

File #: AD-1604

Application Date: October 22, 2021

Map/TL: 3215-00 tax lots 01502 & 01800

APPLICANT	OWNER	AGENT
Knife River Materials PO Box 1145 Medford OR, 97501	Aubrey & Shirley Van Loo Sixes, OR 97476	Tom Gruszczenski Knife River Materials

Land Use Request: A request for modification of conditional use permit AD-1604 to include 12.5 adjacent acres for process water storage and stockpiling of aggregate materials.

Background Information:

Location: The subject property is located approximately 1.5 miles west of Hwy 101 on Cape Blanco Road.

The total subject property size is 797 acres. The existing CUP includes 57 acre portion of the total property. The modification consists of expanding the permit boundary by 12 ½ acres and will result in new CUP boundary of approximately 70 acres.

The proposed expansion area was developed in the mid to late 1990's for use as a cranberry bog. The cranberry bog is no longer in use.

The proposed 12 ½ acre expansion area is located in Tax Lot 1502. Approximately 4 acres is zoned Rural Industrial and approximately 8 ½ acres is zoned Forestry/Grazing (See Attachment A; Site Plan Van Loo Pit Figure 1)

The Analysis section below references the relevant Zoning Ordinance (i.e. Conditional Use Permit) Criteria.

ANALYSIS

Applicable Criteria:

Curry County Zoning Ordinance

Section 3.050 Forestry-Grazing Zone (FG)

Section 3.052 Conditional Uses Subject to Administrative Approval by the Director

24. Land-based mining and processing of oil, gas, or other subsurface resources, as defined in ORS Chapter 520 and not otherwise permitted in

3.041(10), and the mining and processing of aggregate and mineral resources as defined under ORS Chapter 517 but not including support or processing facilities for offshore oil, gas, or marine mineral activities. (1, 9, 16)

Section 3.170 Rural Industrial Zone (RI)

Section 3.172 Conditional Uses Subject to Administrative Approval by the Director

7. A permanent facility for the secondary processing of aggregate or other mineral resources such as an asphalt or concrete plant but not including facilities used for processing offshore oil, gas or mineral resources.

Section 7.040 Standards Governing Conditional Uses

1. Conditional Uses Generally

10. Mining, quarrying, or other extractive activity

17. Uses on resource land

Criteria and Findings

Curry County Zoning Ordinance

Section 3.050. Forestry Grazing Zone (FG).

Purpose of Classification: The Forestry Grazing Zone is applied to resource areas of the county where the primary land use is commercial forestry with some intermixed agricultural uses for livestock uses. The purpose of the Forestry Grazing Zone is:

(a) to implement the forest land policies of the Curry County Comprehensive Plan; and

(b) to implement Statewide Planning Goal 4 with respect to forest lands in the county.

(c) to implement the agricultural land policies of the Curry County Comprehensive Plan with respect to livestock grazing and related farm uses which are intermixed with forest land in some parts of the county; and

(d) to implement Statewide Planning Goal 3 with respect to intermixed farm and forest land in the county.

If the subject tract was predominantly in agricultural (farm) use on January 1, 1993 then uses as specified under Sections 3.070 to 3.078 of this ordinance are applicable

Section 3.170. Rural Industrial Zone (RI).

Purpose of Classification. The RI zoning classification is applied to all rural lands with existing industrial uses in built and committed exceptions to the Statewide Planning Goals as of the date of adoption of this ordinance. All future rezoning to this zoning designation shall require an exception to Goals 3 and/or 4, 14 and other Goals which are applicable to the specific site, and shall be limited to those expressly authorized by statute and the comprehensive plan.

The subject property is split zoned Forestry-Grazing and Rural Industrial. The zone purposes are listed above.

Section 3.050 Forestry-Grazing Zone (FG)

Section 3.052 Conditional Uses Subject to Administrative Approval by the Director

24. *Land-based mining and processing of oil, gas, or other subsurface resources, as defined in ORS Chapter 520 and not otherwise permitted in 3.041(10), and the mining and processing of aggregate and mineral resources as defined under ORS Chapter 517 but not including support or processing facilities for offshore oil, gas, or marine mineral activities. (1, 9, 16)*

Section 3.170 Rural Industrial Zone (RI)

Section 3.172 Conditional Uses Subject to Administrative Approval by the Director

7. *A permanent facility for the secondary processing of aggregate or other mineral resources such as an asphalt or concrete plant but not including facilities used for processing offshore oil, gas or mineral resources.*

Mining and processing of aggregate and mineral resources is permitted conditionally within the FG zone. Permanent facilities for secondary processing of aggregate and mineral resources are permitted conditionally within the Rural Industrial zone. Conditional use permit (AD-1116) has been issued to mine and process aggregate in a 57 acre portion of the site. The proposed modification is for processing only, no mining is proposed in the expansion area and is consistent with the existing CUP and has no effect on the operations of the site other than to store water in an area previously used to store water and provide additional area to stockpile aggregate.

The general standards of 3.172(7) are addressed in section 7 this report.

In addition to the standards of the zone in which the conditional and permitted use is located and the other standards in this ordinance, conditional permitted uses must meet the following standards:

Section 7.040 Standards Governing Conditional Uses

1. Conditional and Permitted Uses Generally.

a) Set-backs and building height. The County may require property line set-backs or building height restrictions other than those specified in this Ordinance in order to render the proposed conditional use compatible with surrounding land uses.

b) Off-street parking, additional lot area and buffering. The County may require access to the property, off-street parking, additional lot area, or buffering requirements other than those specified in in this Ordinance to render the proposed conditional or permitted use compatible with surrounding land uses.

c) More restrictive construction standards. The County may require that the development be constructed to standards more restrictive than the Uniform Building Code or the general codes in order to comply with the Comprehensive Plan and specific standards established and conditions imposed in granting the Conditional Use Permit for the proposed use.

d) Utility statement requirements. If the proposed conditional or permitted use involves development that will use utility services, the applicant shall provide statements from the affected utilities that they have reviewed the applicants' proposed plans. These statements shall explicitly set forth the utilities' requirements, terms and conditions for providing or expanding service to the proposed development and shall be adopted by the Commission or Director as part of the Conditional or Permitted Use Permit.

Subsections a, b, c, d are applicable to this proposal. Subsections e, f, & g are specific to expansion of public water systems and is not applicable to this proposal and not included.

Additional setback, height restrictions, parking, buffering, building code requirements, etc. may be conditions of approval in order to render the proposed use compatible with the surrounding properties. Conditions of approval, if any, will be addressed in later portions of this report.

Service Provider Confirmation forms from Coos-Curry Electric and Sixes Rural Fire Protection District have been previously provided and included in the existing CUP. The proposed amendment does not change those approvals, nor does the proposed amendment require the use of utility services.

Section 7.040 Standards Governing Conditional Uses

10. Mining, quarrying, or other extractive activity.

- a) *Plans and specifications submitted to the Commission for approval must contain sufficient information to allow the Commission to review and set siting standards related to the following standards:*
- (1) *Impact of the proposed use on surrounding land uses in terms of Department of Environmental Quality standards for noise, dust, or other environmental factors;*

Pursuant to CCZO Section 2.060(1) the Planning Director has the authority to review, and approve or deny applications for uses listed as Conditional Uses Subject to Administrative Approval by the Director. Mining and aggregate processing are conditional uses listed subject to approval by the Director.

The existing CUP allows excavation and processing (crushing). A noise study and analysis that was submitted as part of the original CUP application concluded there would be no impact to others. The proposed expansion results in no changes to the excavation or processing area which are the basis for the noise generation. Residential use and the boundaries of Cape Blanco State Park remains the same distance from the proposed aggregate site as it was in 2012 and the noise study that was completed continues to be applicable as neither the stockpile or ponds will result in a new area of noise generation. It is not reasonable to consider that the proposed ponds located in a former bog (i.e. pond) area will result in any addition noise of any significance nor will the stockpiles.

- (2) *The impact of the proposed use on water quality, water flow, or fish habitat on affected rivers or streams;*

Consistent with the CUP application and approval, there will be no impacts on water quality, water flow, or fish habitat and streams as this is an upland site and does not include any wetlands. A Stormwater Permit has been applied for and has been approved and the site has been inspected by DOGAMI (see Attachments B WPCF Documents). No water will be discharged from the site, water will be infiltrated into the ground through the use of seepage ponds and or trenches and there will be no impact to flow or quantity. There is no fish habitate or affected rivers or streams.

(3) The impact of the proposed use on overall land stability, vegetation, wildlife habitat and land or soil erosion;

Consistent with the CUP application and approval, the site will be operated to prevent erosion and control sediment consistent with the Curry County Zoning Ordinance 3.300 – 3.324 and DOGAMI requirements which includes the DOGAMI approved Operating and Reclamation Plan. A Geotechnical Site Evaluation was completed in September 2021 by Cascadia Geoservices, Inc. and concluded the site is stable and is well drained (see Attachment A; Geotechnical Evaluation), consistent with the Curry County Zoning Ordinance 3.300 – 3.324 requirements.

There are no identified conflicts with wildlife habitat.

Gorse, a noxious weed, is being removed from the property as part of the mining operation and as such is a positive impact.

(4) The adequacy of protection for people residing or working in the area from the proposed mining activity through fencing of the site;

Consistent with the CUP application and approval, Fencing is not necessary because the use is in a rural area with natural barriers due to distances from the site to residential and other nonagricultural uses. Regardless however, a field fence is maintained along Cape Blanco Road as well an entrance gate to control livestock which also controls access of people.

(5) The rehabilitation of the land upon termination of the mining activity. The proposed rehabilitation must at least meet the requirements of state surface mining or gravel removal permits.

Consistent with the CUP application and approval, the site will be reclaimed in accordance with the allowable zoning uses and the DOGAMI approved Reclamation Plan. This will result in the pond area remaining as ponds upon reclamation for future farming or wildlife or in backfilling the pond area to establish grazing pasture for agricultural purposes.

The planned secondary beneficial use for this site is Agriculture/Grazing as the site will ultimately be backfilled and shaped to blend in with the surrounding topography. Although the Reclamation Plan states that reclamation is scheduled to begin within 180 days after the completion of mining

activities, per Curry County File No. AD-1604, reclamation will be conducted concurrently with mining operations and will include ongoing backfilling operations, spreading of growth medium and revegetation. Taking into consideration that all excavation ponds will likely be backfilled with overburden and clean construction materials, it is unlikely that any excavation slopes will remain onsite however, the final excavated sloping configurations at 1½H:1V or flatter and all final fill slopes at 2H:1V or flatter.

All compacted areas including stockpiling and processing areas will be scarified and/or ripped with earth moving equipment to decompact the upper surface to a depth of 12 inches prior to spreading growth medium. A minimum of 12 inches of growth medium will be placed on all areas to be reclaimed to Agriculture. Additional materials including overburden and imported fill materials may be utilized. All areas receiving soil materials will be seeded and planted.

The permittee will revegetate all areas receiving growth medium utilizing an all-purpose, native, weed-free, pasture grass seed mix at a minimum rate of 30 lbs. per acre. Seeding will be conducted either in the spring or fall via mechanical or hydro-seeding. Fertilizers and lime will only be used if necessary to establish vegetation.

All structures, equipment, and refuse will be removed from the site upon the completion of reclamation operations and all stormwater runoff will continue to be contained onsite via internal infiltration.

(6) If the proposed extractive activity involves the removal of rock, gravel, or sediment from a river or stream, the proposal shall be reviewed by the Oregon Department of Fish and Wildlife and it may provide a written statement to the county regarding the possible impact on fish habitat associated with the affected river or stream.

Consistent with the CUP application and approval, the existing CUP mining and processing activities are upland mining and do not involve any river or stream activity. Similarly the proposed expansion does not include any river or stream activity, nor does it include any mining (i.e. the removal of rock, gravel or sediment from the proposed expansion area).

(7) The County will define an area around the specific removal site which includes all lands within 250 feet of the site, based on the site map for a state mining or gravel permit. The applicant shall provide findings which identify the existing uses on those lands included within this area. The Commission shall evaluate the applicant's findings with regard to the potentially conflicting uses identified in the area based on the factors below:

i) If the mining activity can be sited on an alternate site

The subject property is identified as a mineral resource site on the CC Comprehensive Plan Mineral Resources Map (Ordinance 98-5) and therefore ideally suited for mineral extraction activities as evidenced by being approved via the existing CUP and DOGAMI operating permit. The proposed modification to expand the area does not include mining in the area: it only includes the immediately adjacent unused cranberry bogs for process water sedimentation and storage and stockpiling of processed aggregate. It is contiguous to the approved CUP area. The buffer shown in Attachment C of the original permit application is still applicable as no changes to the removal area are proposed.

ii) where conflicting uses are identified the economic, social environmental and energy consequences of the conflicting uses shall be determined and methods developed to resolve the conflict.

