	0
51	55.455	40	0	0	0

Global Minimum Query (spencer) - Safety Factor: 1.10543

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	10.1395	10.093	0	0	0
2	11.0458	10.3668	5.29101	3.38615	32.6185
3	11.9521	10.6507	20.268	12.9711	32.6184
4	12.8584	10.9448	43.6828	27.9562	32.6185
5	13.7647	11.2492	74.3522	47.584	32.6185
6	14.671	11.5639	111.156	71.1378	32.6185
7	15.5773	11.8892	153.034	97.9391	32.6185
8	16.4837	12.225	198.987	127.348	32.6185
9	17.39	12.5716	248.069	158.76	32.6186
10	18.2963	12.929	299.393	191.606	32.6185
11	19.2026	13.2974	352.126	225.354	32.6185
12	20.1089	13.677	405.484	259.502	32.6185
13	21.0152	14.0679	458.739	293.584	32.6184
14	21.9215	14.4702	511.209	327.165	32.6185
15	22.8278	14.8841	562.265	359.839	32.6185
16	23.7341	15.3097	611.324	391.236	32.6185
17	24.6405	15.7474	657.849	421.011	32.6185
18	25.5468	16.1971	701.353	448.853	32.6185
19	26.4531	16.6592	741.392	474.477	32.6185
20	27.3594	17.1339	777.569	497.63	32.6185
21	28.2657	17.6213	809.533	518.086	32.6185
22	29.172	18.1217	836.974	535.648	32.6185
23	30.0783	18.6354	859.631	550.148	32.6185
24	30.9846	19.1625	877.284	561.445	32.6185
25	31.891	19.7034	889.758	569.429	32.6185
26	32.7973	20.2584	896.925	574.015	32.6185
27	33.7036	20.8276	898.699	575.151	32.6185
28	34.6099	21.4115	895.04	572.809	32.6185
29	35.5162	22.0104	885.953	566.994	32.6185
30	36.4225	22.6246	871.492	557.739	32.6185
31	37.3288	23.2545	851.755	545.108	32.6185
32	38.2351	23.9005	826.891	529.195	32.6185
33	39.1414	24.5631	797.095	510.126	32.6185
34	40.0478	25.2425	762.617	488.061	32.6185
35	40.9541	25.9394	723.756	463.19	32.6185
36	41.8604	26.6541	680.867	435.742	32.6185
37	42.7667	27.3874	634.36	405.979	32.6185
38	43.673	28.1396	584.707	374.202	32.6185
39	44.5793	28.9114	532.439	340.751	32.6185
40	45.4856	29.7036	478.153	306.009	32.6185
41	46.3919	30.5167	422.513	270.4	32.6184
42	47.2982	31.3515	366.258	234.398	32.6185
43	48.2046	32.2088	310.203	198.524	32.6185
44	49.1109	33.0895	255.247	163.354	32.6186
45	50.0172	33.9945	202.378	129.518	32.6185
46	50.9235	34.925	152.678	97.7112	32.6185
47	51.8298	35.8818	107.336	68.6932	32.6185
48	52.7361	36.8664	67.6537	43.2971	32.6185
49	53.6424	37.8799	35.0571	22.4359	32.6185
50	54.5487	38.9239	11.1102	7.1103	32.6184
51	55.455	40	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.10432

