EXHIBIT B

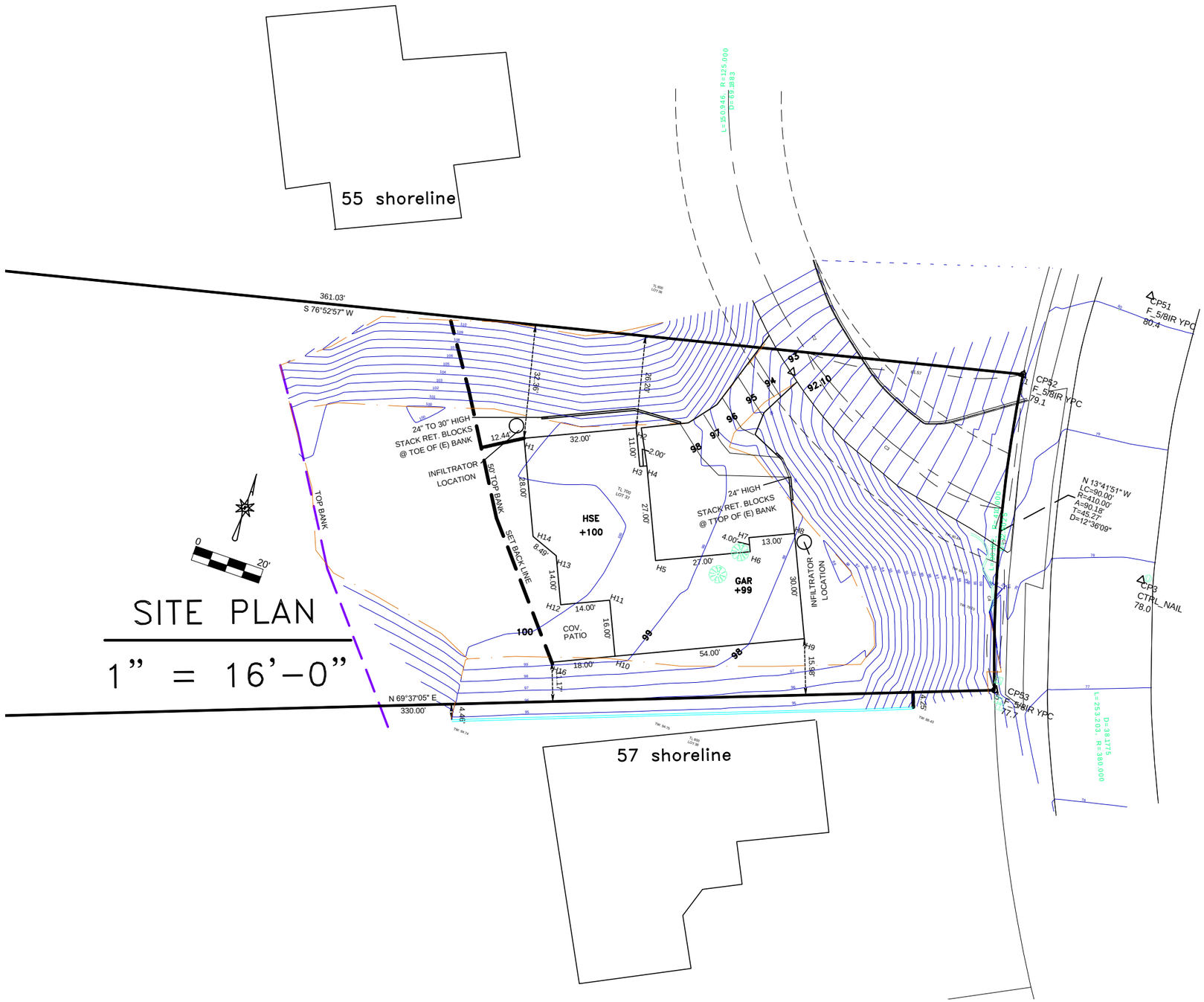
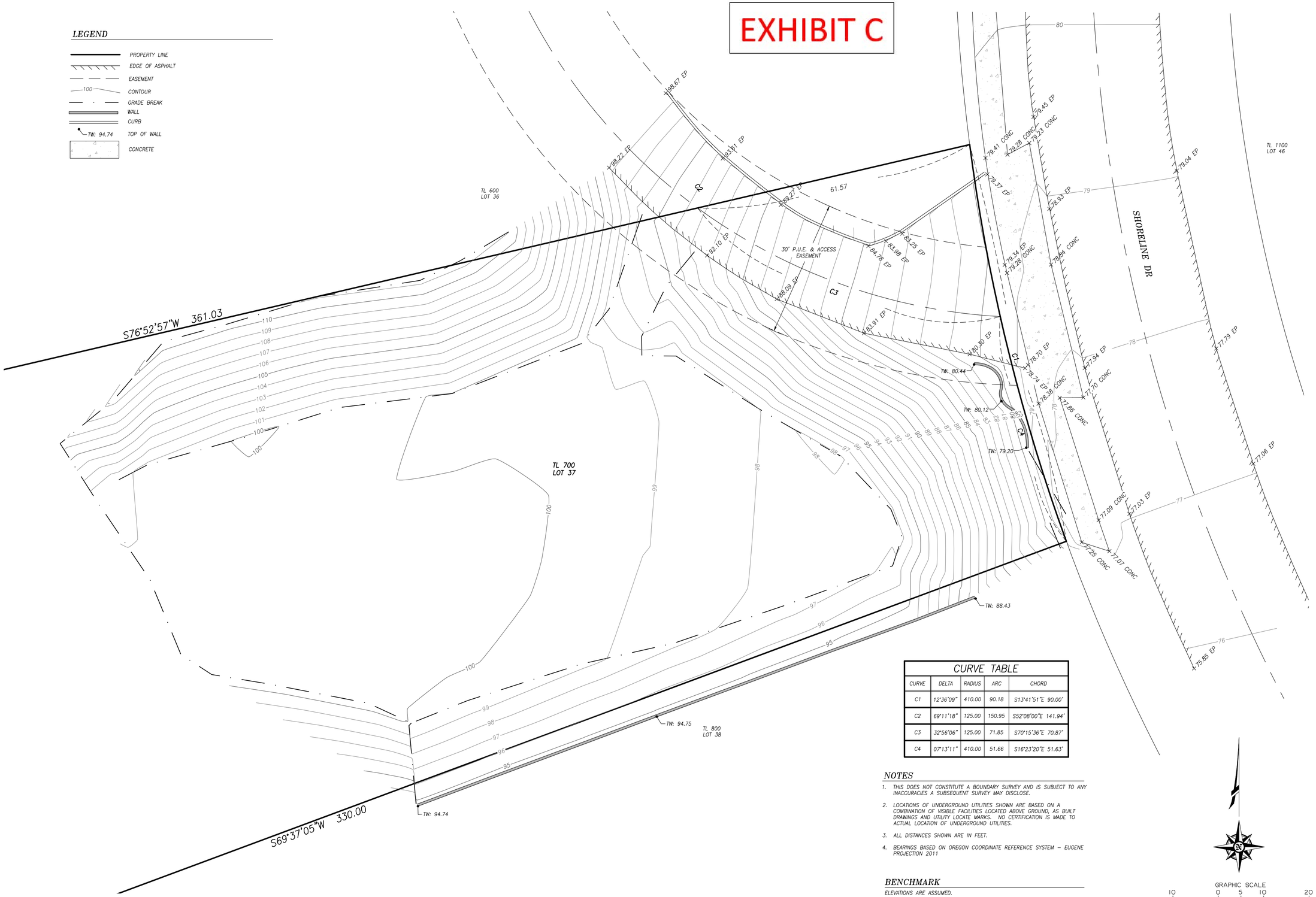

55 shoreline
361.03'
S 76°52'57" W
L=150.946'
R=125.000'
D=69.1683
CP51
F_5/8IR YPC
80.4
CP52
F_5/8IR YPC
79.1
93
94
92.10
95
96
97
98
24" TO 30" HIGH
STACK RET. BLOCKS
@ TOE OF (E) BANK
32.35'
26.20'
12.44'
32.00'
11.00'
2.00'
H1
H2
H3
H4
INFILTRATOR
LOCATION
50' TOP BANK
28.00'
HSE
+100
27.00'
24" HIGH
STACK RET. BLOCKS
@ TTOP OF (E) BANK
4.00'
13.00'
H7
H6
H5
H8
GAR
+99
30.00'
INFILTRATOR
LOCATION
TOP BANK
SET BACK LINE
H14
8.49'
H13
14.00'
H12
14.00'
H11
COV.
PATIO
16.00'
100
98
18.00'
H10
54.00'
H9
15.98'
H16
1.17'
N 69°37'05" E
330.00'
4.46'
R=25'
CP53
F_5/8IR YPC
77.7
N 13°41'51" W
LC=90.00'
R=410.00'
A=90.18'
T=45.27'
D=12°36'09"
CP3
CTRL_NAIL
78.0
L=253.203'
R=380.000'
D=38.1775
0
20'
SITE PLAN
1" = 16'-0"
57 shoreline

EXHIBIT C



CURVE TABLE				
CURVE	DELTA	RADIUS	ARC	CHORD
C1	12°36'09"	410.00	90.18	S13°41'51"E 90.00'
C2	69°11'18"	125.00	150.95	S52°08'00"E 141.94'
C3	32°56'06"	125.00	71.85	S70°15'36"E 70.87'
C4	07°13'11"	410.00	51.66	S16°23'20"E 51.63'

NOTES

1. THIS DOES NOT CONSTITUTE A BOUNDARY SURVEY AND IS SUBJECT TO ANY INACCURACIES A SUBSEQUENT SURVEY MAY DISCLOSE.
2. LOCATIONS OF UNDERGROUND UTILITIES SHOWN ARE BASED ON A COMBINATION OF VISIBLE FACILITIES LOCATED ABOVE GROUND, AS BUILT DRAWINGS AND UTILITY LOCATE MARKS. NO CERTIFICATION IS MADE TO ACTUAL LOCATION OF UNDERGROUND UTILITIES.
3. ALL DISTANCES SHOWN ARE IN FEET.
4. BEARINGS BASED ON OREGON COORDINATE REFERENCE SYSTEM – EUGENE PROJECTION 2011

BENCHMARK

ELEVATIONS ARE ASSUMED.

GRAPHIC SCALE
10 0 5 10 20
(IN FEET)

TAX MAP: 18-12-16-41 TAX LOT: 700

Z:\2021\21-438 Shelter Cove Lot 37\Survey Transfer\21-438 EXIST COND.dwg 8/13/2021 2:20 PM EMILYP

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Springfield, OR 97477
p: 541.746.0637
www.BranchEngineering.com

REGISTERED PROFESSIONAL LAND SURVEYOR

PRELIMINARY

OREGON
NOVEMBER 30, 2007
RENEE CLOUGH
69162LS
EXPIRES: December 30, 2021

project title:

EXISTING CONDITIONS SURVEY FOR SHELTER COVE LOT 37

TAX MAP:18-12-16-41 TAX LOT: 700
SHORELINE DR.
FLORENCE, OREGON

revisions:

date: AUG. 2, 2021
drawn by: EJP
designer: RC
project no: 21-438

EXISTING CONDITIONS SURVEY

sheet: 1

EXHIBIT D

CITY OF FLORENCE
SITE INVESTIGATION REPORT PHASE 2

Premier Contracting Services
Applicant

1/31/
Date

Build SFD on lot 37 shelter cove
Proposal

18-12-16-41 00700
Map No. Tax Lot

56 Shoreline dr Florence
Street Address

low density
Zoning District

Overlay District

This investigation was done by:

RECEIVED
City of Florence
JAN 31 2022
By:

Signature

Todd Carlen
Name

Contractor
Title

Florence City Code 10-7-4: Site Investigation

A. **Areas Requiring a Site Investigation:** Areas identified on the "Hazards Map," "Soils Map," or Resource Inventory are subject to the site investigation procedure contained in site investigation reports by Wilbur E. Ternyik, published by OCZMA. No building permit, conditional use permit or other permit subject to the provisions of this Title may be issued except with affirmative findings that:

1. Upon specific examination of the site, the condition identified on the "Hazards Map" or "Soils Map" or supporting inventory documents did not exist on the subject property; or
2. That harmful effects could be mitigated or eliminated through, for example, foundation of structural engineering, setbacks or dedication of protected natural areas.

Site investigation requirements may be waived where specific standards, adequate to eliminate the danger to health, safety and property, have been adopted by the City. This exception would apply to flood-prone areas, which are subject to requirements of the National Flood Insurance Program and other problem areas which may be adequately protected through provisions of the Building Code. (Ord. 669, 5-17-82)

B. **Site Preparation Permit Required:** A site preparation permit is required for sites identified as subject to a site investigation. A permit will be issued by the Planning Director based on criteria 1 and 2 of 10-7-4-A.

SITE INVESTIGATION – PHASE 2
DEVELOPMENT APPLICATION CHECKLIST

See report, "Beach and Dune Implementation Techniques: Site Investigation Reports," Oregon Coastal Zone Management Association, for details on the following requirements.

A. **<u>STATE AND LOCAL LAND USE REGULATIONS</u>**
Submit letter from City planning staff and/or engineer certifying that the proposed development site plan conforms with applicable city regulations and plan designations. Letter must indicate approval of conformance with any special code provisions. If an exception to a statewide planning goal or a variance has been

previously approved for the particular locale, substantiate accordingly.

B. IDENTIFIED SET BACK LINE OR DESIGNATIONS

Identify on site plan all established set back lines.

C. IDENTIFIED HAZARDOUS CONDITIONS

1. Map to approximate scale all identified areas of wind erosion, water erosion, and slide activity.
2. Provide written details on extent of hazard: wind erosion, water erosion, slide areas.

D. EXISTING SITE VEGETATION

1. Map all major areas of vegetation and provide lists of dominant species in each area.
2. Provide investigator's assessment of age, condition, and stability of all vegetated areas.
3. Identify on site plan any removal or modification of vegetative cover.
4. Give brief description of vegetative cover on adjoining lands.
5. Identify and describe areas where vegetative cover poses a fire hazard. List species and condition. Propose solution to fire hazard problem. Furnish dated photographs of such areas.

E. FISH AND WILDLIFE HABITAT

1. Describe and identify any rare or endangered species or unique habitats present on the site.
2. Describe any adverse impacts on significant habitat to be caused by the proposed development.
3. If adverse impacts are anticipated, describe plans for minimizing such impacts.
4. Describe possible benefits to adjoining habitats to be realized as a result of the project.

F. FLOODPLAIN ELEVATION

1. Identify on site plan 100 year floodplain and highest observed tide line. Give elevation of same.
2. Identify on site plan the State of Oregon Beach Zone Line or the top of river bank.
3. Give evidence that elevation of the lowest habitable floor will be raised above the top of the highest predicted storm wave or 100 year floodplain. Registered surveyor or engineer signed report will suffice.

G. HISTORICAL AND ARCHAEOLOGICAL SITES

1. Describe and locate on site plan any identified historical or archaeological sites.
2. Describe any protection measures that my be needed to protect the site.

H. CONDITION OF ADJOINING AREAS

1. Open Dunes
   a. Give location of open dunes in relationship to the development site.
   b. Indicate approximate size (acres), maximum elevation, direction of movement, and predicted rate of movement of adjoining open dune areas.
   c. Indicate ownership of adjoining dunes and proposed future management, if known.
   d. Indicate investigator's assessment of probably threat to development site. Furnish aerial photographs if possible.
2. Active Foredunes
   a. Describe size (height and width) of active foredunes on adjoining areas.
   b. Describe any threat they pose to development site.
   c. Describe any plans for cooperative measures to alleviate problems.
3. Storm Run-off Erosion
   a. Describe any known storm run-off or flood velocity hazards on adjoining property that might adversely affect the site. Examples might be stream, river, denuded watershed, etc.
   b. Describe any plans for cooperative measures to alleviate problems.
4. Wave Undercutting or Wave Overtopping
   a. Describe extent of recent or historic undercutting, length of area and height of cut.
   b. Describe area of wave overtopping and furnish photographs or other evidence.
   c. Describe historic stability of beaches or riverbank in the general area.

d. Furnish investigator's assessment of possible threat to the site.

I. DEVELOPMENT IMPACTS

1. Report should include the investigator's assessment of the site's overall capability and suggest maximum use level that will not cause weight slope failure, vegetation problems from too high a density of human population, damage to aquifer, etc. This is a judgment of extreme importance because the cumulative effect of minor impacts could result in a total dune project or riverbank failure.

2. Describe any projected off site adverse impacts on adjoining or nearby properties as a result of the development.
3. Identify and list all benefits of the project (information needed to evaluate social economic gains as required by Statewide Planning Goal 9: Economy, and coordination with possible area recreation plan):
   a. New jobs created (temporary construction and permanent)
   b. Increased tax base or assessed valuation of completed project
   c. Describe any newly created or restored habitat resulting from development
   d. Describe any improvement to public access provided by the project
4. Evaluate the impact of the proposed development on seasonal surface water and drainage flow patterns and the potential impact of flooding problems resulting from the development. If the development proposes to lower the groundwater in the deflation plain, plans must accommodate problems associated with changes in the landform. The SIR should address groundwater considerations including high water table, ponding, saltwater intrusion, drawdown on sand spits, and pollution potential.

J. PROPOSED DESIGN

1. Furnish a site plan map drown to scale. Show in detail exact location and size of all proposed structures. Scale drawing of front, back and side view are required as well.
2. Submit detailed plans and specifications for structure foundation and identify materials to be used.
3. Furnish detailed plans and specifications for the placement of all protective structures proposed.
4. Provide complete location mapping and actual work specifications for all initial, temporary, or maintenance stabilization plans proposed.
5. Furnish detailed cost estimates and post performance bond in that amount with City to accomplish stabilization or restoration proposed, if required by City.
6. Identify legal responsibilities for long range vegetation maintenance programs.
7. Describe any benefits realized from dune or river bank stabilization or restoration measures proposed.
8. Furnish copies of necessary shorefront protection permits or completed permit applications (e.g., U.S. Army Corps of Engineers, Oregon Division of State Lands, etc.
9. Furnish detailed plans and specifications for interim stabilization, permanent re-vegetation, and vegetative maintenance as proposed.
10. Furnish detailed plan for off-road vehicle and pedestrian management, if applicable.
11. Furnish detailed plan for required reclamation of areas disturbed for sand removal, road construction, logging, etc.

K. LCDC COASTAL GOAL REQUIREMENTS

1. Identify potential conflicts with Coastal Goals or LCDC-acknowledged comprehensive Plan, and Oregon's Coastal Management Program. In addition, for river bank applications, relevant Statewide Planning Goals also include: Goal 16: Estuarine Resources, Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces, Goal 6: Air, Water and Land Resources Quality, and Goal 7: Areas Subject to Natural Hazards
2. Identify efforts made in development design to resolve or minimize identified conflicts.

July 8, 2022

Branch ENGINEERING INC
Since 1977
civil · transportation
structural · geotechnical
SURVEYING

Scott and Sharon Hancock
4955 South Pyrite Road
Flagstaff, Arizona

RE: EROSION/RECESSION SITE ASSESSMENT
LOT 37 SHELTER COVE
FLORENCE, OREGON
BRANCH ENGINEERING INC. PROJECT NO. 21-335

Pursuant to your request, Branch Engineering Inc. (BEI) has performed an erosion/recession assessment of the bay frontage at the above listed location.

1.0 SCOPE OF WORK

On June 1, 2021, BEI geotechnical engineering staff conducted a geologic hazard reconnaissance of the site, general vicinity, and subsurface investigation that included three hand-auger borings and one Dynamic Cone Penetrometer test in the proposed building pad area. On May 31, 2022 BEI staff returned to the site to perform an erosion/recession assessment along the bay frontage of the property. The land-based assessment of the property's shoreline was limited to land adjacent to the property because of dense vegetation extending to the waterline. A Small Unmanned Aircraft System (UAS) drone operated by licensed BEI staff was used to photograph and observe the shoreline of the site and adjacent properties. Other resources that were utilized for the writing of this report are listed below:

- Google Earth, earth.google.com
- Geologic Map of Oregon, 1991 Walker and MacLeod. Map from US Dept. of Interior, Geological Survey
- State of Oregon, Department of Geology and Mineral Industries (DOGAMI) Bulletin 85, Environmental Geology of Coastal Lane County Oregon.
- State of Oregon, Geologic Map of Oregon website, http://www.oregongeology.org/geologicmap/
- United States Dept. of Agriculture, Natural Resources Conservation Service, Pacific Northwest Soils website, http://www.or.nrcs.usda.gov/pnw_soil/or_data
- State of Oregon, Department of Geology and Mineral Industries (DOGAMI) website, Statewide Geohazards Viewer (HazVu), http://www.oregongeology.org/hazvu/
- Geotechnical Engineering Evaluation and Design Proposed Erosion Control Project North Cove Bank Preservation Coalition Report. Ash Creek Associates, Inc. Dated May 16, 2006.

- Bank Failure Assessment, 16 Sea Watch Court Florence, Oregon. GeoScience, Inc. Dated March 18, 2011.

- National Assessment of Shoreline Change: Historical Shoreline Change Along the Pacific Northwest Coast. U.S. Department of the Interior, U.S. Geological Survey. Open File Report 2012-1007.

- Shoreline Stabilization at Station Siuslaw River Florence, Oregon. February 2012. U.S. Coast Guard Civil Engineering Unit Oakland Environmental Division. 2000 Embarcadero, Suite 200 Oakland, CA.

- Effectiveness of Spur Jetties at Siuslaw River, Oregon. Report 1 Prototype Monitoring Study 1995. U.S. Army Corps of Engineers. Waterways Experiment Station.

- Physical Processes and Geologic Hazards. Paul D. Komar, Kathy Bridges Fritzpatrick. Oregon Coastal Zone Management Association, Inc. May, 1979.

- Environmental Data Resources (EDR) Lightbox Package including Historical Topographic Maps, Aerial Imagery from 1952 to 2016, and EDR Radius Map.

- Aerial Drone Photos by BEI Small Unmanned Aircraft System (UAS) licensed staff

2.0 PROJECT LOCATION AND DESCRIPTION

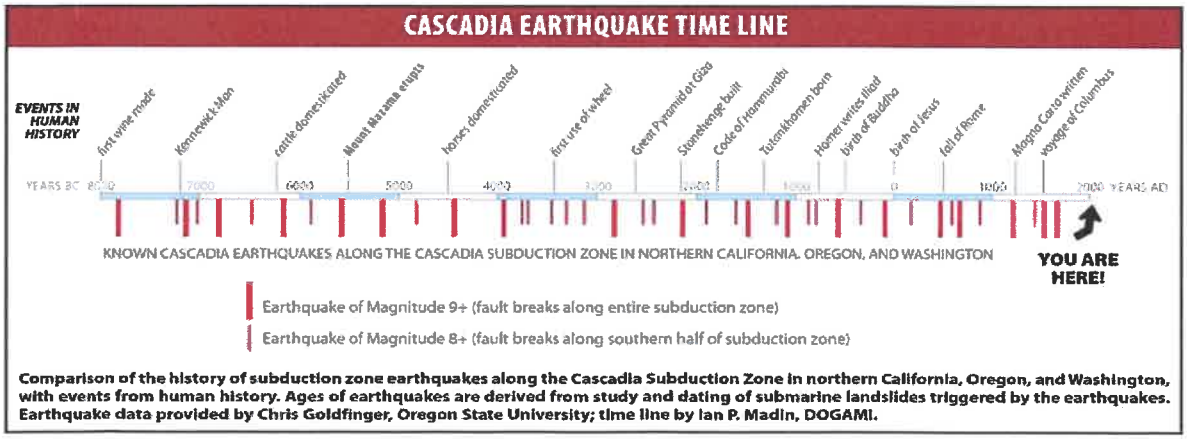
The project site is located in the Shelter Cove Phase II development in Florence, Oregon, at latitude 44.004689° north and longitude 124.124617° west. The site is accessed via a small sand and aggregate driveway off the southwest side of an unnamed, private drive that connects to the west side of Shoreline Drive.

The project site is located approximately 1.3-miles upriver from the mouth of the Siuslaw River near a projection of land called Cannery Point on the right (east) bank of the estuary. Lot 37 and the surrounding properties are located on geologically younger, marginally stabilized dune sands that formed along the banks of the Siuslaw River. Site elevations vary from approximately 97-feet above mean seal level (MSL), to the banks of the tidally influenced Siuslaw River, which can be approximated as +/- 5-feet MSL in this area. Topographically the site is a flat bench cut into the dune crest during the initial site development to provide a level building pad. Slopes vegetated with grass and short shrubs rise above this level area to the north at 25- to 30-degees, with an elevation difference of approximately 18-feet between the level bench on Lot 37 and the property to the north. The property to the south is approximately 10-feet lower in elevation and is separated by a concrete retaining wall. Slopes to the north average 30-degrees along the private accessway and are well vegetated with shrubs and scattered evergreen trees. The western slope is approximately 165-feet in length, with slopes measured at 20- to 37-degrees. This slope is covered with well established vegetation consisting of grass, shrubs, and evergreen trees. Numerous small diameter PVC pipes were noted on the slope, no obvious purpose for these pipes was ascertained during the site investigation. During both site investigations a shallow landslide located on the bay shore slopes of Lot 36 was observed and is discussed further in this report.

