Hydrologic Soil Group—Clackamas County Area, Oregon
(Waterfront Residences)

Map Scale: 1:3,430 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

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 Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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: Clackamas County Area, Oregon
Survey Area Data: Version 14, Sep 18, 2018

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

Date(s) aerial images were photographed: Jul 26, 2014—Sep 5, 2014

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
67	Newberg fine sandy loam	A	0.7	4.6%
82	Urban land		14.3	95.4%
W	Water		0.0	0.0%
Totals for Area of Interest			**14.9**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Preliminary Drainage Report

Cove Waterfront Residences – Early Grading

2322.14307.01

Prepared for

The Cove, LLC

1961 Collingwood St, Ste. 212

Vancouver, BC V6R 3K6

December 10, 2018

Prepared for The Cove, LLC

Project Name Cove Waterfront Residences – Early Grading

Job Number 2322.14307.01

Date December 10, 2018

DOWL
720 SW Washington Street, Suite 750
Portland, Oregon
97205

Telephone: 971-280-8641
Facsimile: 800-865-9847
kglidden@dowl.com

Name	Title	Date	Revision	Reviewer
Kyle Glidden	Project Engineer	12/10/2018	1	Mike Towle

Executive Summary

The project is located in Oregon City, east of and bordering the Clackamette Cove, and south of the Tri-City Wastewater Treatment Plant. The project will complete the major earthwork needed for the future development that include a new Agnes Ave roadway, a multi-use path Esplanade, as well as future apartment and mixed use buildings. The construction activities during the Early Grading phase will be limited to modifying the existing grade to match the subgrade for the future development, as well as constructing several rockery walls necessary for the mass excavation.

The proposed storm design will meet the requirements of both The City of Oregon City as listed in the *Stormwater and Grading Design Standards (OCSGDS)* dated February 2015.

The proposed private and public conveyance system will be designed using the 25-year storm event in the final Drainage Report.

The proposed Early Grading project does not meet the minimum thresholds to trigger water quality standards as outlined in Section 1.2.1 of OCSGDS. Proper erosion and sediment control will be installed and maintained during the duration of the project to minimize sediment-laden runoff from the site.

No downstream analysis will be required for this project for the Early Grading phase due to no proposed conveyance systems. A downstream will also not be required for full build-out due to the proximity to the outfall in the Clackamette Cove.

Table of Contents

Tables

Figures

1 Project Overview

1.1 Project Overview

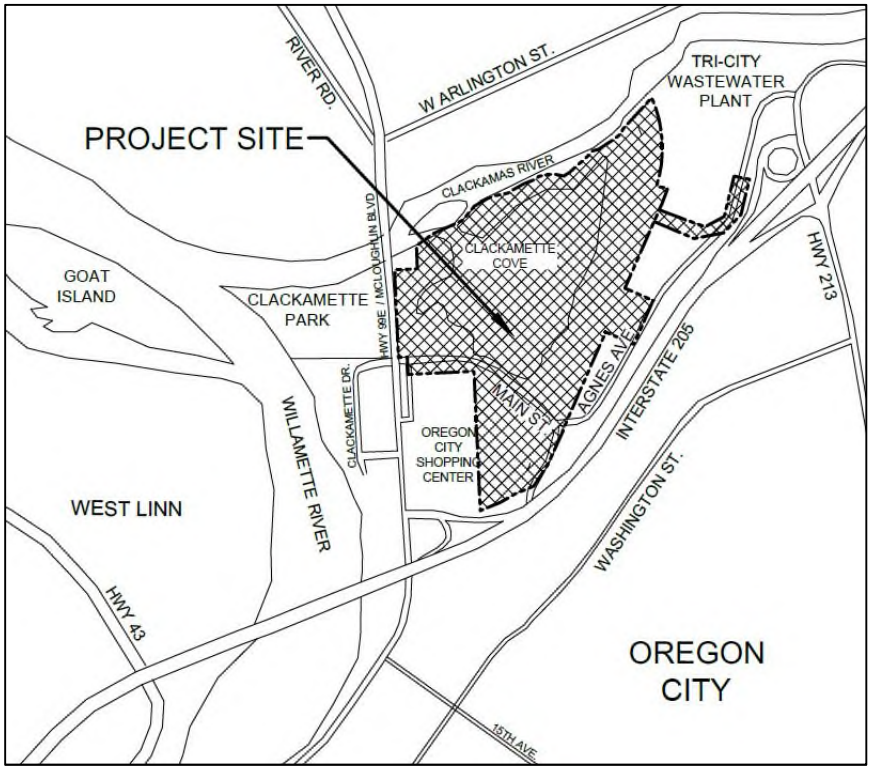
The proposed Waterfront Early Grading project will complete the major earthwork needed for the future development that include a new Agnes Ave roadway, a multi-use path Esplanade, as well as future apartment and mixed use buildings. The construction activities during the Early Grading phase will be limited to modifying the existing grade to match the subgrade for the future development, as well as constructing several rockery walls necessary for the mass excavation.

The Early Grading project will include the removal of several trees along within the development area, as well as the esplanade and NROD area along the bank.

1.2 Location

The project is located in Oregon City, east of and bordering the Clackamette Cove, and south of the Tri-City Wastewater Treatment Plant (See Figure 1-1, Vicinity Map).

Figure 1-1 Vicinity Map



2 Existing Conditions

2.1 Existing Topography

The existing site contains a multi-use path, vegetated areas, and a temporary gravel parking lot constructed during Phase I of the overall Cove Development. The site has widely varying

slopes. The bank adjacent to the Clackamette Cove has slopes ranging from 20 percent to 130 percent. Above the bank, slopes generally vary between 1 and 8 percent. The site drains west towards the Clackamette Cove. The highest elevation of 60 is located in the northern section of the site. The lowest elevation of 7 is located at the surveyed water surface level.

2.2 Climate

The site is located in Clackamas County approximately 90 miles inland from the Pacific Ocean. There is a gradual change in seasons with defined seasonal characteristics. Average daily temperatures range from 35°F to 82°F. Average annual rainfall recorded in this area is 47 inches.

2.3 Site Geology

The underlying soil types on the site, as classified by the United States Department of Agriculture Soil Survey of Clackamas County, Oregon are identified in Table 2-1 (See Technical Appendix: Hydrologic Soils Map - Clackamas County).

Table 2-1 Soil Characteristics

Soil Type	Hydrologic Group
Urban Land	D
Newberg Fine Sandy Loam	A

Group A soils have high infiltration rates when thoroughly saturated, Group B soils have moderate infiltration rates when thoroughly saturated, while Groups D and C soils have very slow infiltration rates when thoroughly saturated. Group D soils is the dominant soil type. Therefore, a soil classification of group D was conservatively assigned to the whole site.

2.4 Existing Hydrology

Stormwater runoff currently sheet flows into the Clackamette Cove, with no storm collection or conveyance facilities present.

2.5 Infiltration

No infiltration test was taken during geotechnical investigations. However, due to the nature of the project (large fill volumes), no infiltration will be incorporated into the design of facilities.

2.6 Groundwater

Groundwater was not encountered in any of the exploratory test pits during the geotechnical investigation. The geotechnical report can be found in the Technical Appendix.

3 Proposed Conditions

3.1 Proposed Topography

General topography on the site will remain the same as existing. Slopes will be flattened to a maximum of 3H:1V (permanent), and 1.5H:1V (temporary).

3.2 Proposed Hydrology

The final subgrade surface at the end of the Early Grading project will sheet flow towards the Clackamette Cove and include sedimentation basins (as needed) to collect sediment prior to sheet flowing into the Clackamette Cove. These sedimentation basins will be located in the future esplanade area, at the top of the bank above the Clackamette Cove. See section 5.0, Erosion and Sediment Control for more information.

3.3 Proposed Water Quality

Section 1.2.1 of the Oregon City Stormwater and Grading Design Standards describe the threshold for applicability of the standards as below:

A. 5,000 square feet of new or replaced impervious surface

B. Creation of more than 500 square feet of new impervious surface within a water quality resource area, or

C. Disturbance of 1,000 square feet of existing impervious surface within a water quality resource area as part of a commercial or industrial redevelopment

The proposed Early Grading project does not meet the minimum thresholds for any of these requirements, as no impervious area will be added. Therefore, water quality standards will not be enforced for this phase of the project. Proper erosion and sediment control will be installed and maintained during the duration of the project to minimize sediment-laden runoff from the site. Further details are discussed in Section 5.0.

4 Future Conditions

4.1 Future Topography

The future site will maintain the general topography of the mass-graded surface, but will eliminate temporary 1.5H:1V slopes with the construction of various site and building walls. The resulting maximum slope will be 3H:1V.

4.2 Future Hydrology

The full build-out of the Waterfront Residences project will consist of a new Agnes Road, emergency access through Tract D, a multi-use esplanade path, residential and mixed use buildings, and associated parking and landscaping.

At the completion of the final project, runoff from the on-site parking lots and Agnes Avenue will be collected by trapped catch basins or curb-cuts adjacent to water quality facilities. After treatment, runoff will be conveyed through a new storm main in Agnes Ave and connect to the existing storm system in Main St that outfalls to the Clackamette Cove.

Runoff from the proposed Esplanade and Garage parking will surface flow to the Clackamette Cove after treatment.

4.3 Future Water Quality

The full build-out of the Waterfront Residences will achieve water quality standards through various means. In Agnes Ave, all runoff from the water quality storm will be treated with roadside planters and swales.

Onsite water quality will be achieved through a mixture of LID facilities and mechanical treatment. LID treatment will occur to the maximum extent feasible, through swales in the surface level parking area, and vegetated filter strips adjacent to the garage-level parking. Where LID treatment is not feasible, mechanical treatment will be provided to treat the water quality storm.

5 Erosion and Sediment Control

5.1 Source Erosion Control

Several efforts will be incorporated to reduce the source erosion during and immediately after construction. All slopes at 4H:1V or steeper will be covered with a slope stabilization matting once the subgrade elevation is reached. See the Mass Grading plans for these proposed locations. Exposed soils that are not rocked or otherwise covered with slope stabilization matting will be seeded to stabilize vegetation. During construction, all temporary stockpiles will be covered during wet weather.

5.2 Sediment Control

Should any sediment erosion occur, several BMPs will be in place during construction to prevent the sediment from leaving the site. On all slopes of 4H:1V and steeper, compost wattles will be placed at intermittent intervals down the slope to slow any runoff and trap sediment. Should sediment control become a concern, sedimentation basins will be constructed in the esplanade area to allow sediment to settle before overflowing and shedding down the bank to the Clackamette Cove. These basins are further discussed in Section 5.3.

As a last defense, a “lower limits EC protection” will be installed just above the ordinary high water line. This will consist of two compost wattles, two straw wattles, and a sediment fence below them.

5.3 Sedimentation Basins

The sedimentation basins are sized to collectively hold the entire 2-yr storm event. Instead of one large basin, several will be installed along the alignment of the future esplanade. Xpswmm was used to determine the runoff volume from the 2-year storm event. The inputs and results are listed below:

Area = 19.984 ac

CN = 84

Q_2 = 6.03 cfs

V_2 = 92,000 cu. ft.

With a pond depth of 3.5 feet, the bottom area needed for the ponds is ~26,300 sq ft. The esplanade area offers ~50,300 sq. ft. of available area.

The design and location of the sediment pond can be seen in more detail on the Early Grading Plans, included in the Technical Appendix.

6 Downstream Analysis

No downstream analysis will be required for this project for the Early Grading phase due to no proposed conveyance systems. A downstream will also not be required for full build-out due to the proximity to the outfall in the Clackamette Cove.

7 Summary

The Early Grading project does not trigger any water quality requirements as laid out in the Oregon City Stormwater and Grading Design Standards. Due to the large amounts of earthwork proposed with this project, many precautions will be taken to prevent sediment-laden runoff from leaving the site, including multiple temporary sediment ponds that are sized to accommodate the runoff volume from the 2-year storm event.