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	10.1395	10.093	0	0	0
2	11.0458	10.3668	4.43685	0.206153	2.66027
3	11.9521	10.6507	17.3065	1.60508	5.2987
4	12.8584	10.9448	37.9343	5.25992	7.89422
5	13.7647	11.2492	65.6018	12.0724	10.4272
6	14.671	11.5639	99.5488	22.7635	12.8802
7	15.5773	11.8892	138.979	37.8585	15.2379
8	16.4837	12.225	183.064	57.6778	17.488
9	17.39	12.5716	230.957	82.3336	19.6206
10	18.2963	12.929	281.797	111.733	21.6284
11	19.2026	13.2974	334.722	145.587	23.5066
12	20.1089	13.677	388.88	183.428	25.2524
13	21.0152	14.0679	443.44	224.625	26.8645
14	21.9215	14.4702	497.601	268.418	28.3435
15	22.8278	14.8841	550.604	313.936	29.6903
16	23.7341	15.3097	601.739	360.236	30.9072
17	24.6405	15.7474	650.353	406.332	31.9966
18	25.5468	16.1971	695.854	451.227	32.9614
19	26.4531	16.6592	737.718	493.943	33.8045
20	27.3594	17.1339	775.488	533.549	34.5286
21	28.2657	17.6213	808.781	569.191	35.1365
22	29.172	18.1217	837.279	600.106	35.6304
23	30.0783	18.6354	860.733	625.645	36.0125
24	30.9846	19.1625	878.961	645.286	36.2841
25	31.891	19.7034	891.838	658.641	36.4466
26	32.7973	20.2584	899.298	665.464	36.5008
27	33.7036	20.8276	901.327	665.649	36.4466
28	34.6099	21.4115	897.955	659.231	36.2841
29	35.5162	22.0104	889.258	646.379	36.0124
30	36.4225	22.6246	875.348	627.391	35.6304
31	37.3288	23.2545	856.371	602.684	35.1365
32	38.2351	23.9005	832.509	572.781	34.5287
33	39.1414	24.5631	803.969	538.302	33.8045
34	40.0478	25.2425	770.993	499.951	32.9614
35	40.9541	25.9394	733.848	458.499	31.9966
36	41.8604	26.6541	692.836	414.772	30.9072
37	42.7667	27.3874	648.294	369.635	29.6903
38	43.673	28.1396	600.597	323.976	28.3435
39	44.5793	28.9114	550.164	278.687	26.8646
40	45.4856	29.7036	497.468	234.647	25.2524
41	46.3919	30.5167	443.045	192.702	23.5066
42	47.2982	31.3515	387.5	153.644	21.6284
43	48.2046	32.2088	331.529	118.186	19.6205
44	49.1109	33.0895	275.93	86.937	17.488
45	50.0172	33.9945	221.629	60.3728	15.2379
46	50.9235	34.925	169.699	38.8044	12.8802
47	51.8298	35.8818	121.397	22.3402	10.4272
48	52.7361	36.8664	78.2022	10.8434	7.89421
49	53.6424	37.8799	41.8584	3.88213	5.2987
50	54.5487	38.9239	14.4354	0.670725	2.66027
51	55.455	40	0	0	0

◆ **Group 1 - Scenario 2**

Global Minimum Query (bishop simplified) - Safety Factor: 1.1065

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	10.1395	10.093	0	0	0
2	11.0458	10.3668	4.35851	0	0
3	11.9521	10.6507	16.7921	0	0
4	12.8584	10.9448	36.3811	0	0
5	13.7647	11.2492	62.237	0	0
6	14.671	11.5639	93.5019	0	0
7	15.5773	11.8892	129.348	0	0
8	16.4837	12.225	168.98	0	0
9	17.39	12.5716	211.628	0	0
10	18.2963	12.929	256.559	0	0
11	19.2026	13.2974	303.064	0	0
12	20.1089	13.677	350.468	0	0
13	21.0152	14.0679	398.126	0	0
14	21.9215	14.4702	445.423	0	0
15	22.8278	14.8841	491.775	0	0
16	23.7341	15.3097	536.629	0	0
17	24.6405	15.7474	579.465	0	0
18	25.5468	16.1971	619.794	0	0
19	26.4531	16.6592	657.16	0	0
20	27.3594	17.1339	691.141	0	0
21	28.2657	17.6213	721.348	0	0
22	29.172	18.1217	747.428	0	0
23	30.0783	18.6354	769.064	0	0
24	30.9846	19.1625	785.976	0	0
25	31.891	19.7034	797.921	0	0
26	32.7973	20.2584	804.696	0	0
27	33.7036	20.8276	806.141	0	0
28	34.6099	21.4115	802.137	0	0
29	35.5162	22.0104	792.609	0	0
30	36.4225	22.6246	777.529	0	0
31	37.3288	23.2545	756.919	0	0
32	38.2351	23.9005	730.85	0	0
33	39.1414	24.5631	699.449	0	0
34	40.0478	25.2425	662.899	0	0
35	40.9541	25.9394	621.443	0	0
36	41.8604	26.6541	575.389	0	0
37	42.7667	27.3874	525.113	0	0
38	43.673	28.1396	471.062	0	0
39	44.5793	28.9114	413.765	0	0
40	45.4856	29.7036	353.83	0	0
41	46.3919	30.5167	291.96	0	0
42	47.2982	31.3515	228.95	0	0
43	48.2046	32.2088	165.706	0	0
44	49.1109	33.0895	103.244	0	0
45	50.0172	33.9945	42.7083	0	0
46	50.9235	34.925	-14.6218	0	0
47	51.8298	35.8818	-67.3163	0	0
48	52.7361	36.8664	-113.78	0	0
49	53.6424	37.8799	-152.235	0	0
50	54.5487	38.9239	-180.698	0	0
51	55.455	40	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.07864