No conflicting uses have been identified and Mining and processing at the site have been approved and commenced. Similarly, the use of the cranberry bog pond area for water and stockpiling does not result in any conflicts.

8) A rock crusher, washer or sorter shall not be located closer than 500 feet to any residential or commercial use. Surface mining equipment and necessary access roads shall be constructed, maintained, and operated in such a manner as to eliminate, as far as is practicable, noise, vibration, or dust

which are injurious or substantially annoying to persons living in the vicinity.

A rock crusher, washer or sorter are/will not be located closer than 500 feet to any residential or commercial use. Surface mining equipment and necessary access roads are/will be constructed, maintained, and operated in such a manner as to eliminate, as far as is practicable, noise, vibration, or dust which are injurious or substantially annoying to persons living in the vicinity. All equipment will be located at least 500 feet from any residential or commercial uses on all adjacent property.

Approval of this amendment does not change the driveway location or any changes to the actual mining (extraction) of the site.

(9) No uses are permitted relating to offshore oil, gas or marine mineral exploration or development.

No uses relating to offshore oil, gas, or marine mineral exploration or development are proposed or otherwise included.

Section 7.040 Standards Governing Conditional Uses

17. Uses on resource land.

a) The proposed use will not force a significant change in, or significantly increase the cost of, accepted farming or forest practices on agricultural or forest land.

The proposed use is consistent with the Comprehensive Plans for subject property, and the only affect on farming or forest practices will be positive because of the long-term benefits to agriculture via the removal of noxious gorse.

b) The proposed use will not significantly increase fire suppression costs or significantly increase the risks to fire suppression personnel.

The proposed use of the amendment area for water storage and aggregate stockpiles and will not significantly increase fire suppression costs or significantly increase the risks to fire suppression personnel as they are not flammable. Removal of gorse will reduce the fire danger.

c) Uses listed authorized in Section 3.041 or Section 3.051 are also subject to this section, A written statement be recorded with the deed or written contract with the County or its equivalent shall be obtained from the land owner which recognizes the rights of adjacent and nearby land owners to conduct forest operations consistent with the Oregon Forest Practices Act and related Oregon Administrative Rules.

The statement that is required seems more pertinent to residential use than to an aggregate extraction site. The land owners have provided a document to the County entitled "Waiver of Right of Remonstrance against Customarily (Commonly) Accepted Farm and Forestry Practices", which remains in effect and includes the amendment area.

Section 3.170 Rural Industrial Zone (RI)

Section 3.172 Conditional Uses Subject to Administrative Approval by the Director

7. A permanent facility for the secondary processing of aggregate or other mineral resources such as an asphalt or concrete plant but not including facilities used for processing offshore oil, gas or mineral resources.

CCZO Section 7.040 Standards Governing Conditional Uses lists no specific standards as it relates to this conditional use within the Rural Industrial zone.

The subject property contains a Rural Site Exception (RSE) identified in the CC Comprehensive Plan Zoning Maps as site No. 10. A portion of that area is included in the existing CUP and the remainder of that area is included in the proposed modification. The pond area will be used for process water and stockpiling. Processing is a permitted use. No conditional use is required to comply with the RI zone because no facility for the secondary processing of aggregate, asphalt, or concrete is proposed within this application.

Attachment A; Site Plan Van Loo Pit, Sheet 1

Follows this page

LOCATED IN THE NORTHWEST 1/4 OF
TOWNSHIP 32 SOUTH, RANGE 15 WEST, WILLAMETTE MERIDIAN,
CURRY COUNTY, OREGON

T32S-R15W-TL1502
92410 CAPE BLANCO ROAD
SIXES, OR 97476
OWNER: AUBREY & SHIRLEY VAN LOO
AREA: 282.30 AC
SPLIT ZONING: FG - FORESTRY/GRAZING (277.30 AC)
RI - RURAL INDUSTRIAL (5.00 AC)

PROPOSED EXPANSION AREA FOR
C.U.P. AND DOGAMI PERMIT BOUNDARY
(AREA = 12.5± ACRES)

EXISTING C.U.P. AND DOGAMI
PERMIT BOUNDARY
(AREA = 57.2± ACRES)

EXPANDED C.U.P. AND DOGAMI PERMIT AREA
(TOTAL AREA = 69.7± ACRES)



T32S-R15W-TL1800
CAPE BLANCO ROAD
SIXES, OR 97476
OWNER: AUBREY & SHIRLEY VAN LOO
AREA: 350.71 AC
ZONING: FG - FORESTRY/GRAZING

SITE PLAN - VAN LOO PIT
C.U.P. & DOGAMI PERMIT BOUNDARY EXPANSION

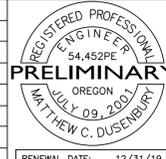
PREPARED FOR:

KNIFE RIVER MATERIALS
ATTN: TOM GRUSZCZENSKI
P.O. BOX 1145
MEDFORD, OREGON 97501



(09-20-2018 PHOTO PROJECTED ON TO
NAD83 (2011) OREGON STATE PLANE,
SOUTH ZONE 3602 COORDINATE SYSTEM)

DOGAMI-MLR INFORMATION	
PERMIT NUMBER: 08-0104	DRAWN: mcd
SITE NAME: VAN LOO PIT	DATE: 08/08/19
PERMIT HOLDER: LTM, INCORPORATED P.O. BOX 1145 MEDFORD, OR 97501 541-770-2960	
PERMIT HOLDER SIGNATURE:	



WHETSTONE
ENGINEERING, INC.

SITE PLAN - VAN LOO PIT
C.U.P. & DOGAMI PERMIT BOUNDARY EXPANSION
CURRY COUNTY, OREGON

SHEET
OF
1

JOB NO. 19-019
FILE: basemap.dwg

OFFICE: (541) 664-9344
whetstoneengineering@bj.com

615 ALDER STREET
CENTRAL POINT, OREGON 97502

Attachment B; WPCF Permit

Follows this page



Permittee: LTM, Incorporated		Source Address: Cape Blanco Road, Sixes	Date Inspected: 1/30/2020
Facility Name: Van Loo		Source Phone #: 541-732-2732	Official Contacted/Title: Tom Gruszczenski
DEQ File: Pending DOGAMI ID: 08-0104		Mailing Address: PO Box 1145, Medford OR 97501	
EPA ID # (NPDES only):			System Classification:
Permit #: WPCF 1000		Type of Inspection: Routine/application	
Permit Exp. Date: October 31, 2017			
COMPLIANCE STATUS	No Violations	Violations Noted	SUMMARY OF INSPECTION FINDINGS, COMMENTS & RECOMMENDATIONS
Schedule A Waste Discharge Limitations	X		
Schedule B Monitoring and Reporting	X		
Schedule D Special Conditions	X		
Schedule F General Conditions	X		
SFO or MAO Requirements	X		
VIOLATIONS NOTED:			

This sand and gravel pit is currently undeveloped and pending permit issuance. LTM, Incorporated has applied for coverage under the WPCD 1000 permit in order to conduct dewatering of mine cells. Pumped groundwater will be conveyed to onsite trenches or mined out cells for infiltration to the water table.

DOGAMI Permit Conditions:

The Permittee must:

1. not allow mining operations to physically disturb any area outside of the permit boundary.
2. prior to conducting any surface mining operations onsite, either relocate the utility line(s) offsite or submit a revised surveyed boundary map which includes 15 foot setbacks between all excavation operations and the utility lines.
3. not conduct blasting operations at the site without first amending the Operating Permit.
4. obtain and maintain compliance with the appropriate DEQ Permit prior to the generation, storage, and/or disposal of any process water onsite.
5. follow the Best Management Practices for gorse eradication as specified in Curry County Administrative Decision No. AD-1604.
6. salvage, store, and stabilize all available soil materials onsite for final reclamation.
7. stabilize all barren soil and overburden stockpiles and berms prior to October 30 of each year or as needed to reduce compaction and prevent water and wind erosion.
8. obtain coverage and maintain compliance under a DEQ NPDES 1200-A General Permit or a DEQ Individual NPDES Permit prior to discharging any stormwater runoff from the mining operation into waters of the state.
9. follow the "Inadvertent Discovery Plan for Cultural Resources" in the event of an inadvertent discovery of possible cultural materials.
10. establish all final excavated sloping configurations at 1½H:1V or flatter.
11. establish all final fill slopes at 2H:1V or flatter.
12. rip and/or scarify all compacted areas including the stockpiling and processing areas with earth moving equipment to decompact the upper surface to a depth of 12-inches prior to spreading growth medium.
13. replace a minimum of 12 inches of growth medium on all areas to be reclaimed to Agriculture.
14. ensure all imported material meets the DEQ clean fill standard or the use must be specifically allowed by the Department of Environmental Quality by rule, permit, or other written authorization.
15. revegetate all areas receiving growth medium utilizing an all-purpose, native, weed-free, pasture grass seed mix at a minimum rate of 30 lbs. per acre.
16. control noxious or invasive plants and weeds found to be present onsite via annual or semiannual spot spraying or other means.
17. ensure that mining operations including those within Phase 7 (as shown on the Environmental Science Associates, Inc. Site Plan Map) do not impact the 0.3 acre pond located onsite.

PREPARATION TIME: 1

INSPECTION TIME: 1

FOLLOW-UP TIME:

CC: Permittee WQ UIC Coordinator

Inspector's Name: Lisa Reinhart

Region & Office: DOGAMI

Inspector's Signature:

Date: 2/19/20







July 10, 2018

Ms. Lisa Reinhart
Oregon Department of Geology and Mineral Industries
229 Broadalbin St SW
Albany, OR 97321

RE: Van Loo Pit OPA # 08-0104 – WPCF 1000 Application Revisions

Dear Ms. Reinhart:

Attached is the revisions requested to the referenced storm water application.

Please let me know if have any questions or if any further revisions are required.

Sincerely,

Knife River Materials

Tom Gruszczenski, PE
Technical Services Manager

Attachments: WPCF 1000 Application Revision 1

**DEQ USE ONLY
REGIONAL OFFICE**

Received: _____
 Application #: _____
 File #: _____
 LLID/RM: _____
 DOC Conf.: _____

**APPLICATION FOR COVERAGE UNDER
THE WATER POLLUTION CONTROL
FACILITY WPCF-1000 GENERAL PERMIT**



Oregon Department of Environmental Quality

DEQ USE ONLY

Received: _____
 Amount Received: _____
 On-Site Surcharge: _____
 Check #: _____
 Deposit #: _____
 Notes: _____

A. REFERENCE INFORMATION

1. Legal Name of Applicant: LTM, INCORPORATED 2. Common Facility Name: KRM VAN LOO

3. Enter Site Location by **Latitude** and **Longitude**:

LATITUDE	Deg.	<u>42</u>	Min.	<u>48</u>	Sec.	<u>59</u>
LONGITUDE	Deg.	<u>124</u>	Min.	<u>30</u>	Sec.	<u>57</u>

4. Facility Contact Name: TOM GRUSZCZENSKI
 Contact Telephone #: 541 732 2732
 Fax #: TOM GRUSZCZENSKI @
 Email: KNIFERIVER.COM

5. Facility Physical Address: CAPE BLANCO RD
 City, State: SIXES, OREGON

6. Facility Mailing Address: PO BOX 1145
 City, State, Zip Code: MEDFORD OR 97501

7. Invoice to: TOM GRUSZCZENSKI Telephone #: 541 770 2960
 Billing Address: PO BOX 1145 City, State, Zip Code: MEDFORD OR 97501

B. GENERAL DESCRIPTION OF FACILITY

Briefly describe the facility and primary method of storm water treatment and disposal.
SAND AND GRAVEL WILL BE MINED AND PROCESSED (e.g. SCREENING, WASHING, CRUSHING). THE MINE EXCAVATION WILL BE USED TO CONTAIN & INFILTRATE WATER.

C. REQUIRED INFORMATION

- Attach a copy of:
1. A map of the facility location.
 2. A site map showing the facility layout and storm water drainage include location of wells, vehicle/equipment wash areas, and U.I.C.s (drywells, infiltration trenches, etc.).
 3. Schedule for development, if this is a new facility being constructed.
 4. Schematic diagrams of waste streams, and treatment and disposal facilities.
 5. Groundwater information.
 6. Evaluation of groundwater and surface water impacts.

D. OTHER PERMITS

List any existing permits for this site.