Technical Appendix

Technical Appendix

- Hydrologic Soil Map – Clackamas County
- Geotechnical Assessment – APEX
- Cove Waterfront Early Grading Plans (not to scale)

Geotechnical Assessment
Cove Waterfront
Oregon City, Oregon

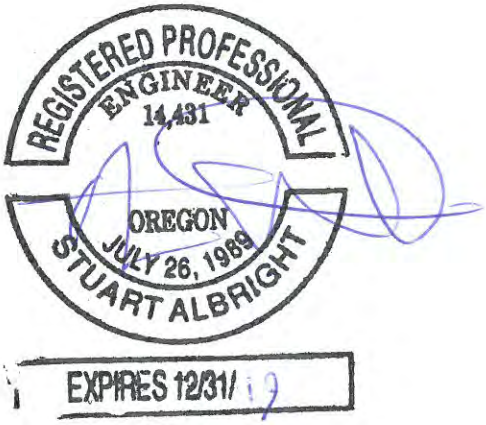
Prepared for:
The Cove, LLC

December 19, 2017
2367-00

Geotechnical Assessment
Cove Waterfront
Oregon City, Oregon

Prepared for:
The Cove, LLC

December 19, 2017
2367-00



Stu Albright, P.E.
Principal Engineer

Table of Contents

Figures

Appendix

1.0 Introduction and Limitations

This report presents Apex Companies, LLC's (Apex's) geologic assessment and geotechnical engineering evaluation and recommendations for the proposed Cove Waterfront development in Oregon City, Oregon (Figure 1). Our scope of work included a geologic site reconnaissance and numerous phases of subsurface explorations. Additional aspects of our work scope included a site vicinity geologic reference review, as well as the preparation of this report.

The work was performed for the exclusive use of The Cove, LLC for specific geotechnical-related application to this project. This work was conducted in accordance with generally accepted professional practices in the same or similar localities related to the nature of the work accomplished, at the time the services were performed. No other warranty, express or implied, is made.

2.0 Site Description and Project Understanding

Site Description. The Clackamette Cove site is located in Oregon City, Oregon in the area generally bounded by Highway 99E on the west, the Clackamas River on the north, the old Rossman Landfill and Tri-Cities Wastewater Treatment Plant on the east, and Main Street on the south. It consists of the tax lots that surround and totally contain Clackamette Cove.

The overall topography of the Site is relatively flat, although steep slopes surround Clackamette Cove. Lot 1 is southwest of Clackamette Cove and mostly vacant, with the exception of a series of stockpiles placed by the Oregon City Department of Public Works. Lots 3 through 7 are east of Clackamette Cove and are vacant, with the exception of a small single-story building used by the Clackamas County Sherriff for equipment storage an apparently inactive truck scale, left over from historical activities at the site, and a paved pathway. Figure 2 shows a plan view of the Site.

The Site is located southeast of the confluence of the Clackamas River and the Willamette River. Oregon Highway 99 runs in a north-south alignment west of the Site, and Oregon Highway 205 runs in a north-south alignment east of the Site. Residential property is north of the Site; industrial properties, including the Tri-Cities Service District wastewater treatment plant, are east of the Site; retail-commercial property (the Oregon City Mall) is south of the Site; and Clackamas Cove, a pedestrian pathway, and open undeveloped land is west of the Site.

Clackamette Cove is a former sand/gravel mining pit that is now connected to the Clackamas River. The Clackamette Cove area was undeveloped and used for agricultural purposes through the early 1950s. From the mid-1950s through 1986, the property was used for mining sand and gravel and manufacturing asphalt concrete. Since 1986, the property has been generally undeveloped. The eastern portion of the site was

previously in use as a railroad right-of-way. East of the railroad, the site was used for an unlined municipal waste landfill (Rossman Landfill).

Project Understanding. Although the final development details may change somewhat, the overall development scheme and site work needs have been identified at this time. As we understand it, the overall approach to site development includes excavation of the lake front to soften grades at the waterfront with filling on the eastern half of the site. We understand that the project will include construction of a mixed-use development featuring apartments, and commercial parcels as well as the installation of services, parking areas, and access drives.

The project will feature a significant amount of roadway construction including the development of a new City Street, Agnes Avenue, and an emergency access roadway called the Agnes Extension.

We anticipate that structural loading will be moderate, with wall loads not exceeding 5 kips per lineal foot (Klf) and column loads of less than 450 kips.

3.0 Geologic Setting

3.1 Site Geologic Conditions

Geology. The Clackamette Cove area lies at the confluence of the Clackamas River and the Willamette River. The geology in the vicinity of the Site is composed of fluvial sediments, including Quaternary alluvium overlying the Troutdale Formation (Miocene to Pliocene age). The local basement rock underlying the Troutdale Formation is the Columbia River Basalt (CRB).

Quaternary alluvium consists of approximately 40 to 60 feet of gravel and sand, interbedded with silt lenses. These deposits were mined for aggregate, creating Clackamette Cove. The Troutdale Formation is composed of semi-impermeable clay overlying a lower sandy conglomerate interbedded with the Sandy River Mudstone. The CRB is a series of lava flows or flood basalts.

Hydrogeology. A shallow, unconfined alluvial aquifer is present within the Quaternary alluvium. The alluvial aquifer is separated from a deeper aquifer in the CRB by approximately 120 feet of low permeability, fine-grained deposits (GRI, 1991). A network of groundwater monitoring wells was installed as part of numerous studies of impacts from the Rossman Landfill. The regional groundwater flow direction in the shallow alluvial aquifer is generally to toward the confluence of the Clackamas and Willamette Rivers.

Water levels beneath the site vary seasonally in direct response to changes in river flows. Groundwater levels are likely to vary seasonally.

Area Seismicity. The seismicity of Oregon City, and hence the potential for ground shaking, is controlled by three separate fault mechanisms. These include the Cascadia Subduction Zone (CSZ), the mid-depth intraplate zone, and the relatively shallow crustal zone. Descriptions of these potential earthquake sources are presented below.

The CSZ is located offshore and extends from Northern California to British Columbia. Within this zone, the oceanic Juan De Fuca Plate is being subducted beneath the continental North American Plate to the east. The interface between these two plates is located at a depth of approximately 15 to 20 kilometers (km). The seismicity of the CSZ is subject to several uncertainties, including the maximum earthquake moment magnitude (Mw) and the recurrence intervals associated with various Mw earthquakes. (Moment magnitude is used by seismologists to measure larger earthquakes and is based on fault displacement and area of fault rupture, while for smaller earthquakes the moment magnitude is approximately equal to the familiar Richter Scale Magnitude.) Anecdotal evidence of previous CSZ earthquakes has been observed within coastal marshes along the Oregon coast. Sequences of interlayered peat and sands have been interpreted to be the result of large subduction zone earthquakes occurring at intervals on the order of 300 to 500 years, with the most recent event taking place approximately 300 years ago. A definitive study of Oregon seismic hazards completed by Geomatrix (1995) suggests that the maximum earthquake associated with the CSZ is Mw 8 to 9. This is based on an empirical expression relating Mw to the area of fault rupture derived from earthquakes that have occurred within subduction zones in other parts of the world. An Mw 9 earthquake would involve a rupture of the entire CSZ. As discussed by Geomatrix (1995), this has not occurred in other subduction zones that have exhibited much higher levels of historical seismicity than the CSZ and is considered unlikely. For the purpose of this study, an earthquake of Mw 8.5 was assumed to occur within the CSZ.

The intraplate zone encompasses the portion of the subducting Juan De Fuca Plate located at a depth of approximately 30 to 50 km below western Oregon. Very low levels of seismicity have been observed within the intraplate zone in Oregon. However, much higher levels of seismicity within this zone have been recorded in Washington and California. Several reasons for this seismic quiescence were suggested in the Geomatrix (1995) study and include changes in the direction of subduction between Oregon and British Columbia as well as the effects of volcanic activity along the Cascade Range. Historical activity associated with the intraplate zone includes the 1949 Olympia Mw 7.1 and the 1965 Puget Sound Mw 6.5 earthquakes. Based on the data presented within the Geomatrix (1995) report, an earthquake of Mw 7.25 has been chosen to represent the seismic potential of the intraplate zone.

The third source of regional seismicity that can result in ground shaking is near-surface crustal earthquakes occurring within the North American Plate. The historical seismicity of crustal earthquakes in western Oregon is higher than the seismicity associated with the CSZ and the intraplate zone. The 1993 Scotts Mills (Mw 5.6) and Klamath Falls (Mw 6.0) earthquakes were crustal earthquakes.

3.2 Site Seismic Soil Coefficient and Ground Shaking

IBC Seismic Design Parameters. The site coefficient was determined based on the International Building Code (IBC) Section 1615.1.5. The subsurface shear wave velocity profile is based upon correlations developed for normalized SPT blow counts. The site subsurface conditions have been modeled as consisting of surface fills overlying native silt to a depth of 20 feet below the ground surface (bgs) and very dense cobbles and gravels at depths from 20 feet bgs to 50 feet bgs. Below 50 feet bgs, we have assumed that the Eocene- to Oligocene-aged Marine Sedimentary bedrock contact is present. Shear wave velocity based upon correlation to normalized SPT blow counts was in excess of 650 feet per second. While our borings only extended to a maximum depth of 30 feet bgs, based upon review of near-vicinity geologic studies for the project site area, we estimate that this dense gravel unit underlying the site extends to depths in excess of 100 feet bgs.

We recommend that the seismic design of the building utilize the IBC site soil classification "D". A site classification of "D" equates to a moderately stiff to stiff soil profile.

3.3 Liquefaction

The potential for soil liquefaction during seismic ground shaking is generally associated with loose, saturated, non-plastic sands and some very soft, recently deposited silt soils. The soils present on this site that are located below the seasonal groundwater table consist of dense or very dense gravels. This type of subsurface profile is not typically associated with liquefaction issues.

A liquefaction assessment was conducted in accordance with the 26th Annual ASCE Geotechnical Seminar, April 30, 2003 "Recent Advances in Soil Liquefaction Engineering, A Unified And Consistent Framework" by R.B. Seed et al. The Seed et al. methodology developed for liquefaction susceptibility based upon standard penetration testing was employed. The soil profile assumed for our model is detailed in the above section regarding Site Seismic Soil Coefficient. Based upon our understanding of the site subsurface conditions, we estimate the probability of soil liquefaction beneath the project site to be very low.

3.4 Fault Displacement and Subsidence

There are no mapped faults in the near vicinity of the project site. It is our opinion that the potential for on-site fault displacement and associated ground rupture is remote.

3.5 Dynamic Landslides

The current slopes adjacent to the Cove are oversteepened and in places, overhanging. Those slopes are susceptible to static failure and would be particularly susceptible to failure during a seismic event. The project plans call for regrading those slopes with 3H:1V slopes. Such slopes would be stable during a

design seismic event. We therefore estimate that the potential for post-development dynamic landsliding is very low.

3.6 Tsunami

There is no potential for tsunami at the site due to the site's elevation and distance from coastal areas.

4.0 Subsurface Conditions

Numerous phases of field explorations have been undertaken from 2006 to 2017. Past explorations consisted of 30 backhoe and trackhoe test pits excavated throughout the site. Those explorations were supplemented in 2017 by 11 drilled borings. The approximate locations of the explorations are indicated on the accompanying site plan (Figure 2). In addition to the geotechnical explorations completed for the project development, more than 50 past environmental explorations have been completed across the site. Subsurface conditions encountered during field explorations are described below.

Topsoil. Soils near the ground surface generally consist of imported, mineral fill soils with little to no organics. As such, the development of topsoil over the past 20 to 30 years has been minimal except adjacent to trees. The upper 2 to 6 inches of the site may contain sufficient organics to require stripping from structural areas. This material should be stripped during initial site work. Topsoil strippings should not be reemployed as structural fill, but can potentially be reused in landscaping areas.

Fill. The entire site has been previously filled. The fills generally consist of a mix of silts, sands, and gravels with some boulders. Large slabs of concrete and other debris were encountered at depth throughout the site. Although some organic material including sticks and branches has been encountered in the explorations, the occurrences were generally random and widely spread. Significant deposits of topsoil, stripping, and/or refuse have not been encountered within the fill. This is consistent with the site history wherein the site fills would have been placed under the control of the quarry operators.

Native Sandy Silt. The majority of the test pits excavated for this project terminated in fills. Boring logs for deeper explorations indicate that the shallow, native soils (where encountered) consist of sandy silts. These soils are generally encountered as stiff to hard. For the majority of the site, these soils were removed during site quarrying.

Dense Troutdale Gravels. The fills and sandy silts (where encountered) are underlain at depths of 20 to 25 feet below the ground surface by dense to very dense, partially cemented, gravels with varying amounts of silts, sands, and cobbles.

Groundwater. The static groundwater table was not observed in any of our exploratory test pits. Previous work in the area by environmental consultants indicates that the groundwater table is controlled by the water

levels in the Cove. Generally, the water table is located below the surface of the dense gravels which is consistent with the site history where quarrying was stopped above the cove level. Shallow, perched water is anticipated throughout the site during prolonged wet weather.