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	10.1395	10.093	0	0	0
2	11.0458	10.3668	4.54941	0	0
3	11.9521	10.6507	17.5466	0	0
4	12.8584	10.9448	38.0565	0	0
5	13.7647	11.2492	65.1753	0	0
6	14.671	11.5639	98.03	0	0
7	15.5773	11.8892	135.779	0	0
8	16.4837	12.225	177.61	0	0
9	17.39	12.5716	222.743	0	0
10	18.2963	12.929	270.426	0	0
11	19.2026	13.2974	319.941	0	0
12	20.1089	13.677	370.598	0	0
13	21.0152	14.0679	421.737	0	0
14	21.9215	14.4702	472.73	0	0
15	22.8278	14.8841	522.981	0	0
16	23.7341	15.3097	571.924	0	0
17	24.6405	15.7474	619.024	0	0
18	25.5468	16.1971	663.781	0	0
19	26.4531	16.6592	705.725	0	0
20	27.3594	17.1339	744.421	0	0
21	28.2657	17.6213	779.468	0	0
22	29.172	18.1217	810.498	0	0
23	30.0783	18.6354	837.182	0	0
24	30.9846	19.1625	859.226	0	0
25	31.891	19.7034	876.374	0	0
26	32.7973	20.2584	888.41	0	0
27	33.7036	20.8276	895.158	0	0
28	34.6099	21.4115	896.487	0	0
29	35.5162	22.0104	892.306	0	0
30	36.4225	22.6246	882.574	0	0
31	37.3288	23.2545	867.296	0	0
32	38.2351	23.9005	846.529	0	0
33	39.1414	24.5631	820.384	0	0
34	40.0478	25.2425	789.025	0	0
35	40.9541	25.9394	752.681	0	0
36	41.8604	26.6541	711.641	0	0
37	42.7667	27.3874	666.261	0	0
38	43.673	28.1396	616.972	0	0
39	44.5793	28.9114	564.279	0	0
40	45.4856	29.7036	508.771	0	0
41	46.3919	30.5167	451.128	0	0
42	47.2982	31.3515	392.122	0	0
43	48.2046	32.2088	332.633	0	0
44	49.1109	33.0895	273.651	0	0
45	50.0172	33.9945	216.292	0	0
46	50.9235	34.925	161.805	0	0
47	51.8298	35.8818	111.587	0	0
48	52.7361	36.8664	67.1988	0	0
49	53.6424	37.8799	30.3809	0	0
50	54.5487	38.9239	3.07381	0	0
51	55.455	40	0	0	0