DOGAMI OPA #

E. SIGNATURE OF LEGALLY AUTHORIZED REPRESENTATIVE

I hereby certify that the information contained in this application is true and correct to the best of my knowledge and belief. In addition, I agree to pay all permit fees required by Oregon Administrative Rules 340-45 and/or 340-71. This includes an application fee and an fee invoiced annually by DEQ to maintain the permit.

Joel Frasier

Vice President

Name of Legally Authorized Representative (Type or Print)

Title

[Signature]

7/1/18

Signature of Legally Authorized Representative

Date

**Water Pollution Control Facility
Facility Plan Report**

Applicant Name LTM, INCORPORATED DOGAMI ID No. 08-0104
db2 KNIFE RIVER MATERIALS

A facility plan report (FPR) is a required component of *all* WPCF 1000 applications. An FPR is *also* required for NPDES 1200-A applications for sites that use and dispose of process water.

The following maps are required components of a complete WPCF application package:

- A map that shows the permit site location; and
- A more detailed map showing the permit boundary, well locations, nearby surface water bodies and processing facilities.

DOGAMI may be able to provide you with a map that can be modified for these purposes.

Site Information

Depth to groundwater 20 FEET

Distance to nearest stream 3,400 FEET

Name of nearest stream SIXES

Site geology (material underlying the facilities)

Sand and gravel

Bedrock

Other - Describe _____

Activities Needing Water Pollution Control Facilities

Rock washing

Sand classifiers

Concrete mixer-truck clean out

Asphalt plant emission controls

Other _____

Facilities On Site

Lined settling ponds/Liner description _____

Unlined settling ponds

Waste concrete sumps

Upland disposal of concrete

Other _____

Waste Disposal

Fines from the washing plant are permanently placed in mined out areas and incorporated into the site reclamation plan

Fines are recovered and sold directly or incorporated into other products and sold

Waste concrete is used for: N/A

Disposition of asphalt plant sludge: N/A

How will the facilities be operated to prevent any degradation of off-site groundwater or surface water?:

OPERATION OF THE SITE WILL BE PERIODIC AND INCLUDE SETTLING AND RECIRCULATION OF WASH WATER ALONG WITH REINFILTRATION OF BOTH WASH & STORM WATER. THE FACILITY AND OPERATION WILL BE CLOSELY MONITORED FOR OFF SITE IMPACTS AND IF IMPACTS ARE DETECTED OR CONSIDERED LIKELY TO OCCUR OPERATIONS WILL CEASE UNTIL CHANGES CAN BE IMPLEMENTED TO PREVENT IMPACTS.

Groundwater Information

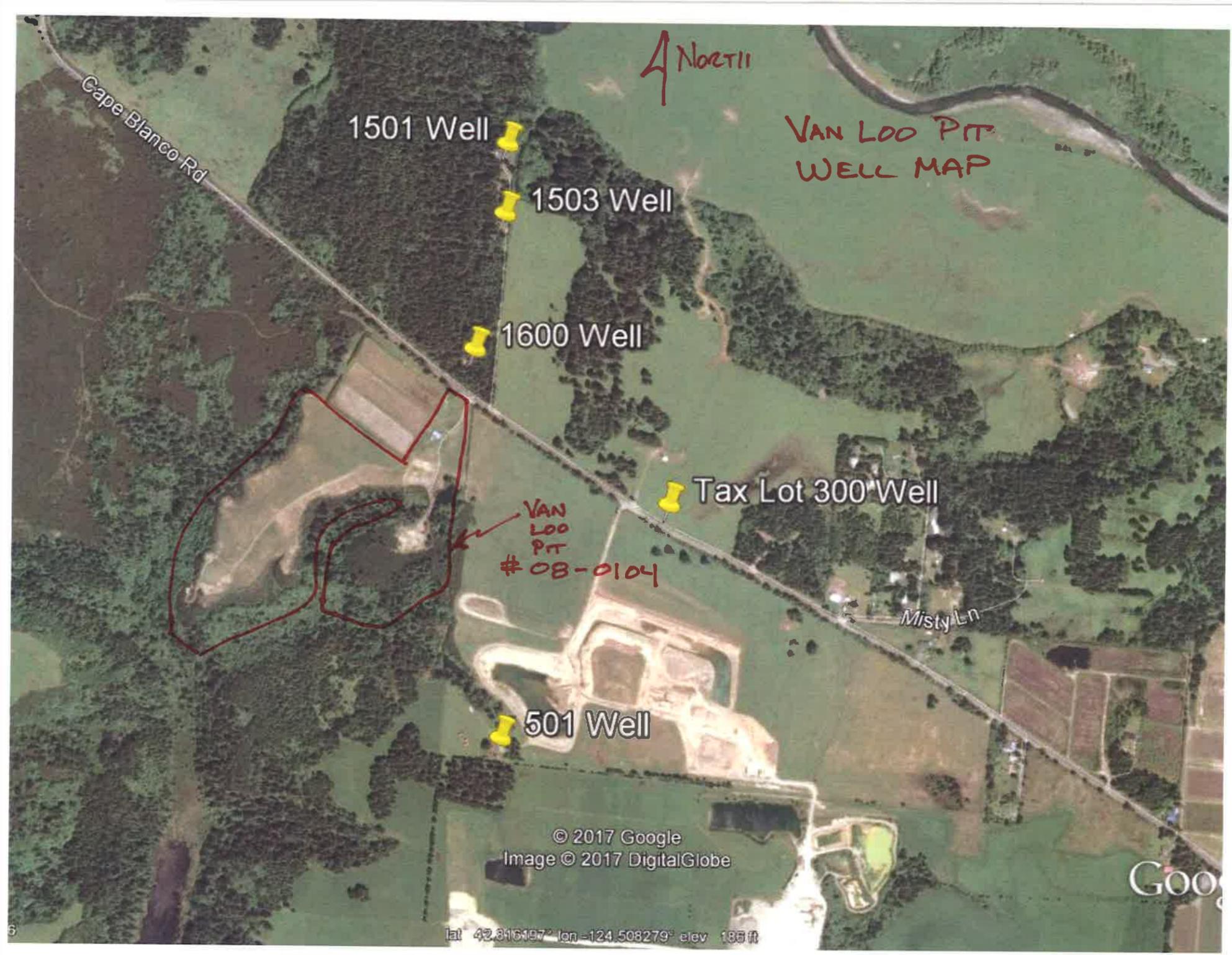
The site consists of alluvial sand and gravel deposits which were likely deposited by the ancestral Sixes and/or Elk Rivers, uplifted via active plate tectonics, and are now situated tens to hundreds of feet above the elevation of Sixes and Elk Rivers and flood plains. The site is located in the SE quarter of section 7 in Township 32 south, Range 15 west and in referencing the Oregon Water Resources Department (WRD) on-line well log database, there are 3 water wells currently located within T32S, R15W, Section 7 which report the depth of static groundwater. The depths are reported to range between 20 and 40 feet below natural ground surface, however no elevation data for the completed wells appeared to be available on the reports. I located on the map 4 houses by tax lots within 1500 feet of the permit boundary which presumably use groundwater as there is no municipal water supply available. The Pacific Ocean is located approximately 0.8 miles west of the westernmost permit boundary.

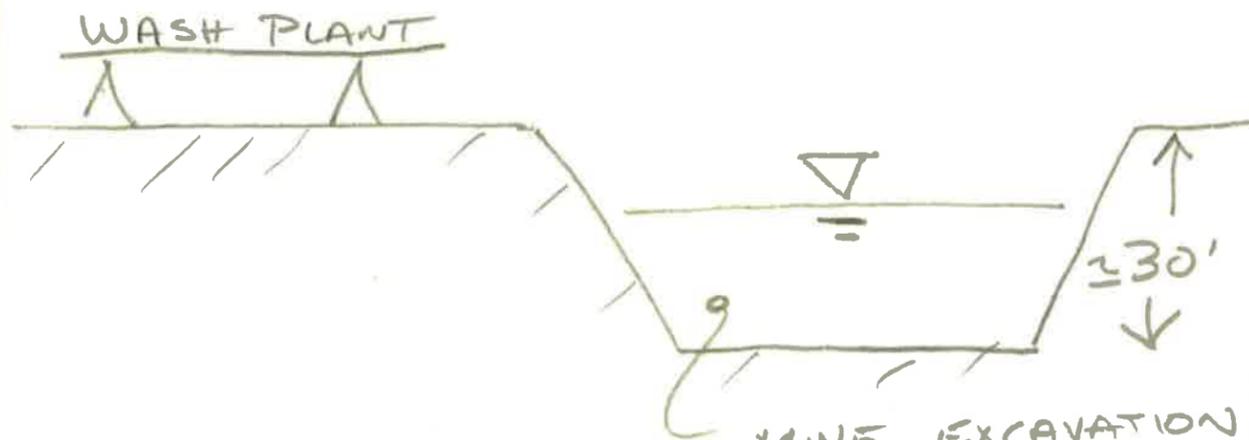
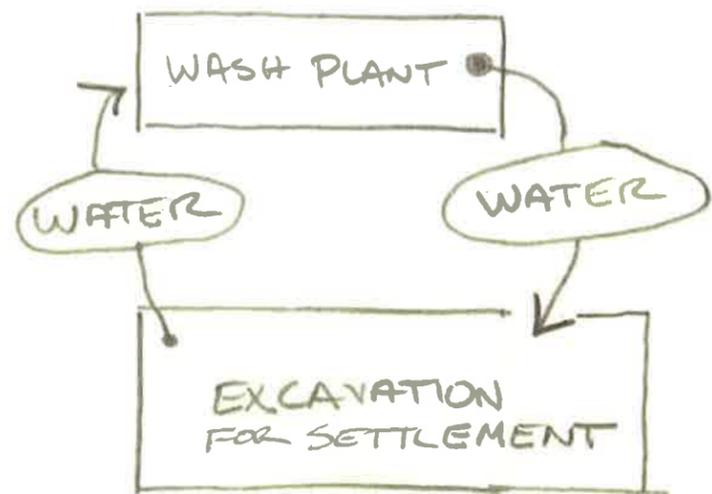
Evaluation of Groundwater and Surface Water Impacts

In order to accommodate mining, dewatering will be conducted by drawing the water table down approximately 10 feet within various mine cells. Mining areas will be limited in size of up to 6 acres. Mining cells will be backfilled, and the mining areas reclaimed as pasture as the next mining area is developed. Pumped ground water will be conveyed to onsite trenches or mined out cells for infiltration to the water table. As noted above, the depth of mining will be approximately 30 feet and the depth to groundwater is approximately 20 feet below ground surface.

Surface water impacts are also unlikely as there will be no discharge to surface water. Currently precipitation primarily percolates directly into the ground and the mining activity is not going to change that. Once mining begins surface water that does not directly drain into the ground will be directed via grading to the onsite infiltration areas. The materials being mined are alluvial sand and gravels with high proportions of sand. Sand is a proven filter and as such any sediment will be filtered from the before moving any significant distance through the ground.

According to WRD's well log data base the nearest supply well is approximately 1000 feet from the permit boundary. Given the re-infiltration of groundwater to the water table onsite and distance to supply wells, impacts to offsite groundwater resources are not anticipated.