3.0 SITE GEOLOGY AND GEOLOGIC HAZARD MAPPING

The subject site is located near the northern extent of the longest coastal strip of sand dunes on the Oregon Coast. The sand dunes in the area likely formed post ice-age during the Late Pleistocene to the Holocene epoch by eolian processes associated with the activity of wind and changes in sea levels; however, limited studies performed by Beckstrand 2001, and Peterson 2002 show that some dune formation occurred as early as 37,00 years ago. The typical pattern seen in the area is active transverse dunes (running parallel to the ocean) caused by the varying on, and off shore winds, with areas of deflation plains, lying inland and between active or stabilized dune areas where the water table is exposed or near the surface. The north shore of the Siuslaw in the project vicinity is mapped as geologically younger (Late Pleistocene to Holocene), marginally stabilized dune sand composed of fine-grained, poorly sorted sand with little topsoil formation. Based on work done by Ash Creek Associates and others in the project vicinity, including ours, the underlying geologic unit referred to as Marine Terrace Deposits (MTD) was found exposed along the shoreline. This unit formed during the Pleistocene when sea levels were lower than at present, and is composed of estuarine, flood-plain, marine, fluvial sediments, and buried topsoil horizons deposits. In the project vicinity the MTD unit is composed of dune deposits that underwent periods of extensive topsoil formation and subsequent burial. The weathering of minerals led to the formation of clay and iron oxide deposits that cement the sand grains and act an aquitard, restricting the vertical hydraulic conductivity of groundwater in the area. During the site investigation groundwater was observed flowing from the boundary of the MTD and overlying dune sand on the adjacent lot to the north.

The site is located approximately 60-miles east of the Cascadia Subduction Zone, which is a zone of converging tectonic plates that historically produces major earthquake events that is located to the west of the Oregon Coast. The figure below shows a timeline of historical Subduction Zone earthquake events. The nearest mapped active fault is approximately 7.3-miles to the southwest of the site and is labeled as a part of the Cascadia fold and fault belt.



The HazVu website shows that the subject site is expected to experience severe shaking in the event of a Cascadia Subduction Zone earthquake and very strong shaking for lesser earthquakes. HazVu has also characterized the site as having a high-risk landslide and for earthquake induced liquefaction of the subsurface soils.

4.0 SITE SOIL AND GROUNDWATER

Three exploratory hand-auger borings were advanced on the relatively flat portion of the property to approximately 4.5-feet below ground surface (BGS) during the June 1, 2022 site visit. Site soils generally consist of tan-brown, poorly graded, fine-grained sand. Moisture contents of the sand were generally observed to be damp after penetrating below the dry crust of the surficial sand. Even though no moist or wet sand was observed at either boring location, the sands observed are expected to exhibit rapid dilatancy when saturated.

Site work performed by Ash Creek Associates in 2006 in the northern portion of the Shelter Cove development found dune sand from the surface to a depth of at least 60-feet BGS, overlying the MTD deposits of organic sandy clays and silts. Inclinometers placed during their investigation were used to assess groundwater depths, which were determined to be in the range of 21- to 24-feet above MSL. We expect the groundwater level to fluctuate seasonally with higher groundwater levels observed during the wet season; generally late October to late May.

To assess the soil type and groundwater during the May 31, 2022 site investigation BEI staff accessed the bay frontage of the property. The MTD deposits along the adjacent lot to the north were exposed and consisted of dense partially cemented, poorly graded sand with silt and clay. The MTD deposits above the waterline stood vertical for approximately 3- to 7-feet in height, the MTD deposits extended below the waterline to an unknown depth. An area of deposition along the piers near Cannery Point was noted from drone photos. In this area it appears the MTD deposits extend further out into the bay. Hand probing areas close to shore had 1- to 2-feet of loose sand overlying the MTD shelf that projected out into the bay. Groundwater was noted issuing from the boundary between the MTD deposits and the overlying sand. The rate varied, but was estimated to be at least a gallon per minute in areas where erosion had concentrated the flow. Piping of the overlying sand deposits was noted where the groundwater flow volume was highest. Deposits of the sand were also noted in the water below these areas.

Photo 1: MTD deposits and groundwater issuing from the boundary with overlying sand.

The bay frontage of Lot 37 was densely vegetated; however, BEI staff were able to access the north edge and use the drone to visually assess the frontage. Rip-rap boulders varying from less than 1-foot in diameter, to several feet in diameter were noted along the waterline extending at least 3- to 4-feet up the slope. Based on imagery from the drone and the land-based perspective from the northwest property corner, the slope drops steeply into the bay from the rip-rap edge. In areas along the bay frontage, the aerial imagery appears to show "shadows" along the slope below the waterline, which could be cavities or concave slopes below the waterline. It is BEI's opinion that the MTD deposits below the waterline may be vertical to concave.

5.0 EROSION AND RECESSION NOTED DURING RECONNAISSANCE

Based on historical imagery obtained from EDR Lightbox (attached) for the following years 1954, 1976, 1982, 1988, 1994, 2000, 2005, 2009, 2012, 2016, and Google Earth Imagery for the years 2005, 2012, 2016, and 2019, the site has experienced periods of bay shore erosion; however, the most significant alternation to the site is associated with mass grading of the area during the development of the Shelter Cove subdivision. The resolution of the aerial images also makes determining a rate of erosion for the site difficult as the precision of any measurements would be on the order of tens of feet. The 1954 aerial photo shows the site vicinity as partially vegetated dunes descending as sand clear of vegetation to the river bank. By 1976 a series of four groins (constructed in 1974) on the south bank of Siuslaw Bay. One of the groins is directly across the bay from the site. Also visible in the 1976 aerial photo is an area of sand clear of vegetation in the site vicinity. This area was vegetated in the 1954 aerial photo. The site vicinity remains relativity unchanged until the 1994 aerial image that shows construction of the Shelter Cove subdivision altering the site and vicinity by removing vegetation and performing mass grading operations. Mass grading of the site appears to consist of a flattening of the dune for a building pad and clearing of the slope to the bay. In the 1994 aerial photo the slopes descending to Siuslaw Bay are mostly clear of vegetation and remain relatively clear until the 2009 to 2012 aerial photos that show sparse vegetation in 2009, and relatively dense vegetation in 2012. Sometime between 2012 and the next available aerial image in 2016, a shallow landslide begins to develop on the adjacent lot's bayside slopes to the north. At the time of BEI site visits in 2021 and 2022 the landslide appeared to be entirely within the adjacent lot to the north; however, we were not able to locate property corners so this could not be confirmed. The exact cause of the landslide is unknown, but based on the lack of rip-rap armoring, we suspect that a combination of piping of the sand overlying the MTD deposits, and erosion of the MTD deposits lead to recession at the toe of the slope to the point where the overlying sand experienced a loss of lateral support and translational landslide resulted. Because of the dense vegetation along the slope and bay frontage of Lot 37, the site investigation was limited to the periphery and aerial reconnaissance using a drone. The bay frontage of the site appears to be composed of rip-rap that extends up into the vegetation a distance of 3- to 4-feet where it was visible. Below the vegetation line, which roughly corresponds to the high-water line, the rip-rap extends for a short distance before the shore drops off near vertical, to vertical with depths greater than 6-feet (estimated with a stick at the northwest corner). Drone photographs show the conditions observed in the northwest corner to be consistent along the length of the property. Shadows along the submerged bank indicate possible areas of concavity that may be undercut submerged banks in the MTD deposits.

Photo 2: Lot 36 (presumed left of vegetation line) and part of Lot 37 are visible in this photo. Note the exposed sand from the landslide on Lot 36, loose sand deposited below the waterline on left half of photo, and the dense vegetation and deeply incised banks below the waterline on Lot 37.

6.0 SUMMARY OF FINDINGS

Based on the site reconnaissance, research, and aerial imagery dated from 1954, to the site visits conducted by BEI, the site has experience erosion from the Siuslaw Rivers flow and the daily tidal flux. However; rip-rap placed along the bay shore at the project site and continuing upriver appears to have slowed the erosion as no visible shoreline changes are readily apparent at the site from at least 1994 to the time of BEI investigation. In the 2011 report *Final Preliminary Erosion Control Study. USCG 2011,* at the Coast Guard station located approximately 1000-feet to the southeast of the project site the main drivers for erosion were determined to be the natural meandering process of the river accelerated by alterations to the river and bays shoreline in the area. The Coast Guard station and the project site are located in similar geomorphological positions, so comparisons are within reason. With a groin located on the opposite bank and a similar position on a semi-vegetated dune that drops down a sand bank to the bay shore. At the project site, rip-rap appears to have been placed along the bay shore sometime between 2000 and 2005. How far the rip-rap was placed into the bay to protect the toe from scour is unknown. The rip-rap has protected the exposed bank to some degree, but based on the near vertical bank below the shoreline, erosion seems to have continued removing material from the submerged bank.

7.0 Conclusions

Because of the project sites geomorphological position, the erosional undercutting of the shoreline is expected to continue. Groins placed on the south bank are likely acting to focus the rivers flow, deflecting the energy to the opposite (east) bank and increasing the flow velocity. This process will likely accelerate due to climate change, expected sea level rise, and an increasing frequency and intensity of storm events. The likelihood of the landslide on the adjacent lot increasing in size should be considered high. The piping of the overlying sand at the boundary of MTD deposit was noted in several placed at the base of the landslide and will continue to mobilize sand at the boundary. Based on our observations and professional opinion, the highest risk to site development would be continued erosion of the bank below the rip-rap eventually causing a failure which exposes the sand overlying the MTD deposit. This could result in a landslide similar to the one on the adjacent lot which would then experience further erosion due to piping of sand at the contact of the sand overlying the MTD deposit. Using the aerial images from the placement date of the rip-rap (definitively in 2005), Lot 37 appears to have experienced minimal erosion of bank. Erosional loss from 1954 to the definitive date of rip-rap placement in 2005 appears to be on the order of 20 or more feet, but because of the resolution of the photos and difficulty in reference position, the error is at least equal to the estimated erosion rate. Erosion rates measured (USGS 2011 report) for the MTD deposits at the Coast Guard Station are approximately 1- to 2-feet per year. Based on proximity and similar geomorphic position, it is our opinion that the MTD erosion rate measured at the Coast Guard Station is applicable for project vicinity. Given a 50-year residential design life and the measured erosion rates of 1- to 2-feet per year, approximately 50- to 100-feet of bank recession could be anticipated with no corrective measures to arrest the erosion. Using a bank recession of 50 -to 100-feet over 50-years, and a slope angle of 30-degrees, approximately 80- to 130-feet of land has the potential to be lost from the level portion of the property.

8.0 RECOMMENDATIONS

At the time of our site observations site slopes and the shoreline appear to be stable; however, if left unchecked the erosion of submerged bank material is expected to continue. To determine a site-specific rate of erosion and possible mitigation methods, the shoreline of the site would need to be accurately surveyed. If possible, an investigation utilizing either sonar, or if conditions permit, a water-based reconnaissance of the conditions below the waterline would need to be conducted. A survey of the site would also determine if the landslide on the adjacent lot was contained within that lot.

9.0 REPORT LIMITATIONS

The conclusions and recommendations in this report are based on the conditions described in this report and are intended for the exclusive use of Scott and Sharon Hancock and their representatives for use in the site development design and construction. Services performed by the geotechnical engineer for this project have been conducted with the level of care and skill exercised by other current geotechnical professionals in this area under similar budget and time constraints. No warranty is herein expressed or implied.

The conclusions in this report are based on the site conditions as they currently exist and it is assumed that the limited site locations that were physically investigated generally represent the conditions at the site. Should site development or site conditions change, or if a substantial amount

of time goes by between our site investigation and site development, we reserve the right to review this report for its applicability. If you have any questions regarding the contents of this report, or if we can be of further assistance, please contact our office. This report presents BEI's site observations, site research, site explorations, and recommendations for the proposed site development.

Sincerely,
Branch Engineering Inc,

Ronald J. Derrick

Digitally signed by Ronald J. Derrick
OREGON 2022.07.08 09:58:38 -07'00'

REGISTERED PROFESSIONAL ENGINEER #16170 OREGON SEPT 15, 1992 RONALD J. DERRICK

EXPIRES: 12/31/2023

Sam Rabe EIT
Engineering Technician

Ronald J. Derrick, P.E., G.E.
Principal Geotechnical Engineer

Vicinity Photo From Google Earth Dated 4/29/2019

0' —— 1000'

Branch ENGINEERING Inc Since 1977

SITE VICINITY PHOTO - LOT 37 SHELTER COVE
TAX MAP 18-12-16-41 LOT 700

FIGURE-1

6-20-2022

BEI PROJECT NO. 21-335-01

Tax Map Photo From Lane County Dated 2021

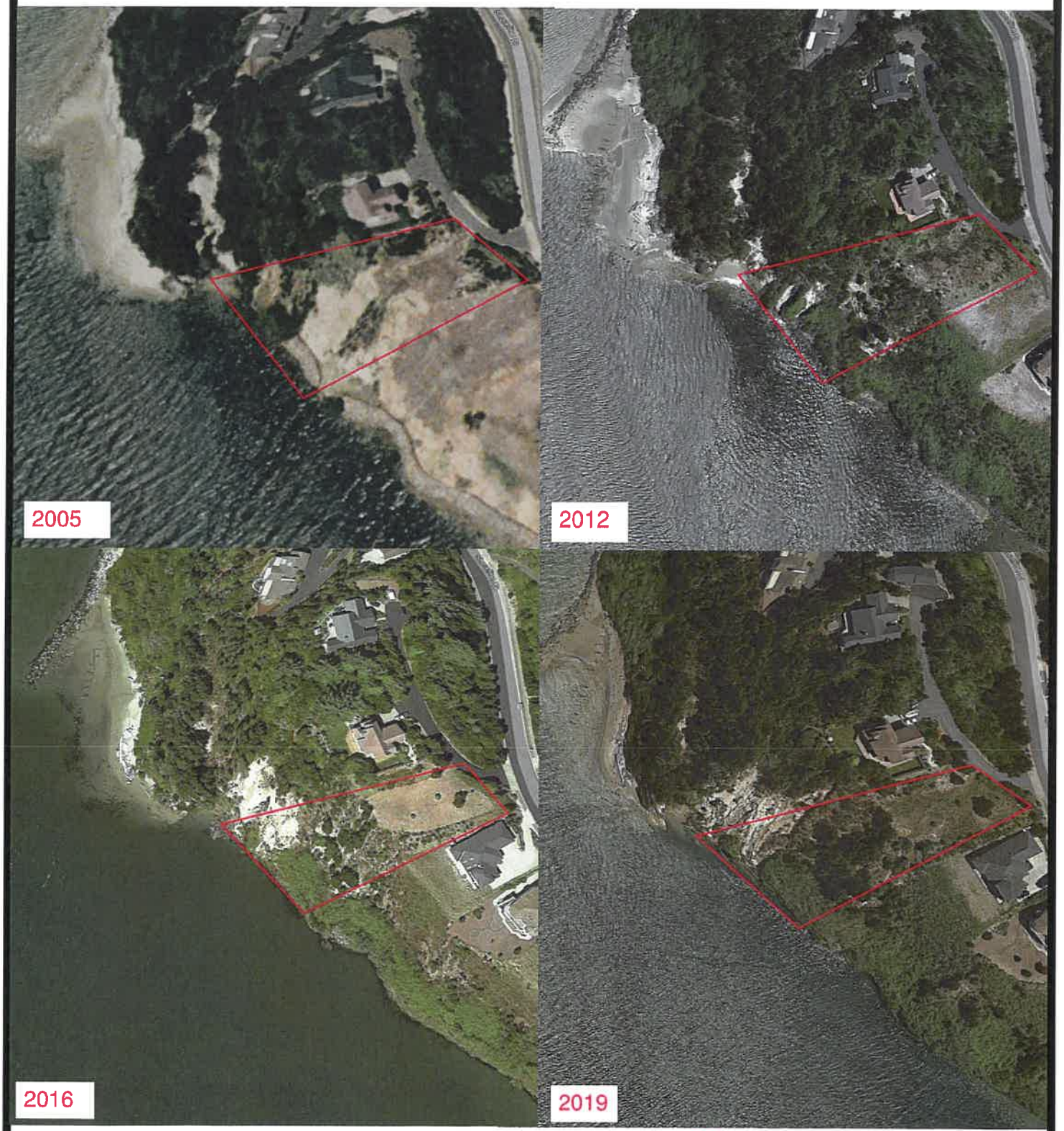
Branch ENGINEERING INC. Since 1977

SITE LOCATION MAP - LOT 37 SHELTER COVE
TAX MAP 18-12-16-41 LOT 700

FIGURE-2

6-20-2022

BEI PROJECT NO. 21-335-01



Area Investigated

N

Site Area Photos From Google Earth, Not to Scale

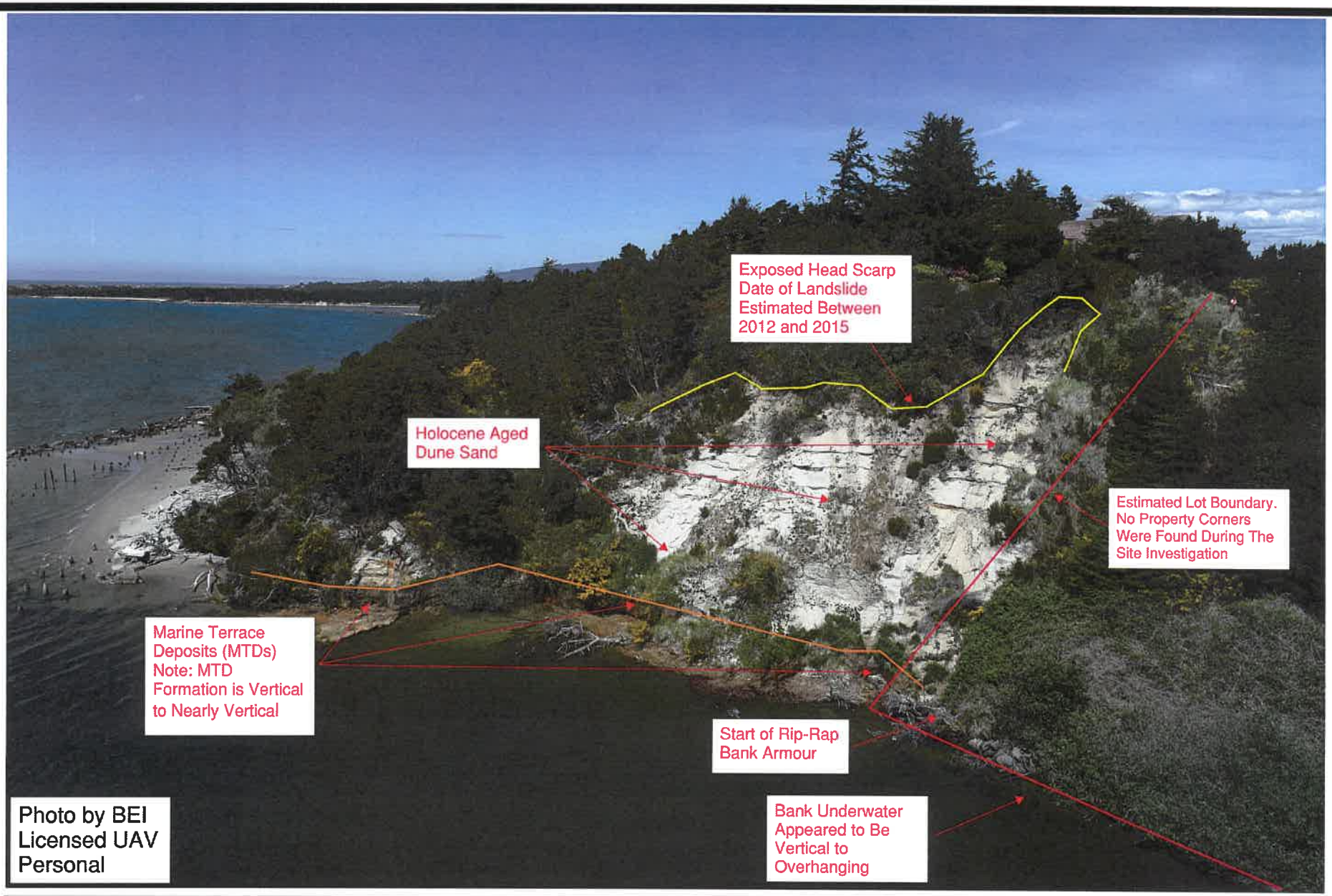
Branch ENGINEERING Inc Since 1977

SITE AERIALS PHOTOS 2005, 2012, 2016, 2019
LOT 37 SHELTER COVE
TAX MAP 18-12-16-41 LOT 700

FIGURE-3

6-20-2022

BEI PROJECT NO. 21-335-01



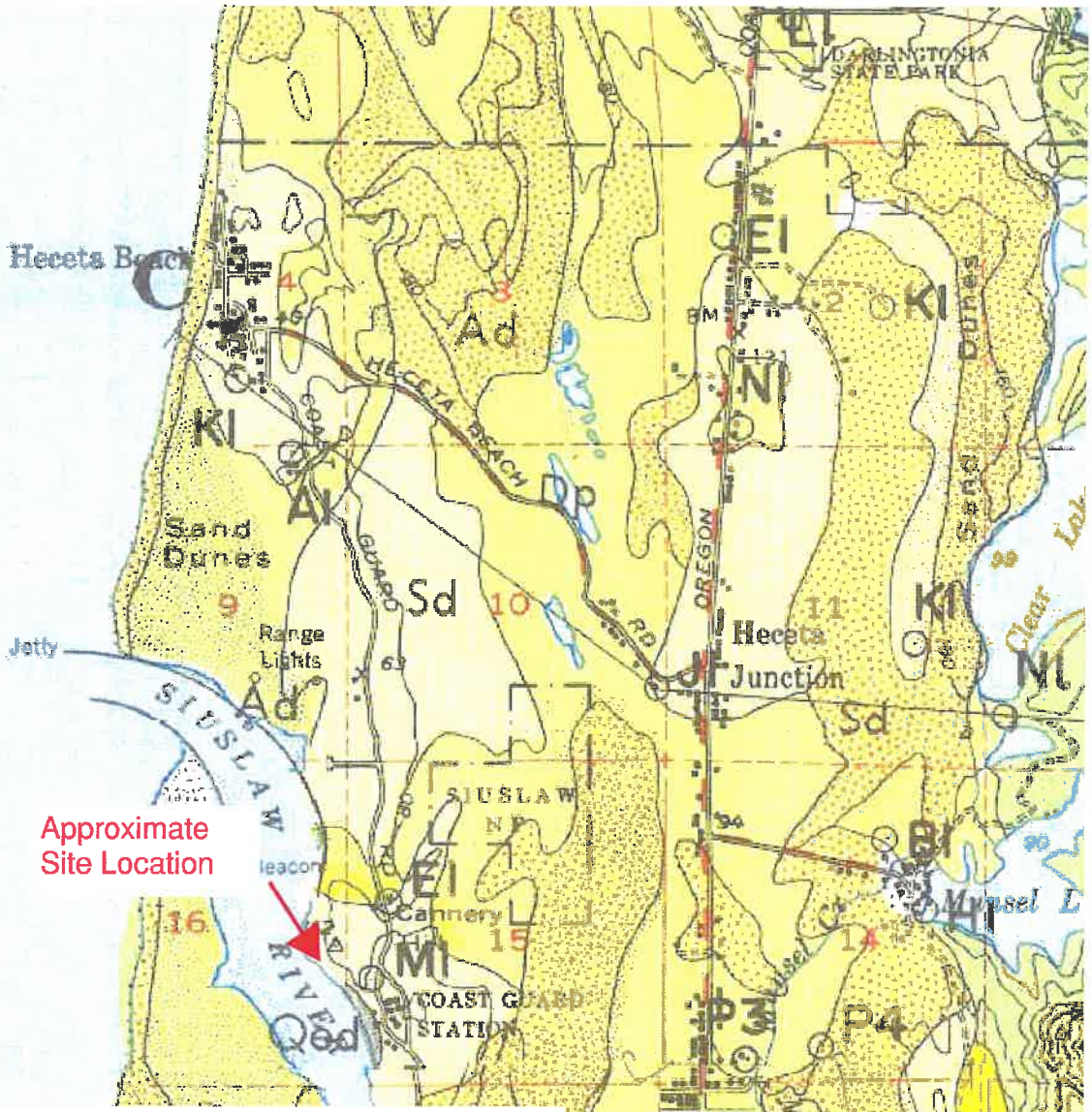
Branch ENGINEERING Inc. Since 1977

SITE GEOMORPHOLOGICAL AND GEOLOGIC FEATURES
LOT 37 SHELTER COVE TAX MAP 18-12-16-41 LOT 700

FIGURE-4

6-20-2022

PROJECT NO. 21-335-01



Ad	**Active dunes** *Deposits of open sand up to 200' thick which move in response to wind. Composed of clean fine sand but locally may have layers of silt, clay, and peat, and hard iron-stained layers a few inches thick. Buried soil horizons may be present at several levels.*
Sd	**Stabilized dunes** *Old dunes covered by vegetation; weak to moderate soil development overlying unconsolidated fine sand. Iron bands and buried soil horizons are common.*
Dp	**Deflation plain** *Interdune areas eroded by wind to the summer level of the water table. Includes wet, plant- and brush-covered areas partly flooded most of winter and spring months when the water table is high.*
Qt	**Elevated alluvial terrace deposits** *Remnants of former river flood plain along the north side of the Siuslaw River and near the mouth of Big Creek; composed of silt, sand, and thin gravel.*