Global Minimum Query (spencer) - Safety Factor: 1.10543

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	10.1395	10.093	0	0	0
2	11.0458	10.3668	5.29101	3.38615	32.6185
3	11.9521	10.6507	20.268	12.9711	32.6184
4	12.8584	10.9448	43.6828	27.9562	32.6185
5	13.7647	11.2492	74.3522	47.584	32.6185
6	14.671	11.5639	111.156	71.1378	32.6185
7	15.5773	11.8892	153.034	97.9391	32.6185
8	16.4837	12.225	198.987	127.348	32.6185
9	17.39	12.5716	248.069	158.76	32.6186
10	18.2963	12.929	299.393	191.606	32.6185
11	19.2026	13.2974	352.126	225.354	32.6185
12	20.1089	13.677	405.484	259.502	32.6185
13	21.0152	14.0679	458.739	293.584	32.6184
14	21.9215	14.4702	511.209	327.165	32.6185
15	22.8278	14.8841	562.265	359.839	32.6185
16	23.7341	15.3097	611.324	391.236	32.6185
17	24.6405	15.7474	657.849	421.011	32.6185
18	25.5468	16.1971	701.353	448.853	32.6185
19	26.4531	16.6592	741.392	474.477	32.6185
20	27.3594	17.1339	777.569	497.63	32.6185
21	28.2657	17.6213	809.533	518.086	32.6185
22	29.172	18.1217	836.974	535.648	32.6185
23	30.0783	18.6354	859.631	550.148	32.6185
24	30.9846	19.1625	877.284	561.445	32.6185
25	31.891	19.7034	889.758	569.429	32.6185
26	32.7973	20.2584	896.925	574.015	32.6185
27	33.7036	20.8276	898.699	575.151	32.6185
28	34.6099	21.4115	895.04	572.809	32.6185
29	35.5162	22.0104	885.953	566.994	32.6185
30	36.4225	22.6246	871.492	557.739	32.6185
31	37.3288	23.2545	851.755	545.108	32.6185
32	38.2351	23.9005	826.891	529.195	32.6185
33	39.1414	24.5631	797.095	510.126	32.6185
34	40.0478	25.2425	762.617	488.061	32.6185
35	40.9541	25.9394	723.756	463.19	32.6185
36	41.8604	26.6541	680.867	435.742	32.6185
37	42.7667	27.3874	634.36	405.979	32.6185
38	43.673	28.1396	584.707	374.202	32.6185
39	44.5793	28.9114	532.439	340.751	32.6185
40	45.4856	29.7036	478.153	306.009	32.6185
41	46.3919	30.5167	422.513	270.4	32.6184
42	47.2982	31.3515	366.258	234.398	32.6185
43	48.2046	32.2088	310.203	198.524	32.6185
44	49.1109	33.0895	255.247	163.354	32.6186
45	50.0172	33.9945	202.378	129.518	32.6185
46	50.9235	34.925	152.678	97.7112	32.6185
47	51.8298	35.8818	107.336	68.6932	32.6185
48	52.7361	36.8664	67.6537	43.2971	32.6185
49	53.6424	37.8799	35.0571	22.4359	32.6185
50	54.5487	38.9239	11.1102	7.1103	32.6184
51	55.455	40	0	0	0

Global Minimum Query (gle/morgenstern-price) - Safety Factor: 1.10432

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [deg]
1	10.1395	10.093	0	0	0
2	11.0458	10.3668	4.43685	0.206153	2.66027
3	11.9521	10.6507	17.3065	1.60508	5.2987
4	12.8584	10.9448	37.9343	5.25992	7.89422
5	13.7647	11.2492	65.6018	12.0724	10.4272
6	14.671	11.5639	99.5488	22.7635	12.8802
7	15.5773	11.8892	138.979	37.8585	15.2379
8	16.4837	12.225	183.064	57.6778	17.488
9	17.39	12.5716	230.957	82.3336	19.6206
10	18.2963	12.929	281.797	111.733	21.6284
11	19.2026	13.2974	334.722	145.587	23.5066
12	20.1089	13.677	388.88	183.428	25.2524
13	21.0152	14.0679	443.44	224.625	26.8645
14	21.9215	14.4702	497.601	268.418	28.3435
15	22.8278	14.8841	550.604	313.936	29.6903
16	23.7341	15.3097	601.739	360.236	30.9072
17	24.6405	15.7474	650.353	406.332	31.9966
18	25.5468	16.1971	695.854	451.227	32.9614
19	26.4531	16.6592	737.718	493.943	33.8045
20	27.3594	17.1339	775.488	533.549	34.5286
21	28.2657	17.6213	808.781	569.191	35.1365
22	29.172	18.1217	837.279	600.106	35.6304
23	30.0783	18.6354	860.733	625.645	36.0125
24	30.9846	19.1625	878.961	645.286	36.2841
25	31.891	19.7034	891.838	658.641	36.4466
26	32.7973	20.2584	899.298	665.464	36.5008
27	33.7036	20.8276	901.327	665.649	36.4466
28	34.6099	21.4115	897.955	659.231	36.2841
29	35.5162	22.0104	889.258	646.379	36.0124
30	36.4225	22.6246	875.348	627.391	35.6304
31	37.3288	23.2545	856.371	602.684	35.1365
32	38.2351	23.9005	832.509	572.781	34.5287
33	39.1414	24.5631	803.969	538.302	33.8045
34	40.0478	25.2425	770.993	499.951	32.9614
35	40.9541	25.9394	733.848	458.499	31.9966
36	41.8604	26.6541	692.836	414.772	30.9072
37	42.7667	27.3874	648.294	369.635	29.6903
38	43.673	28.1396	600.597	323.976	28.3435
39	44.5793	28.9114	550.164	278.687	26.8646
40	45.4856	29.7036	497.468	234.647	25.2524
41	46.3919	30.5167	443.045	192.702	23.5066
42	47.2982	31.3515	387.5	153.644	21.6284
43	48.2046	32.2088	331.529	118.186	19.6205
44	49.1109	33.0895	275.93	86.937	17.488
45	50.0172	33.9945	221.629	60.3728	15.2379
46	50.9235	34.925	169.699	38.8044	12.8802
47	51.8298	35.8818	121.397	22.3402	10.4272
48	52.7361	36.8664	78.2022	10.8434	7.89421
49	53.6424	37.8799	41.8584	3.88213	5.2987
50	54.5487	38.9239	14.4354	0.670725	2.66027
51	55.455	40	0	0	0