MINE EXCAVATION
AS NEEDED FOR
SETTLEMENT/
RECIRCULATION
OF WATER

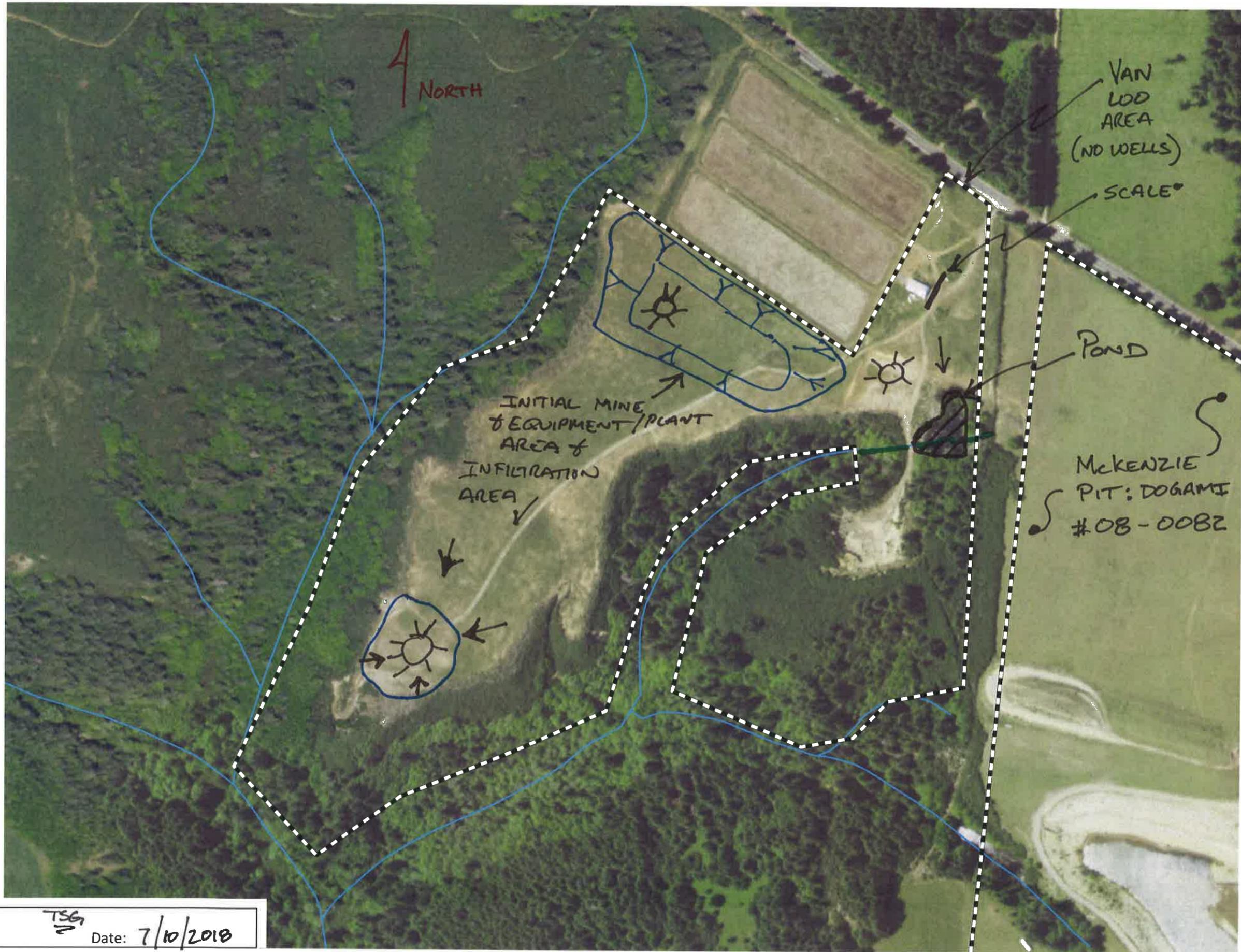
VAN LOO PIT Stormwater Pollution Control Plan

DEQ No. _____
 DOGAMI 08-0104

Legend

-  Permit Area
-  Disturbance Area
-  Drainage Area
-  Material Handling Area
-  Operating Equipment Area
-  Paved Area
-  Pond
-  Drainage Pattern
-  Culvert
-  Conveyance Ditch
-  Elevated/Graveled Road
-  Watercourses
-  Infiltration
-  Spring or Seep
-  Vegetation Filter
-  Sediment Control Structure
-  Wheel Washing
-  Spill Prevention
-  Hazardous Waste
-  Discharge Structure
-  Sampling Point
-  Well

0 150 300 600
 Feet



Permittee: **KNIFE RIVER MATERIALS**

TSG

Date: 7/10/2018

October 3, 2019

Ms. Lisa Reinhart
Oregon Department of Geology and Mineral Industries
229 Broadalbin St SW
Albany, OR 97321

RE: Van Loo Pit OPA # 08-0104 – WPCF 1000 Application Revisions

Dear Ms. Reinhart:

Attached is the revisions requested to the referenced storm water application.

Please let me know if have any questions or if any further revisions are required.

Sincerely,

Knife River Materials



Tom Gruszczenski, PE
Technical Services Manager

Attachments: WPCF 1000 Application Revision 1

Groundwater Information

The site consists of alluvial sand and gravel deposits which were likely deposited by the ancestral Sixes and/or Elk Rivers, uplifted via active plate tectonics, and are now situated tens to hundreds of feet above the elevation of Sixes and Elk Rivers and flood plains. The site is located in the SE quarter of section 7 in Township 32 south, Range 15 west and in referencing the Oregon Water Resources Department (WRD) on-line well log database, there are 3 water wells currently located within T32S, R15W, Section 7 which report the depth of static groundwater. The depths are reported to range between 20 and 40 feet below natural ground surface, however no elevation data for the completed wells appeared to be available on the reports. I located on the map 4 houses by tax lots within 1500 feet of the permit boundary which presumably use groundwater as there is no municipal water supply available. The Pacific Ocean is located approximately 0.8 miles west of the westernmost permit boundary.

Evaluation of Groundwater and Surface Water Impacts

In order to accommodate mining, dewatering will be conducted by drawing the water table down approximately 10 feet within various mine cells. Mining areas will be limited in size of up to 6 acres. Mining cells will be backfilled, and the mining areas reclaimed as pasture as the next mining area is developed. Pumped ground water will be conveyed to onsite trenches or mined out cells for infiltration to the water table. As noted above, the depth of mining will be approximately 30 feet and the depth to groundwater is approximately 20 feet below ground surface.

Surface water impacts are also unlikely as there will be no discharge to surface water. Currently precipitation primarily percolates directly into the ground and the mining activity is not going to change that. Once mining begins surface water that does not directly drain into the ground will be directed via grading to the onsite infiltration areas. The infiltration areas will be located in the mining area and relocated as needed to follow the active mining area and to maintain infiltration.

The materials being mined are alluvial sand and gravels with high proportions of sand. Sand is a proven filter and as such any sediment will be filtered from the before moving any significant distance through the ground. The proposed washing is ubiquitous to basically every sand & gravel operation in the state of Oregon.

According to WRD's well log data base the nearest supply well is approximately 1000 feet from the mining boundary. Given the uniform alluvial ground, that sand is a proven method of water filtration/purification and distance to supply wells, impacts to offsite groundwater resources are not anticipated.

Van Loo Pit WPCF Site Map 1

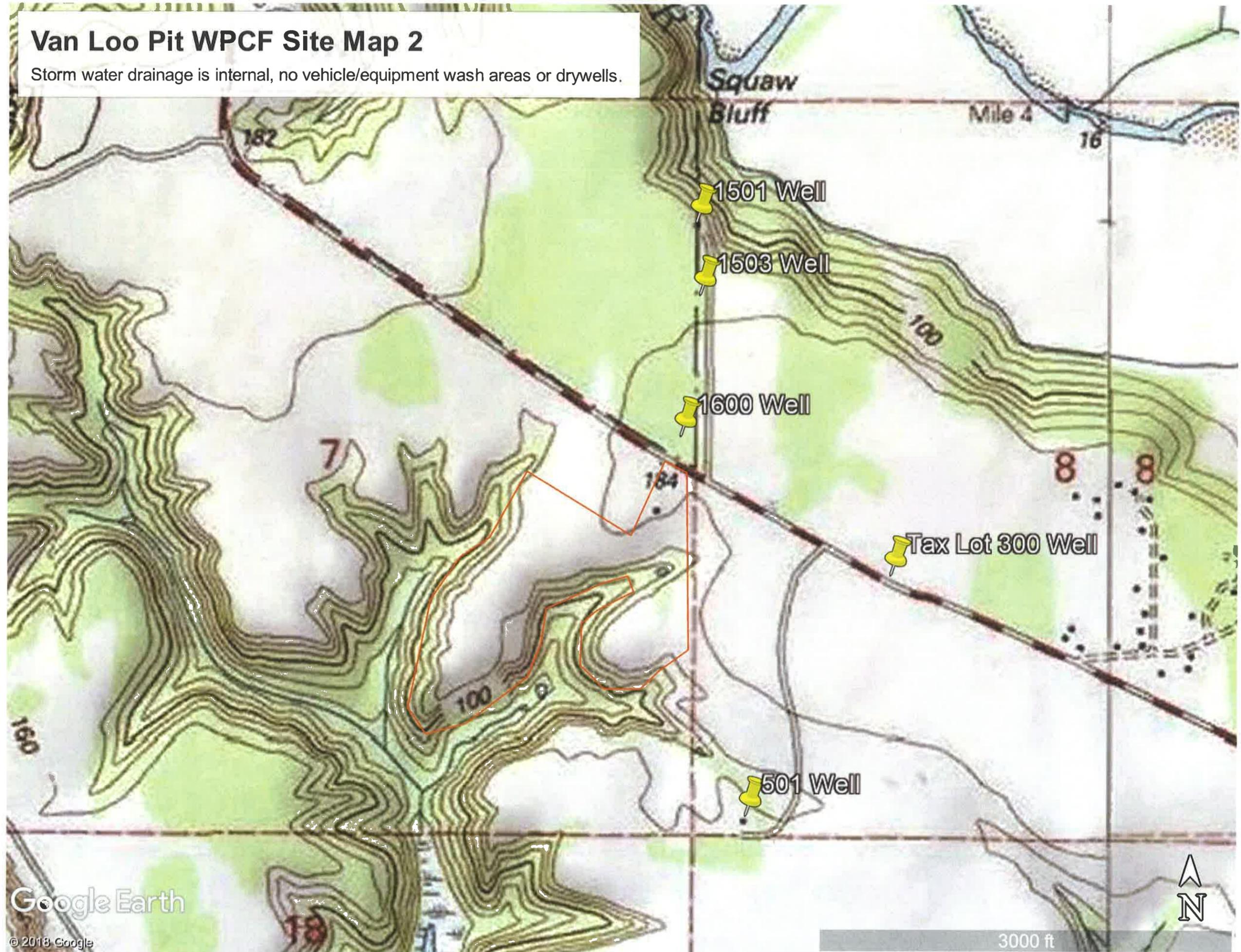
Storm water drainage is internal, no vehicle/equipment wash areas or drywells.

Washwater Pond (size and location to vary)



Van Loo Pit WPCF Site Map 2

Storm water drainage is internal, no vehicle/equipment wash areas or drywells.





Well Log Query Results *GPS points, where available are at the far right of the table. Click link to view on map*

Township: 32 S, Range: 15 W, Sections: 7,8,17,18

Well Log	T-R-S/ QQ-Q	Taxlot	Street of Well	Owner	Company	Special Standards	Well Type	First Water	Completed Depth	Static Water Level	Yield	Completed Date	Received Date	Bonded Constructor	Startcard	Well Id #	New	Abandon	Deepen	Alteration	Conversion	Domestic	Irrigation	Community	Livestock	Industrial	Injection	Thermal	Dewatering	Piezometer	Latitude/ Longitude	
CURR 1020	32.00S-15.00W-7 NE-NE			KRUMMEN, EDWARD PO BOX 805 PORT ORFORD OR 97465			W	23.00	35.00	23.0	32.0	04/05/1976	04/06/1976	NOGGLE, LU H GREENACRES HAND DUG WELLS			√				√											
CURR 1021	32.00S-15.00W-7 NE-NE			KRUMMEN, EDWARD PO BOX 805 PORT ORFORD OR 97465			W	32.00	0.00	20.0	5.0	03/01/1976	03/03/1976	MILLER, ANDREW W BILL MILLER WELL DRILLING			√	√			√											
CURR 1022	32.00S-15.00W-7 SE-NE				INDEPENDENT FISHERMANS COOP PO BOX 74 PORT ORFORD OR 97465		W	91.00	0.00	40.0	6.0	11/09/1978	12/14/1978	MILLER, ANDREW W BILL MILLER WELL DRILLING			√	√														
CURR 1023	32.00S-15.00W-8			HENSLEY, GLENN CAPE BLANCO RT BOX 1 SIXES OR 97476			W		52.00	10.0	13.0	11/30/1970	01/26/1971	BARRINGTON, DONALD E BARRINGTON WELL DRILLING			√				√											
CURR 1043	32.00S-15.00W-17 -NE			SMITH, LESTER PORT ORFORD OR 97465			W	52.00	67.00		6.0	09/16/1957	10/11/1957	BARRINGTON, DONALD E			√				√											
CURR 1735	32.00S-15.00W-7 NE-SE	201	CAPE BLANCO RD	VAN LOO, A D PO BOX 234 SIXES OR 97476			W	5.00	120.00			04/25/1995	05/01/1995	MACK, JAMES A	71631		√	√			√											
CURR 50220	32.00S-15.00W-8 NW-SE	300	44501 FINCH LANE, SIXES	POLAND, GALE	POLAND, TERESA 17910 ALSEA HWY ALSEA OR 97324	√	W	30.00	100.00	90.0	5.0	08/28/1997	09/18/1997	MACK, JAMES A BANDON WELL & SEPTIC CO. INC.	93134	10862	√				√											
CURR 51245	32.00S-15.00W-8 NW-SE	500	44503 FINCH LANE	BAILEY, JANET 44503 FINCH LANE SIXES OR 97476			W	100.00	140.00	10.0	1.0	06/28/2005	07/07/2005	MEYER, GLEN L MEYER WELL DRILLING	169256	78576	√				√											
CURR 51695	32.00S-15.00W-8 NW-SE	500	44503 FINCH LN	BAILEY, JANET 44503 FINCH LN SIXES O 97476			W		0.00			06/23/2009	06/24/2009	WRIGHT JR, JOHN N WRIGHTS ARTESIAN	1007209		√				√											
CURR 51710	32.00S-15.00W-8 NW-SE	500	44503 FINCH LN OFF CAPE BLANCO RD	BAILEY, BILL 44507 FINCH LN SIXES OR 97476			W	20.00	60.00	-18.0	1.0	07/29/2009	09/10/2009	WRIGHT JR, JOHN N WRIGHTS ARTESIAN	1007641	98785	√				√											