5.0 Conclusions and Recommendations

The presence of variable fill throughout the site will have the most significant impact on the future development. The majority of the fills encountered consisted of mineral soils or inert materials. However, the consistency of the fills is highly variable. Without treatment, the variability would inevitably result in differential and unpredictable foundation settlement.

In working with the design team, we evaluated a number of options for foundation support. Although we considered deep foundations, installation would encounter frequent boulders and concrete and be impractical. We considered a variety of options for support that would involve a combination of site improvement and foundation stiffening. The most cost-effective solution, and one that will be a compromise between future settlement potential and practicality. The approach consists of densifying the upper surface of the site, placing densified crushed rock, and tying the foundation elements together with grade beams. That approach has ultimately been selected by the project team.

5.1 Grading Recommendations

We have provided recommendations for wet weather and dry weather construction as well as other geotechnical concerns and issues relative to the project site. Because of the potential for the presence of erosion- and moisture-sensitive near-surface fill soils, Apex recommends that site grading and utility trenching be conducted during extended periods of relatively dry weather conditions. If wet weather construction is attempted, development costs may be significantly higher due in part to the increased cost of imported granular fill, maintenance of soft subgrade areas generated as a result of construction activities, and installation of a granular working blanket over construction-trafficked portions of the site.

Removal of Old Concrete, Old Fills, and Other Buried Features. In general, the fills encountered during our explorations consisted of relatively dense, non-organic soils with limited quantities of debris. Given the developed nature of the site, old foundations and concrete slabs may be encountered during site preparation and grading. Our borings were advanced in discrete locations across widely spaced intervals and variation was noted between the fill soils encountered; therefore, it is possible that organic fills or other unsuitable material could also be encountered. Landscaping, organic soils, and other unsuitable fills should be removed from building and pavement areas as encountered. Further, all fill soils should be removed from beneath foundation bearing areas. Overexcavated areas should be backfilled with compacted structural fill. Old utilities and structural features associated with past developments such as footings, retaining walls, etc., should be removed during initial site work. Removal of such features can be limited to areas that will function as foundation subgrade for the new structure. Failure to remove these features can

result in additional settlement or other issues within new structures and pavements. For other areas of the site, such improvements can be removed as they are encountered and conflict with proposed improvements. We would generally recommend that the improvements be removed to a depth of 2 feet below planned surface improvements. If encountered, any vaults or basement structures encountered should be perforated to allow for drainage and subsequently filled with structural fill.

Building Pad Recompaction. Prior to commencing development of structures, we recommend that the building pads and a zone 20 feet outside of the structures horizontally be recompacted using a large (greater than 40 kip weight) surface roller with vibratory compaction. Studies have shown that the effectiveness of vibratory rollers generally increases significantly with each overlapping pass up to a maximum of approximately seven where returns diminish significantly. Further, studies show measurable densification to depths of six feet or more with repeated passes of a large roller.

After rough grading but prior to recompaction, the upper three feet of material should be overexcavated. The resulting subgrade should be visually evaluated and proof rolled with a with a loaded 10- to 12-yard dump truck or other suitable equipment. Any areas of subgrade that pump, weave, or contain obvious debris should be overexcavated and backfilled with clean material from on site

The exposed site surface should then be recompacted through a minimum of seven passes of a vibratory roller of at least 40,000 pounds in weight. As with the proofroll, any areas that roll or pump should be overexcavated and backfilled with select on-site material.

Wet Weather Construction. Ideally, construction would be scheduled to occur during summer months when extended periods of warm, dry weather are typical. This will minimize the impacts of rain and wet soil conditions on construction.

If wet weather construction is conducted, it is recommended that all haul roads be armored with 12 to 18 inches of imported gravel fill. All structural fill material placed during wet weather construction should consist of imported granular fill. The import fill should contain less than 5 to 8 percent fines content by weight.

Measures to ensure stormwater runoff does not enter trenches and excavations will be required during wet weather construction. In addition, the potential for presence of groundwater seeps during winter months may necessitate dewatering within trenches and excavations.

Compaction Recommendations. Structural fills should be installed on a subgrade that has been prepared in accordance with the above recommendations. Fills should be installed in horizontal lifts not exceeding 8 inches in thickness (loose—prior to compaction), and should be compacted to at least 92 percent of the maximum dry density for fine-grained native soils. The maximum dry densities should be determined in accordance with ASTM D 1557 (Modified Proctor Test). The compaction criteria may be reduced to

85 percent in non-structural landscape or planter areas. Fills placed over ground that slopes in excess of 3H:1V should be keyed and benched into firm soils beneath all topsoil and tree or brush roots.

A summary of recommended compaction specifications is provided in the following table.

Recommended Fill Compaction Specifications

Material	Percent of Maximum Dry Density ASTM D 1557
Structural Fill and Trench Backfill	92
Landscaping Fill	85
Base Rock for Slabs and Pavements	95

Structural Fills During Summer Grading. During dry weather, structural fills may consist of virtually any well-graded soil that is free of debris, organic matter, and high percentages of clay or clay lumps, and that can be compacted to the preceding specifications. However, if excess moisture causes the fill to pump or weave, those areas should be dried and re-compacted, or removed and backfilled with compacted granular fill. In order to achieve adequate compaction during wet weather, or if proper moisture content cannot be achieved by drying, we recommend that fills consist of well-graded granular soils (sand or sand and gravel) that do not contain more than 5 percent material by weight passing the No. 200 sieve. In addition, it is usually desirable to limit this material to a maximum 6 inches in diameter for ease of compaction and future installation of utilities.

5.2 Finished Cut and Fill Slopes

Although steeper rock slopes may be feasible for portions of the site, we recommend that upland finished cut and fill slopes not exceed gradients of 2H:1V. Slopes that are subject to inundation, such as those that intersect the Cove) should be finished at cut slopes that do not exceed 3H:1V. Cut and fill slopes should be protected immediately from erosion following completion of grading. Erosion protection should consist of placement of jute mesh and seeding with erosion-resistant vegetation or other engineer-approved erosion control methods.

5.3 Excavations

Subsurface conditions encountered during the site investigation indicate that precautions in utility excavations will be required due to the potential for caving/sloughing. Any excavations deeper than 4 feet should be sloped or shored in accordance with Occupational Safety and Health Act (OSHA) regulations. Normally, shoring systems (for excavations less than 20 feet in depth) are contractor-designed and -installed items.

5.4 Erosion Control

We recommend that finished cut and fill slopes be protected immediately following grading with vegetation, gravel, or other approved erosion control methods. Water should not be allowed to flow over slope faces or drop from outfalls but should be collected and routed to stormwater disposal systems. Riprap, gabion baskets, or similar erosion control methods may be necessary at stormwater outfalls or to reduce water velocity in ditches. Silt fences should be established and maintained throughout the construction period. Silt fence barriers should be established downslope from all construction areas to protect natural drainage channels from erosion and/or siltation. In order to decrease erosion potential, care should be taken to maintain native vegetation and organic soil cover over as much of the site as possible.

5.5 Foundation Support

For the purpose of our initial foundation assessments we have assumed that the proposed structure/structures will be five stories or less, and that column loads will not exceed maximum factored loads of about 450 kips, and factored loads for continuous wall footing will not exceed 5 Klf. If structural loading exceeds the above assumptions by greater than 20 percent, Apex should be informed in order to re-assess the validity of our foundation recommendations.

Under the current development scheme, the project is proposed to feature spread footings that would bear within five feet of the existing ground surface. Unfortunately, some 15 to 20 feet old fill will still be in place under the foundations. Our recommendations for foundations assume that the building pads will be recompacted in accordance with our site preparation recommendations and that the structures will be underlain by a minimum of three feet of compacted granular fill.

Spread Footings. For spread footings established on recompacted fills and a granular fill pad as previously described, the foundations can be designed for an allowable bearing capacity of 2.5 kips per square foot (Ksf). We estimate that foundations designed in accordance with the above recommendations will experience less than 2 inches of total settlement and less than 1 inch of differential settlement between adjacent foundation elements. In order to even out such movements throughout the structure, we recommend connecting adjacent foundations through grade beams.

For sliding resistance, the native soils underlying spread footings can be assumed to have an ultimate coefficient of friction of 0.40. Passive soil pressure can be developed along the sides of footings if granular backfill is used around footings and the backfill is compacted to at least 95 percent of the material's maximum dry density as determined by ASTM D-1557 testing. An equivalent passive fluid weight of 350 pcf can be used for resistance against sliding.

Minimum allowable foundation size and minimum allowable foundation embedment depth should comply with IBC requirements.

The sliding coefficient, allowable bearing, and passive soil resistance may each be increased by 1/3 for short-term, temporary loading conditions such as high wind or seismic shaking.

Site Work Observation and Inspection. With any of the above described approaches to foundation support, we recommend that Apex be involved closely with the project general contractor and earth work contractor or pier contractor during initial site work and preparation of foundation subgrade areas. All structural fill placement and compaction should be monitored routinely with regular density testing conducted and documented.

5.6 Slabs on Grade and Vapor Retarders for Finished Areas

For slab-on-grade construction, we recommend installation of at least 6 inches of clean crushed rock or a clean gravel section between the bottom of the slab, and subgrade. For the gravel to be defined as "clean", it should contain less than 6 or 7 percent fines by weight passing a standard No. 200 sieve.

We would normally recommend the use of a vapor retarder between the slab and the subgrade soils. The vapor retarder discussion is rendered moot by the need to provide methane collection and venting as well as radon collection and venting under the slabs.

5.7 Retaining Structures

We have prepared lateral pressure recommendations for restrained and unrestrained walls. The loads and pressures developed from these recommendations are our best estimate of actual loads that may develop and do not contain a factor of safety. The recommendations assume that the retaining wall backfill material will consist of clean, durable, well-drained granular backfill as described in the Structural Fill Section of this report. If traffic loads are expected within a horizontal distance from the top of the wall equal to the wall height, a surcharge equivalent to an additional 2 feet of backfill height should be added to earth loads acting on the wall. Retaining wall pressures are assumed to act horizontally (normal to the wall), based on the practice of installing drainage membranes or impervious wall coatings that prevent friction between the wall and backfill.

Non-Restrained Walls. Non-restrained walls have no restraint at the top and are free to rotate about their base during backfilling. Most cantilever retaining walls fall into this category. We recommend that non-restrained walls be designed for pressures developed from the equivalent fluid weights shown in the following table.

Non-Restrained Retaining Wall Pressure Design Recommendations

Backfill Slope Horizontal/Vertical	Equivalent Fluid Weight (pounds per cubic foot)
Level	35
3H:1V	45
2H:1V	85

Restrained Walls. Restrained walls are any walls that are prevented from rotation during backfilling. Walls with corners and jogs and those that are restrained by a floor slab, floor diaphragm, and/or roof fall into the category of restrained walls. We recommend that restrained walls be designed for pressures developed from the equivalent fluid weights shown in the following table.

Restrained Retaining Wall Pressure Design Recommendations

Backfill Slope Horizontal/Vertical	Equivalent Fluid Weight (pounds per cubic foot)
Level	55
3H:1V	65
2H:1V	105

Seismic Lateral Earth Pressure. Lateral earth pressure acting on retaining walls should be increased to account for seismic loadings. We have prepared recommendations for seismic lateral earth pressures on non-restrained walls in accordance with the Mononobe-Okabe methodology. The peak ground acceleration used in preparing these recommendations was developed based on SDs/2.5 in accordance with the OSSC. Recent research indicates that for peak ground acceleration values less than 0.4g, seismic earth pressure can be ignored. However, we recommend utilizing the accepted practice of calculating the load based on one half of the peak ground acceleration for even low levels of site shaking.

The Mononobe-Okabe methodology was developed for non-restrained walls. Recent research indicates that at-rest (restrained) walls may not be subject to any load increases during seismic events. Further, methodologies for evaluating the loading on restrained walls are known to be quite conservative and as such, the factors of safety have been shown to more than address the seismic loading on restrained walls.

Seismic Earth Pressures may be approximated by a uniformly distributed rectangular pressure which is applied over the entire back of the wall. "H" represents the height of the wall in feet. The resultant force acts at a distance approximately 0.6H above the base of the wall.

Unrestrained Wall Seismic Surcharge Design Pressure Recommendations

Design Condition	Seismic Pressure Surcharge (pounds per square foot)
Seismic Active Earth Pressure (Unrestrained)	7H

These pressures represent our best estimate of actual pressures that may develop and do not contain a factor of safety. These pressures assume retaining wall backfill material is well-drained.

Retaining Wall Backfill. The backfill behind and within 4 feet of the retaining walls should consist of free-draining granular material and should meet recommended specifications provided in the Suitable Fill section of this report.