Discharge Sections

Entity Information

◆ Group 1

Shared Entities

Type	Coordinates (x,y)
External Boundary	-10, -10 80, -10 80, 33.655 80, 38.0273 80, 40 76.034, 40 55, 40 17.1706, 14.7804 10, 10 -10, 10 -10, 8.28949 -10, 5
Material Boundary	-10, 5 9.416, 6.354 26.972, 10.559 51.403, 21.64 66.489, 29.45 80, 33.655
Material Boundary	-10, 8.28949 5.937, 9.046 15, 10 44.163, 25.7 55.193, 30.944 64.06, 35.054 80, 38.0273

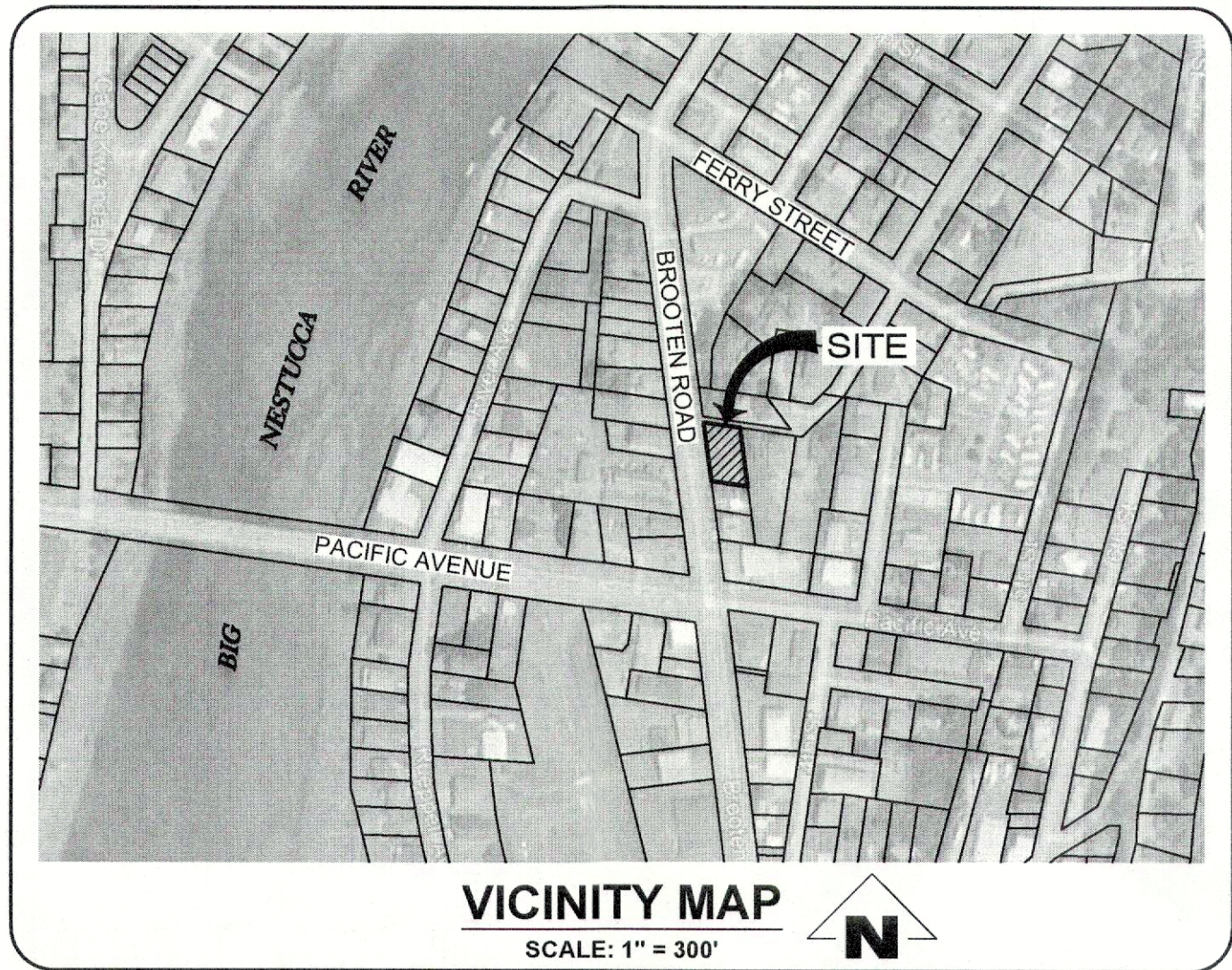
Scenario-based Entities

Type	Coordinates (x,y)	Master Scenario	Scenario 2
Water Table	-10, 5 9.416, 6.354 26.972, 10.559 38.594, 14.399 51.625, 17.481 80, 19.3195	Assigned to:  Medium Dense Sand  Very Dense Sand  Sandstone / Basalt Bedrock	Assigned to:  Medium Dense Sand  Very Dense Sand  Sandstone / Basalt Bedrock

ZIPLY CONDITIONAL USE PERMIT

LAND USE APPLICATION

N.E. 1/4 N.W. 1/4 SEC. 30 T.4S. R.10W. W.M.
TAX MAP 4S1030BA TAX LOT 4600
PACIFIC CITY, OREGON



SITE DATA