1 2

[Download Data](#)

ATTACHMENT 40



Well Log Query Results *GPS points, where available are at the far right of the table. Click link to view on map*

Township: 32 S, Range: 15 W, Sections: 7,8,17,18

Well Log	T-R-S/ Q-Q	Taxlot	Street of Well	Owner	Company	Special Standards	Well Type	First Water	Completed Depth	Static Water Level	Yield	Completed Date	Received Date	Bonded Constructor	Startcard	Well id #	New	Abandon	Deepen	Alteration	Conversion	Domestic	Irrigation	Community	Livestock	Industrial	Injection	Thermal	Dewatering	Piezometer	Latitude/ Longitude		
CURR 52447 Exempt Use Map	32.00S-15.00W-8 NW-SE	500	44503 FINCH LN SIXES OREGON 97476	BAILEY, JANET 44503 FINCH LN SIXES OR 97476			W	20.00	60.00	18.0	1.0	08/16/2013	09/16/2013	WRIGHT, JACOB N WRIGHTS ARTESIAN	1020704	110483	√					√											
CURR 52552	32.00S-15.00W-8 NE-SW	300	CAPE BLANCO ROAD, SIXES OR 97476	PUHL, MARY ANNE	BOOTS N BEACH LLC ATTN: KARAMA BILLICK PO BOX 23638 EUGENE OR 97402		W	17.50	41.00	17.5	11.0	04/11/2014	04/14/2014	MACK SR, JAMES A BANDON WELL & PUMP COMPANY	1022350	110221	√					√											

1 2

[Download Data](#)

Attachment C; Geotechnical Evaluation

Follows this page

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Email: info@cascadiageoservices.com

www: CascadiaGeoservices.com



Geotechnical Site Evaluation

92410 Cape Blanco Road

T32S R15W Tax Lot 1502

Sixes, Oregon 97476

Mr. Tom Gruszczenski

Knife River Materials Corporation

3959 Hamrick Road

Central Point, Oregon 97502

Sent via email: Tom.Gruszczenski@kniferiver.com

September 9, 2021

CGS Project No. 21078

TABLE OF CONTENTS

INTRODUCTION.....	3
PROJECT UNDERSTANDING AND DESCRIPTION	3
SURFACE DESCRIPTION	4
SUBSURFACE EXPLORATIONS.....	5
Subsurface Conditions Encountered.....	6
LABORATORY ANALYSIS.....	7
GROUNDWATER	8
GEOLOGIC HAZARDS	9
Liquefaction.....	9
Tsunamis.....	10
Slope Stability Analysis	10
DISCUSSION AND RECOMMENDATIONS	11
LIMITATIONS.....	13
PROFESSIONAL QUALIFICATIONS	15
FIGURES.....	16
ATTACHMENTS	20

INTRODUCTION

Cascadia Geoservices, Inc. (CGS) is pleased to provide you with this Geotechnical Site Evaluation report which summarizes our evaluation of geologic hazards for a portion of your leased mining property located near Sixes, Oregon (see Figure 1, Location Map). We understand that you are requesting that CGS evaluate the subject property and provide you with recommendations for developing the site. This report summarizes our project understanding and site investigation, including subsurface explorations, and provides our conclusions and recommendations for developing the site.

PROJECT UNDERSTANDING AND DESCRIPTION

Our understanding is based on email and telephone correspondence with you beginning on May 18, 2021, and on a preliminary site visit to the property on June 1, 2021. Our understanding is further based on a site plan dated August 8, 2019, sent to us by you. And our understanding is based on a second site visit on June 23, 2021, at which time a geologic reconnaissance of the site was performed, and two exploratory geotechnical borings were completed.

We understand that you are currently mining gravel on a leased property southwest of the site which is 57.2 +/- acres, and that the mining operation is operating under an Oregon Department of Geology and Mineral Industries (DOGAMI) Operating Permit and a Curry County Conditional Use Permit (CUP). We further understand that you are proposing to expand your mining operation by adding an additional 12.5 +/- acres along the western portion of the permitted site. We understand that as part of the county's CUP application process, the county is requesting that you provide a geologic hazard report for the proposed expansion area (site or subject property). The expansion area is bordered on the west by a northeast-southwest-trending drainage swale.

County Zoning Ordinance Section 3.252 (Development in Areas of Geologic Hazards) provides review standards for all proposed development activity within areas identified as having natural hazards.

Under the ordinance, the applicant is required to provide a geologic hazard assessment by an Oregon certified engineering geologist that identifies site-specific geologic hazards, associated levels of risk, and the suitability of the site for the proposed development activity. The geologic hazard assessment must include an analysis of the risk of geologic hazards on the subject property, on contiguous and adjacent property,

and on upslope and downslope properties that may be at risk from, or pose a risk to, the development activity. The geologic hazard assessment shall also assess erosion and any increase in stormwater runoff and any diversion or alteration of natural stormwater runoff patterns resulting from the development activity. The geologic hazard assessment shall also include one of the following:

- a) A certification that the development activity can be accomplished without measures to mitigate or control the risk of geologic hazard to the subject property or to adjacent properties resulting from the proposed development activity.
- b) A statement that there is an elevated risk posed to the subject property or to adjacent properties by geologic hazards that requires mitigation measures for the development activity to be undertaken safely.

SURFACE DESCRIPTION

The site is located within the Klamath Mountain physiographic region of southwestern Oregon and is part of an elevated marine terrace at an elevation of approximately 180 feet above mean sea level (AMSL) (see Figure 2, Site Map). The site is currently an 8.0-acre fallow cranberry bog which is bordered by a 10.0-foot-high earthen berm.

The subject property is in an area which is principally agricultural and is bordered on the east and south by pasture and on the west by a drainage swale. The site is accessed via Cape Blanco Road and an unimproved driveway that accesses the site from the east. Cape Blanco Road borders the site on the north. A 10-foot-high earthen berm along the western side of the cranberry bog is bordered on the west by an unimproved dirt road. The top of the berm is set back between 60 and 70 feet from the break-in-slope above the swale.

The western border of the expansion area is bordered by a northeast-southwest-trending drainage swale. The stability of the slopes and the area which borders the east side of the swale is the focus of our site evaluation. The drainage swale is part of a deeply incised dendritic-pattern drainage which drains the terrace, and which flows to the south. The swale where it borders the expansion area measures approximately 530 feet long and is 145.0 feet across. The descending slopes on the east side of the swale which border our expansion area range in grade from 60 to 100 percent and are 40

feet, measured parallel to slope. The swale is densely vegetated with both native and exotic trees and brush. One hundred-year-old evergreen trees flank the slope and were observed to be straight with no visible thickening or offset near the base. The slope is mantled with a thick layer of organic, loamy soil.

Based on mapping done by others,^{1,2} there are three types of soils within the proposed expansion area. The soil in the southwest portion of the expansion area consists of fine sandy loam (115F – Ferrelo-Bullards complex, 0 to 20 percent slopes). The sand is well drained and was derived from sandy eolian and marine deposits. The soil that covers most of the western half of the expansion area consists of silty loam (138B – Grindbrook-Wadecreek complex, 0 to 8 percent slopes). The silty loam is derived from mixed alluvium and is described as moderately well drained. The soil that covers the eastern half of the expansion area consists of silty clay loam (151D – Horseprairie silt loam, 0 to 15 percent slopes). The silty clay loam is derived from marine deposits and is also well drained. The soil overlies sediments of Quaternary marine middle terrace deposits (Late Pleistocene) which consist of semi-consolidated sand, silt, clay, and gravel.

At the time of our site visit, the site appeared stable with no ground cracks, areas of settlement, fresh earthen scarps, or landslides observed. The top of the drainage swale looked well drained with no standing water, seeps, or hydric plants visible.

SUBSURFACE EXPLORATIONS

In order to analyze the soils at the site, CGS observed the completion of two geotechnical borings during our June 23, 2021, site visit. The borings were drilled by Dan J Fischer Excavating Inc. from Forest Grove, Oregon. The borings were drilled using a trailer-mounted drill rig and advanced using solid-stem auger drilling techniques. Standard Penetration Tests (SPTs) of the soils were completed at 2.5- and 5.0-foot intervals. The borings were drilled to depths ranging from 16.5 to 19.0 feet below ground surface (bgs) where they were terminated due to refusal (the inability to advance the borings due to hard material encountered). The borings were logged by a member of our staff from our southern Oregon coast office. Soil samples from the borings were collected and stored in moisture-proof plastic bags and transported to CGS's lab. Upon

¹ United States Department of Agriculture. Natural Resource Conservation Service Web Soil Survey. Retrieved from <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

² Oregon Department of Geology and Mineral Industries (DOGAMI) Geologic Map of Oregon, viewed at <https://gis.dogami.oregon.gov/maps/geologicmap>

completion, the borings were filled with bentonite chips and the locations determined and recorded using GPS. The locations of the borings are shown on Figure 2, Site Map, and detailed bore logs are included at the back of this report as Attachment 1.

Subsurface Conditions Encountered

The material encountered in the borings was similar. Both borings were drilled on the western side of the site along the unimproved road near the top of the drainage (see Figure 2, Site Map). The primary difference in the borings was depth to dense soil and an increased silt content.

Boring B-1 encountered very loose, brown, silty sand with some gravel from 0.0 to 5.0 feet bgs. We infer that this is fill. At 5.0 to 12.5 feet bgs the soil became silty sand / sandy silt. At 12.5 feet bgs to the bottom of boring B-1 at 19.0 feet bgs the soil became dense-to-very-dense, tannish brown, gravelly sand. The sand was observed to be well graded and well cemented. The sand and gravel were observed to be sub-rounded to sub-angular in shape. The soil encountered in B-1 was observed to be moist, becoming moist to wet from 10.0 to 12.5 feet bgs.

Boring B-2 encountered loose, brown, silty sand with some gravel from 0.0 to 5.0 feet bgs. The sand was observed to be moist. We infer that is fill. At 3.0 feet bgs the soil became medium-dense and at five feet became dense, tannish brown sand with some fine gravel. The sand here was also well graded and well cemented. The sand and gravel consisted of sub-rounded to sub-angular fragments. At 7.5 feet bgs the sand became very dense to the bottom of the boring at 16.5 feet bgs. The soil was observed to be moist to wet at 9.0 to 12.0 feet bgs. Based on mapping by others,³ we interpret the sands to be part of the Quaternary middle marine terrace deposits.

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

Fill: Encountered from 0.0 to 5.0 feet bgs in B-1 and B-2. Consisted of very loose, brown, silty sand with some gravel.

Quaternary Middle Marine Terrace Deposits:

Sandy Silt / Silty Sand with some Gravel: Encountered from 5.0 to 12.5 feet bgs in boring B-1. The silty sand / sandy silt was observed to be very loose to loose, brown, and moist. Boring B-2 encountered silty sand at 5.0 to the bottom of

boring B-2 at 16.5 feet bgs. The silty sand was observed to be dense to very dense and the sand and gravel were observed to be sub-rounded to sub-angular fragments of various lithologies. The sand encountered in both borings was observed to be well graded.

Gravelly Sand: Encountered from 12.5 to the bottom of boring B-1 at 19.0 feet bgs. The gravelly sand was observed to be dense to very dense, tannish brown and moist. The sand and gravel were observed to be sub-rounded to sub-angular in shape and the sand was observed to be well graded.