Mechanically-Stabilized Earth Walls. Mechanically-stabilized earth (MSE) retaining wall backfills should consist of clean, granular soils (i.e., sand, gravels, crushed rock). MSE walls require high-quality backfill for durability, good drainage, constructability, and good soil reinforcement interaction. These characteristics can be obtained from well-graded granular materials. MSE systems depend on friction between the reinforcing elements and the soil. In such cases, a material with high friction characteristics is specified and required. Some systems rely on passive pressure on reinforcing elements and, in those cases, the quality of backfill is still critical. These performance requirements generally eliminate predominantly fine-grained soils, particularly soils with high clay content.

Recommended soil strength parameters for use in the reinforced retaining wall design are summarized in the following tables. Soil cohesion should be assumed as zero.

MSE Backfill, Soil Strength Design Recommendations

Backfill Type	Design Friction Angle (Φ)	Moist Soil Unit Weight (γ)	Active Lateral Earth Pressure Coefficient[2]	At-Rest Lateral Earth Pressure Coefficient[3]
Select Borrow, Imported Clean Sand[1]	34 degrees	120 pcf	0.28	0.44
Crushed Rock	40 degrees	135 pcf	0.22	0.36

MSE Backfill, Active and At-Rest Earth Pressure Coefficients for Sloping Backfill

Backfill Type	Active Earth Pressure Coefficient 3:1 Backslope	At-Rest Earth Pressure Coefficient 3:1 Backslope	Active Earth Pressure Coefficient 2:1 Backslope	At-Rest Earth Pressure Coefficient 2:1 Backslope
Select Borrow, Imported Clean Sand[1]	0.33	0.49	0.41	0.57

Backfill Type	Active Earth Pressure Coefficient 3:1 Backslope	At-Rest Earth Pressure Coefficient 3:1 Backslope	Active Earth Pressure Coefficient 2:1 Backslope	At-Rest Earth Pressure Coefficient 2:1 Backslope
Crushed Rock	0.30	0.45	0.36	0.51
WSDOT Gravel Backfill for Walls	0.24	0.38	0.28	0.42

Notes:
1. Select Borrow, Imported Clean Sand: The sand should contain less than 9 percent or 10 percent fines by weight passing a standard No. 200 sieve.
2. Coulomb Active Lateral Earth Pressure with wall friction. The value assumes level backfill.
3. At-Rest Earth Pressure, Ko = 1-sin(Φ). The value assumes level backfill.

Traffic Surcharging Loads. If traffic loads are expected within a horizontal distance from the top of the wall equal to the wall height, a uniform lateral earth pressure acting horizontally on reinforced walls equal to 60 psf should be added to earth loads acting on the wall.

External and Global MSE Wall Stability. MSE wall stability should be determined for overturning, bearing, and sliding stability. Appropriate factors of safety should be utilized in design. The following soil parameters should be employed in external stability checks.

MSE Wall External Stability, Soil Design Parameters

Parameter	Symbol	Units	Value
WSDOT Gravel Backfill for Retaining Walls			
Backfill Soil Unit Weight	γ	pcf	See Table 4
Backfill Soil Friction Angle	Φ	degrees	See Table 4
Active Lateral Earth Pressure Coefficient (Coulomb with wall friction)	Ka	--	See Tables 4 & 5
At-Rest Lateral Earth Pressure Coefficient (Ko = 1-sin(Φ)	Ko	--	See Tables 4 & 5
In-place Soils at Foundation Grade			
Foundation Soil Friction Angle	φ	degrees	28
Foundation Soil Unit Weight	γ	pcf	120
Base Sliding Coefficient (Ultimate)	d	--	0.34
Allowable Bearing Capacity for footing embedded a minimum of 3 feet	q_{all}	Ksf	2 [2.]
Allowable Bearing Capacity for footing embedded a minimum of 6 feet	q_{all}	Ksf	4 [3.]
Passive Lateral Earth Pressure Coefficient	kp	--	2.77

Notes:
1. Ksf = Kips per square foot.
2. The bottom of footing is a minimum of 3 feet below all adjacent grades.
3. The bottom of footing is a minimum of 6 feet below all adjacent grades.

MSE Wall Foundation Embedment. To reduce long-term MSE wall stability issues associated with sloughing of existing slopes, we recommend that the toe of the MSE wall be embedded. The forward edge (toe) of wall should be set back a horizontal distance from the face of the slope a minimum of the height of the slope divided by two (H / 2).

Total and Differential Settlement Estimate. For MSE backfill heights of 15 feet or less in which foundations are embedded a minimum of 3 feet below all surrounding grades, our estimated total settlement is less than 2 inches. Differential settlement over either a 50-foot section or 100-foot section of MSE wall is estimated to be less than 1 inch.

Suitable Fill Materials. Backfill selection should be based on the ability of the material to drain and the drainage design developed for MSE walls. Weather conditions will also affect the ability to place and properly compact fill materials utilized in MSE wall construction. Additionally, for MSE walls and reinforced slopes, the susceptibility of the backfill reinforcement to damage due to placement and compaction of backfill on the soil reinforcement should be taken into account with regard to backfill selection.

Additional Design Considerations. Utility trenching should not be conducted in the reinforced zone of MSE walls. Trenching will invariably cut through reinforcement layers within the wall zone and undermine wall stability.

5.8 Pavements

The following recommendations for parking lot pavements and access driveways are specific to non-public right-of-way areas. Our designs assume that the subgrade within 8 inches of the bottom of the pavement section will be compacted to 95 percent of the material's maximum dry density in accordance with ASTM D 1557 (Modified Proctor) testing. If the road subgrade is not re-compacted to a uniform density and stiffness, the gravel base will have to be increased significantly. If re-compaction of the subgrade is not conducted, the gravel base thickness should be increased by 50 percent from those thicknesses indicated in the following table.

Specifications for pavements, base course, and sub-base should conform to Oregon Department of Transportation (ODOT) specifications. Our pavement design sections are provided in the following table.

Flexible Asphalt Concrete Pavement Design

Approximate Number of Trucks	Equivalent Single Axle Loads (ESALs x 1000)	Asphalt Concrete Thickness (inches)	Base Rock Thickness (inches)
Auto parking	10	2.5	10
6	25	3	10
15	66	3.5	11

Intermediate truck loading conditions and the resultant asphalt concrete and base rock sections can be interpolated from the above table. These designs are intended for use on private streets. Construction traffic should be limited to unpaved and untreated roadways, or specially constructed haul roads. If this is not possible, the pavement design selected from the above table should include an allowance for construction traffic.

5.9 Agnes Avenue

Agnes Road is planned to be developed as a City street in accordance with the requirements of the City of Oregon City. In general, the Agnes Road alignment follows the old railroad right-of-way that previously formed the east boundary of the Clackamette Cove quarry site. The railroad right-of-way predates the quarry by decades and was generally filled above adjacent grades (to avoid flooding).

We completed a series of five borings within the Agnes Avenue right-of-way. Shallow soils, likely subgrade soils, encountered consisted generally of dense gravel fills associated with past railroad and roadway development. Portions of the right-of-way have been filled over with sand and silt fills. It is possible that remnants of track and ties could be found at depth, although none were seen within our borings.

The pavement subgrade resilient modulus (M_R) was developed from correlation with soil types present throughout the corridor. The soils present at subgrade throughout the area generally consist of sandy silt and sand fills. Based on our experience, we selected a conservative resilient modulus of 6,000 pounds per square inch (psi).

Based on our explorations and evaluation of past site history, the proposed alignment of Agnes Avenue is appropriate for the development of the City street. The subgrade soils will require recompaction in accordance with City requirements as preparation for final subgrade grades.

5.10 Agnes Extension

The Agnes Extension portion of the project consists of extending a ¾ width roadway from the west end of Agnes Avenue to the east. The roadway will cross the old Rossman Landfill.

The Rossman Landfill has been extensively studied and consisted of a municipal solid waste (MSW) landfill that was open until 1969. The MSW was placed in unlined trenches and pits. Compaction of the waste and daily cover were no typical. The cells of the landfill were subsequently capped with on-site silts and sands.

An exploration program completed by AGRA Earth and Environmental in 1998 included five borings and four test pits within or near the proposed Agnes Extension footprint. In general, the explorations encountered 6 to 15 feet of surface fill (gravels, sands, and silts) overlying 5 to 13 feet of MSW.

Ideally, roadways would not be developed over MSW landfills but the nature of this site results in a requirement for an emergency outlet at the north end. The original Agnes Avenue was developed over the Rossman Landfill and ultimately had to be closed when differential settlement made the roadway undriveable. However, the total depth of removal and complications associated with landfill removal and relocation preclude excavating and removing the existing landfill material.

The failed Agnes Avenue was constructed directly over the landfill with no preparation. Further, the amount of MSW under the original Agnes was closer to 20 feet and the landfill was recently closed. Settlements during the initial 10 to 20 years after closure are much higher than the long-term settlement after that time.

Based on our research, we recommend that the roadway area be preloaded in order to reduce the total amount of settlement that will occur post construction. Surcharging landfills is a common approach to developing roadways and was applied over the portions of Rossman Landfill located east of the 205 freeway.

The long-term settlement after surcharging can be approximated by consolidation theory. Published guidance indicates that the compression index (C'c) for mature solid waste ranges up to 0.22 and the mean secondary compression coefficient (Cα) for mature landfill waste is 0.05 strain/log time. Based on this value, we evaluated the time rate of settlement associated with ongoing collapse of the waste as well as the addition of the roadway section and roadway fill. We also evaluated the level of consolidation that would occur under surcharge loads of varying heights.

With a net four foot fill over the roadway (approximately) our analysis indicates that the MSW compression would approach four inches with a further four inches of settlement occurring over the next 20 years. In order to accelerate the long-term settlements, we propose placing a surcharge fill over the roadway above and beyond the net fill for the roadway. Based on published values, and attempting to limit long-term settlements to one inch, our analysis indicates that a 20-foot surcharge, left in place for approximately 90 days would reduce the long-term settlement to less than an inch.

6.0 Recommendations for Additional Services

We have prepared recommendations relative to the overall site work and development of this site. As specific building plans are developed, we recommend significant geotechnical involvement in the subsequent planning and design of those structures.

7.0 Closing

This report presented Apex's geotechnical engineering evaluation and recommendations for the proposed project. Subject to the recommendations provided within this report, construction of the proposed project is feasible from a geotechnical standpoint. We trust that this report meets your needs. If you have any questions, or if we can be of further assistance, please call. We look forward to working with you in the future.

Note: Base map prepared from USGS 7.5-minute quadrangle of Oregon City, OR, dated 2017 as provided by USGS.gov.