Site Map From DOGAMI

Branch ENGINEERING Inc. Since 1977

SITE GEOLOGY MAP
LOT 37 SHELTER COVE
TAX MAP 18-12-16-41 LOT 700

FIGURE-5

6-20-2022

BEI PROJECT NO. 21-335-01

Lot 37 Shelter Cove
55 Shoreline Drive
Florence, OR 97439

Inquiry Number: 7019153.8
June 14, 2022

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

06/14/22

Site Name:

Lot 37 Shelter Cove
55 Shoreline Drive
Florence, OR 97439
EDR Inquiry # 7019153.8

Client Name:

Branch Engineering
310 5th Street
Springfield, OR 97477
Contact: Ron Derrick

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2016	1"=500'	Flight Year: 2016	USDA/NAIP
2012	1"=500'	Flight Year: 2012	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2005	1"=500'	Flight Year: 2005	USDA/NAIP
2000	1"=500'	Acquisition Date: January 01, 2000	USGS/DOQQ
1994	1"=500'	Acquisition Date: January 01, 1994	USGS/DOQQ
1988	1"=500'	Flight Date: July 20, 1988	USGS
1982	1"=500'	Flight Date: July 12, 1982	USDA
1976	1"=500'	Flight Date: May 01, 1976	USGS
1954	1"=500'	Flight Date: October 01, 1954	USGS
1952	1"=500'	Flight Date: October 14, 1952	USDA

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

INQUIRY #: 7019153.8

YEAR: 2016

= 500'

N

EDR

INQUIRY #: 7019153.8

YEAR: 2012

= 500'

N

EDR


Approximate
Site Location
INQUIRY #: 7019153.8
YEAR: 2009
= 500'
N
EDR

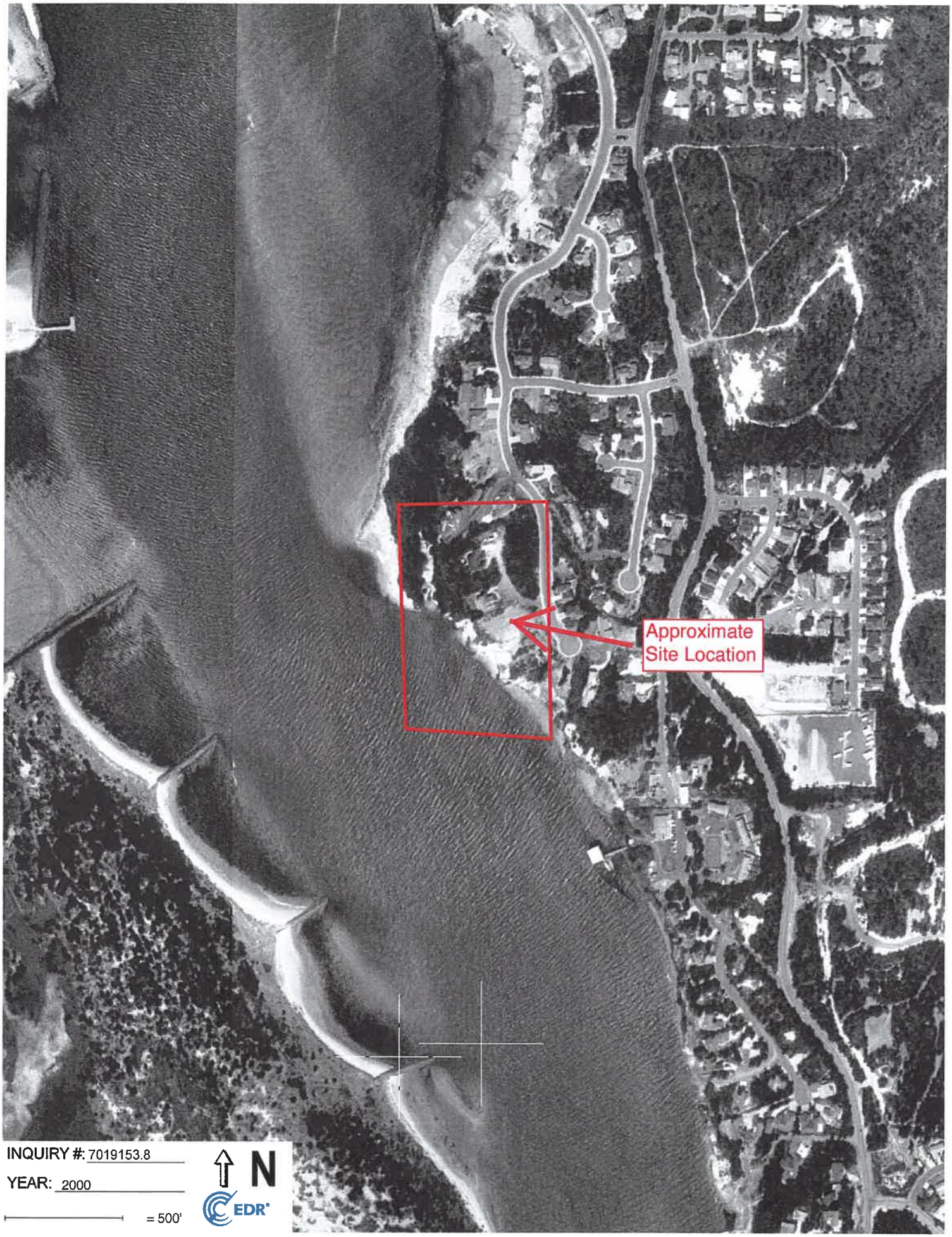
INQUIRY #: 7019153.8

YEAR: 2005

= 500'

N

EDR



INQUIRY #: 7019153.8

YEAR: 2000

= 500'

N

EDR

INQUIRY #: 7019153.8

YEAR: 1994

= 500'

N

EDR

INQUIRY #: 7019153.8

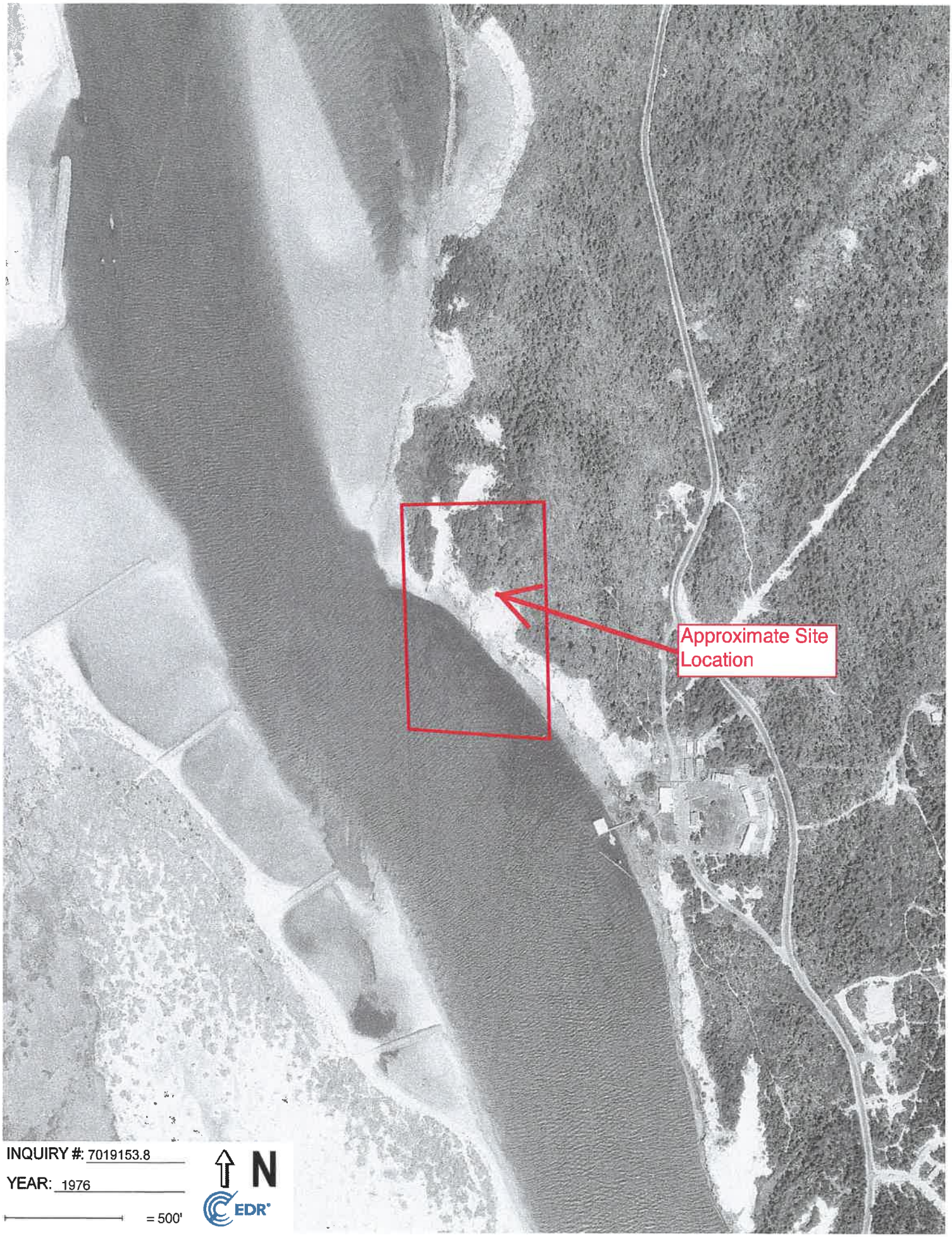
YEAR: 1988

= 500'

N

EDR


Approximate Site Location
INQUIRY #: 7019153.8
YEAR: 1982
= 500'
N
EDR



INQUIRY #: 7019153.8

YEAR: 1976

= 500'

N

EDR


Approximate Site Location
INQUIRY #: 7019153.8
YEAR: 1954
= 500'
N
EDR

Exhibit D.2

Branch ENGINEERING inc
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SURVEYING

September 19, 2022

Scott and Sharon Hancock
4955 South Pyrite Road
Flagstaff, Arizona

RE: RECOMMENDED SETBACK & SLOPE RETREAT MITIGATION MEASURES
LOT 37 SHELTER COVE
FLORENCE, OREGON
BRANCH ENGINEERING INC. PROJECT NO. 21-335

Pursuant to the City of Florence's (COF) request for a site-specific recommendation as to the risk of retreat and erosion of the sand slope down to the Siuslaw River on the southwest edge of the property, Branch Engineering Inc. (BEI) has revisited our July 8, 2022 Erosion/Recession Site Assessment report and subsequent site information provided by the COF.

The erosion of the east bank of the Siuslaw River in the area of the subject site and several others locations appears to have been accelerated by the construction of the river groynes on the west bank prior to 1976. As we noted in our July 8, 2022 report the extent of erosion is difficult to determine from the aerial photographs but is estimated to be at least 20-feet between 1952 and 2005. Rudimentary measurements from Rhododendron Drive indicate possibly 80-feet of slope loss from 1976 to 2016. Development of the Shelter Cove subdivision occurred between 1988 and 1994 with the adjacent house on the north side appearing in the 2000 photograph.

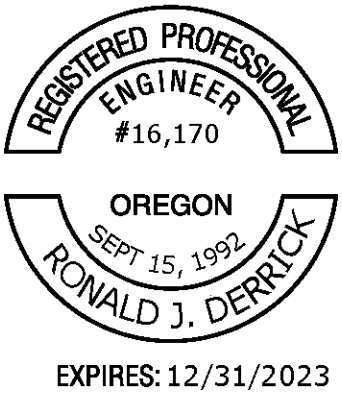
It is our understanding that around 2006 a rip-rap revetment was constructed along the toe of the slope in accordance with the December 1, 2003 *Dune Stabilization* report by Boire Associates, Inc.; however, details of construction and the extent of revetment have not provided to BEI, if they exist. Our investigation encountered remnants of rip-rap material scattered near the toe of slope and below the water line but it was not indicative of an engineered revetment as shown in the Boire report and subsequent addendums.

As BEI previous concluded, the approximately 90-feet dune sand lies atop a cemented terrace layer that appears to have some undercutting below in more easily eroded sediment that are generally below the river surface level. The construction of the river groynes have diverted the river flow to the east and caused erosion of the bank in the area of the subject site and other locations. The rate of erosion appears to have been higher during the 10-to 15-years after immediately after groyne construction as expected and a slight rate of erosion increase sometime after the construction of the rip-rap revetment in 2006 possibly due to the weight of the revetment shearing off the cemented terrace layer that holds the overlying toe of the dune sand slope. The apparent failure of the revetment may have been the cause of the surficial slope failure observed off the northwest corner of Lot 37 and onto the adjacent lot to the north. The slope erosion in the failure area appears to be relatively stable since 2019. It is not known whether the adjacent property owner(s) have maintained records of the slope conditions.

Based on our site research, BEI concludes that the stabilized rate of erosion of the west slope of Lot 37 property is approximately 1-foot per year and for an anticipated 50-year life span of the residential structure we continue to recommend at least a 50-foot setback from the top of the dune sand slope as stipulated in our June 18, 2021 *Geotechnical Site Evaluation*. In addition, vegetation

shall be maintained and enhanced on the existing slope and all stormwater runoff from impervious surface area shall be collected and conveyed to a suitable point of disposal away from the existing slope. The property owner has been advised that this location is prone to river erosion activity and the rate of may vary depending on circumstances and activities beyond their control, and that the risk of slope erosion and failure exists. Building foundations should be designed for rigidity and structural cohesiveness, and may be designed to accommodate future under pinning, if required. Development of the lot as proposed does not increase the risk of slope instability nor does development have any additional risk than the developed properties immediately adjacent to the site

Sincerely,
Branch Engineering Inc,



Ronald J. Derrick, P.E., G.E.
Principal Geotechnical Engineer

Exhibit D.3

Branch ENGINEERING inc
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structural · geotechnical
SURVEYING

September 26, 2022

Scott and Sharon Hancock
4955 South Pyrite Road
Flagstaff, Arizona

RE: RECOMMENDED SETBACK & SLOPE RETREAT MITIGATION MEASURES - *REVISED*
LOT 37 SHELTER COVE
FLORENCE, OREGON
BRANCH ENGINEERING INC. PROJECT NO. 21-335

Pursuant to the City of Florence's (COF) request for a site-specific recommendation as to the risk of retreat and erosion of the sand slope down to the Siuslaw River on the southwest edge of the property, Branch Engineering Inc. (BEI) has revisited our July 8, 2022 Erosion/Recession Site Assessment report and subsequent site information provided by the COF. BEI has revised our initial letter report dated September 19, 2022 at the request of the COF to address the italicized items herein.

The erosion of the east bank of the Siuslaw River in the area of the subject site and several others locations appears to have been accelerated by the construction of the river groynes on the west bank prior to 1976. As we noted in our July 8, 2022 report the extent of erosion is difficult to determine from the aerial photographs but is estimated to be at least 20-feet between 1952 and 2005. Rudimentary measurements from Rhododendron Drive indicate possibly 80-feet of slope loss from 1976 to 2016. Development of the Shelter Cove subdivision occurred between 1988 and 1994 with the adjacent house on the north side appearing in the 2000 photograph. *The approximately 100-foot high slope on the west side of the subject site ranges in steepness from 2.7:1 (Horizontal:Vertical) to 1.3:1 (H:V) or about 20˚ to 37˚, respectively.*

It is our understanding that around 2006 a rip-rap revetment was constructed along the toe of the slope in accordance with the December 1, 2003 *Dune Stabilization* report by Boire Associates, Inc.; however, details of construction and the extent of revetment have not provided to BEI, if they exist. Our investigation encountered remnants of rip-rap material scattered near the toe of slope and below the water line but it was not indicative of an engineered revetment as shown in the Boire report and subsequent addendums.

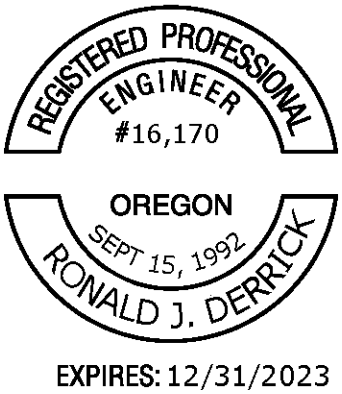
As BEI previous concluded, the approximately 90-feet of dune sand lies atop a cemented terrace layer that appears to have some *erosional* undercutting below this *cemented lens* in more easily eroded sediment that is generally below the river surface level. *The degree of undercutting is unknown, but appears to be less than 2-feet to near vertical below the cemented lens.* The construction of the river groynes have diverted the river flow to the east and caused erosion of the bank in the area of the subject site and other locations. The rate of erosion appears to have been higher during the 10-to 15-years after immediately after groyne construction as expected and a slight rate of erosion increase sometime after the construction of the rip-rap revetment in 2006 possibly due to the weight of the revetment shearing off the cemented terrace layer that holds the overlying toe of the dune sand slope. The apparent failure of the revetment may have been the cause of the surficial slope failure observed off the northwest corner of Lot 37 and onto the adjacent lot to the north. The slope erosion in the failure area appears to be relatively stable since

2019. It is not known whether the adjacent property owner(s) have maintained records of the slope conditions.

Based on our site research, BEI concludes that the stabilized rate of erosion of the west slope of Lot 37 property is approximately 1-foot per year and for an anticipated 50-year life span of the residential structure we continue to recommend at least a 50-foot setback from the top of the dune sand slope as stipulated in our June 18, 2021 *Geotechnical Site Evaluation*. In addition, vegetation shall be maintained and enhanced on the existing slope and all stormwater runoff from impervious surface area shall be collected and conveyed to a suitable point of disposal away from the existing slope. The property owner has been advised that this location is prone to river erosion activity and the rate of may vary depending on circumstances and activities beyond their control, and that the risk of slope erosion and failure exists. Building foundations should be designed for rigidity and structural cohesiveness, and may be designed to accommodate future under pinning, if required. Development of the lot as proposed does not increase the risk of slope instability nor does development have any additional risk than the developed properties immediately adjacent to the site.

As stated in our July 18, 2021 Geotechnical Site Evaluation report, the depth of site stripping for foundation construction is expected to be about 6-inches and the subgrade wetted and roller compacted. At least 4-inches of crushed aggregate is recommended atop the subgrade to mitigate wind erosion. The building footprint shall be on the flattened portion of the property and we recommend that grading activities be confined to the building footprint area; excavation spoils may be spread on the flattened area of the property but shall not exceed 12-inches in thickness or placed within 20-feet of the top of west slope.

Sincerely,
Branch Engineering Inc,



Ronald J. Derrick, P.E., G.E.
Principal Geotechnical Engineer


EXHIBIT E

EXHIBIT F

CITY OF FLORENCE
PHASE I SITE INVESTIGATION REPORT

Todd Larsen Applicant	September 7, 2021 Date
New residence construction Proposal or Project	18-12-16-41 700 Map No. Tax Lot
	Low Density Residential Comprehensive Plan Designation
	Residential Restricted Zoning District
Purpose of Proposal or Project (attach additional sheets, as needed)	
Not addressed Street Address	 Overlay District

Based on submitted information, zoning and comprehensive plan requirements, and the completed Site Investigation Report, this proposal **does / does not** comply with Title 10 of the City Code and the Comprehensive Plan. The proposal **will / will not** achieve the stated purpose. The site and/or building design **will / will not** have adverse impacts and **will / will not** mitigate any adverse impacts.

The completed Site Investigation Report is available at the Planning Department.

This investigation was done by:

Lauren Zatkos
Print

Lauren Zatkos
Signature

Staff Scientist
Title

PHASE 1SITE INVESTIGATION
INITIAL PROPOSED DEVELOPMENT APPLICATION CHECKLIST

YES	NO		
X		1.	LOCAL ZONING REGULATIONS Does the proposed development site plan conform to City, or County Zoning Regulations regarding setback lines and other code provisions? (Contact the City or County Engineer for details.)
		2.	COMPREHENSIVE PLAN SETBACK LINE OR DESIGNATION
X			a. Has a Coastal Construction Setback line (CCSBL) been adopted for this County or city? (Inquire from the County or City Engineer.)
	X		b. If a CCSBL has been adopted for this County or City is the proposed site seaward of the CCSBL?
N/A			c. If the proposed site is seaward of the adopted CCSBL, has application for a variance or exception been made to the Planning Commission having jurisdiction?

PHASE 1SITE INVESTIGATION
INITIAL PROPOSED DEVELOPMENT APPLICATION CHECKLIST

YES	NO	
		3. DUNAL FORMS
		a. Does the property contain any of the following dune formations?
____	X	1. Active Dune
X	____	2. Newer Stablized Dune
____	X	3. Older Stablized Dune
____	X	4. Deflation Plan
____	X	5. leading Edge of Sand dune
____	X	6. Foredune
		3. IDENTIFIED HAZARDOUS CONDITIONS
X	____	a. Has any portion of the property been identified as being affected by any potential or existing geological hazard? (Contact County or City Planning Departments for information published by the State Department of Geology and Mineral Industries, US Department of Agriculture-Soil Conservation Service, US Geological Survey, US Army Corps of Engineers and other government agencies.)
		b. Are any of the following identified hazards present?
____	X	1. foredune
____	X	2. Active Dunes
X	____	3. Water erosion
____	X	4. Flooding
____	X	5. Wind erosion
X	____	6. Landslide or sluff activity
		7. leading edge of active Sand Dune
		c. Are there records of these hazards ever being present of the site? Describe:
		See attached Additional Information document.
		4. EXISTING SITE VEGETATION
X	____	a. Does the vegetation on the site, afford adequate protection against soil erosion from wind and surface water runoff?
____	X	b. Does the condition of vegetation present constitute a possible fire hazard or contributing factor to slide potential?
		(If answer is Yes, full details and possible remedies will be required.)
		5. FISH AND WILDLIFE HABITAT
X	____	a. Does the site contain any identified rare or endangered species or unique habitat (feeding, nesting or resting)?
____	X	b. Will any significant habitat be adversely affected by the development? (Contact Oregon Department of Fish and Wildlife,)
		See attached Additional Information document.
		6. HISTORICAL AND ARCHEEOLOGICAL SITES
____	X	Are there any identified historical or archaeological sites within the area proposed for development? (Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians).)
		7. FLOOD PLAIN ELEVATION
____	X	a. If the elevation of the 100 year flood plain or storm tide has been determined, does it exceed the existing ground elevation at the proposed building site? (Contact the Federal Insurance Administration, City or County Planning

PHASE 1SITE INVESTIGATION
INITIAL PROPOSED DEVELOPMENT APPLICATION CHECKLIST

YES	NO	
		Departments for information on 100 year flood plain. Existing site elevations can be identified by local registered surveyor.)
N/A		b. If elevations of the proposed development is subject to flooding during the 100 year flood or storm tide, will the lowest habitable floor be raised above the top of the highest predicted storm-wave cresting on the 100 year flood or storm tide?
		8. CONDITION OF ADJOINING AND NEARBY AREAS
		Are any of the following natural hazards present on the adjoining or nearby properties that would pose a threat to this site?
	X	a. Active dunes
	X	b. foredune
	X	c. Storm runoff erosion
X		d. Wave undercutting or wave overtopping
X		e. Slide areas
	X	f. Combustible vegetative cover
		(Contact County and City Planning staffs for local hazard information.)
		See attached Additional Information document.
		9. DEVELOPMENT IMPACTS
	X	a. Will there be adverse off-site impacts as a result of this development?
		b. Identify possible problem type
	X	1. Increased wind exposure
	X	2. Open sand movement
	X	3. Vegetative destruction
	X	4. Increased water erosion (storm runoff, driftwood removal, reduction of foredune, etc.)
	X	5. Increased slide potential
	X	6. Affect on aquifer
X		c. Has landform capability (density, slope failure, groundwater, vegetation, etc) been a consideration in preparing the development proposal?
X		d. Will there be social and economic benefits from the proposed development?
		e. Identified benefits
	X	1. New jobs
X		2. Increased tax valuation
	X	3. Improved fish and wildlife habitat
	X	4. Public access
	X	5. Housing needs
	X	6. Recreation potential
	X	7. Dune stabilization (protection of other features)
		8. Other _____
		10. PROPOSED DESIGN
X		a. Has a site map been submitted showing in detail exact location of proposed structures?
X		b. Have detailed plans showing structure foundations been submitted?
N/A		c. Have detailed plans and specifications for the placement of protective structures been submitted if need is indicated?
X		d. Has a plan for interim stabilization, permanent revegetation and continuing vegetative maintenance been submitted?
		e. Is the area currently being used by the following?