SITE AREA: 6,500 S.F. (0.15 AC)
ZONING: PCW-C1
TAX MAP: 4S1030BA
TAX LOT: 4600

PROJECT CONTACTS

OWNER:

GLIMMER TWINS VENTURES, INC.
P.O. BOX 908
PACIFIC CITY, OR 97135
CONTACT: BENJAMIN JOHNSON

SURVEYOR:

BBA LAND SURVEYING, LLC
12014 SE 157TH PLACE
RENTON, WA, 98058
(206) 406-1257 (P)
nicoleb@bbasurveying.com

GEOTECHNICAL ENGINEER:

HARDMAN GEOTECHNICAL SERVICES INC.
10110 SW NIMBUS AVENUE, SUITE B-5
PORTLAND, OR 97223
CONTACT: CHAD S. HARDMAN, P.E.
(P) 503-530-8076

CIVIL ENGINEER:

EMERIO DESIGN, LLC
1500 VALLEY RIVER DRIVE, SUITE 100
EUGENE, OR 97401
CONTACT: SCOTT A. ZELENKA, P.E.
(503) 746-8812 (P)

BENCHMARK INFORMATION

THE VERTICAL DATUM OF THE PROVIDED SURVEY ARE BASED ON NAVD88 PER GNSS OBSERVATIONS, DERIVED FROM OREGON STATE REFERENCE NETWORK. THE 2.0' CONTOUR INTERVAL ARE DERIVED FROM DIRECT FIELD OBSERVATIONS - THE EXPECTED VERTICAL ACCURACY IS EQUAL TO 1/2 CONTOUR INTERVAL OR $\pm 1.0'$ FOR THIS PROJECT.