0 2,000 4,000

Approximate Scale in Feet

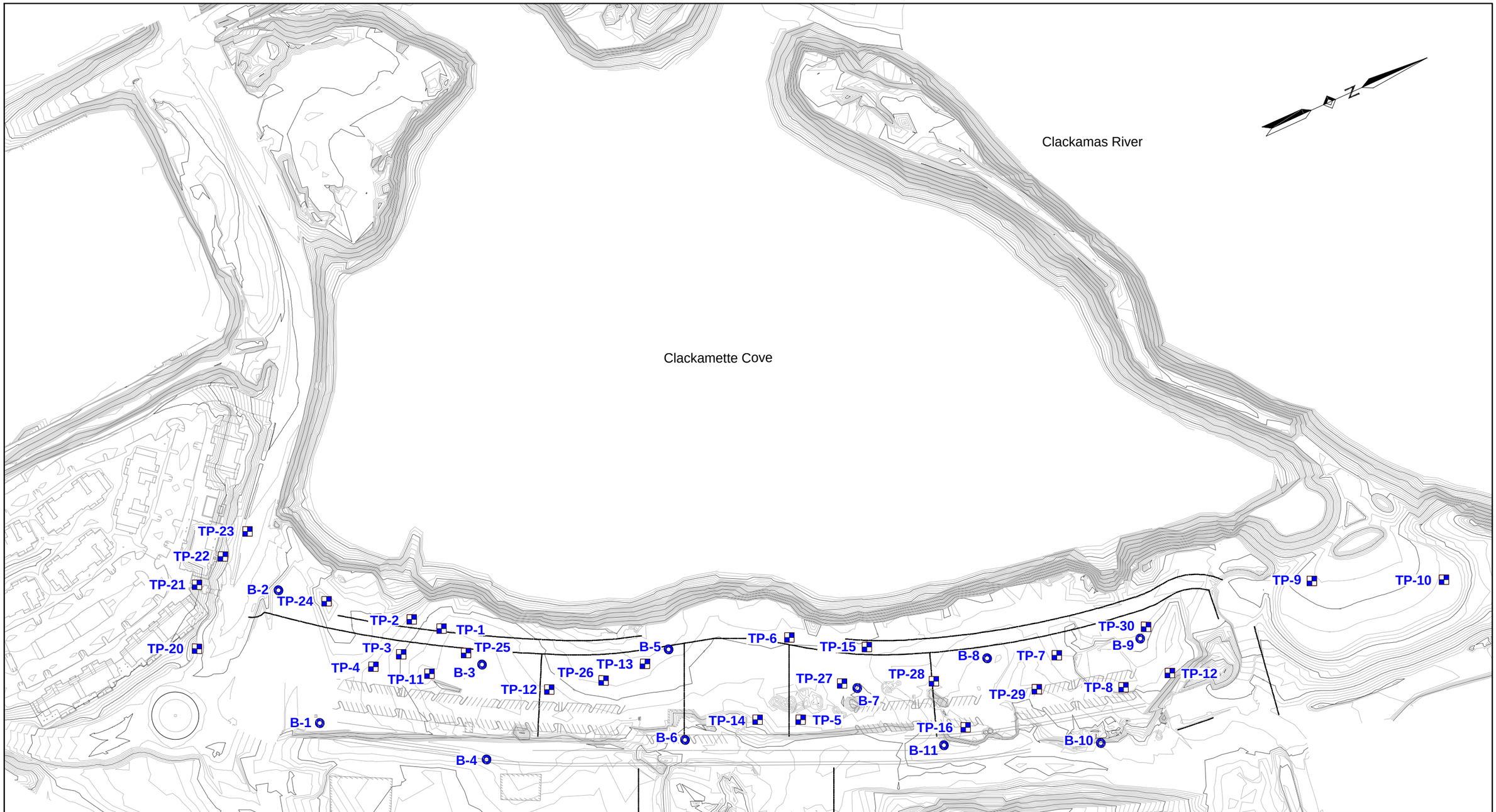
N

Site Location Map

Clackamette Cove
Proposed Cove Waterfront Development
Oregon City, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	2367-00	Figure
September 2017		1



Legend:

TP-1 Test Pit Location

B-1 Boring Location

NOTE: Base map prepared from X-site 2017-08-08 bound.dwg (2017).

Site Vicinity Plan

Clackamette Cove
Proposed Cove Waterfront Development
Oregon City, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	2367-00	Figure
September 2017		2

Appendix A

Soil Boring Logs

Sample Descriptions

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, and grain size, and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
MAJOR CONSTITUENT with additional remarks; color, moisture, minor constituents, density/consistency.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits and Geoprobe® explorations is estimated based on visual observation and is presented parenthetically on test pit and Geoprobe® exploration logs.

SAND and GRAVEL Density	Standard Penetration Resistance in Blows/Foot
Very loose	0 - 4
Loose	4 - 10
Medium dense	10 - 30
Dense	30 - 50
Very dense	>50

SILT or CLAY Density	Standard Penetration Resistance in Blows/Foot
Very soft	0 - 2
Soft	2 - 4
Medium stiff	4 - 8
Stiff	8 - 15
Very Stiff	15 - 30
Hard	>30

Moisture

Dry	Little perceptible moisture.
Sl. Moist	Some perceptible moisture, probably below optimum.
Moist	Probably near optimum moisture content.
Wet	Much perceptible moisture, probably above optimum.

Minor Constituents

	Estimated Percentage
Not identified in description	0 - 5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Sampling Symbols

BORING AND PUSH-PROBE SYMBOLS

- Split Spoon
- Sonic
- Tube (Shelby, Push-Probe)
- Cuttings
- Core Run
- * No Sample Recovery
- SSA Solid Stem Auger
- HSA Hollow Stem Auger
- MR Mud Rotary

TEST PIT SOIL SAMPLES

- Grab
- Bag
- Shelby Tube

Key to Exploration Logs

Clackamette Cove
Proposed Cove Waterfront Development
Oregon City, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number 2367-00

September 2017

Figure Key

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Clackamette Cove
Proposed Cove Waterfront Development
Oregon City, Oregon

Boring Number: **B-1**

Project Number: **2367-00**
Logged By: J. Munsey
Date: August 16-18, 2017
Site Conditions: --
Drilling Contractor: Darryl Metzger
Drilling Equipment: CME 75, 8.5" OD Auger
Sampler Type: --
Depth to Water (ATD): 24'
Surface Elevation: Not Measured

▲ Standard Penetration Resistance (Blows per Foot)

Depth, feet	Sample ID	Sample	Lithologic Description
			GRAVEL surface over GRAVEL FILL with silt and sand.
		☒	SILT (FILL); mottled medium brown/orangish brown, slightly moist, trace burnt organic material.
5		☒	SILT (native); medium brown, slightly moist.
		☒	SILT with fine sand; light brown, slightly moist, 85% silt, 15% sand, poorly graded, micaceous.
10		☒	
15		☒	Silty SAND; medium brown, slightly moist, 75% sand, 25% silt, poorly graded, micaceous
			GRAVEL; medium brown, moist, 90% weathered gravel 10% sand matrix.
20		☒	
25		☒	Becomes wet.
30		☒	Becomes dark gray.
			Bottom of Boring at 31.5' BGS.
			Groundwater estimated to be 24' at time of drilling. (Note: groundwater depth observed only at the time of drilling; with no substantive equilibration period)
35			

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Clackamette Cove
Proposed Cove Waterfront Development
Oregon City, Oregon

Boring Number: **B-2**

Project Number: **2367-00**
Logged By: J. Munsey
Date: August 16-18, 2017
Site Conditions: --
Drilling Contractor: Darryl Metzger
Drilling Equipment: CME 75, 8.5" OD Auger
Sampler Type: --
Depth to Water (ATD): 25'
Surface Elevation: Not Measured

▲ Standard Penetration Resistance
(Blows per Foot)

Depth, feet	Sample ID	Sample	Lithologic Description
			GRAVEL surface over GRAVEL FILL with concrete and asphalt debris.
5			
10			SILT (native); blueish gray, slightly moist, poorly graded, trace well-rounded gravels.
15			Becomes moist, trace organic material.
20			GRAVEL with sand; medium brown, moist, 85% gravel, 15% sand, subangular to well-rounded, fining upward, micaceous.
25			Becomes medium gray. Gravels become basalt-like in composition.
30			
35			Bottom of Boring at 31.5' BGS. Groundwater estimated to be 25' at time of drilling. (Note: groundwater depth observed only at the time of drilling; with no substantive equilibration period)

10 20 30 40

87/9"

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Clackamette Cove
Proposed Cove Waterfront Development
Oregon City, Oregon

Boring Number: **B-3**

Project Number: **2367-00**
Logged By: J. Munsey
Date: August 16-18, 2017
Site Conditions: --
Drilling Contractor: Darryl Metzger
Drilling Equipment: CME 75, 8.5" OD Auger
Sampler Type: --
Depth to Water (ATD): --
Surface Elevation: Not Measured

▲ Standard Penetration Resistance (Blows per Foot)

Depth, feet	Sample ID	Sample	Lithologic Description	10 20 30 40
			Straw erosion control surface over GRAVEL FILL with silt and sand.	
			SILT FILL with gravel; medium brown, slightly moist.	
		☒	1 Foot of concrete debris.	
5		☒		
		☒	GRAVEL FILL with fine to coarse sand; medium brown, slightly moist, well-rounded, well graded.	
10		☒		
15		☒	SILT (native); blueish gray, slightly moist, poorly graded.	
20		☒	GRAVEL with sand; medium brown, moist, well rounded gravels, micaceous, poorly graded, fining upward.	
25		☒	Gravels become basalt-like in composition.	83/10"
			Bottom of Boring at 26.33' BGS.	
30				
35				

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Clackamette Cove
Proposed Cove Waterfront Development
Oregon City, Oregon

Boring Number: **B-4**

Project Number: **2367-00**
Logged By: J. Munsey
Date: August 16-18, 2017
Site Conditions: --
Drilling Contractor: Darryl Metzger
Drilling Equipment: CME 75, 8.5" OD Auger
Sampler Type: --
Depth to Water (ATD): --
Surface Elevation: Not Measured

Depth, feet | Sample ID | Sample

Lithologic Description

GRAVEL surface over gravel FILL with sand.

GRAVEL with sand FILL; medium brown, large gravels, some concrete debris.

SILT (native); blueish-gray, moist, non-plastic, 10% woody debris and organic material.

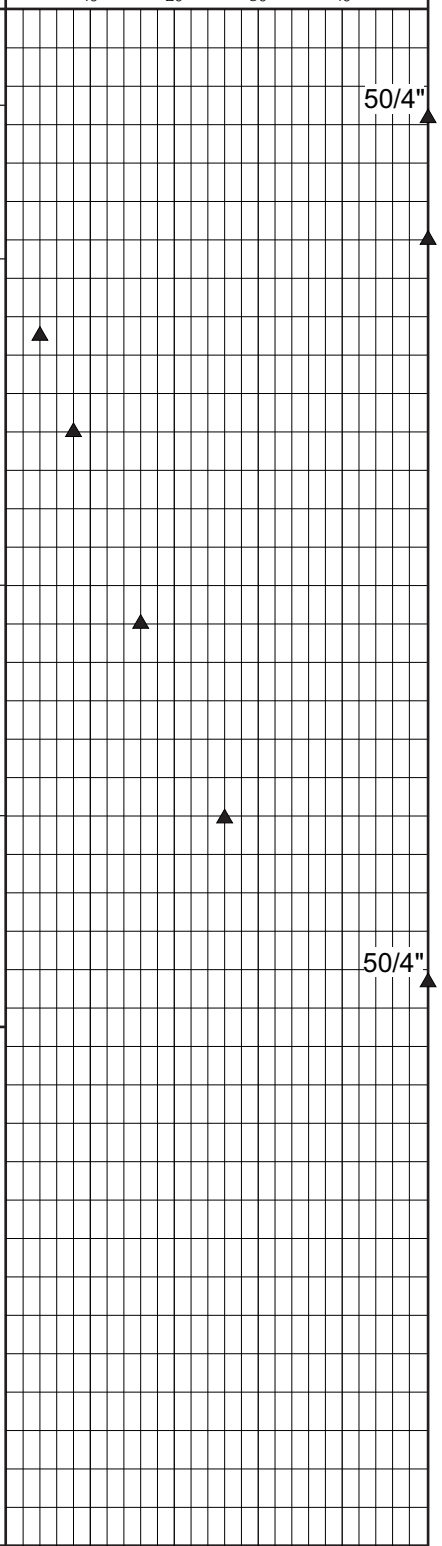
No organic material present.

Fine SAND, blueish-gray, poorly graded, fining upward.

GRAVEL; blueish-gray, moist, well-rounded, slight cementation.

Bottom of Boring at 26.5' BGS.