PHASE 1SITE INVESTIGATION
INITIAL PROPOSED DEVELOPMENT APPLICATION CHECKLIST

YES	NO	
____	__X__	1. Off-road vehicles
____	__X__	2. motorcycles
____	__X__	3. horses
___N/A___		f. Has a plan been developed to control or prohibit the uses of off-road vehicles, motorcycles and horses?

11. LCDC COASTAL GOAL REQUIREMENTS

__X__	____	a. Have you read the LCDC Goals affecting the site? (contact LCDC, City or County office for copies of Goals.)
____	__X__	b. Have you identified any possible conflicts between the proposed development and the Goals or acknowledged comprehensive plans? (If so, list them and contact local planning staff for possible resolution.)
__X__	____	c. Have all federal and state agency consistency requirements been met? (Contact local planning office.)
__X__	____	d. Has applicant or investigator determined that the development proposal is compatible with the LCDD Beaches and Dunes Goal and other appropriate statewide land use planning laws?

Rev. 4/09

CITY OF FLORENCE

PHASE I SITE INVESTIGAITON REPORT

Additional Information

3. Identified Hazardous Conditions:

c. The Oregon Department of Geology and Mineral Industries (DOGAMI) Hazard Viewer (HazVu) Map maps the entirety of the property has having a moderate to high potential for landslide activity. The DOGAMI HazVu tool also maps the entirety of the property as having a high potential for liquefaction in the event of an earthquake. Currently, no pre-existing earthquakes have been mapped on-site.

5. Fish and Wildlife Habitat:

a. The following table lists the "Species of Greatest Conservation Need" that are mapped as potentially utilizing the site at least part of the year. These species and their habitats are designated as in need of conservation efforts by the Oregon Department of Fish and Wildlife (ODFW) and the Oregon Conservation Strategy. Site-specific habitat use was obtained from habitat modeling displayed through the ODFW Compass tool.

Table 1:

Designated "Species of Greatest Conservation Need" Habitat On-Site	
Species	**Modeled Habitat Season Use**
Clouded Salamander	Year-Round
Common Nighthawk	Summer
Harlequin Duck	Summer
Marbled Murrelet	Year-Round
Peregrine Falcon	Year-Round
Red-Necked Grebe	Winter
Short-eared Owl	Winter
Snowy Egret	Winter
Trumpeter Swan	Winter
Western Snowy Plover	Year-Round
Silver Haired Bat	Year-Round
Townsend's Big-eared Bat	Year-Round
Pallid Bat	Year-Round
Long-legged myotis	Year-Round
California myotis	Year-Round

8. Condition of Adjoining and Nearby Areas:

Catastrophic bank failure at 16 Sea Watch Court, Florence, approximately 0.35-miles southeast of the site, occurred in 2010 (GeoScience, Inc., 2011). An approximately 80-foot-wide by 70-foot-tall piece of slope slid down into the Siuslaw River. This landslide was found to be caused by a

combination of wave erosion of the marine terrace deposits at the base of the slope and surface water runoff over the steep top-of-slope. The U.S. Coast Guard Station Siuslaw River, located 0.18-miles south of the site, also submitted an Environmental Assessment for stabilization of the shoreline along the west edge of the Guard Station Property (USCG Civil Engineering Unit, 2012). This report, submitted in 2012, indicates that in the areas where steel pipe piles were driven into the subgrade to support the USCG boathouse, between 5- to 20-feet of riverbank and bottom has been lost since 1961. Both river bottom and shoreline erosion were threatening USCG activities at the time of report submittal.

Beginning approximately 0.2-miles north of the site is the southern end of the North Cove bank stabilization project, for which a geotechnical evaluation and design was submitted in May, 2006 (Ash Creek Associates, 2006). This report found that a 1,650-foot-long bluff along the Siuslaw River was at risk of eroding at rates of up to 30- to 40-feet per year with adequate precipitation. A vegetated buttress was designed for installation along the study area.

At the time of Branch Engineering's site visit to the lot currently addressed in June, 2021, the north-adjacent lot 36 (Tax Lot 600) had active landslide activity along the Siuslaw River-facing slope. The Marine Terrace Deposits and impermeable clays under newly stabilized dunes, which constitute the geology of the majority of the subdivision, seem to have resulted in groundwater seepage near the base of the slope which, combined with wave erosion, has caused undercutting of the bank. Based on Google Earth Imagery, the majority of the slide occurred sometime between 2012 and 2015, with smaller subsequent losses of the vegetation and topsoil layer above the landslide since 2015. According to Google Earth Imagery dated 2021, the landslide has resulted in a cumulative 130-foot-wide and 90- to 130-foot-tall section of the slope having been eroded. This landsliding will likely continue to occur and could potentially impact the slope of the currently investigated lot in the future.

References:

Bank Failure Assessment, 16 Sea Watch Court Florence, Oregon. GeoScience, Inc. Dated March 18, 2011.

Draft Environmental Assessment for Shoreline Stabilization at Station Siuslaw River Florence, Oregon. U.S. Coast Guard Civil Engineering Unit, Oakland. Dated February 2012.

Geotechnical Engineering Evaluation and Design; Proposed Erosion Control Project for North Cove Bank Preservation Coalition, Florence, Oregon. Ash Creek Associates, Environmental and Geotechnical Consultants. Dated May 16, 2006.

EXHIBIT G

Branch ENGINEERING inc
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June 18, 2021

Colette Mathewson
1727 South Crumal Street
Visalia, CA 93292

RE: GEOTECHNICAL SITE EVALUATION
LOT 37 SHELTER COVE
FLORENCE, OREGON
BRANCH ENGINEERING INC. PROJECT NO. 21-335

Pursuant to your request, Branch Engineering Inc. (BEI) conducted a Geotechnical Evaluation of the subject site at the above listed location. This study was requested for the planned construction of a timber-framed single-family residence on the property. The purpose of the study is to identify any geotechnical or geologic hazards that may affect the proposed site development and provide engineering design recommendations for design and construction.

1.0 SCOPE OF WORK

On June 1, 2021, BEI geotechnical engineering staff conducted a reconnaissance of the site, general vicinity, and subsurface investigation that included three hand-auger borings and one Dynamic Cone Penetrometer test at the locations shown on Figure-1. Field log summaries of the hand-auger borings, DCP test, soil survey mapping of the site, and the site, and nearby Oregon Water Resources Department well logs are attached. Other resources that were utilized for the writing of this report are listed below:

- Site Aerial Photo, Figure-1.
- Google Earth, earth.google.com
- Geologic Map of Oregon, 1991 Walker and MacLeod. Map from US Dept. of Interior, Geological Survey
- State of Oregon, Department of Geology and Mineral Industries (DOGAMI) Bulletin 85, Environmental Geology of Coastal Lane County Oregon.
- State of Oregon, Geologic Map of Oregon website, http://www.oregongeology.org/geologicmap/
- United States Dept. of Agriculture, Natural Resources Conservation Service, Pacific Northwest Soils website, http://www.or.nrcs.usda.gov/pnw_soil/or_data
- State of Oregon, Department of Geology and Mineral Industries (DOGAMI) website, Statewide Geohazards Viewer (HazVu), http://www.oregongeology.org/hazvu/
- Geotechnical Engineering Evaluation and Design Proposed Erosion Control Project North Cove Bank Preservation Coalition Report. Ash Creek Associates, Inc. Dated May 16, 2006.

- Bank Failure Assessment, 16 Sea Watch Court Florence, Oregon. GeoScience, Inc. Dated March 18, 2011.

- National Assessment of Shoreline Change: Historical Shoreline Change Along the Pacific Northwest Coast. U.S. Department of the Interior, U.S. Geological Survey. Open File Report 2012-1007.

- Aerial Drone Photos by BEI Small Unmanned Aircraft System (UAS) licensed staff

2.0 PROJECT LOCATION AND DESCRIPTION

The project site is located in the Shelter Cove Phase II development in Florence, Oregon, at latitude 44.004689° north and longitude 124.124617° west. The site is accessed via a small sand and aggregate driveway off the southwest side of an unnamed, private drive that connects to the west side of Shoreline Drive.

The project site is located approximately 1.3-miles upriver from the mouth of the Siuslaw River near a projection of land called Cannery Point. Lot 37 and the surrounding properties are located on geologically younger, marginally stabilized dune sands that formed along the banks of the Siuslaw River. Site elevations vary from approximately 97-feet above mean seal level (MSL), to the banks of the tidally influenced Siuslaw River, which can be approximated as +/- 5-feet MSL in this area. Topographically the site is a flat bench cut into the dune crest during the initial site development to provide a level building pad. Slopes vegetated with grass and short shrubs rise above this level area to the north at 25- to 30-degees, with an elevation difference of approximately 18-feet between the level bench on Lot 37 and the property to the north. The property to the south is approximately 10-feet lower in elevation and is separated by a concrete retaining wall. Slopes to the north average 30-degrees along the private accessway and are well vegetated with shrubs and scattered evergreen trees. The western slope is approximately 165-feet in length, with slopes measured at 20- to 37-degrees. This slope is covered with well established vegetation consisting of grass, shrubs, and evergreen trees. Dense brush on this slope prevented access to the toe of the slope and limited the investigation to the top third. Numerous small diameter PVC pipes were noted on the slope, no obvious purpose for these pipes was ascertained during the site investigation.

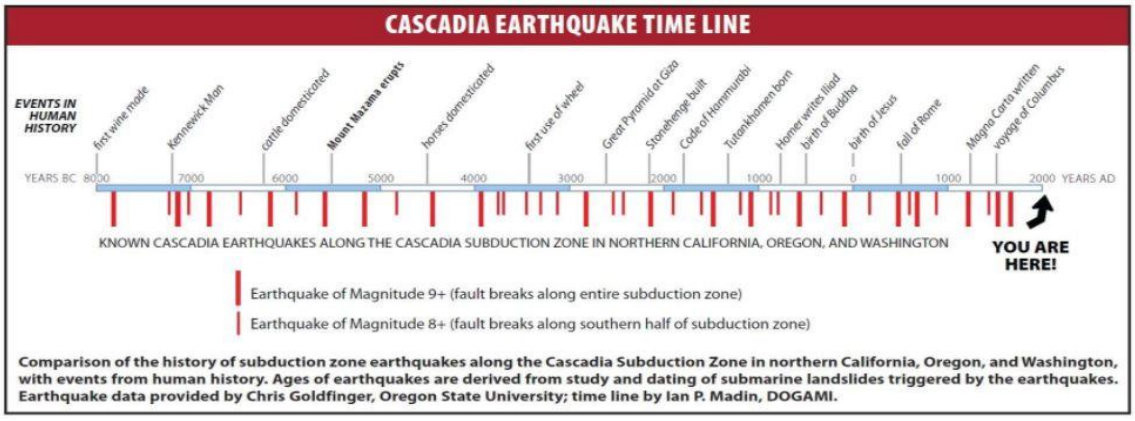
During the site investigation a remote-controlled drone was used to visually assess the site slopes. High winds prevented visual assessment of the toe of the slope on Lot 37. On the adjacent property to the north, Shelter Cove Lot 36, an active landslide was documented and photos of it were taken. Based on the drone photos the slide appears to be entirely within Shelter Cove Lot 36. Discussion of landslides and associated risks is addressed in Section 5 of this report.

Our understanding of the project is that a single-family residence will be built on the level section of the lot.

3.0 SITE GEOLOGY AND GEOLOGIC HAZARD MAPPING

The subject site is located near the northern extent of the longest coastal strip of sand dunes on the Oregon Coast. The sand dunes in the area were likely formed post ice-age during the Late Pleistocene to the Holocene epoch by eolian processes associated with the activity of wind and changes in sea levels. The typical pattern seen in the area is active transverse dunes (running parallel to the ocean) caused by the varying on, and off shore winds, with areas of deflation plains, lying inland and between active or stabilized dune areas where the water table is exposed or near the surface. The north shore of the Siuslaw in the project vicinity is mapped as geologically younger (Late Pleistocene to Holocene), marginally stabilized dune sand composed of fine-grained, poorly sorted sand with little topsoil formation. Based on work done by Ash Creek Associates and others in the project vicinity, including ours, the underlying geologic unit referred to as Marine Terrace Deposits (MTD) was found exposed along the shoreline. This unit formed during the Pleistocene when sea levels were lower than at present, and is composed of estuarine, flood-plain, marine, and fluvial sediments. Weathering of minerals in the MTD unit has led to the formation of clay which cements the soil particles in the unit and acts as an aquitard (impervious to water).

The site is located near the Cascadia Subduction Zone, which is a zone of converging tectonic plates that historically produces major earthquake events that is located to the west of the Oregon Coast. Figure 1 below shows a timeline of historical Subduction Zone earthquake events. The nearest mapped active fault is approximately 7.3-miles to the southwest of the site and is labeled as a part of the Cascadia fold and fault belt.



Comparison of the history of subduction zone earthquakes along the Cascadia Subduction Zone in northern California, Oregon, and Washington, with events from human history. Ages of earthquakes are derived from study and dating of submarine landslides triggered by the earthquakes. Earthquake data provided by Chris Goldfinger, Oregon State University; time line by Ian P. Madin, DOGAMI.

The HazVu website shows that the subject site is expected to experience severe shaking in the event of a Cascadia Subduction Zone earthquake and very strong shaking for lesser earthquakes. HazVu has also characterized the site as having a high-risk landslide and for earthquake induced liquefaction of the subsurface soils.

4.0 SITE SOIL AND GROUNDWATER

Three exploratory hand-auger borings were advanced to approximately 4.5-feet below ground surface (BGS) see Figure-2 for hand auger locations. Site soils generally consist of tan-brown, poorly graded, fine-grained sand. Moisture contents of the sand were generally observed to be damp after penetrating below the dry crust of the surficial sand. Even though no moist or wet

sand was observed at either boring location, the sands observed are expected to exhibit rapid dilatancy when saturated.

A portable Dynamic Cone Penetration (DCP) test was performed adjacent to Hand-Auger 2 to assess the density of the near surface sand within the flattened area. DCP testing consists of recording the blow counts required to drive a steel rod with 10 cm graduations into the soil using a 35-lb slide hammer free falling 18-inches. DCP testing indicated that the near surficial soil is loose in density to at least a depth of 4.5-feet BGS.

Site work performed by Ash Creek Associates in 2006 in the northern portion of the Shelter Cove development found dune sand from the surface to a depth of at least 60-feet BGS, overlying the MTD deposits of organic clays and silts. Inclinometers placed during their investigation were used to assess groundwater depths, which were determined to be in the range of 21- to 24-feet above MSL. We expect the groundwater level to fluctuate seasonally with higher groundwater levels observed during the wet season; generally late October to late May. Groundwater is not expected to adversely impact the site development.

5.0 GEOLOGIC HAZARDS

Landslide/Slope Stability – There are no mapped landslides on, or near the site and the existing site slopes appear to be currently stable. However, site slopes are mapped as high risk for landslide, and as previously discussed an active landslide on Lot 36 to the north was photographed during the site visit. Bank failure and subsequent landslides are well documented on the north bank area from the Shelter Cove Development to the area upriver of the Sea Watch Development. Wave action, fluvial erosion, and mobilization of sand through liquefaction at the boundary of the dune sand and MTD erodes the toe of the slope, the loss of lateral support can lead to rapid erosion events such as landslides as the slope tries to re-establish the materials angle of repose. Slopes in the fine-grain sands of the Florence area are generally stable from 28- to 33-degrees, which is about the natural angle of repose for poorly grades, fine-grained sand. Although no indications of landslide such as head scarps or bare sand were noted during the investigation, it is our opinion that the risk of landslide along the river front slope is high. Northerly regression of the river frontage in the project vicinity will likely continue. Existing vegetation should be maintained on slopes or be reestablished in a timely manner to mitigate wind and water erosion and surface drainage is directed away from the top of slopes.

Tsunami: Based on the Tsunami Inundation Map Lane-04 Florence and the DOGAMI HazVu website, the subject site is mapped outside of the tsunami inundation limit for a XL and XXL, 9.1 to over 9.1 earthquake magnitude, respectively. These limits are speculated and should not be considered exact. A tsunami generated by a CSZ earthquake may result in damage to the subject site and will likely affect access to the site.

Earthquake Shaking – The site is mapped within the zone of very strong to violent shaking in the event of a CSZ earthquake, as is the majority of the Oregon coast.

Liquefaction Potential – Liquefaction at elevations below 20-feet MSL may occur, but surface settlement estimations are expected to be low enough so as to not adversely affect a timber-framed residential structure prepared using the recommendations for building pad preparation described below. We do not anticipate liquefaction in the near surface sand under the proposed

development as it is unlikely that strata would be saturated. There is potential for liquefaction of the of the saturated sands at the boundary of the MTD deposits that would likely impact the river facing slopes due to lateral spreading of the liquefied sands.

Shrink/Swell Potential – The building pad subgrade is expected to be poorly graded, clean sands with no shrink/swell potential.

6.0 RECOMMENDATIONS

All areas intended to directly or laterally support structures, or pavement areas shall be stripped of vegetation, organic soil, unsuitable fill, and/or other deleterious material. These strippings shall be removed from the site, or reserved for use in landscaping or non-structural areas. In areas of existing trees, vegetation, or if any undocumented fill is observed, the required depth of site stripping/grubbing may be increased. The stripping and grubbing depth for the site is expected to be less than 6-inches in depth unless root zones are encountered, which may be up to 24-inches deep.

Native subgrade surfaces consisting of clean sand shall be wetted and rolled with a vibratory smooth drum roller or compacted with a vibratory plate compactor mounted on a medium-sized (+/- 25,000 lbs.) excavator on finished grades with native soil and in areas before fills are placed. Foundations elements on the north and east faces of the property shall be placed so that there is at least 8 lateral feet from the face of slopes or outside a 1:1 plane projected from the toe of slope; whichever is greater. Using an estimated erosion rate of 1-foot per year, an angle of repose for poorly graded sand of 33 degrees, and a design life of 50-years, site structures are recommended to be set back at least 50-feet from where the southern slopes drop off from the edge of the flattened area. The edge of the slope was measured at 140-feet due west from the northwest property corner. All slopes shall be protected from erosion by the timely placement of vegetation, or other means, and runoff should not be allowed to flow down the face of slopes.

If footings are not constructed immediately on prepared subgrade, we recommend that the exposed subgrades be covered with a minimum of 4-inches of compacted aggregate to mitigate wind and water erosion and to prevent the drying out and loosening of the surficial sand. After construction of footings, the perimeter of the footings shall be protected from erosion to mitigate undermining of footings. Conventional spread footings are acceptable if they bear on competent material consisting of compacted sand. The allowable bearing capacity of compacted native sand is 1,500 psf with a predicted settlement of ½-inch, or less, over spans of 20-feet on similar loaded foundation elements.

Dune and Slope Stabilization – Regarding the site landscape plan and stabilization of exposed sand, the following items are recommended to be adhered to:

1. All phases of development shall be conducted so as to avoid interruption of existing drainage patterns.

2. No more area shall be permanently cleared of vegetation than absolutely necessary for development of dwellings, septic systems, and associated utilities.

3. When the dune surface will not be occupied by a structure and are unavoidably disturbed of vegetation—such as being tracked on by equipment—the removal of surface duff shall not be allowed. Such disturbed areas shall be temporarily stabilized during construction in regards to Lane County Manual 10.056(2)(a).

4. Permanent stabilization plantings shall consist of native species appropriate to the environment.

5. Unnecessary cutting into dune ridges or sides shall be avoided

Upon Completion of Construction – Areas cleared of vegetation during construction in excess of what is required for the development listed in condition (2) above shall be replanted with initial plantings in the first planting season within nine months of the termination of major construction activity and secondary plantings following the second growing season as per Lane County Manual 10.056(2)(b). Stormwater drainage from impervious areas shall be conveyed to low lying areas for infiltration.

7.0 REPORT LIMITATIONS

The conclusions and recommendations in this report are based on the conditions described in this report and are intended for the exclusive use of Colette Mathewson and her representatives for use in the site development design and construction. The analysis and general recommendations provided herein may not be suitable for structures or purposes other than those described herein. Services performed by the geotechnical engineer for this project have been conducted with the level of care and skill exercised by other current geotechnical professionals in this area under similar budget and time constraints. No warranty is herein expressed or implied.

The conclusions in this report are based on the site conditions as they currently exist and it is assumed that the limited site locations that were physically investigated generally represent the subsurface conditions at the site. Should site development or site conditions change, or if a substantial amount of time goes by between our site investigation and site development, we reserve the right to review this report for its applicability. If you have any questions regarding the contents of this report, or if we can be of further assistance, please contact our office. This report presents BEI's site observations, site research, site explorations, and recommendations for the proposed site development.