BASIS OF BEARINGS

OREGON COORDINATE SYSTEM, NAD83(91), NORTH ZONE, DERIVED FROM OREGON STATE REFERENCE NETWORK.

PAPER SCALE NOTE

THESE PLANS ARE FULL SIZED ON 22"x34" PAPER, IF 11"x17", SCALE ACCORDINGLY.

DRAWING INDEX

SHEET NO.	SHEET TITLE
01	COVER SHEET
02	EXISTING CONDITIONS
03	PROPOSED SITE PLAN

LEGEND

	BOUNDARY LINE
	EXISTING 1' CONTOUR LINE
	EXISTING 5' CONTOUR LINE
	EXISTING TREE
	EXISTING WATER METER
	EXISTING ELECTRIC POWER POLE
	EXISTING POWER POLE WITH LIGHT
	EXISTING SANITARY SEWER LINE
	EXISTING WATER LINE
	EXISTING UNDERGROUND POWER LINE
	EXISTING UNDERGROUND TELEPHONE LINE
	EXISTING OVERHEAD POWER LINE
	EXISTING BUILDING
	EXISTING ASPHALT
	PROPOSED 1' CONTOUR LINE
	PROPOSED 5' CONTOUR LINE
	PROPOSED ASPHALT
	PROPOSED CONCRETE
	PROPOSED CONCRETE

ENGINEER'S NOTE TO CONTRACTOR

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT THOSE SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN ON THESE DRAWINGS. THE CONTRACTOR FURTHER ASSUMES ALL LIABILITY AND RESPONSIBILITY FOR THE UTILITY PIPES, CONDUITS OR STRUCTURES SHOWN OR NOT SHOWN ON THESE DRAWINGS.

THE CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR THE JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, THAT THIS SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPT FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.

THIS DESIGN COMPLIES WITH ORS 92.044 (7) IN THAT NO UTILITY INFRASTRUCTURE IS DESIGNED TO BE WITHIN ONE (1) FOOT OF A SURVEY MONUMENT LOCATION SHOWN ON A SUBDIVISION OR PARTITION PLAT. NO DESIGN EXCEPTIONS NOT FINAL FIELD LOCATION CHANGES SHALL BE PERMITTED IF THAT CHANGE WOULD CAUSE ANY UTILITY INFRASTRUCTURE TO BE PLACED WITHIN THE PROHIBITED AREA.

NOTICE TO EXCAVATORS:

ATTENTION: OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THE RULES BY CALLING THE CENTER.
(NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS (503)-232-1987).

POTENTIAL UNDERGROUND FACILITY OWNERS

Dig Safely.

Call the Oregon One-Call Center
DIAL 811 or 1-800-332-2344

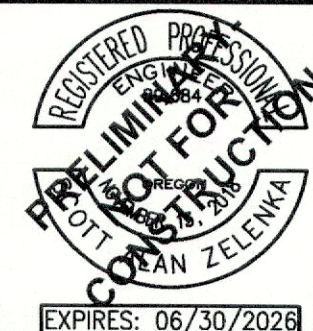
CONDITIONAL USE PERMIT
TAX MAP 4S1030BA
TAX LOT 4600
PACIFIC CITY, OREGON
TILLAMOOK COUNTY

COVER SHEET

REVISIONS

NO. DATE DESCRIPTION

EMERIO
ENGINEERING • SURVEYING • DESIGN
1500 VALLEY RIVER DRIVE, SUITE 100
EUGENE, OREGON 97401
TEL: (503) 746-8812
FAX: (503) 698-8892
www.emeriodesign.com