LABORATORY ANALYSIS

Select samples were packaged in moisture-proof bags and transported to our laboratory where they were classified in general accordance with the Unified Soil Classification System, Visual-Manual Procedure. In addition, select samples were analyzed, where applicable, for water content (ASTM D698), percent of fines (ASTM D1140), and Atterberg limits (ASTM D4318). The results are summarized below in Table 1. The Lab Analysis Reports for the samples are provided at the back of this report as Attachment 2.

Table 1: Laboratory Testing Results

Sample ID	Boring / Depth (feet)	Type of Soil	Water Content (%)	Fines (%)	USCS Symbol ³
SS-1	B-1 / 5.0	Sandy Silt / Silty Sand	36.0	50.0	SM / ML
SS-4	B-1 / 15.0	Sand with Fine Gravel	13.0	11.0	SW
SS-6	B-2 / 5.0	Silty Sand with Fine Gravel	18.0	19.0	SM
SS-10	B-2 / 15.0	Sand with Fine Gravel	11.0	2.0	SW

³ Classification symbols are estimated based on visual observation.

Our lab analysis indicates that the soil encountered in the upper 12.5 feet of boring B-1 has a significant amount of fines. The high-water content in the silty sand / sandy silt is due to the cohesive soils' intrinsic water-holding capacity. The soil encountered from 12.5 feet bgs to the bottom of boring B-1 has a low water content and low percentage of fines. We infer that this is due to the density and highly cemented nature of these soils.

Our analysis and recommendations are based on the following physical properties of the soils encountered which are listed below in Table 2.

Table 2: Physical Properties of Soil

Depth (feet)	Type of Soil	N Value	Effective Unit Weight (pcf)	Drained Friction Angle, ϕ' (degrees)	Drained Cohesion, c' (psf)
0 to 5.0	Very Loose Silty Sand with Some Gravel	2	110 to 130	34 to 35	21.0
5.0 to 19.0	Medium-Dense to Very Dense Silty Sand with Some Gravel	31 to 90	110 to 130	34 to 35	27.0

GROUNDWATER

Moist to wet samples were encountered at 10.0 and 9.0 feet bgs in borings B-1 and B-2, respectively. Caving was not detected in either boring. Our review of water-well cards for the area⁴ indicates that groundwater levels are variable and range from 5.0 to 40.0 feet bgs. We anticipate that the primary groundwater table is near the bottom of the drainage swale west of and adjacent to the site, which is below the site approximately 50.0 feet. It is our opinion that water levels will rise during periods of sustained rainfall and that perched groundwater will form within the surficial sands above confining layers of silts and well-cemented sands. Based on the topography, we anticipate that the hydraulic gradient is mostly to the west and east towards the unnamed drainages that flank the site.

⁴ Oregon Water Resources Department Well Report Query, viewed online at <https://apps.wrd.state.or.us>

GEOLOGIC HAZARDS

A review of the Statewide Geohazards Viewer (Oregon HazVu)⁵ indicates that the site is not part of an identified landslide, earthflow, or debris-flow complex. The state has identified the moderate and steep slopes on the western portion of the site leading into the drainage as having a moderate-to-high likelihood of future landslides.

A review of LIDAR mapping for the area⁶ indicates that the slopes on the western portion of the site are gentle to moderate on the northern part of the drainage swale, becoming steeper to the south. The slope height increases as the drainage becomes larger to the south. The slopes are observed to be arcuate in shape. As such, the LIDAR imagery for these slopes is blocky and irregular. Based on our LIDAR review, there are anomalous landforms associated with geologic hazards including landslides on the slopes on the western portion of the site. The arcuate-shaped slopes are more likely to experience a failure as the shape of the slope collects surface water more readily compared to convex or uniform slopes.

Based on a review of U.S. Geological Survey maps,⁷ there are geologically young fault systems within ½ mile of the subject property. The Battle Rock Fault Zone trends north-northwest/south-southeast and is located approximately ½ mile to the east of the site. The Battle Rock Fault Zone is a geologically young fault, having formed during the middle and late Quaternary (less than 750,000 years ago). Minor movement of less than 0.2 mm per year is indicated. As with other folds and faults located in the Cascadia forearc, it is suspected that great megathrust earthquakes along the Cascadia Subduction Zone will cause future rupture and displacement on these faults.

Liquefaction

Liquefaction occurs when loosely packed, water-logged granular sediments lose their strength in response to strong ground shaking. Liquefaction occurring beneath buildings and other structures can cause major damage during earthquakes. Liquefaction potential was assessed based on the information obtained from our borings and using

⁵ (HazVu). Oregon Department of Geology and Mineral Industries (DOGAMI) Statewide Geohazards Viewer. Viewed at <https://www.oregongeology.org>

⁶ LIDAR is an aerial imagery technology that penetrates the vegetative cover by measuring distance by measuring the amount of time it takes for light to travel from a light-emitting source to an object and back to a sensor.

⁷ U.S. Geological Survey (USGS), Quaternary Faults Web Mapping Application, viewed at <https://earthquake.usgs.gov>

the parameters suggested in Youd & Andrus, et al., 2001.⁸ According to our seismic analysis, the site will experience a peak ground acceleration (PGA) during a design seismic event of 1.15 g. Further, moist to wet samples were observed in borings B-1 and B-2. Based on the observed depth of groundwater and the consistency and cemented nature of the soils, it is our opinion that the liquefaction potential for the site is low to moderate.

Tsunamis

Based on recent mapping and modeling done by the state of Oregon,⁹ the site is not within the Tsunami Inundation Zone. We note that access roads and low-lying areas are in the inundation zone and will be impacted by a local-source Cascadia Subduction Zone earthquake of 8.7 or larger. Because of this, we strongly recommend that you check local resources and the state of Oregon's Department of Geology and Mineral Industries (DOGAMI) Tsunami Resource Center for current information regarding tsunami preparedness and emergency procedures.

Slope Stability Analysis

In order to determine the overall stability of the site, CGS developed a model of the slope in order to determine a factor of safety (FS) against slope failure. The factor of safety is defined as the ratio of the force driving downslope movement (typically gravity) and the forces resisting downslope movement (typically the shear strength of the soil). If the calculated factor of safety is less than 1.0, the driving force is greater than the resisting force and the slope is indicated to be unstable. For sites such as this, a factor of safety equal to or greater than 1.5¹⁰ is suggested to ensure that a site will be stable.

Our slope model was used to complete a slope stability analysis for the slope on the east side of the drainage, which in turn allowed us to determine an FS for the slope. Our

⁸ Youd, T. L., Andrus, I. M., et al., 2001. Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils. ASCE, Journal of Geotechnical and Geoenvironmental Engineering, v. 127, no. 10, pp. 817-833.

⁹ Local-source (Cascadia Subduction Zone) Tsunami Inundation Map for Cape Blanco, Curry County, Oregon. DOGAMI TIM-Curr-02, Plate 1. State of Oregon Department of Geology and Mineral Industries online at <http://www.oregongeology.org>

¹⁰ ODOT – Geotechnical Design Manual—Chapter 7—Slope Stability Analysis

analysis is based on the geology encountered in our borings and on our geologic reconnaissance of the slope.

Our analysis is based on the east-to-west cross section shown on Figure 2 and is tied to the subsurface geology encountered in borings B-1 and B-2. The topography and resulting cross section were developed based on published LIDAR maps of the area and measurements taken at the site.

As shown on Figure 3, the slope stability analysis was performed for groundwater levels which were encountered in our borings. From this analysis, it is shown that the outside edge of the slope may become unstable but that this area is minimal and less than 5.0 feet. The inboard portion of the slope remains stable with a factor of safety above 1.5.

DISCUSSION AND RECOMMENDATIONS

Based on our surface and subsurface investigation, it is our opinion that the subject property is stable. As such, we believe that if the proposed mining expansion development is allowed, the risk of geologic hazards impacting either the subject property or contiguous and adjacent properties is low. Based on this, it is further our opinion that the proposed mining expansion can be accomplished without measures to mitigate or control the risk of geologic hazards.

We base our conclusions on the following.

1. At the time of our site visit, the site appeared stable with no ground cracks, areas of settlement, fresh earthen scarps, or landslides observed. The top and eastern slope of the drainage swale looked well drained with no standing water, seeps, or hydric plants visible. One-hundred-year-old evergreen trees which flank the slope were observed to be straight with no visible thickening or offset near the base that would indicate slope soil creep. A thick layer of organic soils mantles the slope, indicating an extended period of quiescence.
2. Our review of LIDAR imagery of the site did not reveal arcuate shaped scarps or other anomalous landforms associated with landslides or earthflow topography. And our review of recent mapping by the state did not identify the swale slopes as being within landslide terrain that has been inventoried by the state.
3. The material encountered in our borings was generally of a dense consistency. We attribute this in part to the hardness of the granular components, the density

of the buried layers, and to the interstitial cementation of the sediments. It is our experience that these dense sediments are typically stable and will maintain a near-vertical slope with only minor sloughing.

4. There is a minimal amount of undercutting due to erosion at the base of the slope. The slope is part of a drainage which incises the terrace, but where it borders the expansion area, drains only a minimal area near the upper reaches of the drainage. The drainage is seasonal, low gradient, and low flow.
5. Our slope stability analysis indicates that, based on the physical properties of the soils encountered in our borings and the geometry of the slope, the slope is stable with a factor of safety of 1.5 or greater. Based on our slope stability model, we recommend that mining activity including road building should adhere to a minimum setback of 15 feet from the break in slope.

Finally, we were not asked to review the Operating Permit or the Sediment and Erosion Control Plan for the expansion area and were not asked to assess either erosion, an increase in stormwater runoff or diversion, or alteration of natural stormwater runoff patterns resulting from the development activity. It is our opinion that the proposed operation, because of where it is located on the top of the terrace, will not alter or divert natural stormwater runoff. We further note that the surficial soils are granular and thus well drained. It is our opinion that by following the Oregon Department of Environmental Quality Best Management Practices,¹¹ erosion and surface runoff can be abated. We recommend that the site be periodically graded to prevent ponding and to provide positive drainage away from the slopes on the western edge. The granular soils at the site are susceptible to disturbance during the wet season. Trafficability or grading operations may disturb the exposed soils during or after extended wet periods or when the moisture content of the soils is more than a few percentage points above optimum. In order to limit sedimentation and potential runoff, disturbed soils or soft or loose zones should be removed and replaced with compacted structural fill.

¹¹ Industrial Stormwater Best Management Practices Manual, February 2013. Oregon Department of Environmental Quality. Viewed online at <https://www.oregon.gov>

LIMITATIONS

Cascadia Geoservices, Inc.'s (CGS) professional services are performed, findings obtained, and recommendations prepared in accordance with generally accepted principles and practices for engineering geologists. No other warranty, express or implied, is made. The Customer acknowledges and agrees that:

1. CGS is not responsible for the conclusions, opinions, or recommendations made by others based upon our findings.
2. This report has been prepared for the exclusive use of the addressee, and their agents, and is intended for their use only. It is not to be photographed, photocopied, or similarly reproduced, in total or in part, without the expressed written consent of the Customer and Cascadia Geoservices, Inc.
3. The opinions, comments, and conclusions presented in this report are based upon information derived from our literature review, historical topographic map and aerial photograph review, and on our site observations. The scope of our services is intended to evaluate soil and groundwater (ground) conditions within the primary influence or influencing the proposed development area. Our services do not include an evaluation of potential ground conditions beyond the depth of our explorations or agreed-upon scope of our work. Conditions between or beyond our site observations may vary from those encountered.
4. Recommendations provided herein are based in part upon project information provided to CGS. If the project information is incorrect or if additional information becomes available, the correct or additional information should be immediately conveyed to CGS for review.
5. The scope of services for this subsurface exploration and report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.
6. If there is a substantial lapse of time between the submission of this report and the start of work at the site, if conditions have changed due to natural causes or construction operations at or adjacent to the site, or if the basic project scheme is significantly modified from that assumed, this report should be reviewed to determine the applicability of the conclusions and recommendations. Land use, site conditions (both on and off site), or other factors may change over time and

could materially affect our findings. Therefore, this report should not be relied upon after two years from its issue, or in the event that the site conditions change.