Sincerely,
Branch Engineering Inc,

Ronald J. Derrick, P.E., G.E.
Principal Geotechnical Engineer

Attached:
Figure-1 Site Aerial Photo
Figure-2 Site Map
Hand Auger Log (3)
Wildcat Dynamic Cone Log (1)
USDA NRCS Site Soil Mapping and Soil Description
Nearby Well Logs

LEGEND

HA-1 INDICATES APPROXIMATE LOCATION OF EXPLORATORY BORING

Branch ENGINEERING Inc
Since 1977

SCALE: NOT TO SCALE, PHOTO BY BEI

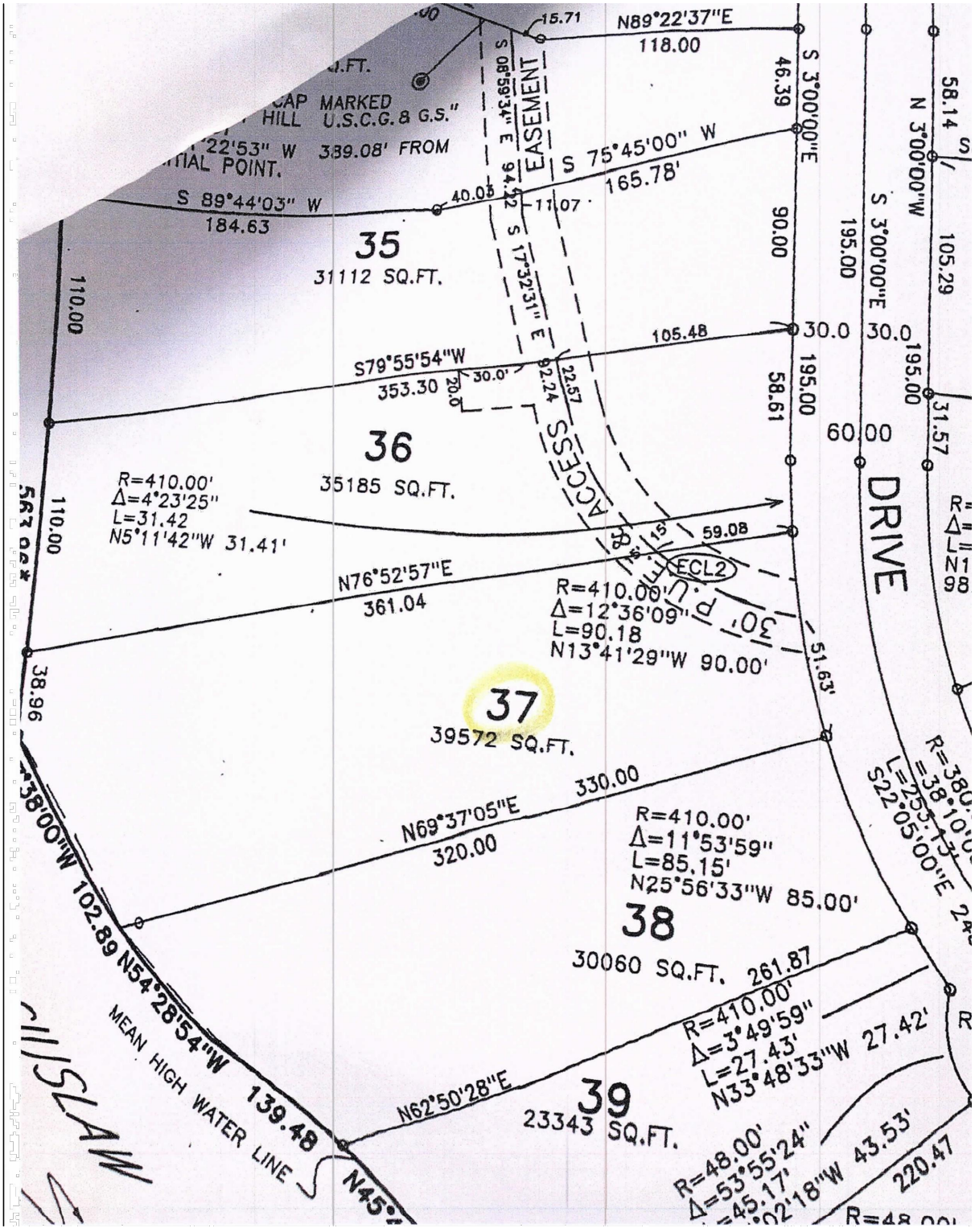
SITE AERIAL PHOTO - LOT 37 SHELTER COVE

FIGURE-1

FLORENCE, OREGON

06-11-2021

PROJECT NO.21-355



GRAPHIC SCALE

35 0 35 70

(IN FEET)

Branch ENGINEERING Inc

Since 1977

SCALE: 1: 70 (8.5"x11")

TAX MAP - LOT 37 SHELTER COVE

FIGURE-2

FLORENCE, OREGON

06-11-2021

PROJECT NO.21-355

RELATIVE DENSITY - COARSE GRAINED SOILS

RELATIVE DENSITY	SPT N-VALUE	D&M SAMPLER (140 lbs hammer)	D&M SAMPLER (300 lbs hammer)
VERY LOOSE	< 4	< 11	< 4
LOOSE	4 - 10	11 - 26	4 - 10
MEDIUM DENSE	10 - 30	26 - 74	10 - 30
DENSE	30 - 50	74 - 120	30 - 47
VERY DENSE	> 50	> 120	> 47

USCS GRAIN SIZE

FINES		< #200 (.075 mm)
SAND	Fine	#200 - #40 (.425 mm)
	Medium	#40 - #10 (2 mm)
	Coarse	#10 - #4 (4.75 mm)
GRAVEL	Fine	#4 - 0.75 inch
	Coarse	0.75 - 3 inch
COBBLES		3 - 12 inches

CONSISTENCY - FINE GRAINED SOILS

CONSISTENCY	SPT N-VALUE	D&M SAMPLER (140 lbs hammer)	D&M SAMPLER (300 lbs hammer)	POCKET PEN. / UNCONFINED (TSF)	MANUAL PENETRATION TEST
VERY SOFT	< 2	< 3	< 2	< 0.25	Easy several inches by fist
SOFT	2 - 4	3 - 6	2 - 5	0.25 - 0.50	Easy several inches by thumb
MEDIUM STIFF	4 - 8	6 - 12	5 - 9	0.50 - 1.00	Moderate several inches by thumb
STIFF	8 - 15	12 - 25	9 - 19	1.00 - 2.00	Readily indented by thumb
VERY STIFF	15 - 30	25 - 65	19 - 31	2.00 - 4.00	Readily indented by thumbnail
HARD	> 30	> 65	> 31	> 4.00	Difficult by thumbnail

UNIFIED SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS: More than 50% retained on No. 200 sieve	GRAVELS: 50% or more *retained* on the No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels and gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS: 50% or more *passing* the No. 4 sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines.
			SP	Poorly-graded sands and gravelly sands, little or no fines.
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE-GRAINED SOILS: Less than 50% retained on No. 200 sieve	SILT AND CLAY	LIQUID LIMIT LESS THAN 50	ML	Inorganic silts, rock flour, clayey silts.
			CL	Inorganic clays of low to medium plasticity, lean clays.
			OL	Organic silt and organic silty clays of low plasticity.
		LIQUID LIMIT 50 OR GREATER	MH	Inorganic silts, clayey silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity.
HIGHLY ORGANIC SOILS			PT	Peat, muck, and other highly organic soil.

MOISTURE CONTENT

DRY: Absence of moisture, dusty, dry to the touch
DAMP: Some moisture but leaves no moisture on hand
MOIST: Leaves moisture on hand
WET: Visble free water, usually saturated

	PLASTICITY	DRY STRENGTH	DILATANCY	TOUGHNESS
ML	Non to Low	Non to Low	Slow to Rapid	Low, can't roll
CL	Low to Med.	Med. to High	None to Slow	Medium
MH	Med. to High	Low to Med.	None to Slow	Low to Med.
CH	Med. to High	High to V.High	None	High

STRUCTURE

STRATIFIED: Alternating layers of material or color > 6mm thick.
LAMINATED: Alternating layers < 6mm thick.
FISSURED: Breaks along definate fracture planes.
SLICKENSIDED: Striated, polished, or glossy fracture planes.
BLOCKY: Cohesive soil that can be broken down into small angular lumps which resist further breakdown.
LENSES: Has small pockets of different soils, note thickness.
HOMOGENEOUS: Same color and appearance throughout.

LIST OF ABBREVIATION & EXPLANATIONS

SPT	Standard Penetration Test split barrel sampler
D&M	Dames and Moore sampler
LL	Atterberg Liquid Limit
PL	Atterberg Plastic Limit
PP	Pocket Penetrometer
VS	Vane Shear
G	Grab sample
MC	Moisture Content
MD	Moisture Density
UC	Unconfined Compressive Strength

TABLE A-1

Branch ENGINEERING Inc. Since 1977
civil · transportation
structural · geotechnical
SURVEYING

HAND AUGER ID: HA-1

Client: Colette Mathewson
Project Name: Lot 37 Shelter Cove
Project Number: 21-335
Project Location: Florence, Oregon
Date Started: Jun 01 2021 **Completed:** Jun 01 2021
Logged By: SPR **Checked By:** RJD
Drilling Contractor: Branch Engineering Inc.
Latitude: **Longitude:** **Elevation:**
Drilling Method: Hand Auger
Ground Water Levels
Equipment: Hand Auger/DCP
Hammer Type: 35 lb Slide Hammer
Notes:

Depth	Graphic	Material Description	Sample	Recovery % RQD	Blow Counts (N Value)	Pocket Pen. (tsf)	SPT N-Value : ▲ MC : ⊗ PL LL: ●–■ 10 20 30 40 50 60 70 80 90
1		Dry, Medium Dense, Aggregate and Poorly Graded Dune Sand.					
2		Damp, Loose, Tan-Brown Poorly Graded Dune Sand, Rapid Dilatancy.					
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
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28							
29							
30							
31							
32							

Plot Legend: ▲ SPT N-Value ◊ Fines Content ⊗ Moisture Content ●—■ Plastic Limit and Liquid Limit

Branch ENGINEERING Inc. Since 1977
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structural · geotechnical
SURVEYING

HAND AUGER ID: HA-2

Client: Colette Mathewson
Project Name: Lot 37 Shelter Cove
Project Number: 21-335
Project Location: Florence, Oregon
Date Started: Jun 01 2021 **Completed:** Jun 01 2021
Logged By: SPR **Checked By:** RJD
Drilling Contractor: Branch Engineering Inc.
Latitude: **Longitude:** **Elevation:**
Drilling Method: Hand Auger
Ground Water Levels
Equipment: Hand Auger/DCP
Hammer Type: 35 lb Slide Hammer
Notes:

Depth	Graphic	Material Description	Sample	Recovery % RQD	Blow Counts (N Value)	Pocket Pen. (tsf)	SPT N-Value : ▲ MC : ⊗ PL LL: ●–■ 10 20 30 40 50 60 70 80 90
1		Dry to Damp, Loose, Tan-Brown Poorly Graded Dune Sand, Rapid Dilatancy.					
2							
3							
4							
5							
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30							
31							
32							

Plot Legend: ▲ SPT N-Value ◊ Fines Content ⊗ Moisture Content ●—■ Plastic Limit and Liquid Limit

Branch ENGINEERING Inc. Since 1977
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structural · geotechnical
SURVEYING

HAND AUGER ID: HA-3

Client: Colette Mathewson
Project Name: Lot 37 Shelter Cove
Project Number: 21-335
Project Location: Florence, Oregon
Date Started: Jun 01 2021 **Completed:** Jun 01 2021
Logged By: SPR **Checked By:** RJD
Drilling Contractor: Branch Engineering Inc.
Latitude: **Longitude:** **Elevation:**
Drilling Method: Hand Auger
Ground Water Levels
Equipment: Hand Auger/DCP
Hammer Type: 35 lb Slide Hammer
Notes:

Depth	Graphic	Material Description	Sample	Recovery % RQD	Blow Counts (N Value)	Pocket Pen. (tsf)	SPT N-Value : ▲ MC : ⊗ PL LL: ●–■ 10 20 30 40 50 60 70 80 90
1–4		Dry to Damp, Loose, Tan-Brown Poorly Graded Dune Sand, Rapid Dilatancy.					

Plot Legend: ▲ SPT N-Value ◊ Fines Content ⊗ Moisture Content ●—■ Plastic Limit and Liquid Limit

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SURVEYING

DYNAMIC CONE LOG

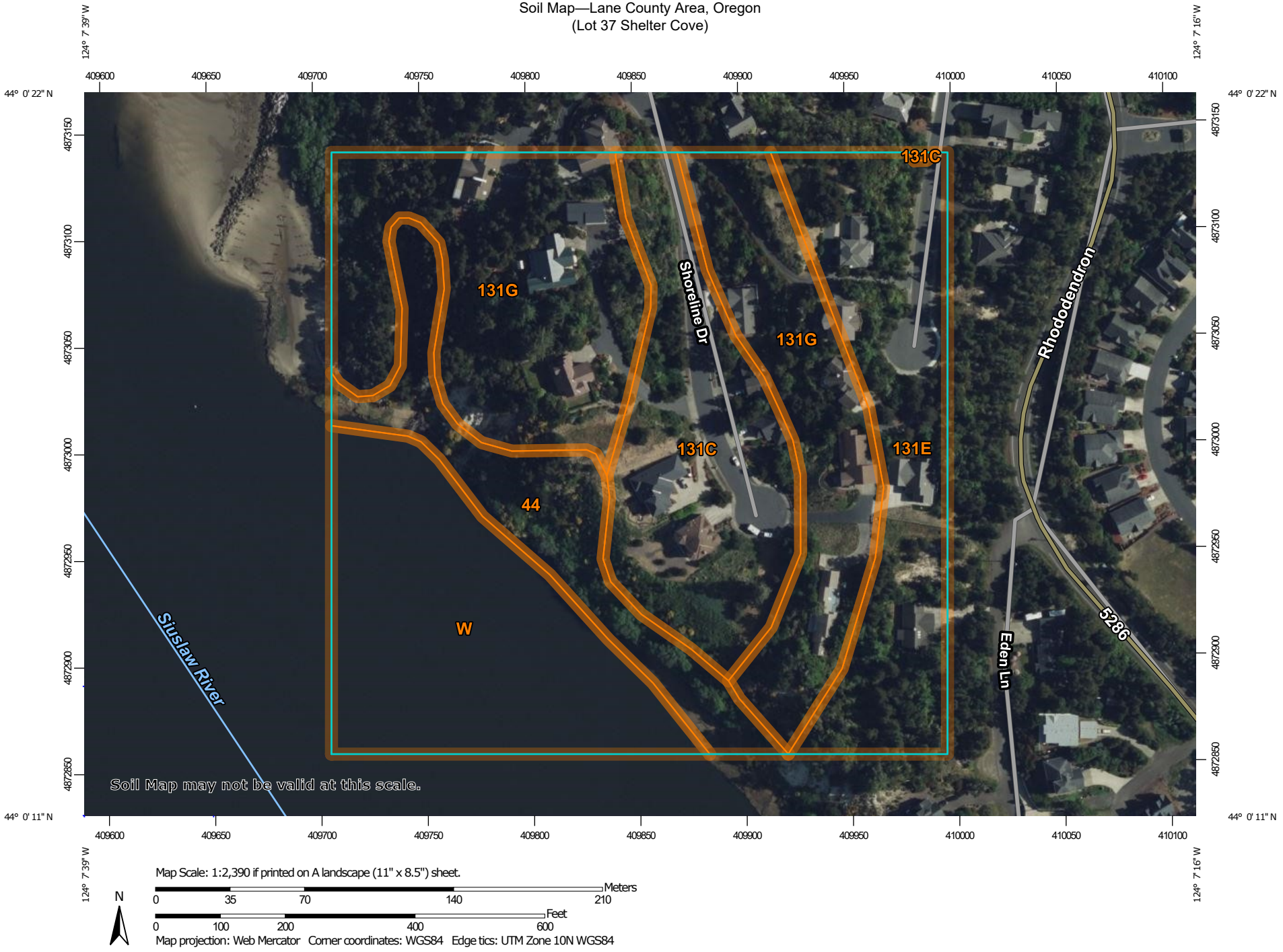
PROJECT NUMBER: 21-335
DATE STARTED: 06-01-2021
DATE COMPLETED: 06-01-2021

HOLE #: DCP-1
CREW: Sam Rabe EIT
PROJECT: Shelter Cove
ADDRESS: Lot 37 Shelter Cove
LOCATION: Florence, Oregon

SURFACE ELEVATION:
WATER ON COMPLETION: No
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	COHESIVE
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
- 1 ft	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
-	7	31.1	•••••••••	8	LOOSE	MEDIUM STIFF
- 2 ft	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
-	8	35.5	••••••••••	10	LOOSE	STIFF
-	8	35.5	••••••••••	10	LOOSE	STIFF
- 3 ft	7	31.1	•••••••••	8	LOOSE	MEDIUM STIFF
- 1 m	8	35.5	••••••••••	10	LOOSE	STIFF
-	8	30.9	••••••••	8	LOOSE	MEDIUM STIFF
- 4 ft	8	30.9	••••••••	8	LOOSE	MEDIUM STIFF
-	7	27.0	•••••••	7	LOOSE	MEDIUM STIFF
-						
- 5 ft						
-						
-						
- 6 ft						
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

Soil Map—Lane County Area, Oregon
(Lot 37 Shelter Cove)



Map Scale: 1:2,390 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Lane County Area, Oregon
Survey Area Data: Version 17, Jun 11, 2020

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

Date(s) aerial images were photographed: May 23, 2020—May 28, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
44	Dune land	2.2	10.9%
131C	Waldport fine sand, 0 to 12 percent slopes	3.5	17.1%
131E	Waldport fine sand, 12 to 30 percent slopes	3.5	17.3%
131G	Waldport fine sand, 30 to 70 percent slopes	7.0	34.5%
W	Water	4.1	20.2%
Totals for Area of Interest		**20.3**	**100.0%**

Lane County Area, Oregon

44—Dune land

Map Unit Setting

National map unit symbol: 236z
Elevation: 0 to 150 feet
Mean annual precipitation: 60 to 100 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 165 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Dune land: 95 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dune Land

Setting

Parent material: Eolian sands

Typical profile

C - 0 to 60 inches: fine sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Yaquina

Percent of map unit: 2 percent
Landform: Marine terraces
Hydric soil rating: Yes

Heceta

Percent of map unit: 1 percent
Landform: Interdunes
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Lane County Area, Oregon
Survey Area Data: Version 17, Jun 11, 2020

Lane County Area, Oregon

131C—Waldport fine sand, 0 to 12 percent slopes

Map Unit Setting

National map unit symbol: 234r
Elevation: 0 to 150 feet
Mean annual precipitation: 60 to 100 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 165 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Waldport and similar soils: 85 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Waldport

Setting

Landform: Dunes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian sand of mixed origin

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 3 inches: moderately decomposed plant material
H1 - 3 to 8 inches: fine sand
H2 - 8 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Yaquina

Percent of map unit: 4 percent

Landform: Marine terraces
Hydric soil rating: Yes

Heceta

Percent of map unit: 4 percent
Landform: Interdunes
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Lane County Area, Oregon
Survey Area Data: Version 17, Jun 11, 2020

STATE ENGINEER
Salem, Oregon

Well Record LANE 019235

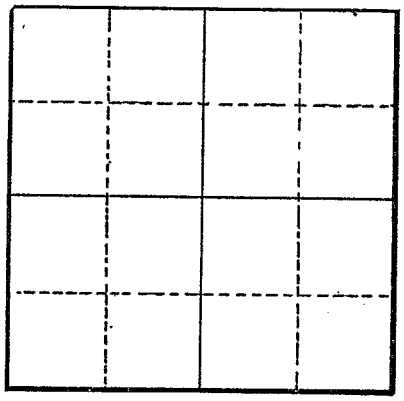
STATE WELL NO. 18/12W-15M(1)
COUNTY Lane
APPLICATION NO. .....

OWNER: Cecil Ames
MAILING ADDRESS: .....

LOCATION OF WELL: Owner's No. .....
CITY AND STATE: .....

.....¼ .....¼ Sec. ..... T. ..... N. S., R. ..... E. W., W.M.

Bearing and distance from section or subdivision corner .....



Section .....

Altitude at well 40

TYPE OF WELL: Drilled Date Constructed .....

Depth drilled 87 Depth cased 82

CASING RECORD:
6 inch

FINISH:
Screened 82 to 87

AQUIFERS:
Dune sand

WATER LEVEL:
35 feet below land surface, August, 1959

PUMPING EQUIPMENT: Type ..... H.P. .....
Capacity ..... G.P.M.

WELL TESTS:
Drawdown ..... ft. after ..... hours ..... G.P.M.
Drawdown ..... ft. after ..... hours ..... G.P.M.

USE OF WATER Domestic Temp. ..... °F. ....., 19.....
SOURCE OF INFORMATION USGS
DRILLER or DIGGER .....
ADDITIONAL DATA:
Log X Water Level Measurements ..... Chemical Analysis ..... Aquifer Test .....

REMARKS:

State Printing 89316

STATE ENGINEER
Salem, Oregon

State Well No. 18/12W-15M(1)
County Lane
Application No.

Well Log

Owner: Cecil Ames Owner's No.

Driller: C. E. Panschow Date Drilled 1959

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Deposits of Quaternary age:			
Sand, "beach"	0	35	35
Silt and clay	35	37	2
Sand, streaks of wood, and silt	37	67	30
Clay, brown	67	69	2
Peat, and sand	69	72	3
Sand, gray, clean, with streaks of peat	72	87	15

STATE OF OREGON

MONITORING WELL REPORT

LANE 52483

Received Date

Well Tag# L

Start Card # 100172

(as required by ORS 537.765 & OAR 690-240-095) Instructions for completing this report are on the last page of this form.

(1) OWNER/PROJECT

Well No. 6100

Co Job No. 386

Name TOM GAERTIG
GAERTIG, ANNA

Street 1424 MESA VERDE CIRCLE

City PLACENTIA State CA Zip 92670

(2) TYPE OF WORK

☒ New Construction ☐ Alter (Recondition ☐ Alter (Repair)

☐ Conversion ☐ Deepening ☐ Abandonmen

(3) DRILLING METHOD

☐ Rotary Air ☒ Rotary Mud ☐ Cable

☐ Hollow Stem Auger Other

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Depth of completed well 55 ft.

Vault

ft. Casing Diameter: 5.00 From: 0 To: 55 Liner

TO

ft.

Monument

Diameter	From	To	Gauge	Material	Welded	Glued	Threaded
1.00				PL	☐	☒	☐

TO

Seal

ft.

TO

ft.

From	To	Material	Amount	Seal Grout Weight	Units
0	34	BE	5		S
34	40	OT	2		S
40	55	BE	3		S

Screen ☐

Filter Pack

ft.

TO

ft.

Filter Pack

Material

Size in.

(5) WELL TEST

Permeability Yield

Conductivity PH

Temperature of water 57 °F/C Depth artesian flow found ft.

Was water analysis done? ☐

By Whom? FOUNDATION

Depth of strata to be analyzed. From ft. to ft.

Remarks

Name of supervising Geologist/Engineer

(6) LOCATION OF WELL By legal description

County Lane

Township 18.00 S Range 12.00 W Section 15

1. NW 1/4 of SW 1/4 of above section.

Legal Desc:

2. Either Street address of well location

21 SEA WATCH PLACE, FLORENCE

or Tax lot number of well location

3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL

Ft. below land surface. Date

Artesian Pressure lb/sq. in. Date

(8) WATER BEARING ZONES

Depth at which water was first found ft.

(9) WELL LOG

Ground elevation 0 ft.

Material	From	To	SWL
SAND	0	55	

Date started 6/9/1997 Completed 6/9/1997

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10025

Signed By DAVID ABERNATHY Date

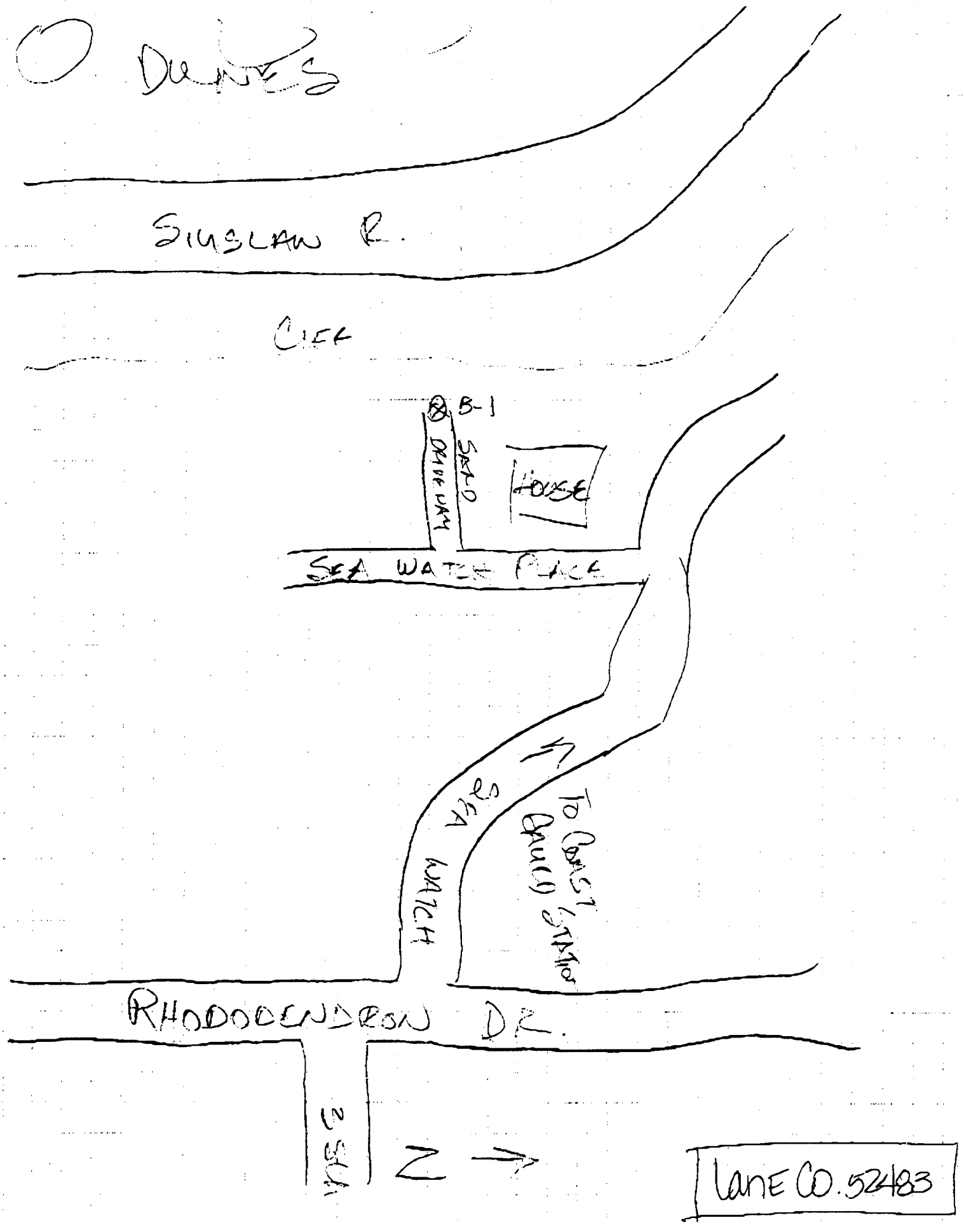
(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10011

Signed By Date

SITE MAP



LANE CO. 52483

LANE 72367

STATE OF OREGON
GEOTECHNICAL HOLE REPORT
(as required by OAR 690-240-0035)

3/29/2013

(1) OWNER/PROJECT

Hole Number B1

PROJECT NAME/NBR: 6-104/SIUSLAW COAST GUARD

First Name _____ Last Name _____

Company US COAST GUARD

Address 2000 EMBARCADERO, SUITE 200

City OAKLAND State CA Zip 94606

(2) TYPE OF WORK

☒ New ☐ Deepening ☒ Abandonment
☐ Alteration (repair/recondition)

(3) CONSTRUCTION

☐ Rotary Air ☐ Hand Auger ☐ Hollow stem auger
☒ Rotary Mud ☐ Cable ☐ Push Probe
☐ Other _____

(4) TYPE OF HOLE:

◉ Uncased Temporary ○ Cased Permanent
○ Uncased Permanent ○ Slope Stablity
○ Other
Other: _____

(5) USE OF HOLE

GEOTECHNICAL

(6) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)

Depth of Completed Hole 75.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
3.87	0	75	Bentonite Grout	0	75	3	S

Backfill placed from _____ ft. to _____ ft. Material _____
Filter pack from _____ ft. to _____ ft. Material _____ Size _____

(7) CASING/SCREEN

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

(8) WELL TESTS

○ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration(hr)

Temperature _____ °F Lab analysis ☐ Yes By _____

Supervising Geologist/Engineer _____

Water quality concerns? ☐ Yes (describe below) TDS amount _____ _____

From	To	Description	Amount	Units

(9) LOCATION OF HOLE (legal description)

County LANE Twp 18.00 S N/S Range 12.00 W E/W WM
Sec 15 SW 1/4 of the SW 1/4 Tax Lot ROW
Tax Map Number _____ Lot _____
Lat ° ' " or 44.00196111 DMS or DD
Long ° ' " or -124.12311111 DMS or DD
○ Street address of hole ◉ Nearest address

IN SIUSLAW RIVER OFF OF US COAST GUARD DOCK, 4255 COAST GUARD RD FLORENCE, OR 97439

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening			☐	
Completed Well			☐	

Flowing Artesian? ☐

WATER BEARING ZONES

Depth water was first found _____

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(11) SUBSURFACE LOG

Ground Elevation _____

Material	From	To
Blue Sand	0	72
Mudstone	72	75

Date Started 3/27/2013 Completed 3/28/2013

(12) ABANDONMENT LOG:

Material	From	To	Amt	sacks/ lbs
Bentonite Grout	0	75	3	S

Date Started 3/28/2013 Completed 3/28/2013

Professional Certification

(to be signed by an Oregon licensed water or monitoring well constructor, Oregon registered geologist or professional engineer).