▲ Standard Penetration Resistance (Blows per Foot)



Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Clackamette Cove
Proposed Cove Waterfront Development
Oregon City, Oregon

Boring Number: **B-5**

Project Number: **2367-00**
Logged By: J. Munsey
Date: August 16-18, 2017
Site Conditions: --
Drilling Contractor: Darryl Metzger
Drilling Equipment: CME 75, 8.5" OD Auger
Sampler Type: --
Depth to Water (ATD): --
Surface Elevation: Not Measured

Lithologic Description

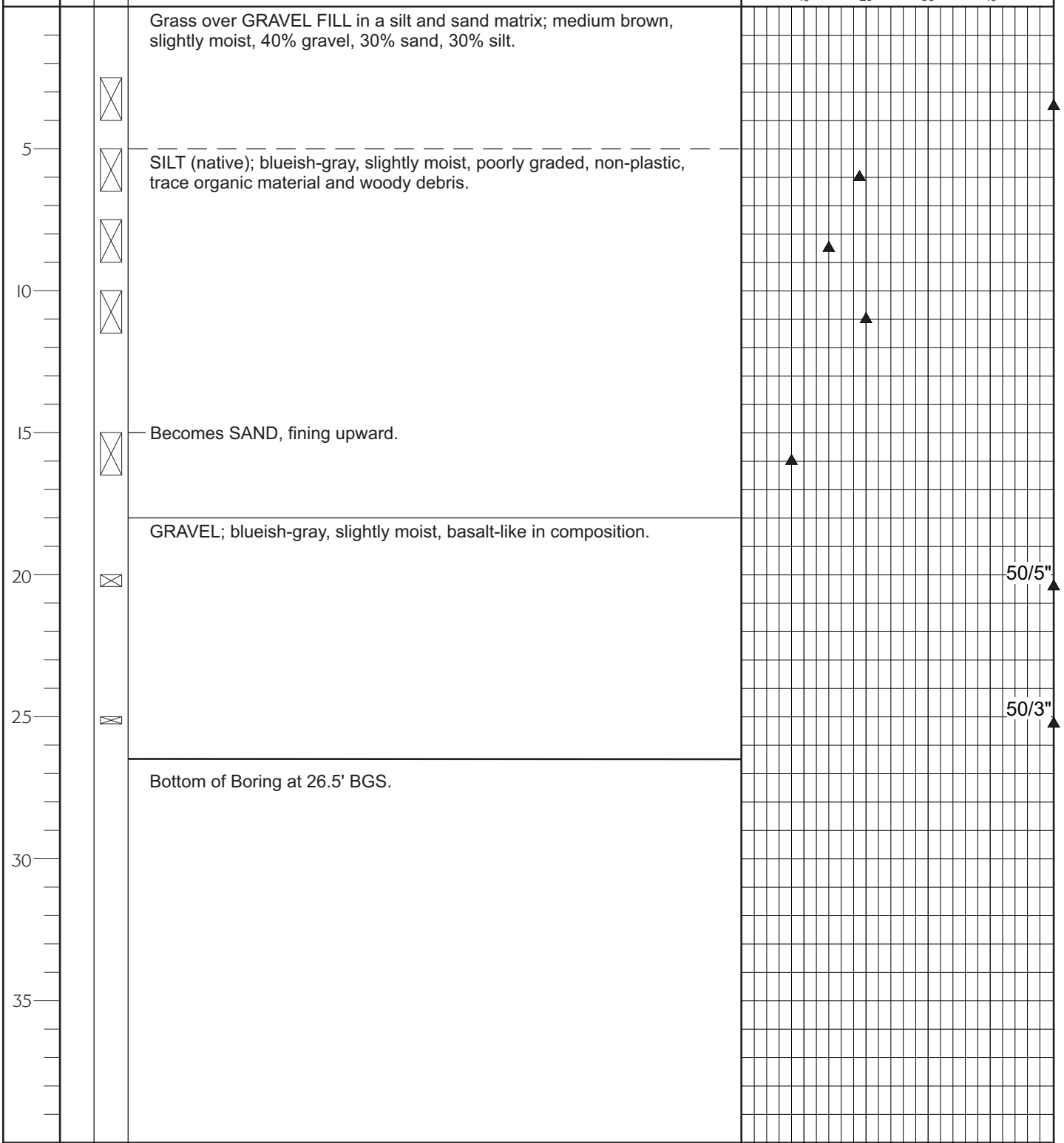
Grass over GRAVEL FILL in a silt and sand matrix; medium brown, slightly moist, 40% gravel, 30% sand, 30% silt.

SILT (native); blueish-gray, slightly moist, poorly graded, non-plastic, trace organic material and woody debris.

Becomes SAND, fining upward.

GRAVEL; blueish-gray, slightly moist, basalt-like in composition.

Bottom of Boring at 26.5' BGS.



Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Clackamette Cove
Proposed Cove Waterfront Development
Oregon City, Oregon

Boring Number: **B-6**

Project Number: **2367-00**
Logged By: J. Munsey
Date: August 16-18, 2017
Site Conditions: --
Drilling Contractor: Darryl Metzger
Drilling Equipment: CME 75, 8.5" OD Auger
Sampler Type: --
Depth to Water (ATD): --
Surface Elevation: Not Measured

Depth, feet | Sample ID | Sample | Lithologic Description | ▲ Standard Penetration Resistance (Blows per Foot) 10 20 30 40

Grass over GRAVEL FILL in a silt and sand matrix; medium brown, dry, matrix supported, trace woody debris and organic material.

5

SILT (native); mottled blueish-gray/dark brown, slightly moist, non-plastic, trace organic material.

SAND; blueish-gray, slightly moist, fine grained trace silt.

10

15

SILT; blueish-gray, slightly moist, poorly graded, non-plastic, micaceous, some thin sand lenses present.

20

25

Becomes moist.

30

Becomes SAND, fining upward.

GRAVEL; blueish-gray, moist, poorly graded, well-rounded, basalt in composition.

35

Bottom of Boring at 36.5' BGS.

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Clackamette Cove
Proposed Cove Waterfront Development
Oregon City, Oregon

Boring Number: **B-7**

Project Number: **2367-00**
Logged By: J. Munsey
Date: August 16-18, 2017
Site Conditions: --
Drilling Contractor: Darryl Metzger
Drilling Equipment: CME 75, 8.5" OD Auger
Sampler Type: --
Depth to Water (ATD): --
Surface Elevation: Not Measured

Depth, feet | Sample ID | Sample

Lithologic Description

Grass and wood chip erosion control cover over GRAVEL and fine sand FILL; medium brown, slightly moist, well graded, frequent concrete and metal debris.

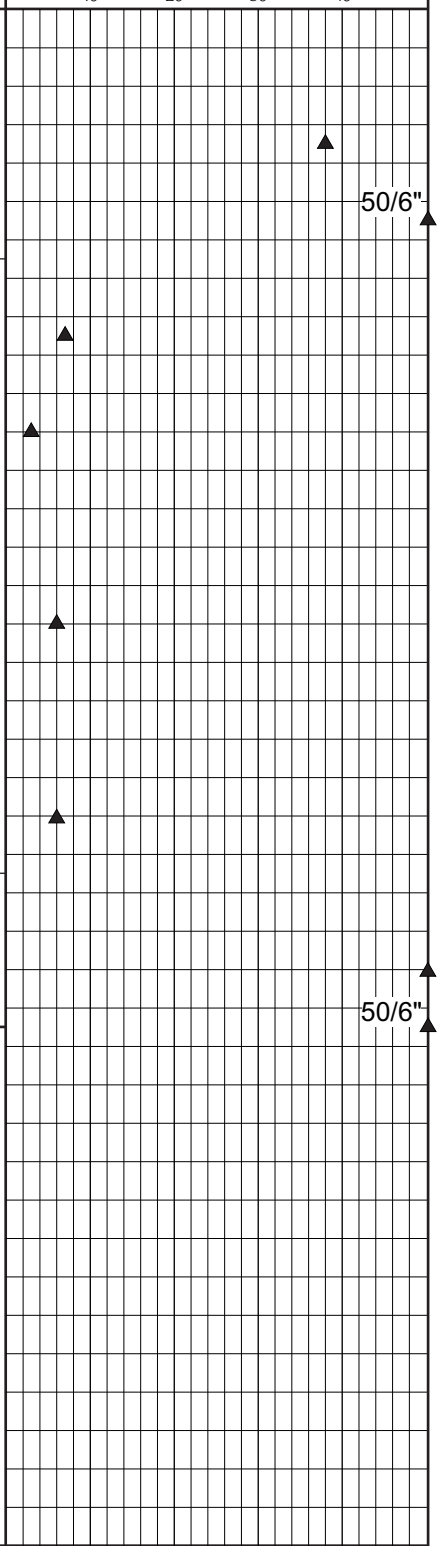
SILT (native); mottled medium brown/orangish-brown, slightly moist, non-plastic.

Becomes blueish-gray, micaceous, some thin sand lenses present.

GRAVEL in sand matrix; medium brown, slightly wet, poorly graded, well-rounded, 90% gravel 10% sand.

Bottom of Boring at 26.5' BGS.

▲ Standard Penetration Resistance
(Blows per Foot)



Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

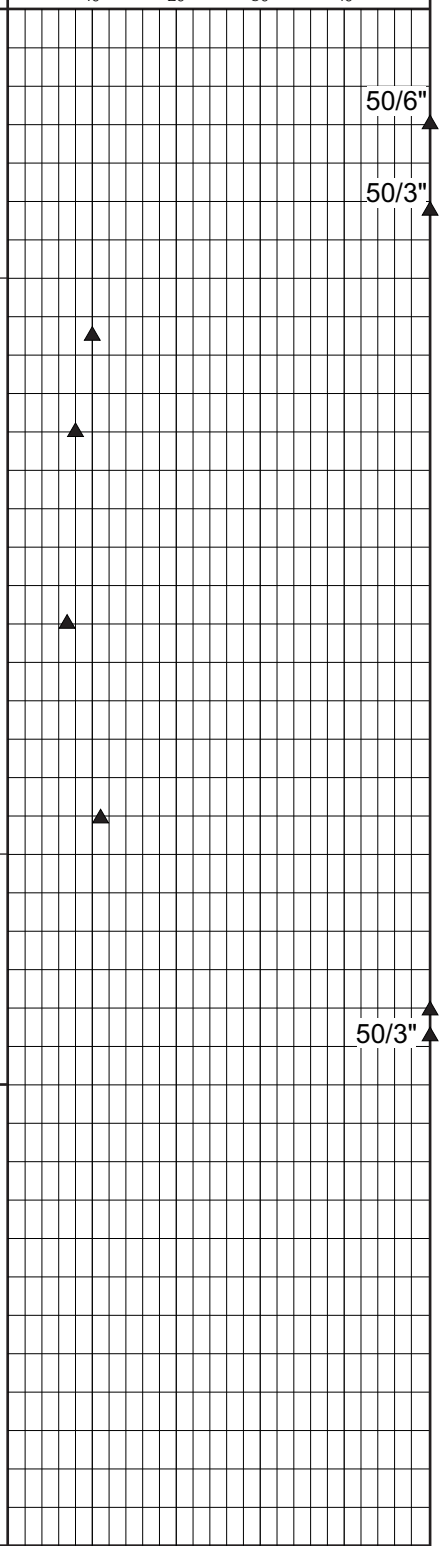
Clackamette Cove
Proposed Cove Waterfront Development
Oregon City, Oregon

Boring Number: **B-8**

Project Number: **2367-00**
Logged By: J. Munsey
Date: August 16-18, 2017
Site Conditions: --
Drilling Contractor: Darryl Metzger
Drilling Equipment: CME 75, 8.5" OD Auger
Sampler Type: --
Depth to Water (ATD): 28'
Surface Elevation: Not Measured

Depth, feet	Sample ID	Sample	Lithologic Description
			Grass over GRAVEL FILL with silt and sand; medium brown, slightly moist, 5% woody debris.
5			Becomes gray.
			SILT (native); blueish-gray, slightly moist, non-plastic, micaceous.
10			Some thin sand lenses present.
15			
20			Becomes fine sand.
			GRAVEL with sand; medium brown, moist, well graded, 85% gravel 15% sand, well-rounded.
25			Becomes wet.
			Bottom of Boring at 28.0' BGS.
30			Groundwater estimated to be 28' at time of drilling. (Note: groundwater depth observed only at the time of drilling; with no substantive equilibration period)
35			

▲ Standard Penetration Resistance (Blows per Foot)



Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Clackamette Cove
Proposed Cove Waterfront Development
Oregon City, Oregon

Boring Number: **B-9**

Project Number: **2367-00**
Logged By: J. Munsey
Date: August 16-18, 2017
Site Conditions: --
Drilling Contractor: Darryl Metzger
Drilling Equipment: CME 75, 8.5" OD Auger
Sampler Type: --
Depth to Water (ATD): --
Surface Elevation: Not Measured

Depth, feet	Sample ID	Sample	Lithologic Description
		⊠	GRAVEL FILL with silt and sand; medium brown, red and gray gravels, slightly moist, well graded, well-rounded, 60% gravel 20% silt 20% sand.
5		⊠	
		▨	SILT (native); blueish-gray, slightly moist, non-plastic, poorly graded, micaceous, trace organics.
10		▨	
15		▨	Becomes moist.
		⊠	GRAVEL with sand; blueish-gray, moist, poorly graded, 85%gravel, 15%sand matrix, well-rounded.
20			Bottom of Boring at 21.5' BGS.
25			
30			
35			

▲ Standard Penetration Resistance (Blows per Foot)

10 20 30 40

50/4"
50/6"
50/6"