7. The work performed by the Consultant is not warranted or guaranteed.
8. There is an assumed risk when building on marginal ground, sites subject to flooding, or adjacent to bluffs, sea cliffs, or on steep ground.
9. The Consultant's work will be performed to the standards of the engineering and geology professions and will be supervised by licensed professionals. Attempts at improving marginal ground, sites subject to flooding, or adjacent to bluffs, sea cliffs, or on steep ground supporting the Customer's property may, through acts of God or otherwise, be temporary and that marginal ground, sites subject to flooding, or adjacent to bluffs, sea cliffs, or on steep ground may continue to degrade over time. The Customer hereby waives any claim that they may have against CGS for any claim, whether based on personal injury, property damage, economic loss, or otherwise, for any work performed by CGS for the Customer relating to or arising out of attempts to stabilize the marginal ground, sites subject to flooding, or bluffs, sea cliffs, or steep ground located at the Customer's property identified hereunder. It is further understood and agreed that continual monitoring of the Customer's property may be required, and that such monitoring is done by sophisticated monitoring instruments used by CGS. It is further understood and agreed that repairs may require regular and periodic maintenance by the Customer.
10. The Customer shall indemnify, defend, at the Customer's sole expense, and hold harmless CGS, affiliated companies of CGS, its partners, joint ventures, representatives, members, designees, officers, directors, shareholders, employees, agents, successors, and assigns (Indemnified Parties) from and against any and all claims for bodily injury or death, damage to property, demands, damages, and expenses (including but not limited to investigative and repair costs, attorney's fees and costs, and consultant's fees and costs) (hereinafter "Claims") which arise or are in any way connected with the work performed, materials furnished, or services provided under this Agreement by CGS or its agents.

PROFESSIONAL QUALIFICATIONS

To review our professional qualifications, please visit our website at www.CascadiaGeoservices.com.

Sincerely,

Cascadia Geoservices, Inc.



Eric Oberbeck, CEG
Expires June 1, 2022

Adam Fulthorpe

Adam Fulthorpe, Staff Geologist

FIGURES

Figure 1, Location Map

Figure 2, Site Map

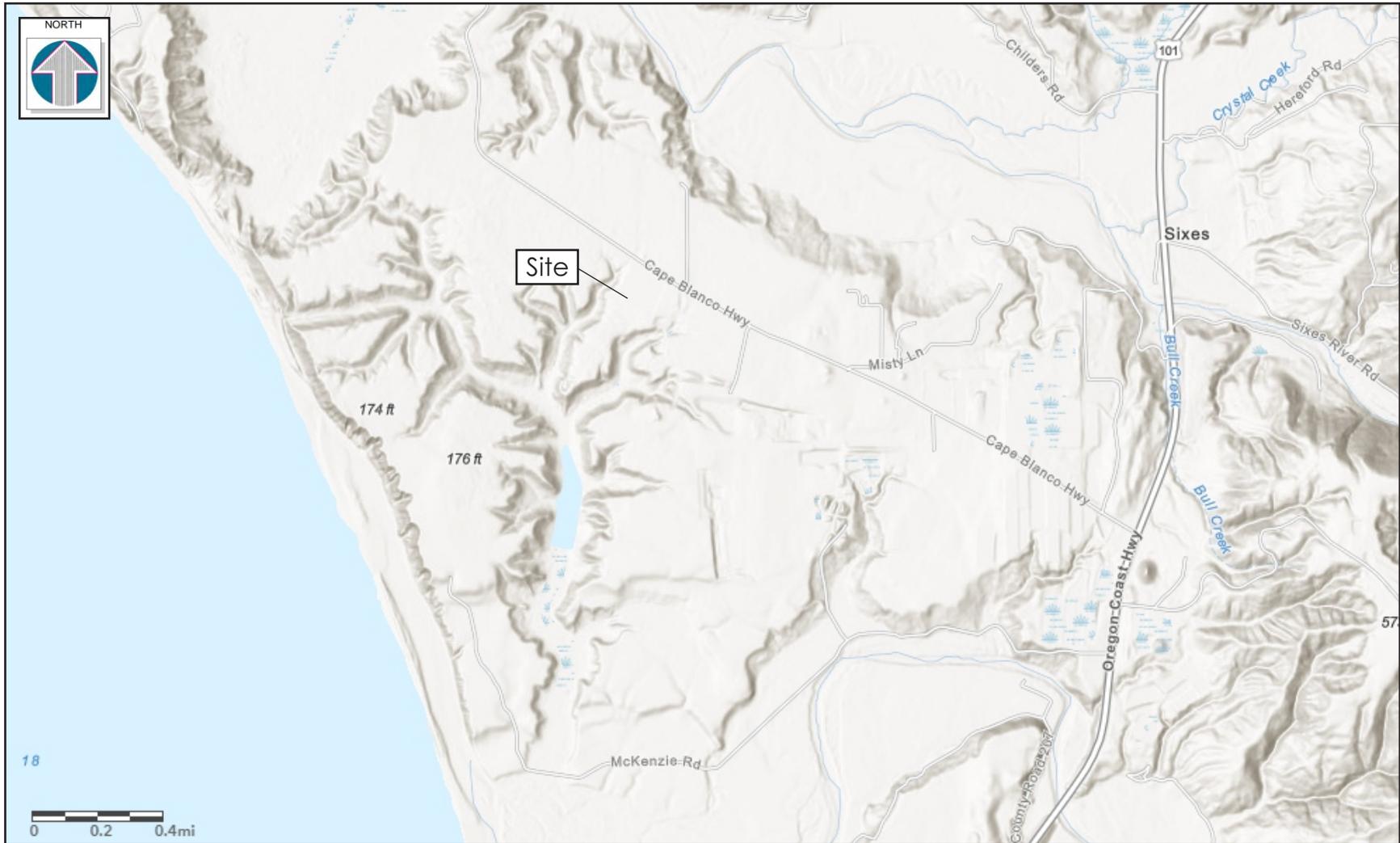
Figure 3, Geologic Cross Section

Figure 4, Slope Stability Analysis

ATTACHMENTS

Attachment 1 – Borehole Logs

Attachment 2 – Lab Analysis Reports



Base map provided by: ESRI

Prepared for: Mr. Tom Gruszscenski



Project: 21078

September 2021

Location Map
 Geotechnical Site Evaluation
 92410 Cape Blanco Road
 T32S R15W Tax Lot 1502, Sixes Oregon 97476

Figure
1



Aerial photograph provided by: CGS

Prepared for: Mr. Tom Gruscenski



Project: 21078

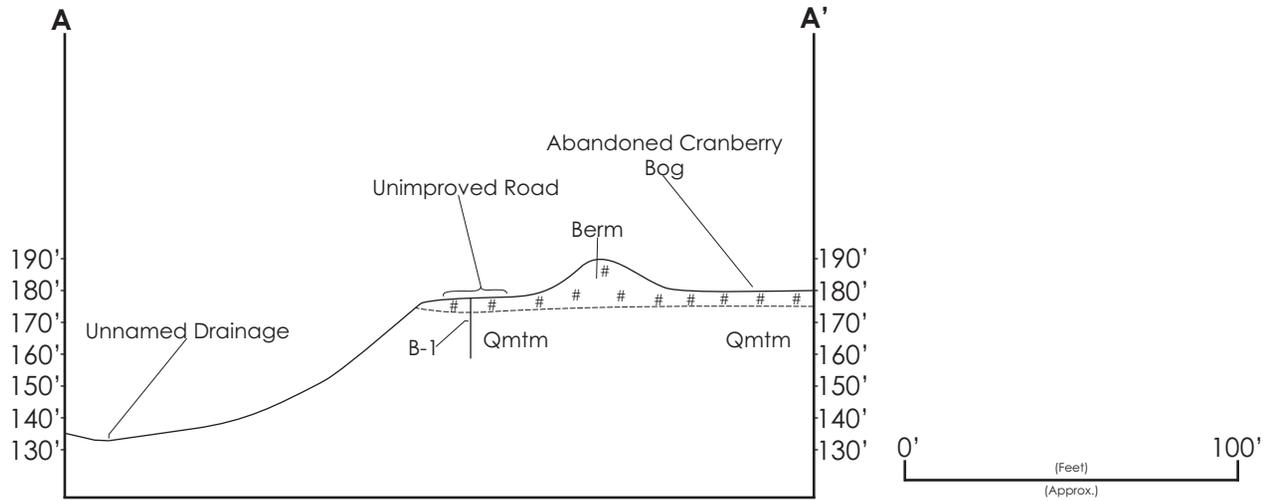
September 2021

Site Map

Geotechnical Site Evaluation
 92410 Cape Blanco Road
 T32S R15W Tax Lot 1502, Sixes, Oregon 97476

Figure
2

Explanation	
Boring	B-1
Fill	##
Quaternary Middle Marine Terrace Deposits	Qmtm
Geologic Contact	-----



Prepared for: Mr. Tom Gruscenski



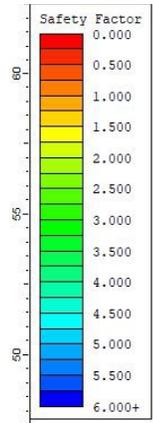
Project: 21078

September 2021

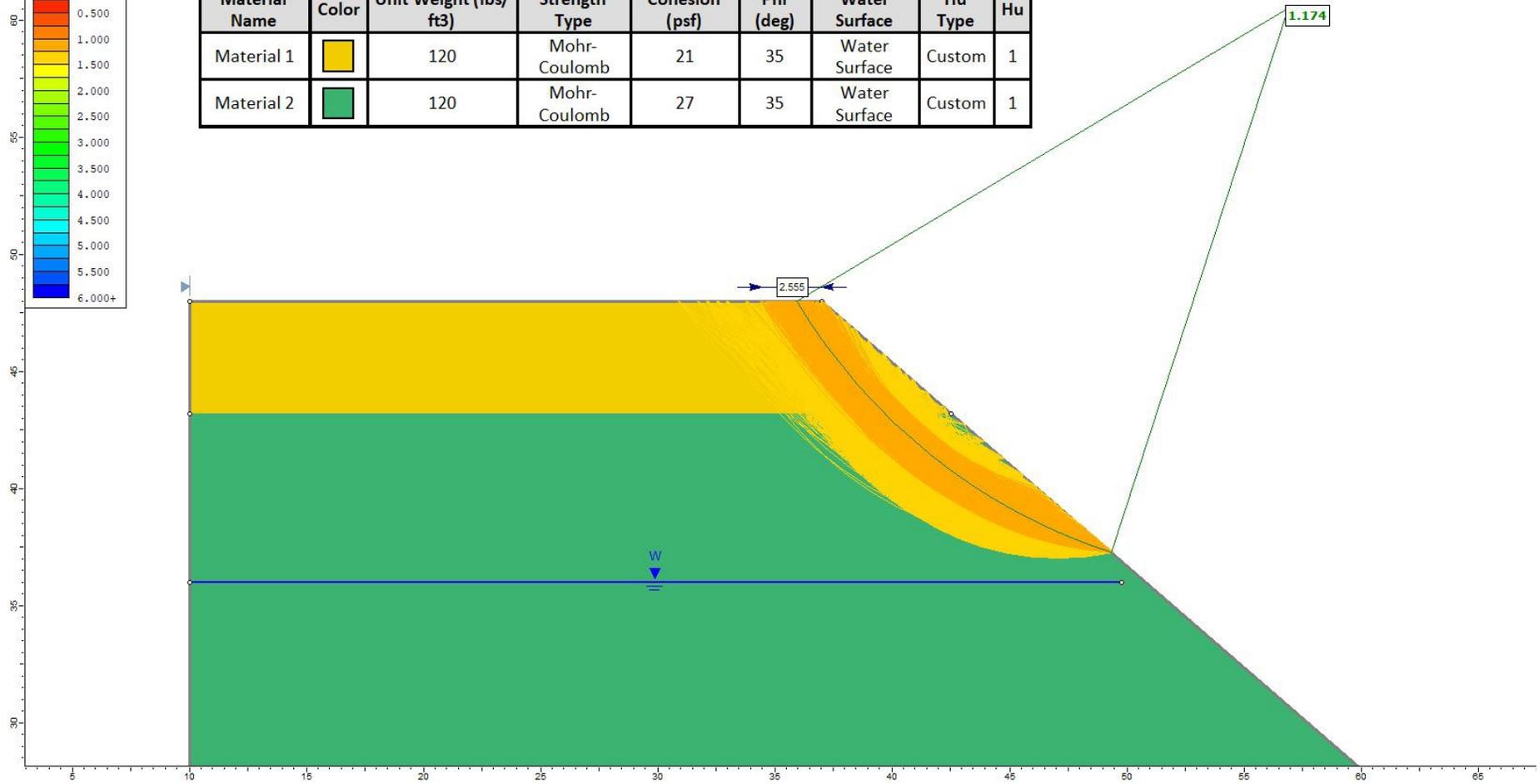
Geologic Cross Section A

Geotechnical Site Evaluation
 92410 Cape Blanco Road
 T32S R15W Tax Lot 1502, Sixes, Oregon 97476