I accept responsibility for the construction, deepening, alteration, or abandonment work performed during the construction dates reported above. All work performed during this time is in compliance with Oregon geotechnical hole construction standards. This report is true to the best of my knowledge and belief.

License/Registration Number 1864 Date 3/29/2013

First Name RICHARD E O Last Name WIGGINS

Affiliation WESTERN STATES SOIL CONSERVATION, INC.

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version:

GEOTECHNICAL HOLE REPORT - Map with location identified must be attached and shall include an approximate scale and north arrow

LANE 72367

3/29/2013

Map of Hole

EXHIBIT H

City of Florence
munity Development Department
250 Highway 101
Florence, OR 97439
Phone: (541) 997 – 8237
Fax: (541) 997 – 4109
www.ci.florence.or.us

Type of Request

THIS SECTION FOR OFFICE USE ONLY

☐ Type I ☐ Type II ☒ Type III ☐ Type IV

Proposal: Build new SFD on lot 37 (Shelter Cove), 56 Shoreline drive

Applicant Information

Name: Premier Contracting Services Phone 1: [redacted]

E-mail Address: [redacted] Phone 2: _____

Address: [redacted]

Signature: _____ Date: 1/31/2022

Applicant's Representative (if any): Todd Larsen

Property Owner Information

Name: Scott and Sharon Hancock Phone 1: [redacted]

E-mail Address: [redacted]

Address: [redacted]

Signature: _____ Date: 1/21/2022

Applicant's Representative (if any): Todd Larsen (Premier Contracting Services

NOTE: *If applicant and property owner are not the same individual, a signed letter of authorization from the property owner which allows the applicant to act as the agent for the property owner must be submitted to the City along with this application. The property owner agrees to allow the Planning Staff and the Planning Commission onto the property. Please inform Planning Staff if prior notification or special arrangements are necessary.*

For Office Use Only:

Received	Approved	Exhibit
RECEIVED City of Florence JAN 31 2022 By:		

Form Revised 11/29/16

Property Description

Site Address: 56 Shoreline Drive Florence OR 97439

General Description: (Lot 37) Shelter Cove Subdivision

Assessor's Map No.: 18 - 12 - 16 - 41 Tax lot(s): 00700

Zoning District: Low-density

Conditions & land uses within 300 feet of the proposed site that is one-acre or larger and within 100 feet of the site that is less than an acre OR add this information to the off-site conditions map (FCC 10-1-1-4-B-3):

Project Description

Square feet of new: 3788 Enclosed total Square feet of existing: 0

Hours of operation: 7:30 - 5:00 Existing parking spaces: 0

Is any project phasing anticipated? (Check One): Yes ☐ No ☑

Timetable of proposed improvements: 6- 8 month once permit is issued and we break ground

Will there be impacts such as noise, dust, or outdoor storage? Yes ☑ No ☐

If yes, please describe: Typical residential construction

Proposal: (Describe the project in detail, what is being proposed, size, objectives, and what is desired by the project. Attach additional sheets as necessary)

Build new SFD + Garage on lot 37 in shelter cove. Build site has very minimum excavation require since home site was previously cleared by developer and/or previous owner. The adjoining property to the north has erosion that also affects proposed property. A solution has been proposed by the neighboring owners as the erosion affect their property the most

For Office Use Only:

Date Submitted: _____ Fee: _____

Received by: _____

Paid

EXHIBIT I

Shelter Cove
Yet more

BOIRE ASSOCIATES INC.
Geotechnical Engineering Solutions

Boire Associates Inc.
520 NW 4th Street
Corvallis, Oregon 97330
TEL 541.753.5344
FAX 541.753.5347

Jim Hurst
PO Box 240000
Florence, Oregon 97439

December 1, 2003

Re: **Dune Stabilization**
Shelter Cover
Florence, Oregon

Project 203.081

Dear Mr. Hurst:

As requested, Boire Associates Inc. has completed an evaluation and recommended stabilization of an existing sand dune located along a portion of the Shelter Cove subdivision in Florence, Oregon. This letter and accompanying figures detail our findings and recommended corrective actions.

BACKGROUND

The subject of this work consists of examining, analyzing and recommending an appropriate repair to correct a slope instability located within the Shelter Cove residential development in Florence, Oregon. The subject area is specifically located on the east bank of the Siuslaw River and covers approximately 700 ft of west facing frontage for five undeveloped lots. An existing residence is located on a sixth lot to the north, which is also considered part of this development.

Historically, the east bank of the Siuslaw River has had ongoing stability problems due to sand erosion and scouring of the toe from the tide fluctuation, currents, and wave action. Boire Associates Inc. was retained to examine site conditions and provide recommendations to minimize future erosion of the sand slope and improve overall stability of the immediate area. Our scope of work was outlined in a proposal dated October 1, 2003 and formally authorized by an "Agreement for Services" dated November 7, 2003.

FIELD WORK

We made visits to the site on September 18, October 2, 2003, and October 28, 2003 to examine site conditions and compare recent topographic surveys to actual field conditions. As part of our work, we used hand-held clinometers to measure slope angles at discrete locations. We also examined portions of the lower ledge to confirm the presence of sand, underlying compressed silt (mudstone), and seeps at the contact between the soil layers.

DISCUSSION

This subject area is located on an approximate 70 to 110 ft high slope consisting of coastal dune sand. At the base of the slope lies a ledge of stiff silt with occasional inter-beds of organic material. Previous explorations in the area have shown the silt layer to be underlain by weakly cemented sands to unknown depths.

The ledge of compressible silt at the base of the sand dune is generally concealed at high tide and exposed at low tide. The silt stratum is relatively impermeable, which prevents vertical transmission of water from precipitation and tidal fluctuations. Perched runoff on the silt has caused the formation of extensive springs at the base of the dune that, when combined with scouring from river and wave action, has created extensive erosion and undermining at the base of the slope. Given the nature of the cohesionless sand comprising the slope, undermining at the base has caused a continual raveling of the bank and upslope areas. Although not directly reported to us, we estimate significant erosion "events" probably occurred during past flooding events when river levels and subsurface water runoff were significantly increased.

As discussed early in our investigation, complete stabilization of the dune would not be practical or cost-effective due to the high slope area and limited land area being protected. However, it should be possible to minimize the progression of bank failures by implementing selective erosion control and installing active shore protection. This work should allow future development of the area.

RIP-RAP (REVETMENT)

Methodology

Our methodology for recommending a mechanical stabilization for the dune area is based on findings that suggest failures of the slope result from erosion emanating at the toe. Consequently, protecting the toe area from outward seepage, river scour and wave action should prevent continued sloughing and washing of the sand dune.

In our evaluation of the slope, we considered several toe protection schemes including a concrete wall (bulkhead), gabion wall, mechanically stabilized earth (MSE) wall, various pile-supported walls, *Rip-Rap*, and conventional surface protection. Given the harsh environment and difficult access, we determined *Rip-Rap* combined with limited surface erosion protection would afford the most cost-effective solution.

Using *Rip-Rap* and other graded aggregates, we designed a series of revetments as shown in Figure 1. The primary factors directing the design were the ledge of compressed silt at the base of the sand and the elevation of the water during high tide. Based on water elevations, scour, and wave action, we established 12 ft (about the mean high tide elevation) as a practical minimum height of the *Rip-Rap* revetment.

After the minimum revetment height was selected, we continued with the design by placing graded aggregate and *Rip-Rap* armor in a configuration that protects the slope while allowing for a reasonable offset from the edge of the compressed silt ledge. The total slope height and length of the exposed areas were also considered in the analysis.

The final design is shown in the attached plan (Figure 1), corresponding slope sections (Figure 2 through 5) and a revetment detail (Figure 6). Note that two limiting constraints were created by the sand ridges and lack of available ledge space between each of the discrete areas. This created four discrete areas for *Rip-Rap* protections as denoted by cross-section A-A', B-B' C-C' and D-D'. The separating ridge areas would not be protected; however; these areas do not appear to have suffered greatly from erosion since the development was platted. It is possible future maintenance and/or slope protections may be needed in these intermediate areas, depending on the performance and secondary impacts of the shore protection.

Construction Guidelines

Based on established guidelines for *Rip-Rap* placement, as well as our specific engineering knowledge of site conditions, we developed some guidelines for construction of the revetment. Our suggestions are as follows:

1. Install all required sediment and erosion control devices, as required by federal, state and local codes.
2. Excavate the toe areas as shown to a stable foundation consisting of compressed (stiff) silt. The foundation subgrade should be smooth, firm, and free from protruding objects or voids that would effect the proper positioning of the first layer of stones. Remove all brush, trees, stumps, and other deleterious materials from the immediate revetment area. Do not disturb upper portions of the slope.
3. Install a *Filter Fabric* along the face of the native slope where the rock fill meets the sand to prevent the migration of the dune material through the revetment. Given the gradation of the sand, plugging is not expected to be a concern. Long-term degradation of the geotextile material is possible (especially from UV exposure); however, the *Graded Rock Ballast* should provide adequate (long-term) sand separation and filtration. Deleting the *Filter Fabric* might be possible but we would have to reexamine conditions to determine if secondary granular filter would be needed.
4. Use *Coarse Granular Fill*, if necessary, to create a level foundation base for the initial fill and *Rip-Rap* placement.
5. Use the appropriate *Buttress Fill* and *Rip-Rap*, as detailed in Figure 6.
6. Place stone for *Rip-Rap* as shown in the drawings in a manner which will produce a reasonably well-graded, compact mass of stone with the proper portions and minimum practicable percentage of voids. Avoid distributions that create large accumulations of

either the larger or smaller sizes of stone. Hand placing or rearranging of individual stones by mechanical equipment may be required to the extent necessary to secure the results specified. The toe trench should receive the largest-sized *Rip-Rap* stones.

7. Continue to place the *Rip-Rap* and *Graded Rock Ballast* concurrently. Ensure the *Rip-Rap* is neatly stacked with staggered joints so that each stone rests firmly on two stones in the tier below. Additionally, smaller stones should be used to fill voids so that each rock rests solidly on the previous rock layer with minimal opportunity for movement.
8. Cover all upper portions of the exposed sand dune (slope) with an *Erosion Control Blanket*. Application of the product should follow the manufactures' guidelines.
9. Hydro-seed and/or plant the upper portions of the slope with beach grass or appropriate vegetation that is capable of establishing and thriving in a coastal environment (wind, rain, salt spray) with sandy soil. We recommend consulting with a landscaping specialist to select the best vegetation species.

SPECIFICATIONS

The following are general descriptions and definitions that have been used in our design. In general, the material descriptions are intended to provide recommended guidelines for selecting and using imported and on-site earth materials. Unless otherwise specified, all materials should conform to Oregon Department of Transportation (ODOT) specifications for gradation and quality.

Rip-Rap

Quality

Stone used for *Rip-Rap* shall be hard, durable, angular in shape; resistant to weathering and to water action; free from overburden, spoil, shale and organic material; and shall meet the gradation requirements specified herein. Neither breadth nor thickness of a single stone should be less than one-third its length. Rounded stone or boulders are not acceptable. Shale and stone with shale seams are not acceptable.

The minimum specific weight of the stone material shall not be less than 2.55. In accordance with the abrasion test in the Los Angeles machine (AASHTO Test T 96), stones should have a percentage loss of not more than 40 after 500 revolutions. In accordance with the sulfate soundness test (AASHTO Test T 104 for ledge rock using sodium sulfate), stones should have a loss not exceeding 10 percent after 5 cycles.

Size

The *Rip-Rap* shall consist of a typical Class 700 stone (English units), as defined by ODOT. The maximum size of the *Rip-Rap* is generally expected to be about 28 inches. The D_{50} is expected to be on the order of 16 inches. The following table is provided as a guideline for individual rock selection:

Table 1. Rip-Rap Rock Size
(Class 700)

Approximate Weight (lbs)	Approximate Diameter (inches)	Percent by Weight (%)
700 – 500	28 – 24	20.0
500 – 200	24 – 18	30.0
200 – 20	18 – 12	40.0
20 – 0	Less than 12	10.0 – 0

Graded Rock Ballast (Buttress Fill)

Material used as *Graded Rock Ballast* should generally consist of 6-inch minus, well-graded, clean, hard, angular crushed rock with less than 5% material passing the No. 200 sieve. The specification is intended to be flexible with regard to gradation; however, unprocessed, rounded gravel would not be acceptable. A suggested gradation is as follows:

Table 2. Gradation Limits for
Graded Rock Ballast

Sieve Size (US Standard)	Percent Passing (by weight)
6 inch	95 – 100
4 inch	60 – 80
2 inch	40 – 60
½"	20 – 40
No. 10	0 – 10
No. 100	0 – 5

Filter Fabric

The *Filter Fabric* should consist of a non-woven Amoco 4553 geotextile. An alternate geotextile type may be substituted if deemed comparable and approved by us.

Erosion Control Blanket

The *Erosion Control Blanket* should consist of a North American Green SC150 straw/coconut product. An alternative type may be substituted if deem comparable and approved by us.

OTHER COMMENTS

Existing House

As authorized, our work has not included any specific recommendations with regard to the existing house located at the north end of the development. Specifically, the subject house is

elevated above the neighboring parcels and the current setback from the slope edge is minimal. The shore and erosion protections recommended by us should decrease further slope raveling and provide an added measure of safety. However, stability of slope is still a concern. Given the site constraints, additional stabilization work would likely require building an intermediate wall on the slope to retain the dune. Our preliminary opinion indicates a soldier pile wall with timber lagging and Manta Ray anchors would be the most cost-effective approach; however, we have not completed any analyses to evaluate the feasibility of constructing such a wall.

New Houses

Development of specific recommendations for house building on the subject lots was beyond the scope of our services. However, we have developed some general guidelines for area development and slope maintenance to maximize protection of the area. Our suggestions are as follows:

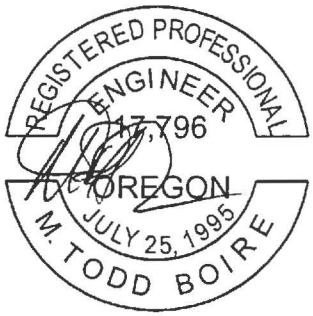
1. If possible, lower the elevation of the lots prior to building. Sand generated from grading may be pushed over the slope (i.e., on top of the new revetment); however, this would require new slope erosion protection and planting.
2. Maximize offsets between the rear sides of new structures and the slope edge. We would discourage building within 40 ft of the top edge of the slope. Prospective homebuilders should consider houses with small, compact building footprints. Sprawling structures and/or residences with detached decks and other ancillary buildings are likely to be more susceptible to future problems.
3. Establish a homeowners association to provide regular maintenance of the slope. This might include summer watering and fertilizing as appropriate. Natural landscaping should be maintained wherever possible.
4. Do not discharge runoff from future structures on the slope or into drywells or other subsurface disposal systems. All runoff should be collected and tight-lined to the City drainage system.

We trust this information meets your current needs. We are available at your convenience to provide onsite construction monitoring. Please contact us with any questions.

Sincerely,

Boire Associates Inc.

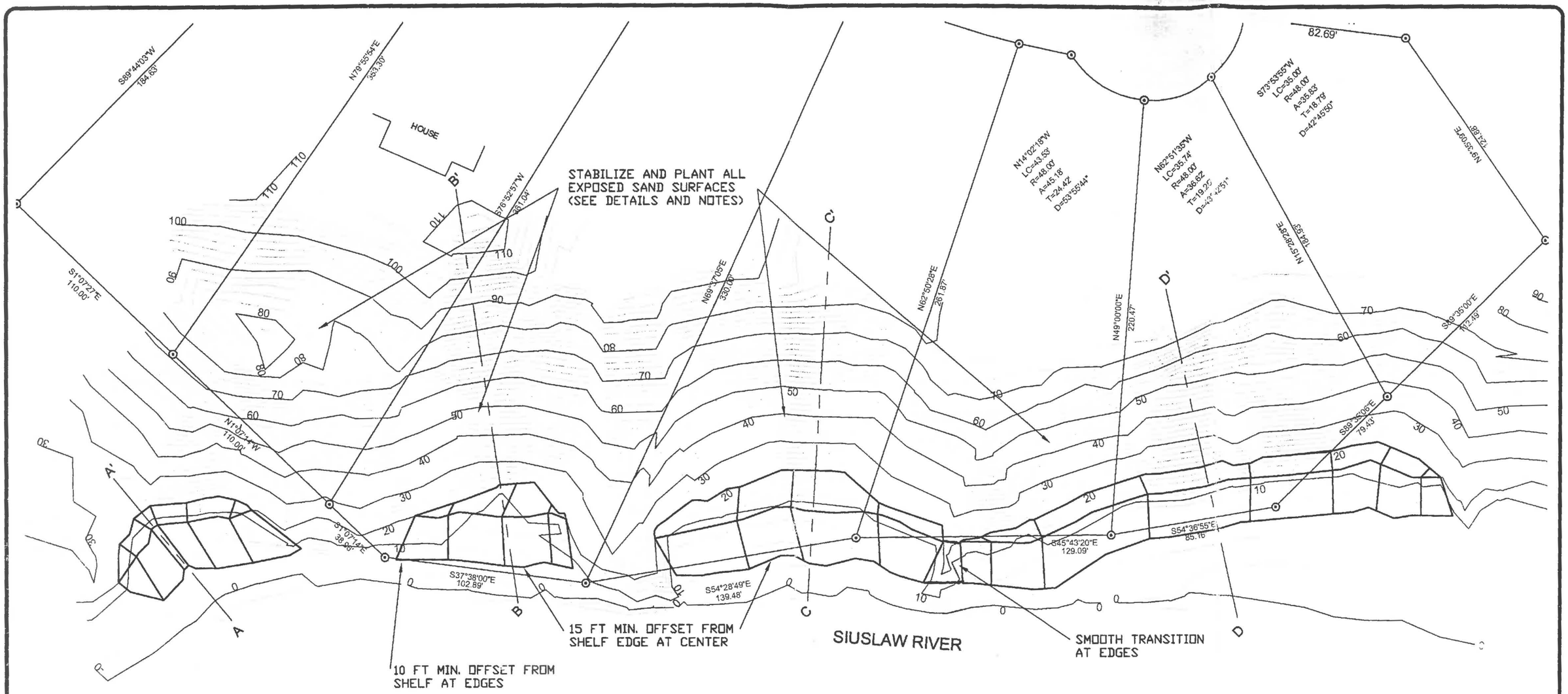
M. Todd Boire, P.E.



EXPIRES 12/31/03

APPENDIX A

(Figures)



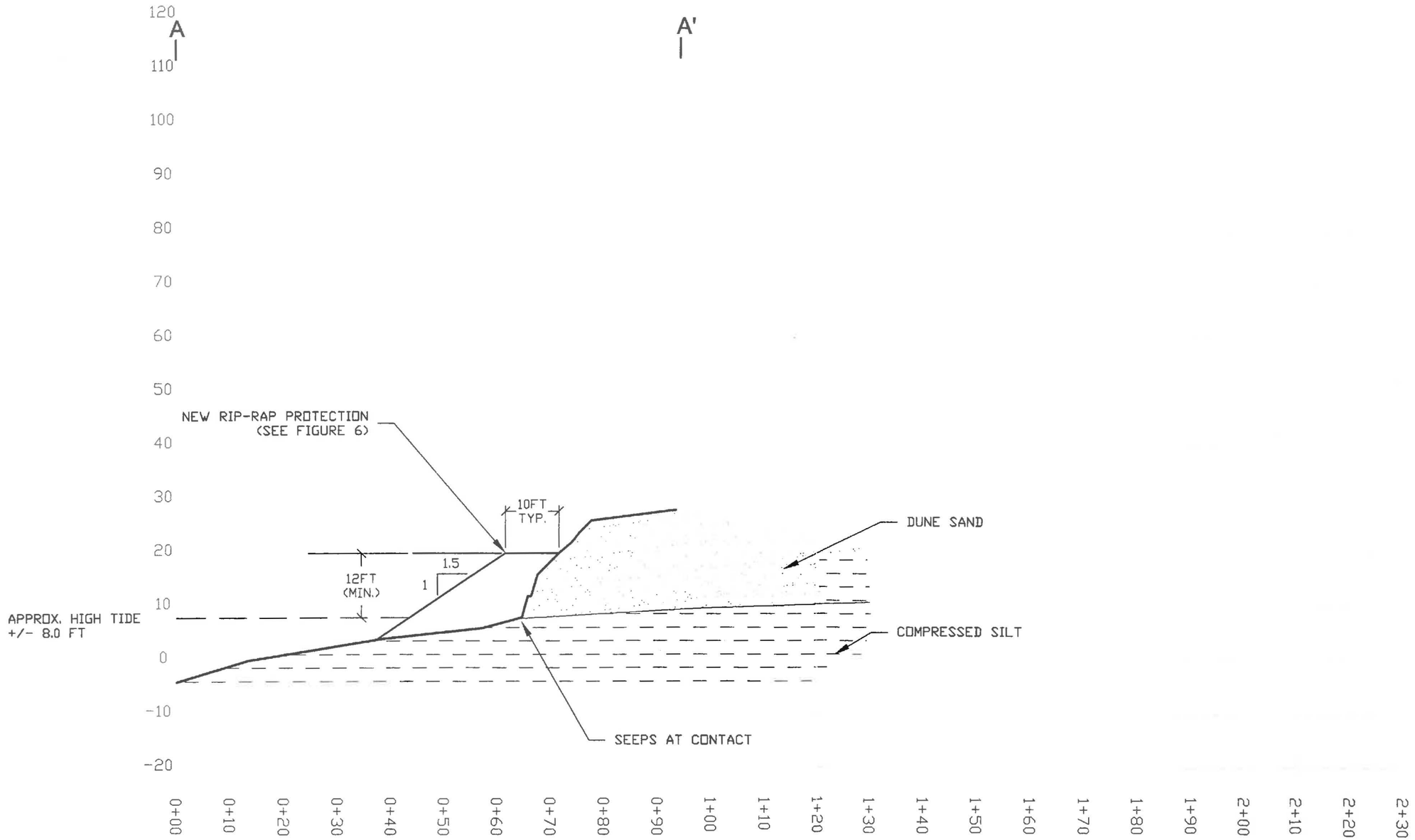
BOIRE ASSOCIATES
Geotechnical Engineering Solutions

SHELTER COVE DUNE STABILIZATION

FLORENCE, OREGON

SITE PLAN

FIGURE NO.
1



SECTION A - A'

SCALE: 1" = 20'

BOIRE ASSOCIATES
Geotechnical Engineering Solutions

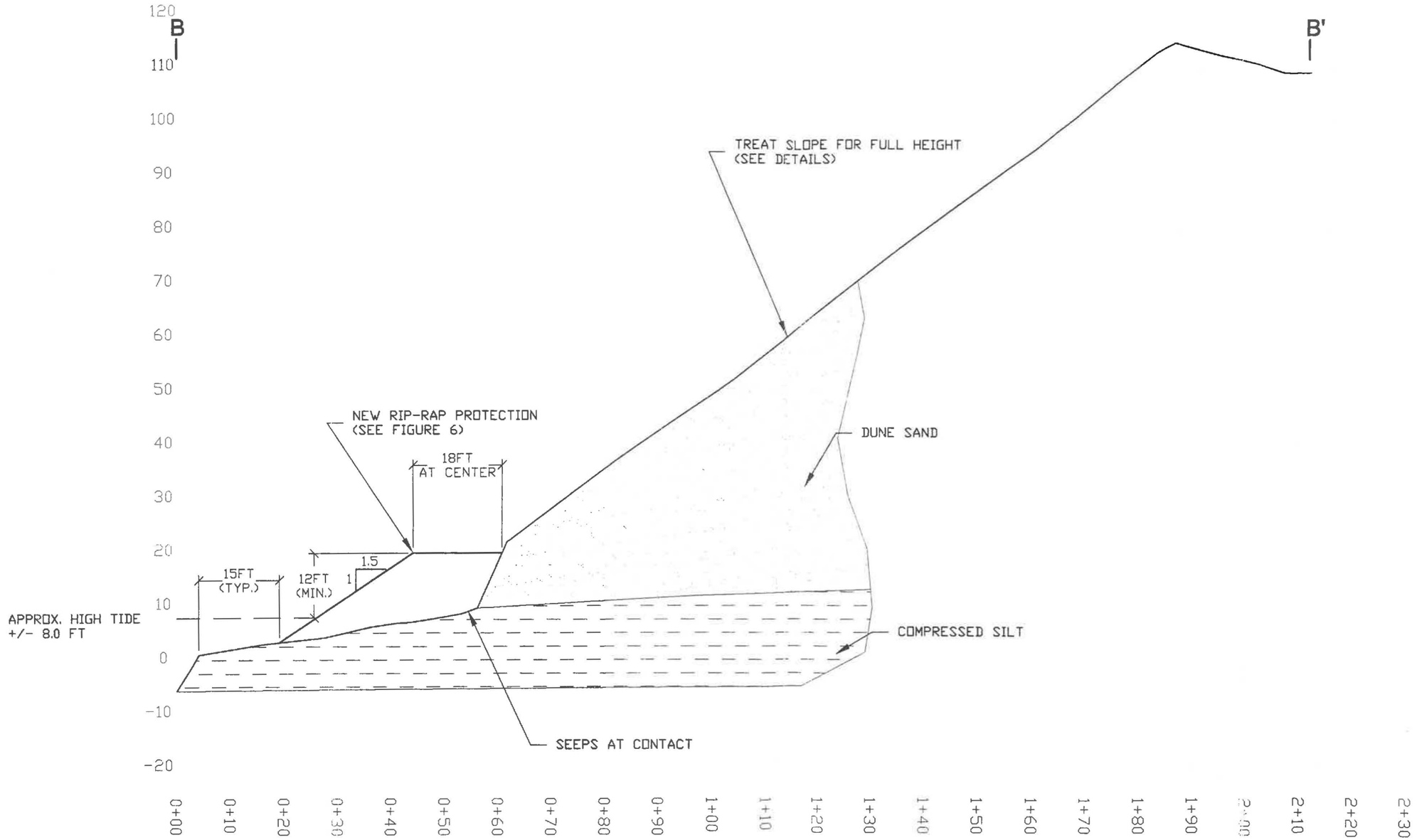
SHELTER COVE DUNE STABILIZATION

FLORENCE, OREGON

SECTION A

FIGURE NO.