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

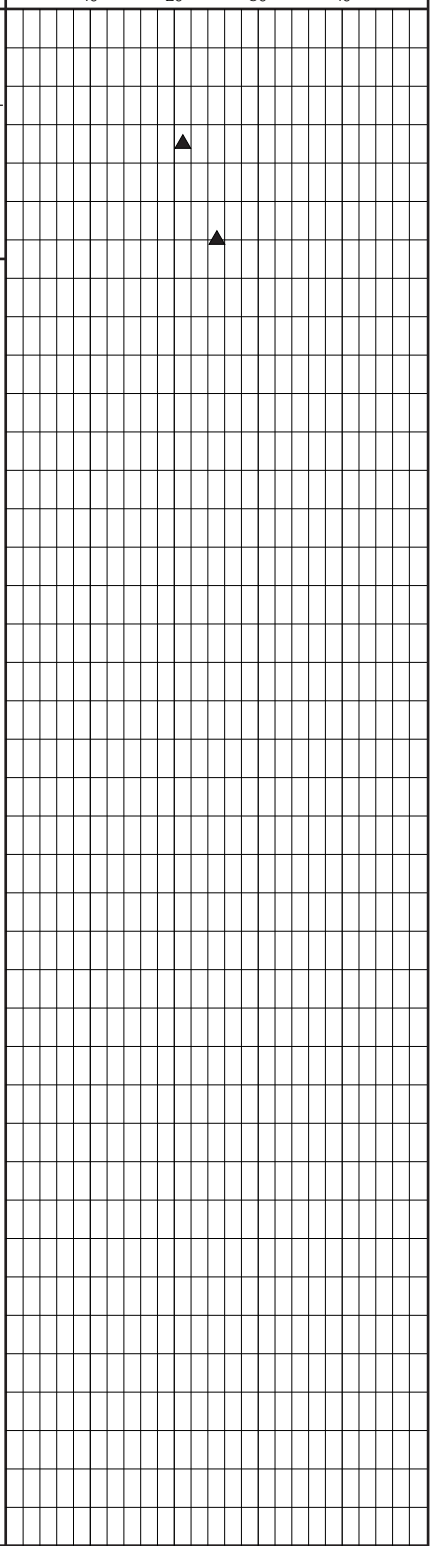
Clackamette Cove
Proposed Cove Waterfront Development
Oregon City, Oregon

Boring Number: **B-10**

Project Number: **2367-00**
Logged By: J. Munsey
Date: August 16-18, 2017
Site Conditions: --
Drilling Contractor: Darryl Metzger
Drilling Equipment: CME 75, 8.5" OD Auger
Sampler Type: --
Depth to Water (ATD): --
Surface Elevation: Not Measured

▲ Standard Penetration Resistance
(Blows per Foot)

Depth, feet	Sample ID	Sample	Lithologic Description
			GRAVEL road surface over GRAVEL and silt FILL; medium brown, slightly moist, well graded, 85% gravel, 15% silt matrix, well-rounded.
		☒	SILT with gravel FILL; dark brown, slightly moist, 75% silt, 25% gravel, trace sand.
5		☒	
			Bottom of Boring at 6.5' BGS.
10			
15			
20			
25			
30			
35			



Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Clackamette Cove
Proposed Cove Waterfront Development
Oregon City, Oregon

Boring Number: **B-11**

Project Number: **2367-00**
Logged By: J. Munsey
Date: August 16-18, 2017
Site Conditions: --
Drilling Contractor: Darryl Metzger
Drilling Equipment: CME 75, 8.5" OD Auger
Sampler Type: --
Depth to Water (ATD): --
Surface Elevation: Not Measured

▲ Standard Penetration Resistance
(Blows per Foot)

Depth, feet	Sample ID	Sample	Lithologic Description
			GRAVEL road surface over GRAVEL FILL; medium gray, dry, well-rounded, gravels basalt-like in composition.
		⊠	SAND with gravel FILL; blueish-gray, slightly moist, well-rounded gravels, well graded, 75% sand, 25% gravel.
5		⊠	
			Bottom of Boring at 6.5' BGS.
10			
15			
20			
25			
30			
35			

10 20 30 40

50/5.5"

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Clackamette Cove
Oregon City, Oregon

Project Number **1195-00**

Test Pit Number **TP-1**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Greg VanDeHey Soil Explorations	Date Completed: 6/6/06
Excavation Equipment: Case Track-Hoe	Logged By: J. Duquette

Depth, feet	Material Description
	4" to 6" silty TOPSOIL.
	(Medium stiff), dry, brown, gravelly SILT. (Fill)
	(Medium stiff to stiff), brown, ASPHALT DEBRIS and SILT.
5	(Medium stiff), dry, brown, COBBLES and SILT. (Fill)
10	Refusal on Concrete Slab/Concrete Debris at 9.0' BGS. No Seepage or Groundwater Noted.

Test Pit Number **TP-2**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Greg VanDeHey Soil Explorations	Date Completed: 6/6/06
Excavation Equipment: Case Track-Hoe	Logged By: J. Duquette

Depth, feet	Material Description
	4" to 6" TOPSOIL.
	(Stiff), dry, brown SILT, ASPHALT DEBRIS, and GRAVEL.
5	(Stiff), dry, brown, COBBLES and SILT with some tree branches and roots. (Fill)
10	Refusal on Concrete Slab/Concrete Debris at 9.0' BGS. No Seepage or Groundwater Noted.

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Clackamette Cove
Oregon City, Oregon

Project Number **1195-00**

Test Pit Number **TP-3**

Test Pit Location See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Greg VanDeHey Soil Explorations	Date Completed: 6/6/06
Excavation Equipment Case Track-Hoe	Logged By: J. Duquette

Depth, feet	Material Description
	TOPSOIL.
	(Dense), dry, gray, crushed ROCK. (Fill)
	(Dense), dry, brown-gray SAND and COBBLES.
	Large chunk of concrete at 2.0'. Some asphalt debris.
	Refusal on Large Concrete Chunk Debris at 4.0' BGS.
5	No Seepage or Groundwater Noted.
10	

Test Pit Number **TP-4**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Greg VanDeHey Soil Explorations	Date Completed: 6/6/06
Excavation Equipment Case Track-Hoe	Logged By: J. Duquette

Depth, feet	Material Description
	TOPSOIL.
	(Dense), dry, brown-gray, SILT and COBBLES.
	(Medium dense), dry, blue-gray SILT and COBBLES. Trace organic debris with an organic odor.
5	(Medium stiff), dry, blue-gray SILT with a little gravel. Trace organic debris with an organic odor. (Fill)
	Intermittent sticks/branches from 8' to 13'.
10	
	Test Pit Terminated at 13.0' BGS in Blue-gray SILT. (Fill)
	No Seepage or Groundwater Noted.

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Clackamette Cove
Oregon City, Oregon

Project Number **1195-00**

Test Pit Number **TP-5**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Greg VanDeHey Soil Explorations	Date Completed: 6/6/06
Excavation Equipment: Case Track-Hoe	Logged By: J. Duquette

Depth, feet	Material Description
	TOPSOIL.
	(Stiff), damp, brown, gravelly SILT. (Fill)
	Concrete slab.
	(Soft), red, moist to damp, silty CLAY with trace organics.
5	Scraps of steel chains.
	(Soft to medium stiff), damp, layers of red, silty CLAY and blue-gray SILT with occasional cobbles. (Fill)
	Hit 12" ribbed steel pipe.
10	Test Pit Terminated at 10.0' BGS.
	Light Seepage at 3.0' BGS.

Test Pit Number **TP-6**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Greg VanDeHey Soil Explorations	Date Completed: 6/6/06
Excavation Equipment: Case Track-Hoe	Logged By: J. Duquette

Depth, feet	Material Description
	TOPSOIL.
	(Medium stiff), dry, gray-brown SILT with some gravel.
	(Very dense), dry SILT and GRAVEL/COBBLES with trace organics.
	Very slow digging to 4.5'
5	Refusal at 4.5' BGS in (Very dense), silty GRAVEL and COBBLES.
	No Seepage or Groundwater Noted.
10	

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Clackamette Cove
Oregon City, Oregon

Project Number **1195-00**

Test Pit Number **TP-7**

Test Pit Location See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Greg VanDeHey Soil Explorations	Date Completed: 6/6/06
Excavation Equipment Case Track-Hoe	Logged By: J. Duquette

Depth, feet	Material Description
	TOPSOIL.
	(Very dense), dry, brown and gray, SAND and GRAVEL with a little silt.
5	(Dense), dry, gray, silty SAND. (Fill)
	(Very dense), dry, gray, silty SAND and GRAVEL.
	Trace wood and root fragments.
	Test Pit Terminated at 8.0' BGS.
	Slow, Hard Digging Over Full Depth of Test Pit.
10	No Seepage or Groundwater Noted.

Test Pit Number **TP-8**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Greg VanDeHey Soil Explorations	Date Completed: 6/6/06
Excavation Equipment Case Track-Hoe	Logged By: J. Duquette

Depth, feet	Material Description
	TOPSOIL.
	(Medium stiff), dry, gray-brown SILT with some gravel.
	(Very dense), dry to damp, gray, sandy GRAVEL and COBBLES.
5	
	(Medium stiff), dry, blue-gray SILT with an organic odor.
10	
	Test Pit Terminated at 13.5' BGS in (Soft to medium stiff), blue-gray SILT.
	Light Seepage at 5.0' BGS.

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Clackamette Cove
Oregon City, Oregon

Project Number **1195-00**

Test Pit Number **TP-9**

Test Pit Location See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Greg VanDeHey Soil Explorations	Date Completed: 6/6/06
Excavation Equipment Case Track-Hoe	Logged By: J. Duquette

Depth, feet	Material Description
	TOPSOIL.
	(Soft), damp, red wood debris and SILT. (Fill)
	(Soft), damp, red-brown, organics and clayey SILT to silty CLAY with some wood debris.
5	
	Log or wood debris.
	(Dense), dry, pink SANDSTONE. (Fill)
	(Soft to very soft), damp, blue-gray SILT with large amounts of organic branches, roots, and wood debris. (Fill)
10	
	Test Pit Terminated at 13.5' BGS. No Seepage or Groundwater Noted.

Test Pit Number **TP-10**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Greg VanDeHey Soil Explorations	Date Completed: 6/6/06
Excavation Equipment Case Track-Hoe	Logged By: J. Duquette

Depth, feet	Material Description
	TOPSOIL.
	(Soft), damp, red-brown, wood debris and SILT.
	(Dense), dry, light-gray GRAVEL.
	(Soft), damp to moist, red-brown, clayey SILT to silty CLAY with trace to a little GRAVEL or ROCK fragments.
5	
	(Soft), damp to moist, blue-gray SILT with organic material.
10	
	(Soft), moist, tan CLAY.
	Test Pit Terminated at 14.0' BGS in (Soft to Medium stiff), Blue-gray SILT. Light Seepage at 12.0' BGS.

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Clackamette Cove
Oregon City, Oregon

Project Number **1195-00**

Test Pit Number **TP-11**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Robinson Construction Co.	Date Completed: 1/7/07
Excavation Equipment: CAT 330 Track Hoe	Logged By: S. Albright

Depth, feet	Material Description
	(Very dense), moist, gray, sandy GRAVEL FILL (Crushed Rock).
5	(Medium dense to dense), moist to wet, gray, silty SAND with gravel.
10	Bottom of Test Pit at 10.5' BGS. No Seepage or Groundwater Noted.

Test Pit Number **TP-12**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Robinson Construction Co.	Date Completed: 1/7/07
Excavation Equipment: CAT 330 Track Hoe	Logged By: S. Albright

Depth, feet	Material Description
	(Very dense), moist, gray, sandy GRAVEL FILL (Crushed Rock).
	Very heavy seepage from 3.0' to 4.0'.
5	(Soft to medium stiff), moist to wet, brown and gray, clayey SILT FILL.
10	(Medium stiff to stiff), moist to wet, tan to brown SILT with some clay. Light seepage at 8.0'.
	Bottom of Test Pit at 12.0' BGS. No Groundwater Noted.

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Clackamette Cove
Oregon City, Oregon

Project Number **1195-00**

Test Pit Number **TP-13**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Robinson Construction Co.	Date Completed: 1/7/07
Excavation Equipment: CAT 330 Track Hoe	Logged By: S. Albright

Depth, feet	Material Description
	(Very dense), moist, gray, sandy GRAVEL FILL (Crushed Rock).
5	(Medium stiff), moist, gray, sandy SILT with gravel. Mild organic odor.
10	Bottom of Test Pit at 11.0' BGS. No Seepage or Groundwater Noted.

Test Pit Number **TP-14**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Robinson Construction Co.	Date Completed: 1/7/07
Excavation Equipment: CAT 330 Track Hoe	Logged By: S. Albright

Depth, feet	Material Description
	(Soft), moist to wet, brown to red, clayey SILT FILL with cobbles, gravel and concrete.
5	(Hard), gray GRAVEL and SAND FILL (Cemented). Potentially a concrete truck washout area.
10	Bottom of Test Pit at 13.0' BGS. No Seepage or Groundwater Noted.