**Figure
3**



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type	Hu
Material 1		120	Mohr-Coulomb	21	35	Water Surface	Custom	1
Material 2		120	Mohr-Coulomb	27	35	Water Surface	Custom	1



Base map provided by: ESRI

Prepared for: Mr. Tom Gruscenski



Project: 21078

September 2021

Slope Stability Analysis

Geotechnical Site Evaluation

92410 Cape Blanco Road

T32S R15W Tax Lot 1502, Sixes, Oregon 97476

Figure

4

**TABLE 1
FIELD CLASSIFICATIONS**

SOILS



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

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

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

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

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

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

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

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

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

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

**TABLE 1
FIELD CLASSIFICATIONS**

SOILS

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

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

7. ANGULARITY	
 rounded 	 Angular 
 subrounded 	 Subangular 

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

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

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

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

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

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

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

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

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

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

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

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

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

TABLE 2
KEY TO TEST PIT AND BORING LOG SYMBOLS



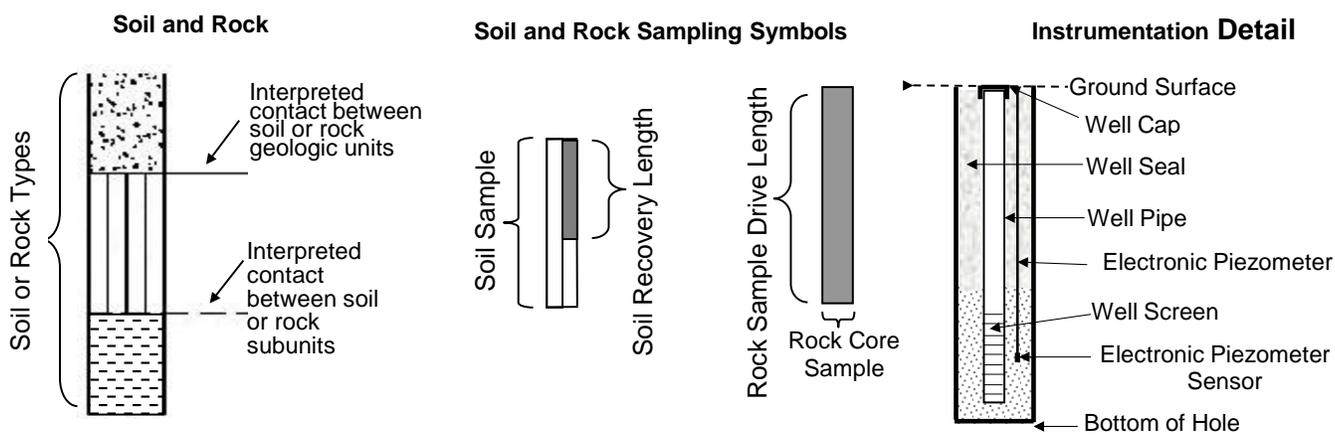
SAMPLE NUMBER ACRONYMS/WATER SYMBOLS

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

Water Level
During Drilling/
Excavation

Water Level
on Date
Measured

LOG GRAPHICS/INSTALLATIONS



GEOTECHNICAL FIELD & LABORATORY TESTING/ACRONYM EXPLANATIONS

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

ENVIRONMENTAL TESTING/ACRONYM EXPLANATIONS

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

BORING B-1

Page 1 of 1

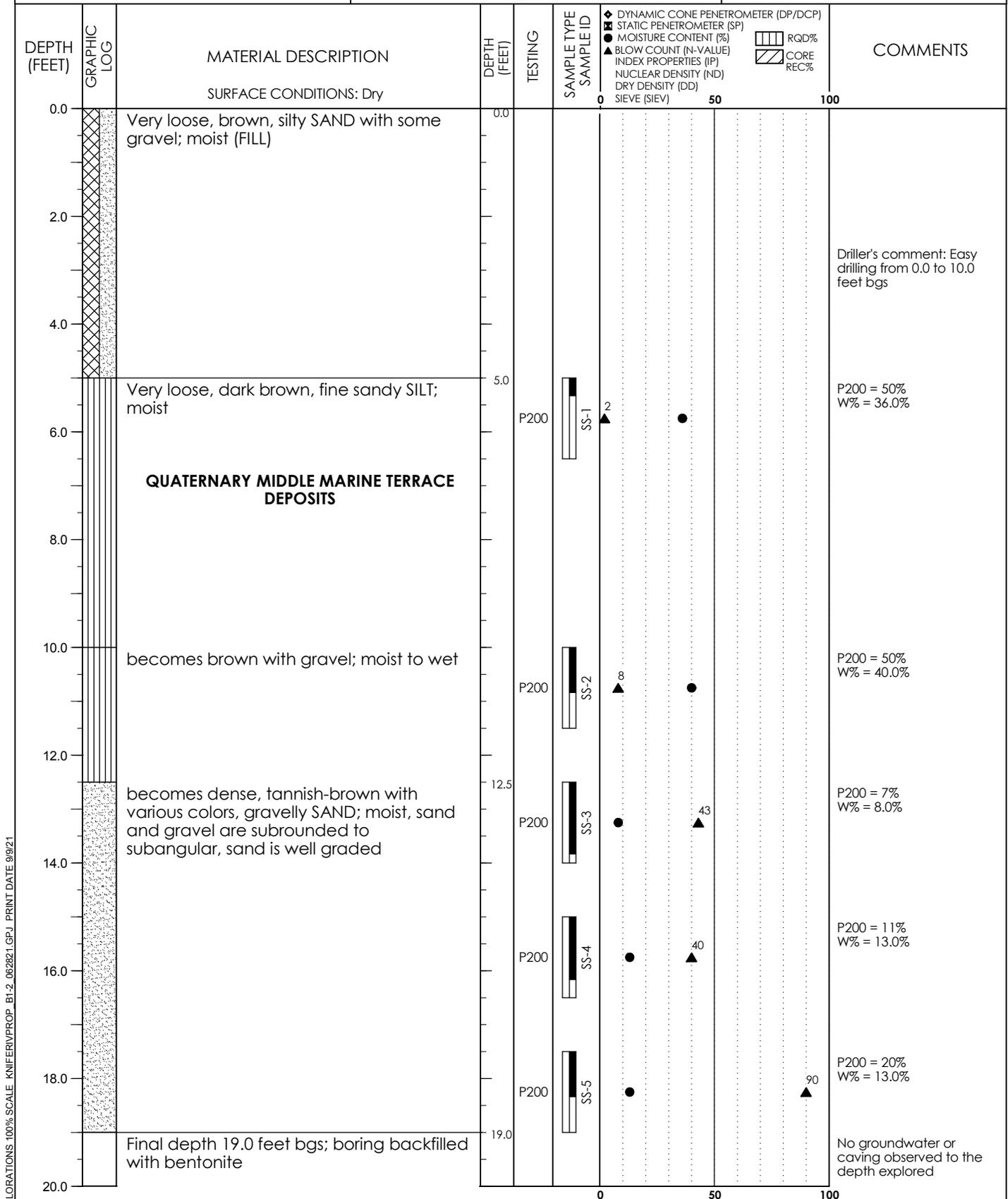
KNIFE RIVER - VAN LOO
T32S R15W TAX LOT 1502
SIXES, OREGON 97476

Cascadia Geoservices, Inc.
190 6th Street
Port Orford, OR 97465
D. 541-332-0433
C. 541-655-0021



COORDINATES/LOCATION:
Lat: 42.817888 Long: -124.516085
(See Figure 2)

CASCADIA GEOSERVICES
PROJECT NUMBER:
21078



ALL EXPLORATIONS 100% SCALE KNIFE RIVER PROP. B1-2_062821.CPJ PRINT DATE 9/9/21

DRILLING METHOD: Single-stem Auger
BIT DIAMETER:

DRILLED BY: Dan J. Fischer Excavating, Inc.
LOGGED BY: A. J. Fulthorpe

LOGGING COMPLETED: 6/23/21

BORING B-1
Page 1 of 1

BORING B-2

Page 1 of 1

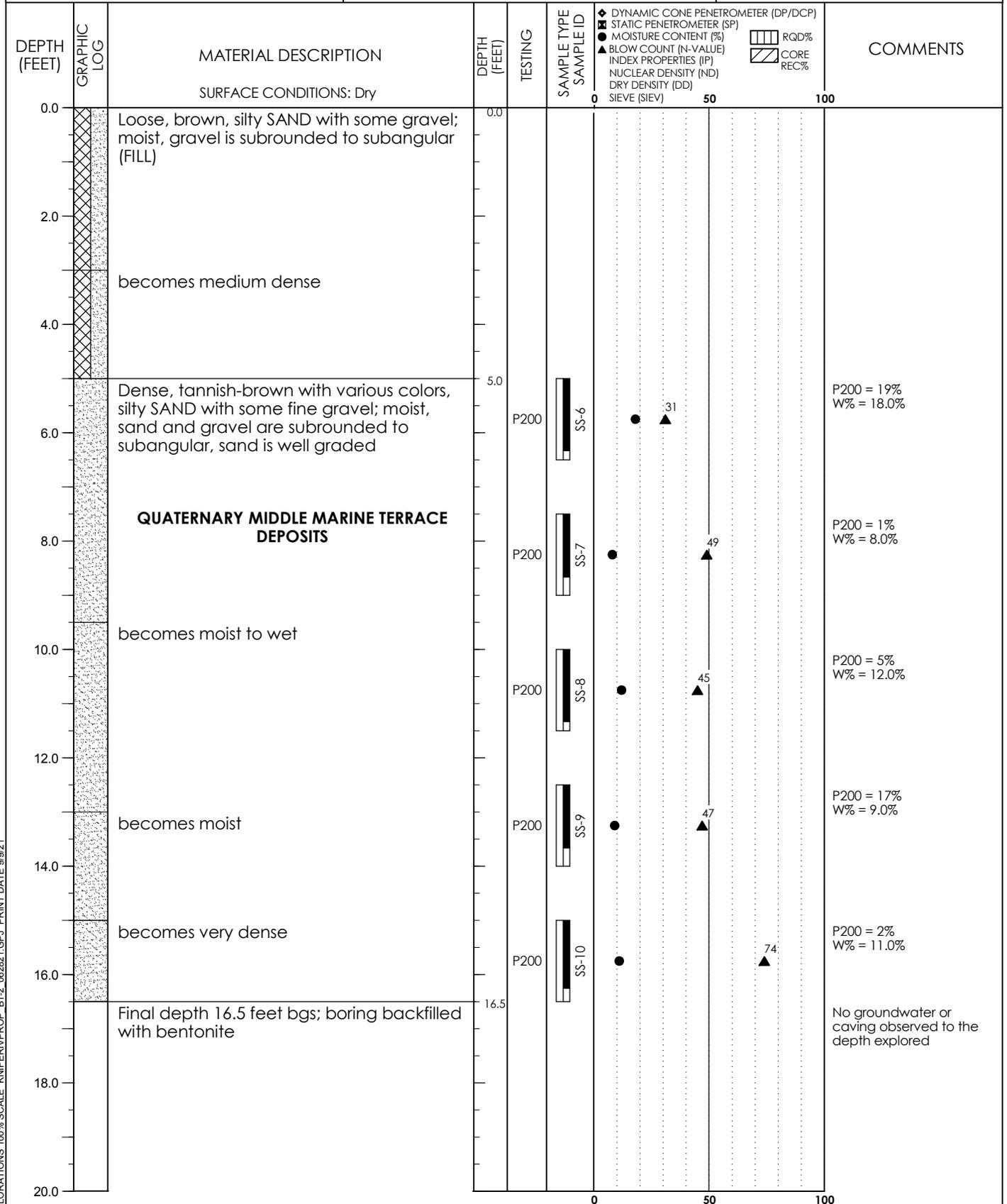
KNIFE RIVER - VAN LOO
T32S R15W TAX LOT 1502
SIXES, OREGON 97476

Cascadia Geoservices, Inc.
190 6th Street
Port Orford, OR 97465
D. 541-332-0433
C. 541-655-0021



COORDINATES/LOCATION:
Lat: 42.818353 Long: -124.515682
(See Figure 2)

CASCADIA GEOSERVICES
PROJECT NUMBER:
21078



ALL EXPLORATIONS 100% SCALE_KNIFERIVPROP_B1-2_062821.CPJ PRINT DATE 9/9/21

DRILLING METHOD: Single-stem Auger
BIT DIAMETER:

DRILLED BY: Dan J. Fischer Excavating, Inc.
LOGGED BY: A. Fulthorpe

LOGGING COMPLETED: 6/23/21

BORING B-2
Page 1 of 1

Attachment D; Rural Site Exception Map

Follows this page