2



SECTION B - B'

SCALE: 1" = 20'

BOIRE ASSOCIATES
Geotechnical Engineering Solutions

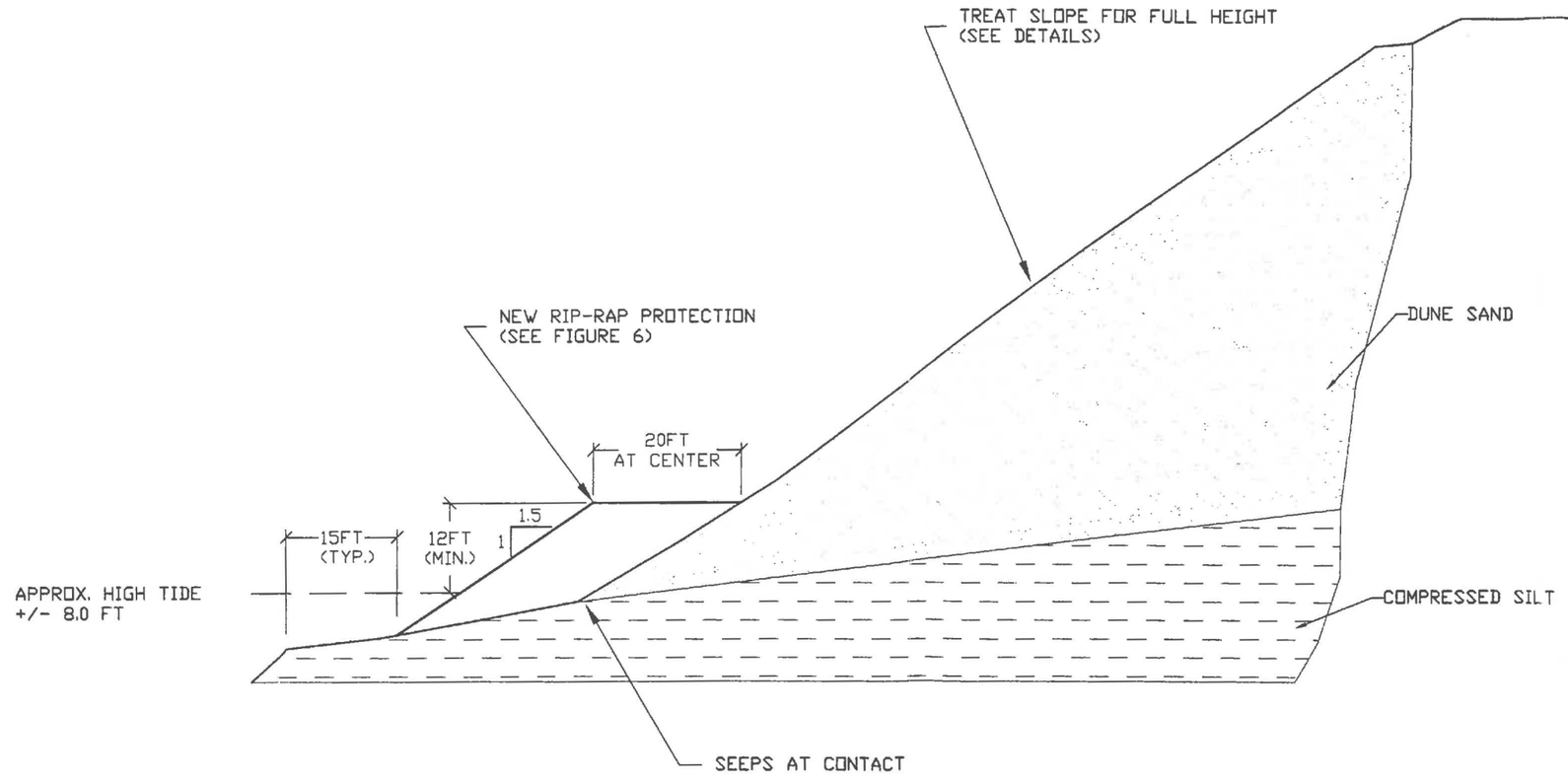
SHELTER COVE DUNE STABILIZATION
FLORENCE, OREGON

SECTION B

FIGURE NO.
3

C

C'



SECTION C - C'

SCALE: 1" = 20'

BOIRE ASSOCIATES
Geotechnical Engineering Solutions

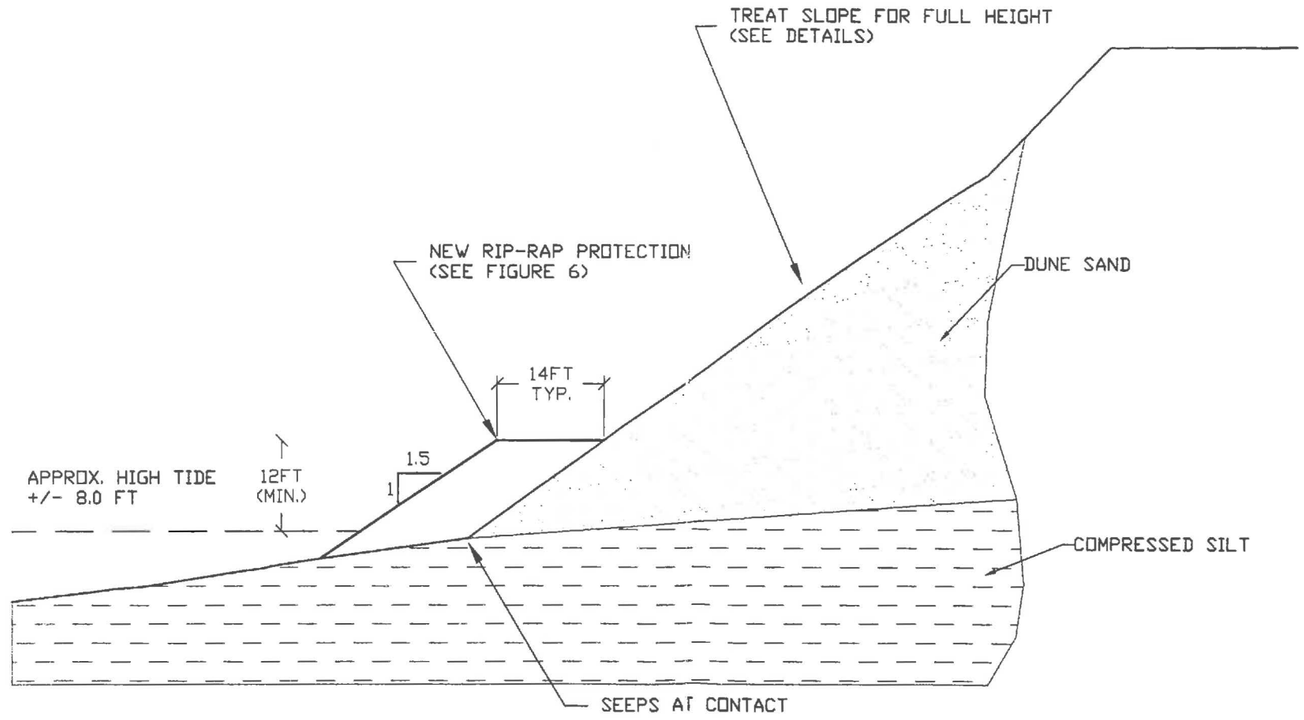
SHELTER COVE DUNE STABILIZATION
FLORENCE, OREGON

SECTION C

FIGURE NO.
4

D

D'



SECTION D - D'

SCALE: 1" = 20'

BOIRE ASSOCIATES
Geotechnical Engineering Solutions

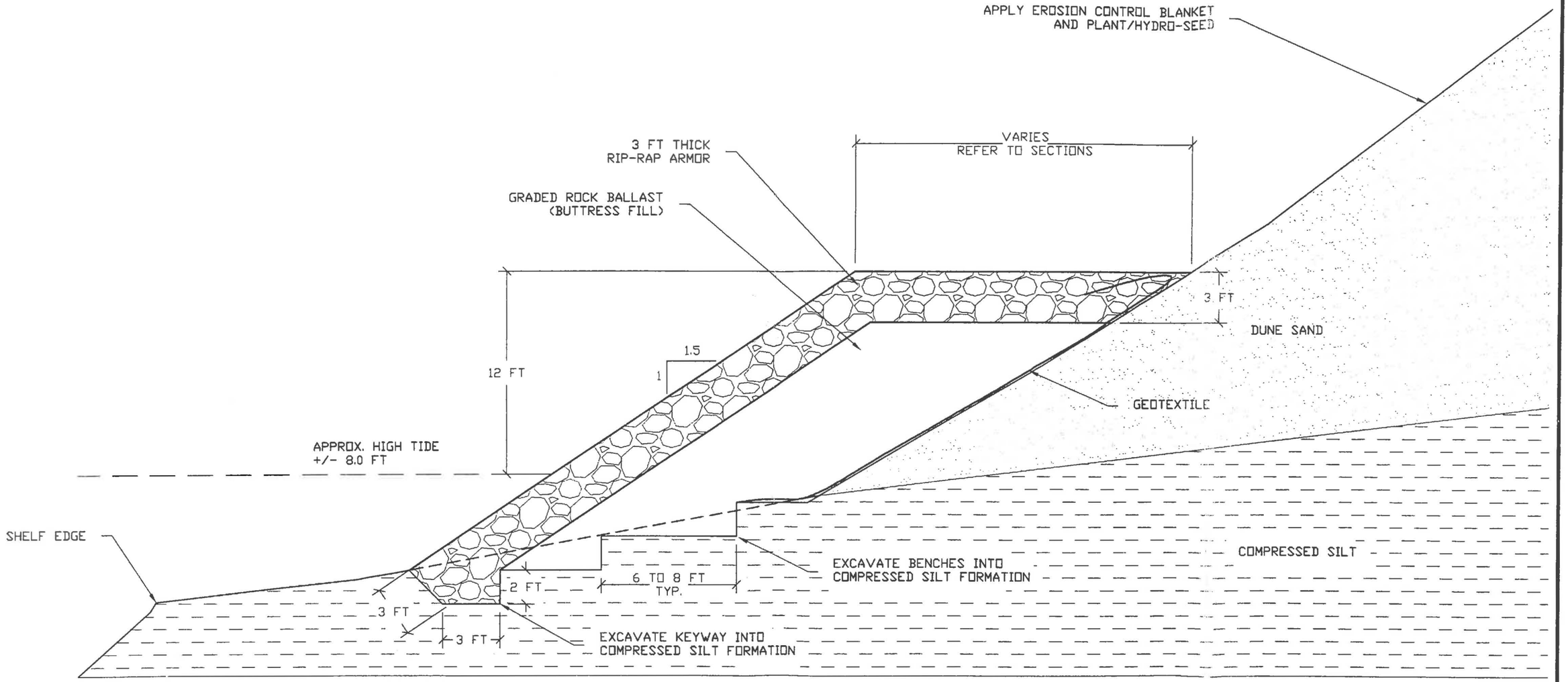
SHELTER COVE DUNE STABILIZATION

FLORENCE, OREGON

SECTION D

FIGURE NO.

5



SECTION DETAIL

SCALE: 1" = 6'

BOIRE ASSOCIATES
Geotechnical Engineering Solutions

SHELTER COVE DUNE STABILIZATION

FLORENCE, OREGON

REVETMENT DETAILS

FIGURE NO.

6

APPENDIX B

(Addenda)

Boire Associates Inc.
Geotechnical Engineering Solutions

520 NW 4th Street
Corvallis, Oregon 97330
Tel: 541.753.5344
Fax: 541.753.5347

Addendum #1 (Technical Memorandum)

To:	Jim Hurst	**From:**	Todd Boire, P.E.
Fax:	541.903.9777	**Pages:**	3 (including figure)
Phone:	541.991-0450	**Date:**	May 2, 2004
Re:	Shelter Cove	**Cc:**	

As you are aware, we recently completed a site investigation and engineering design/recommendations to stabilize a portion of a sand dune located along the east bank of the Siulsaw River within the Shelter Cove subdivision in Florence, Oregon. The results of our work were summarized in a letter-report with accompanying figures dated December 1, 2003. Upon obtaining construction cost estimates, you indicated our plan to extend the riprap buttress toward the river (to allow lost lot area to be reclaimed) would be too expensive and requested a least costly alternative. You also indicated you would be working from above the slope, rather than using a barge. This technical memorandum provides a revised alternative for the revetment design and clarifies some other items contained in our report.

DESIGN MODIFICATIONS

Revetment Section

The revetment section has been reduced to a minimum, uniform width as shown on Figure 6 (Modified). We have not provided a plan drawing; however, the modified revetment would run the full length of the project area previously identified. The rock fill and riprap should cross over the intermediate sand ridges, which would require removing the soil overburden in these areas to expose the underlying layer of compressed silt. The compressed silt should then be benched and/or terraced to provide a keyway for rock fill and riprap placement. After completion of the work, there should be no discontinuities in the revetment along the full length. Revised material quantities are as follows:

Graded Rock Ballast:	1,400 cubic yards
Riprap:	2,250 cubic yards

Geotextile

The contractor inquired as to whether a graded aggregate filter could be used in lieu of the synthetic, non-woven, geotextile for drainage. We would approve of this change if the proposed gradation of the filter rock were provided to us. Alternatively, we could conduct a field approval.

OTHER ISSUES

Slope Disturbance

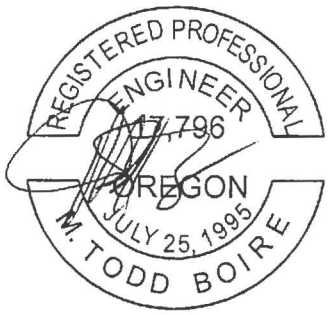
You indicated construction equipment would access the dune from the top. We recognize this would involve some slope disturbances. Any slope areas that are disturbed from access and related construction should be re-graded following completion of the work. Erosion protection should be applied as previously detailed.

House Drainage

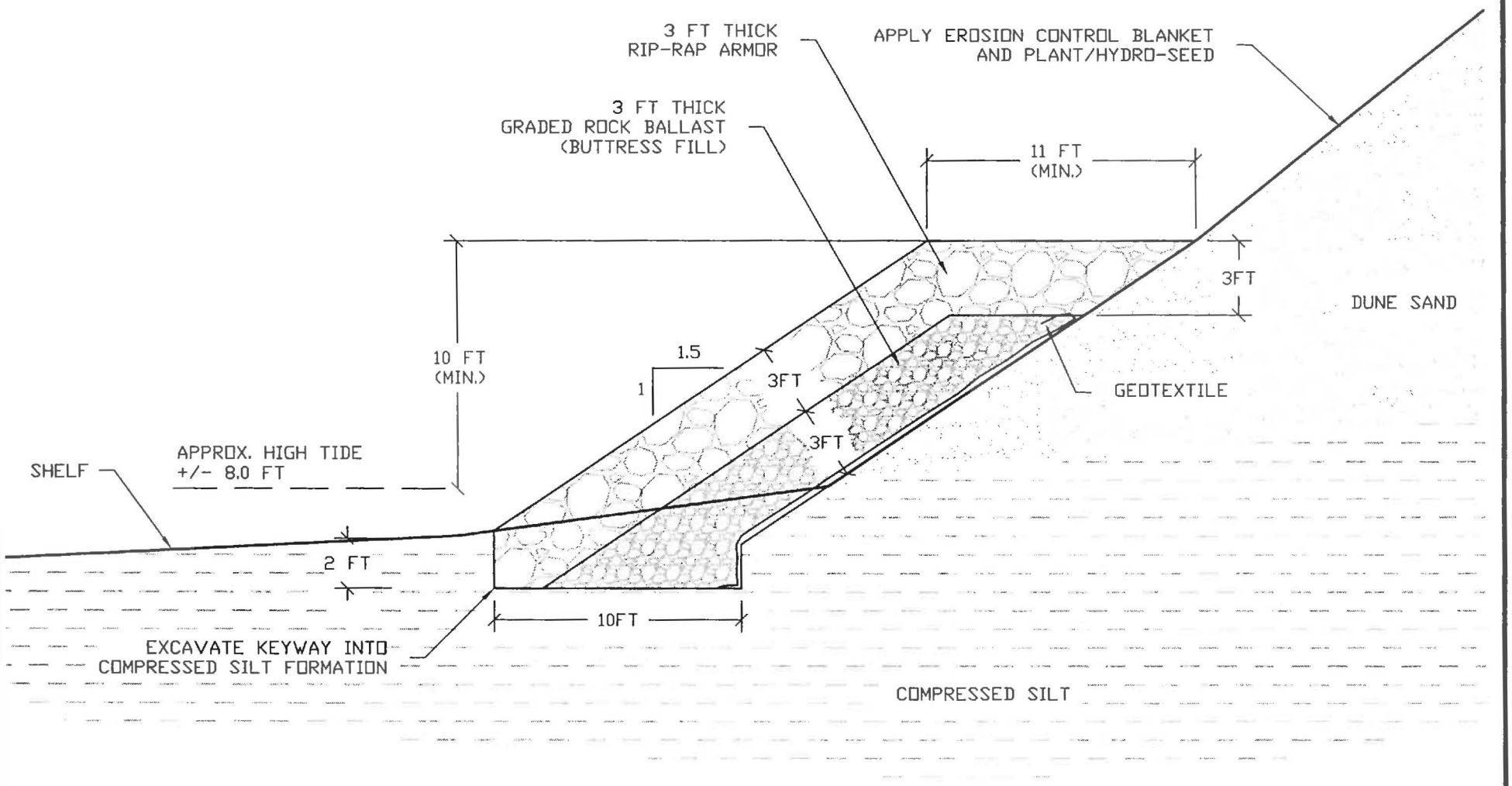
You indicated there is no city storm drainage in the area. Still, our preference is that all roof and yard area drainage be tight-lined to the street. Discharging below the slope is less preferred but may be allowed if other disposal methods are not possible. Discharging on the slope should not be completed.

Setbacks

In our letter, we recommended a 40 ft setback from the slope edge for all homes. For the reduced revetment size (where the lot areas would not be increased), we realize this setback may not be possible. It should be understood that lessening the setback would involve some increased risk for future homes that would have to be assumed individual landowners. Since actual plans are not available, we would recommend reviewing the setbacks for each individual building and lot on a case-by-case basis. For planning, we strongly encourage house footprints be minimized and that simple, square-shaped structures be used wherever possible. Making foundations continuous and rigid, and as deep as possible would also provide added benefit. Extended portions of houses, including projected viewing areas and decks, would be more susceptible to undermining and the effects of differential settlement when slope erosion does occur.



EXPIRES 12/31/05



SECTION DETAIL

SCALE: 1" = 6'

BOIRE ASSOCIATES
Geotechnical Engineering Solutions

REVETMENT DETAILS (MODIFIED)
SHELTER COVE DUNE STABILIZATION
FLORENCE, OREGON

FIGURE NO.
6
(MODIFIED)

Exhibit I-2

APPENDIX B

(Addenda)

Boire Associates Inc.
Geotechnical Engineering Solutions

520 NW 4th Street
Corvallis, Oregon 97330
Tel: 541.753.5344
Fax: 541.753.5347

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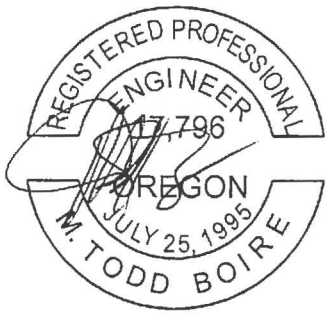
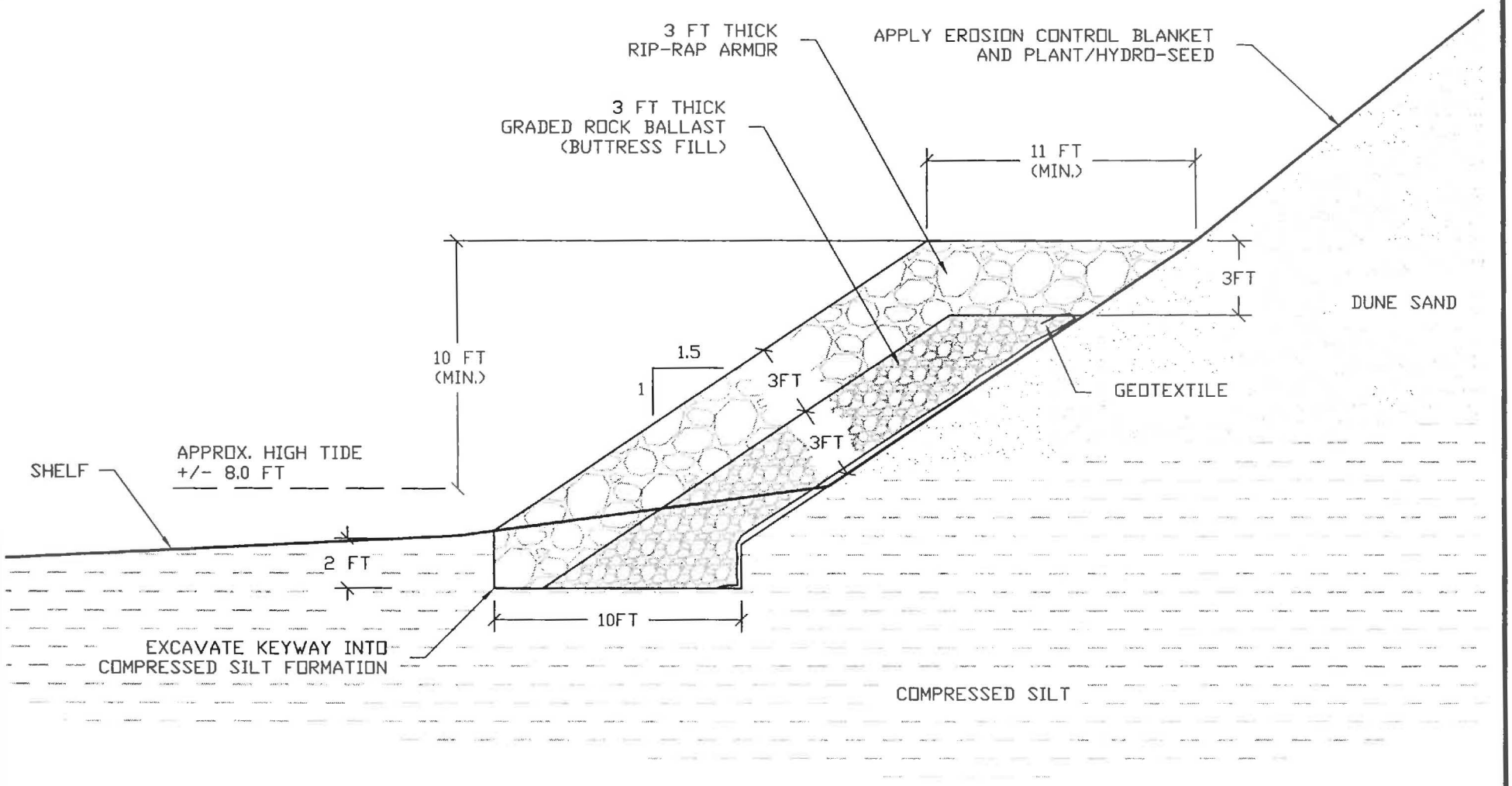


EXPIRES 12/31/05



SECTION DETAIL

SCALE: 1" = 6'

BOIRE ASSOCIATES
Geotechnical Engineering Solutions

REVETMENT DETAILS (MODIFIED)
SHELTER COVE DUNE STABILIZATION
FLORENCE, OREGON

FIGURE NO.
6
(MODIFIED)

Exhibit I-3

Boire Associates Inc.
Geotechnical Engineering Solutions

520 NW 4th Street
Corvallis, Oregon 97330
Tel: 541.753.5344
Fax: 541.753.5347

Addendum #2 (Technical Memorandum)

To:	Jim Hurst	**From:**	Todd Boire, P.E.
Fax:	541.902.7999	**Pages:**	1
Phone:	541.997.5157	**Date:**	July 13, 2004
Re:	Shelter Cove	**Cc:**	

This technical memorandum addresses questions raises by various regulatory agencies during preliminary design meeting. Comments made herein should be considered as an addendum to our prior work.