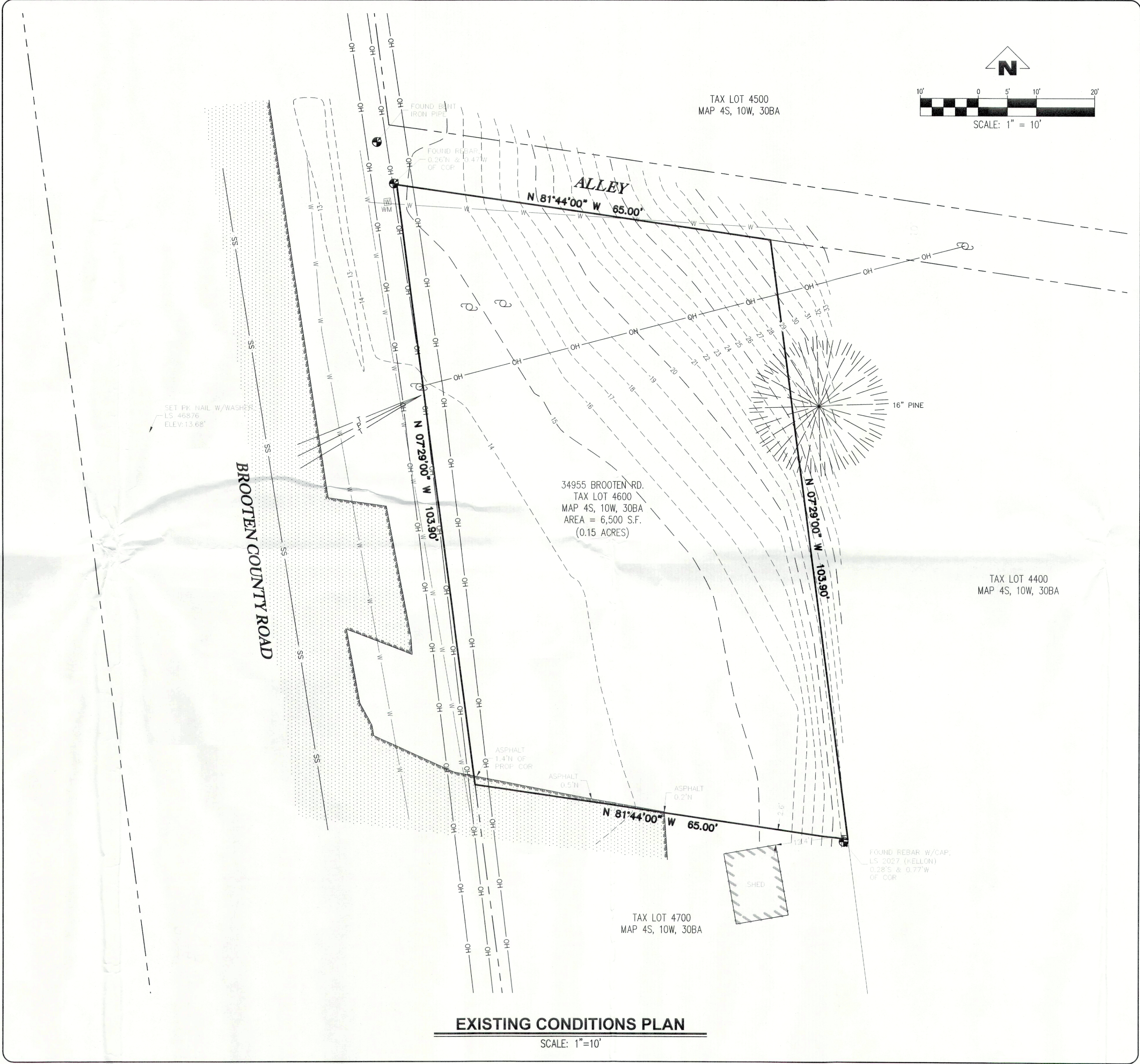


SHEET

01

OF

03



EXISTING CONDITIONS PLAN
SCALE: 1"=10'

CONDITIONAL USE PERMIT
TAX MAP 4S1030BA
TAX LOT 4600
PACIFIC CITY, OREGON
TILLAMOOK COUNTY

EXISTING CONDITIONS

REVISIONS	
NO.	DESCRIPTION

EMERIO
ENGINEERING • SURVEYING • DESIGN
1500 VALLEY RIVER DRIVE, SUITE 100
EUGENE, OREGON 97401
TEL: (503) 686-9602
FAX: (503) 686-9602
www.emeriodesign.com





CONDITIONAL USE PERMIT
TAX MAP 4S1030BA
TAX LOT 4600
PACIFIC CITY, OREGON
TILLAMOOK COUNTY

PROPOSED SITE PLAN

REVISIONS	
NO.	DESCRIPTION

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