General Need for Riprap Stabilization

One reviewing agency indicated riprap would not be needed and that vegetative plantings or other biomaterials would be sufficient to resist erosion and stabilize the slope. In our opinion, this is a risky stabilization alternative given the harsh climate and general marine environment. That is, factors such as the direct southwest exposure with sustained high winds, tidal fluctuations, wave action, river current/ water velocities, and groundwater seepage are considered significant driving forces. Note also, the slope is comprised of cohesionless sand that is configured very near the angle of repose. Therefore, shallow biostabilization measures are not recommended as a primary corrective action.

Riprap Keyway

Our design shows a nominal 2 ft deep keyway for the riprap, which we understand is not allowed by one or more regulatory agencies. Please be advised, the keyway is intended to force any potential failures to occur within the rock rather than at the interface between the rock and compressed silt. Therefore, removing the keyway may decrease the factor of safety against sliding. At a very minimum, we would suggest a nominal "clearing excavation" to remove any loose material at the base of the riprap. We would also suggest some excavation be allowed to flatten or even back-slope the foundation area.

Vegetated Riprap

One regulatory agency will require vegetated planting within the riprap for the purposes of shading. This addition is not preferred by us but would be allowed. As a side, it should be noted that the specific surface area of a particle increases geometrically with decreasing diameter. Therefore, new riprap would already be considerably less thermally active than the existing sand. In any case, we would expect the river would be unaffected by the shore protection given its volume and direct contact with the ocean.

to plant growth. The laboratory reports should also include any recommended fertilizer and lime amendment requirements for woody plant material.

8.3 VEGETATED RIPRAP (JOINT PLANTING)

8.3.1 Description

Joint planting refers to the insertion of live cuttings (stakes) in the openings or joints between the rock in a riprap revetment, as shown in Figures 8-1 and 8-2. Alternatively, the cuttings can be tamped into the ground at the same time the rock is being placed on the slope face. The latter approach facilitates installation of the cuttings but also complicates rock placement and increases the likelihood of damage to the cuttings if the rock is tailgated or dumped in place.

8.3.2 Objective

Live cuttings placed in this manner should extend into the soil beneath the stone armor, as illustrated in Figure 8-1. The objective is to have these live cuttings root in the soil beneath the riprap, thus reinforcing the bank, anchoring the riprap, and improving drainage by extracting soil moisture.

8.3.3 Effectiveness

A vegetated riprap revetment (joint planting) provides the following advantages:

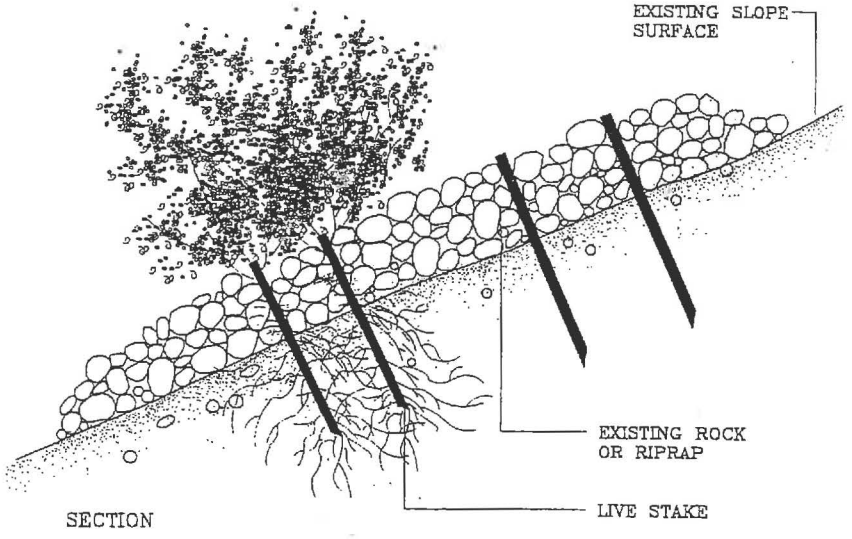


Figure 8-1. Schematic illustration of an established, growing vegetated riprap revetment.

Source: Biotechnical & Soil Bioengineering Slope Stabilization. 1996.

EXHIBIT J

W A V E B E A C H G R A S S N U R S E R Y
WILBUR E. TERNYIK, CONSULTANT & OWNER
Producers of Plant Materials for Sand Dune Stabilization
Collectors of Native Plants for Marsh Creation & Restoration
ONL #00008284 OLCL #10120
SAND EROSION CONTRACTOR
P.O. BOX 1190 - FLORENCE, OREGON 97439
(503) 997-2401

July 10, 1992

Florence City Planning Department
Laura Gillespie, Planning Director
P.O. Box 340
Florence, OR 97439

Re: Shelter Cove Subdivision Phase II

Dear Laura,

Recent events concerning site conditions related to river erosion and resulting in slope failure fronting the Siuslaw River prompted this letter. The necessary permits allowing us to rip rap the severe erosion areas have been turned down due to objections from LCDC. Since we are now well into the 92 construction season timing is critical if we are to move forward this year.

With this in mind I visited the site three more times to determine the impacts of this denial and find solutions to alleviating erosion hazards. The first trip on site was with Matt Burdett of Wobbe & Associates, to determine exact boundaries at the top of the erosion bluff on those lots affected. The second time was with Laura Gillespie and Don Hazen from the City Planning Department and Gene Wobbe. This was to examine conditions on Lots 37 and 38, relative to erosion impacts short and long term and vegetative cover on the east portions of these lots. The erosion slope caused by the toe of slope river erosion is steep and extends to the top of the bluff. It is composed of fine Yaquina sand that will continue to slide into the Siuslaw River Estuary. Photo I, vividly shows the extent of this erosion. All critical riparian vegetative habitat has been destroyed. This cannot be restored until the river erosion is stopped.

Exact locations of two erosion areas are shown on two maps enclosed. The most serious erosion is identified as Area "B" on the map Exhibit I. This is best described as an erosion cove between two existing sandstone points. The erosion is caused by river waves from the SW wind storms and boat traffic wakes. Increased erosion are in some part due to COE installation of pile dike structures and rock groins on the west side of the river. This attempt to stabilize the authorized navigation channel works well.

However, it also keeps the deep water channel against the Shelter Cove property. The rate of erosion at the toe of the slope in Area"B" is estimated at 2' per year. This results in the slope failure above. The rip rap permit denial insures that the erosion will continue unabated into the future.

The City of Florence then asked for a top of the bluff erosion rate figure using historic data. This information would then be used to establish safe setback lines on Lots 37 and 38. Mr. Wobbe then submitted a letter and map (Exhibat 2), showing this rate of erosion at the top of the sand bluff. As shown on the maps both lots are deep and there appears to be safe locations on both lots on the east one-third of each property. Exact location of setback lines will be set by the City of Florence. In addition Exhibit I also identifies another erosion Area "C" at the west edge of LOt 39. It is my opinion this erosion area is small and poses no major slope failure problems to Lot 39 at the time. Vegetative cover on this slope will be strenthened by planting and fertilization.

There also is consideration of denying an outfall permit to provide safe dispersal of stormwater run off. This possibility dictated a closer look at Phase II topography and vegetative cover. During our joint site visit two facts were established. 1. There are steep slopes where roads, driveways, and homes will be located. 2. That LCDC dune classification of, "Older Stabilized Dunes", is correct. The climax dune vegetation is dense making foot traffic crawling over or under the jungle. Under current conditions no wind or water erosion will take place. However, once construction activities start hard surface roads, driveways, and roofs will concentrate run off waters. This creates severe water erosion hazards due to underlying sand. If not contained severe erosion gullies will wash out roads, utilities, and undermine foundations. I have personally observed gullies develop over night 15' in width and 12' deep. Again, I strongly recommend that <u>all stormwater</u> be collected and tightlined to a safe dispersal area.

Two possible options for correcting this hazard are available.

<u>Option I</u> - Would be the collection of storm water tightlined to a small created marsh pond at the southend of Shoreline Drive. Draw backs to this option are possible loss of one lot. Even more serious problem, of the water seeping from the pond down through the sand to an impervious layer where it could super saturate a large area next to the river. This would result in a massive slough into the river. This threat is real and has occurred at other locations on the lower river. This in turn would only add to lower river sedimentation currently destroying esturine values. As Dr. Byrne of OSU stated in an early OCCDC meeting in Tillamook, "All Oregon estuaries are slowly dying due to uncontrolled sedimentation."

<u>Option II</u> - The preferred approach would be to collect all storm water and tightline it to a river level outfall. The dispersal would be located on the sandstone shelf at the river level. It is my understanding that Oregon's DEQ has no problems with this approach. This method along with temporary and permanent vegetation restoration plans on file with the City of Florence, is the best method of avoiding potential serious erosion problems on this landform.

Please feel free to contact me if there are further problems.

Sincerely,

Wilbur E. Ternyik
Wetlands,Beaches and Dune Consultant

cc: Jim Hurst
Bill Kloss
Branch Engineering

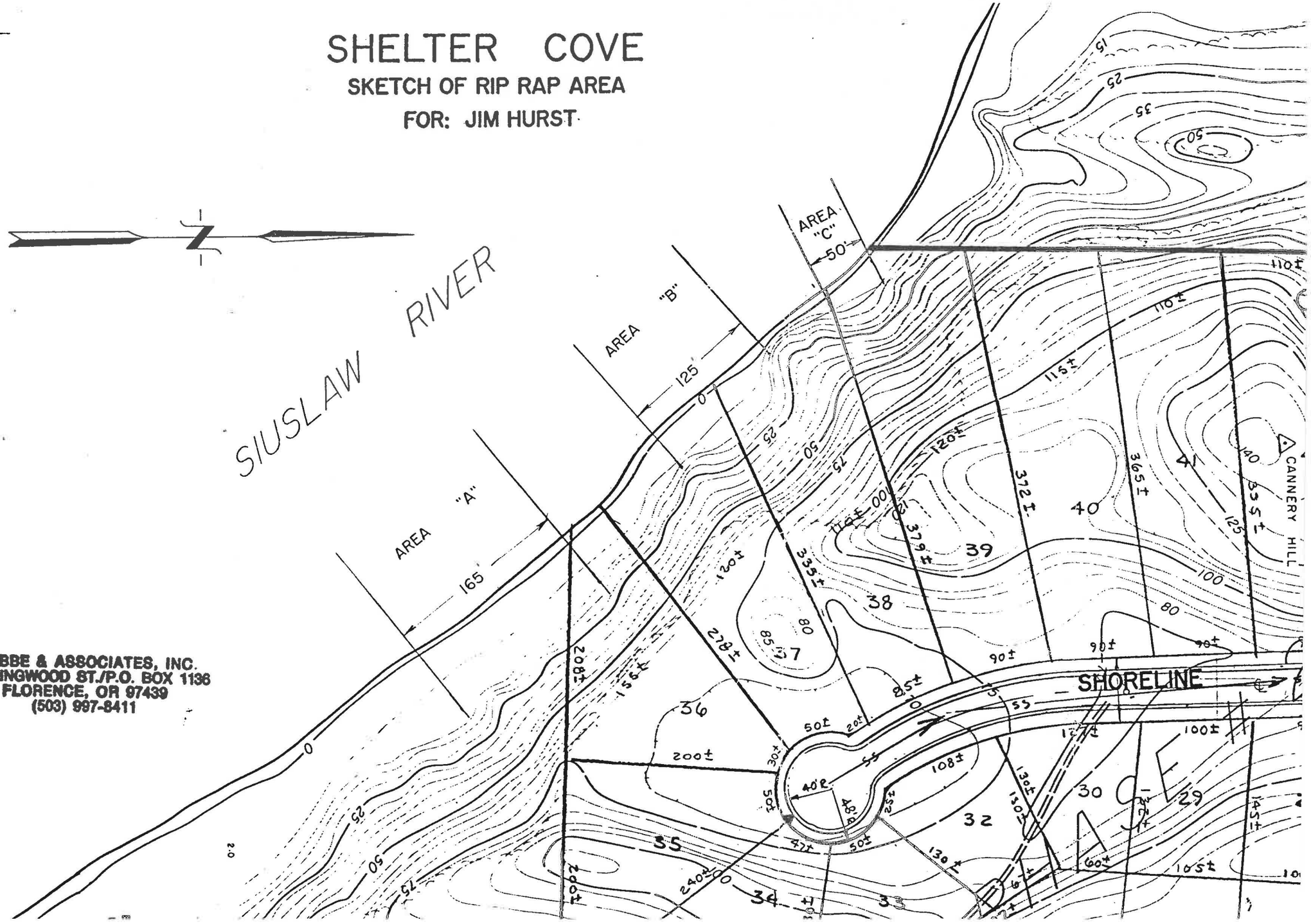
Photo 1 - by Wilbur E. Ternyik - 6/92
Location - Jim Hurst's Shelter Cove Subdivision, Siuslaw River, Florence, Oregon.
Gene Wobbe and Don Hazen standing in middle of upper portion of slide area, on Lots 37 and 38.
Note - Progressive nature of slope failure and shrubs sliding down the slope, into the river.
Restoration of riparian vegetation is impossible until river toe of slope is stablized.

EXHIBIT I

SHELTER COVE

SKETCH OF RIP RAP AREA

FOR: JIM HURST



WOBBE & ASSOCIATES, INC.
510 KINGWOOD ST./P.O. BOX 1136
FLORENCE, OR 97439
(503) 997-8411

EXHIBIT 2

WOBBE & ASSOCIATES, INC.

P.O. Box 1136
510 Kingwood Street
Florence, OR 97439

Phone (503) 997-8411

June 30, 1992

Wilbur Ternyik
P.O. Box 1190
Florence, OR 97439

RE: Shelter Cove Subdivision Phase II for Jim Hurst - Florence, Lane County, Oregon.

I have estimated the amount of erosion along the top of the bank along the Siuslaw River adjacent to Shelter Cove Subdivision Phase II in the vicinity of Lots 36 - 39 as shown on the enclosed map. Based on a City of Florence topographic map dated 1975 and survey ties to the top of the bank in 1992, I estimate 5 to 25 feet of erosion from the top of the bank in this area between 1975 and 1992. The erosion in this area appears to average less than 1 foot per year.

Sincerely,

Eugene M. Wobbe

Eugene M. Wobbe P.L.S.

EXHIBIT 2

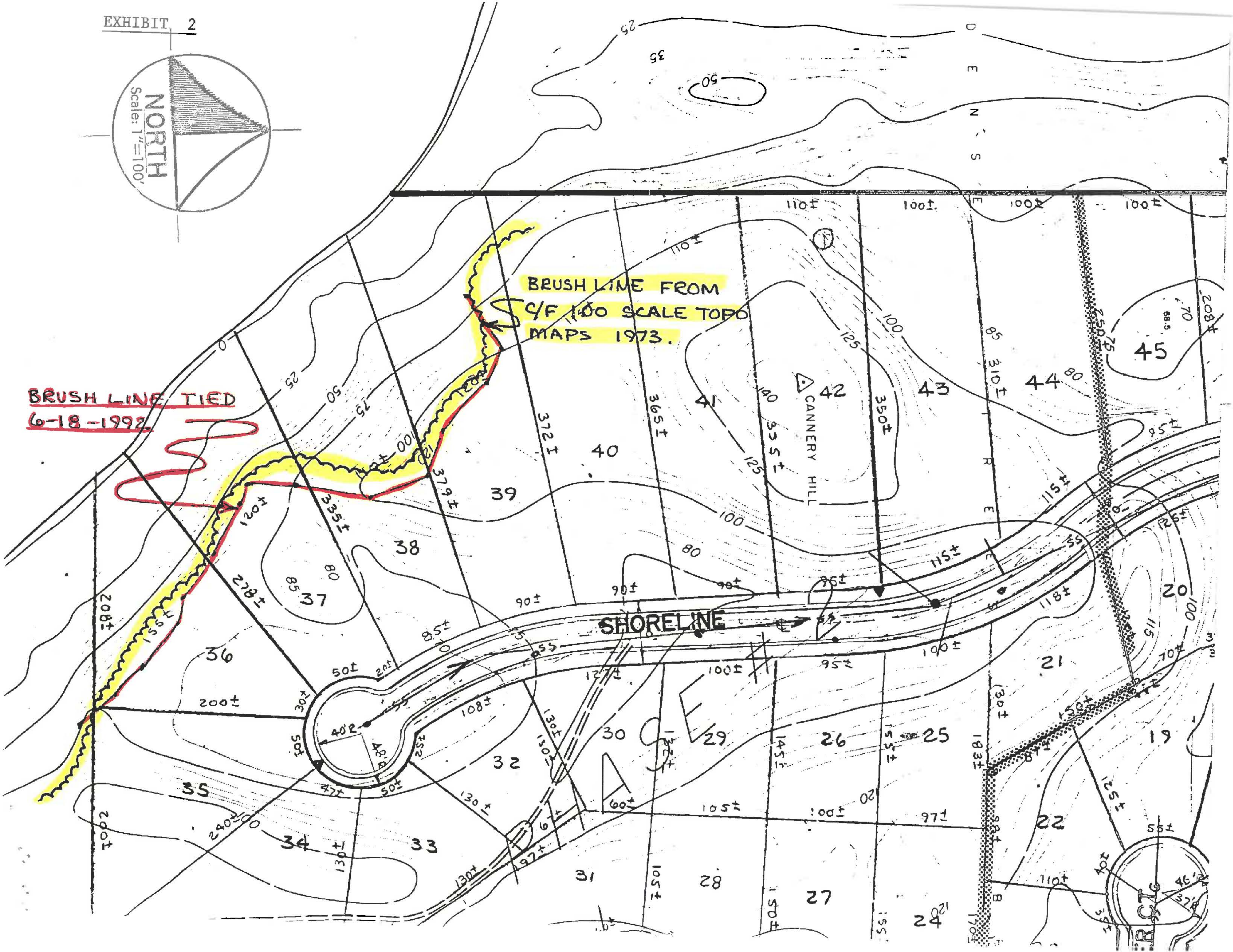

NORTH
Scale: 1"=100'
BRUSH LINE TIED
6-18-1992
BRUSH LINE FROM
C/F 100 SCALE TOPO
MAPS 1973.
SHORELINE
CANNERY HILL
35
36
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EXHIBIT K

CITY OF FLORENCE
PLANNING COMMISSION

RESOLUTION 04-07-27-28

IN THE MATTER OF AN APPLICATION FOR A CONDITIONAL USE PERMIT TO CONSTRUCT REVETMENT ALONG AND ON LOTS 36-41 OF SHELTER COVE PUD, NORTH, SOUTH AND WEST OF SINGLE FAMILY RESIDNECES AND EAST OF THE SIUSLAW RIVER IN THE RESTRICTED RESIDENTIAL DISTRICT WITH OVERLAYS OF THE NATURAL RESOURCES CONSERVATION COMBINING DISTRICT (NRC), AND THE CONSERVATION ESTUARY DISTRICT (CE), MR 18-12-16-41, TAX LOT 600-1000 AND MR 18-12-11-32, TAX LOT 1600, AS APPLIED FOR BY ROB WARD, AGENT FOR SHELTER COVER HOMEOWNERS.

WHEREAS, application was made by Rob Ward, agent for Shelter Cove Homeowners, for a construction of revetment in and along the Siuslaw River of the west facing frontage for lots 36-41 of the Shelter Cove PUD; and

WHEREAS, the Planning Commission/Design Review Board met in public hearing on July 27, 2004 to consider the application, evidence in the record and testimony received; and

WHEREAS, the Planning Commission/Design Review Board determined, after review of the application, testimony and evidence in the record, that the application meets the applicable criteria, or can meet the criteria through compliance with certain Conditions of Approval; and

WHEREAS, the Planning Commission/Design Review Board of the City of Florence finds, based on the Findings of Fact, staff recommendation and evidence and testimony presented to them, that the following conditions are required for full compliance with applicable criteria:

1. Approval shall be shown on Dune Stabilization evaluation and recommendation for a portion of Shelter Cover subdivision Project number 203.081 completed by Boire Associates Inc. Any modifications to the approved plans or changes of use, except those changes relating to the criteria regulated by the Uniform Building Code, will require approval by the Community Development Director or the Planning Commission/Design Review Board.

2. A construction plan shall be submitted to the Community Services Department prior to commencement of the project. The construction plan shall be prepared by a registered civil engineer and shall include design specification and drawings, site access plan, construction schedule, and mitigation plan for areas disturbed during construction, if necessary. Interim soil stabilization methods shall be implemented during construction of rip-rap project.

3. The consulting engineer shall submit a notice of acceptance of installation of rip-rap to the Community Services Department within 14 days of the project completion. Said notice shall provide documentation that the project was completed according to the approved plans.

4. Vegetation clearing on site shall be kept to a minimum to comply with the NRC District requirements. Area where vegetation is removed shall be mitigated through a revegetation plan. The revegetation plan shall be prepared by a specialist in dune stabilization and approved by a registered civil engineer. A copy of the said plan shall be submitted to the Community Service Department prior to any work on site. The revegetation plan shall include type, location and size of plant materials, method of irrigation, and a maintenance schedule to ensure establishment of vegetation. This plan shall be implemented immediately following completion of the rip-rap installation.

5. Copies of the approved DSL and ACE permits for construction of the bank stabilization project shall be submitted to the Community Services Department prior to any work being done on site.

6. Property owner shall enter into an agreement to indemnify, defend, and hold the City of Florence harmless from any claims arising in regard to this approval prior to construction. This agreement shall be subject to City approval prior to recordation, and apply to all assigns and successors of the subject property.

7. The applicants will present to the Community Development Department a signed "Affidavit of Acceptance" of all conditions prior to commencement of construction. The signed affidavit must be received by the Community Service Department before the project approval shall become effective.

8. The Consulting Engineer or his/her qualified designee will be on site during installation of rip rap or other stabilization method.

NOW THEREFORE BE IT RESOLVED by the Planning Commission/Design Review Board of the City of Florence that the proposal is approved and that the Findings of Fact

attached as Exhibit "A", revised July 27, 2004, is hereby incorporated by reference and adopted in support of this decision.

ADOPTED BY THE FLORENCE PLANNING COMMISSION/DESIGN REVIEW BOARD the 27th day of July, 2004.

WAYNE PAUL, Chairman
Florence Planning Commission