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Clackamette Cove
Oregon City, Oregon

Project Number **1195-00**

Test Pit Number **TP-15**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Robinson Construction Co.	Date Completed: 1/7/07
Excavation Equipment: CAT 330 Track Hoe	Logged By: S. Albright

Depth, feet	Material Description
	(Soft), moist to wet, silty CLAY FILL.
5	
10	
	Bottom of Test Pit at 14.5' BGS. No Seepage or Groundwater Noted.

Test Pit Number **TP-16**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Robinson Construction Co.	Date Completed: 1/7/07
Excavation Equipment: CAT 330 Track Hoe	Logged By: S. Albright

Depth, feet	Material Description
	(Very dense), moist, gray, sandy GRAVEL FILL (Crushed Rock).
5	(Medium stiff), moist, gray, sandy SILT.
10	Bottom of Test Pit at 10.0' BGS. No Seepage or Groundwater Noted.

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Clackamette Cove
Oregon City, Oregon

Project Number **1195-00**

Test Pit Number **TP-17**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Robinson Construction Co.	Date Completed: 1/7/07
Excavation Equipment: CAT 330 Track Hoe	Logged By: S. Albright

Depth, feet	Material Description
5	Debris FILL. Logs, boulders, cables, chain, concrete, asphalt and random garbage in a sandy silt matrix.
10	Bottom of Test Pit at 14.0' BGS. No Seepage or Groundwater Noted.

Test Pit Number **TP-18**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Robinson Construction Co.	Date Completed: 1/7/07
Excavation Equipment: CAT 330 Track Hoe	Logged By: S. Albright

Depth, feet	Material Description
5	Moist to wet, dark gray to black, silty SAND FILL. Some asphalt concrete chunks. Mild organic odor.
10	Bottom of Test Pit at 14.0' BGS. No Seepage or Groundwater Noted.

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Clackamette Cove
Oregon City, Oregon

Project Number **1195-00**

Test Pit Number **TP-19**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Robinson Construction Co.	Date Completed: 1/7/07
Excavation Equipment: CAT 330 Track Hoe	Logged By: S. Albright

Depth, feet	Material Description
	Moist to wet, dark gray to black, silty sand FILL. Some asphalt concrete chunks. Mild organic odor.
5	
10	
	(Medium dense to dense), moist to wet, gray, silty SAND with gravels and cobbles.
	Bottom of Test Pit at 14.5' BGS. No Seepage or Groundwater Noted.

Test Pit Number **TP-20**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Erickson Excavating	Date Completed: 11/6/07
Excavation Equipment: Link Belt LS 2650	Logged By: J. Duquette

Depth, feet	Material Description
	(Very dense), dry, silty gravel FILL. Hard digging.
5	
	Increasing sand content.
	Becomes (very hard).
	Test Pit Refusal at 8.5' BGS. No Seepage or Groundwater Noted.
10	

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Clackamette Cove
Oregon City, Oregon

Project Number **1195-00**

Test Pit Number **TP-21**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Erickson Excavating	Date Completed: 11/6/07
Excavation Equipment: Link Belt LS 2650	Logged By: J. Duquette

Depth, feet	Material Description
	(Dense), dry, gray, sandy gravel FILL.
	(Medium dense), gray, sand FILL.
5	(Soft), moist, gray, silty CLAY to clayey SILT. Large chunk of concrete in east pit wall.
	Grab sample taken.
10	Light seepage from 10.0' to 11.0'.
	Bottom of Test Pit at 14.5' BGS. No Groundwater Noted.

Test Pit Number **TP-22**

Test Pit Location: See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Erickson Excavating	Date Completed: 11/6/07
Excavation Equipment: Link Belt LS 2650	Logged By: J. Duquette

Depth, feet	Material Description
	Silty, sandy TOPSOIL.
	(Medium dense to dense), brown/gray, dry, sand and gravel FILL with a little silt.
	Chunk of rebar.
	Very hard drilling.
5	Test Pit Refusal at 3.5' BGS. No Seepage or Groundwater Noted.
10	

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

Clackamette Cove
Oregon City, Oregon

Project Number **1195-00**

Test Pit Number **TP-23**

Test Pit Location See Figure 2	Surface Elevation: Not Measured
Excavation Contractor: Erickson Excavating	Date Completed: 11/6/07
Excavation Equipment Link Belt LS 2650	Logged By: J. Duquette

Depth, feet

Material Description

TOPSOIL.

(Medium dense), gray/brown, dry, sand and gravel FILL with some silt.

Test Pit Refusal on Concrete at 3.5' BGS. No Seepage or Groundwater Noted.

5

10

THE COVE - EARLY GRADING DDP SET

OREGON CITY, OREGON

BENCHMARK

OREGON STATE HIGHWAY VERTICAL CONTROL RECEIVED FROM CLACKAMAS COUNTY ENGINEERING DEPARTMENT.

"A STANDARD OSHD DISK STAMPED "56 G 220 1934" LOCATED IN THE NORTHEAST CORNER OF THE JOHN MCLOUGHLIN BRIDGE OVER THE CLACKAMAS RIVER.

PUBLISHED NGVD 29 ELEV.=56.117 FEET
CONVERTED TO NAVD 88 ELEV.=59.587 FEET

BASIS OF BEARING

THE BASIS OF BEARINGS OF N23°44'20"E WAS DETERMINED BY HOLDING MONUMENTS AND RECORD INFORMATION PER SURVEY NO. 2009-179, CLACKAMAS COUNTY SURVEY RECORDS.

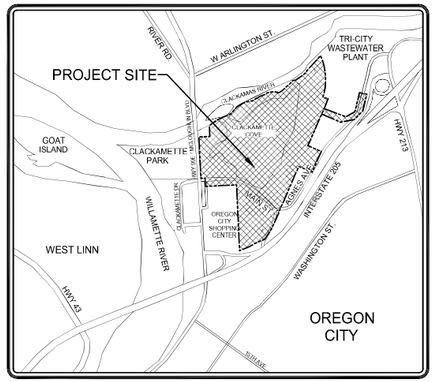
SITE INFORMATION

BORDERED BY I-205, THE CLACKAMAS RIVER AND MCLOUGHLIN BOULEVARD.

OREGON CITY, OREGON

MAP -2S2E29
TAX LOTS - 100, 1500A, 1500B, 1502, 1503, 1505
1508, 1600, 1601

SITE MAP
SCALE: NTS



VICINITY MAP
SCALE: NTS

INDEX OF SHEETS

PROJECT TEAM

APPLICANT
THE COVE, LLC
ATTN: DAVID MOONEY
1961 COLLINGWOOD ST, #212
VANCOUVER, BC V6R 3K6
PHONE: (604) 730-0191

ARCHITECT
LRS ARCHITECTS
ATTN: PAUL BOUNDY, AIA
720 NW DAVIS ST, SUITE 300
PORTLAND, OR 97209
PHONE: (503) 265-1561

GEOTECHNICAL ENGINEER
APEX COMPANIES, LLC
ATTN: STUART ALBRIGHT, PE
3015 SW FIRST AVENUE
PORTLAND, OR 97201
PHONE: (503) 924-4704 x1926

CIVIL ENGINEER
DOWL
ATTN: MIKE TOWLE, PE
720 SW WASHINGTON ST, SUITE 750
PORTLAND, OREGON 97205
PHONE: (971) 280-8645

PLANNING
DOWL
ATTN: READ STAPLETON, AICP
720 SW WASHINGTON ST, SUITE 750
PORTLAND, OREGON 97205
PHONE: (971) 280-8641

SURVEYOR
CARDNO
ATTN: ERIC LYNCH, PLS
5720 SW MACADAM AVE SUITE 200
PORTLAND, OREGON 97219
PHONE: (503) 419-2500

JURISDICTION CONTACTS

PLANNING
CITY OF OREGON CITY
ATTN: LAURA TERWAY
221 MOLALLA AVE., SUITE 200
OREGON CITY, OR 97045
PHONE: (503) 722-3789
FAX: (503) 722-3880

WATER
CITY OF OREGON CITY
ATTN: KEVIN HANKS
122 S. CENTER STREET
OREGON CITY, OREGON 97045
PHONE: (503) 657-8241
FAX: (503) 650-9590

STREET
CITY OF OREGON CITY
ATTN: MATT POWLISON
122 S. CENTER STREET
OREGON CITY, OREGON 97045
PHONE: (503) 657-8241
FAX: (503) 650-9590

PUBLIC WORKS
CITY OF OREGON CITY
ATTN: MARIO DE LA ROSA
625 CENTER STREET
OREGON CITY, OREGON 97045
PHONE: (503) 974-5518
FAX: (503) 657-7892

WASTEWATER / STORMWATER
CITY OF OREGON CITY
ATTN: ERIC HAND
122 S. CENTER STREET
OREGON CITY, OREGON 97045
PHONE: (503) 657-8241
FAX: (503) 650-9590

FIRE
CLACKAMAS FIRE DISTRICT #1
ATTN: MIKE BOUMANN
2930 SE OAK GROVE BLVD
MILWAUKIE, OREGON 97267
PHONE: (503) 496-1517
FAX: (503) 742-2860

OREGON UTILITY NOTIFICATION CENTER
1-800-332-2344

CALL BEFORE YOU DIG

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

REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY
NOT FOR CONSTRUCTION
EXPIRATION DATE: 06/30/20

DOWL
WWW.DOWL.COM
720 SW Washington Street, #750
Portland, Oregon 97205
971-280-8641

COVE WATERFRONT RESIDENCES
EARLY GRADING DDP

EARLY GRADING COVER SHEET

SECTION 29 T2S R2E W.M.
OREGON CITY, OREGON

PROJECT	14307.01
DATE	12/7/2018

SHEET
C000

TREE PROTECTION NOTES

NATURAL RESOURCES OVERLAY DISTRICT NOTES

OREGON CITY ENGINEERED GRADING NOTES

1. PROJECT GRADING LIMITS SHALL BE WITHIN THE PROJECT'S PROPERTY BOUNDARY AND CITY UR PROPERTY, UNLESS OTHERWISE SHOWN ON PLANS. NO GRADING SHALL BE CONDUCTED IN WETLANDS OR OTHER ENVIRONMENTALLY SENSITIVE AREAS UNLESS SPECIFICALLY SHOWN ON THE APPROVED PLANS.
2. THE IDENTIFICATION OR REMOVAL OF UNSUITABLE MATERIAL SHALL BE DONE WITH CONSULTATION WITH THE PROJECT ENGINEER OR PROJECT'S GEOTECHNICAL ENGINEER.
3. REMOVE AND DISPOSE OF ALL ORGANIC AND/OR UNSUITABLE MATERIALS, INCLUDING TREES, STUMPS, ROOTS, BRUSH, AND GRASS IN SUCH A MANNER TO MEET ALL APPLICABLE REGULATIONS. ON-SITE DISPOSAL SHALL BE OF AS DETERMINED BY THE PROJECT ENGINEER OR PROJECT'S GEOTECHNICAL ENGINEER.
4. STOCKPILE EXCESS SOIL MATERIAL ON-SITE AS DIRECTED BY THE PROJECT ENGINEER, PROJECT'S GEOTECHNICAL ENGINEER, OR APPROVED PLANS (UNLESS APPROVED PLANS IDENTIFY EXCESS EXCAVATION IS TO BE REMOVED FROM THE SITE).
5. THE CONTRACTOR SHALL PROTECT ALL TREES NOT SPECIFICALLY SHOWN TO BE REMOVED ON APPROVED PLANS.
6. GRADE THE SITE TO THE ELEVATIONS SHOWN ON THE DRAWING WITH THE NECESSARY ADJUSTMENTS TO ACCOMMODATE THE FINISHES AS SPECIFIED. SHAPE FUTURE PAVED AREAS PER THE PLANS TO A SUBGRADE ELEVATION THAT WILL ACCOMMODATE FUTURE BASE ROCK AND PAVING.
7. STRAIGHT GRADES SHALL BE RUN BETWEEN FINISH GRADE AND/OR FINISH CONTOUR LINES SHOWN, UNLESS OTHERWISE NOTED. FINISH GRADES ARE TO DRAIN AS INDICATED ON THE PLANS. ROUGH GRADING SHALL BE FINISHED BY BLADING AND RAKING TO REASONABLE SMOOTH CONTOURS WITH GENTLE TRANSITIONS.
8. ALL CUT OR FILL SLOPES SHALL BE CONSTRUCTED AT NO STEEPER THAN FOUR (4) HORIZONTAL TO ONE (1) VERTICAL UNLESS OTHERWISE SHOWN ON APPROVED PLANS.
9. AREAS TO RECEIVE FILL MATERIALS SHALL BE PREPARED BY REMOVING ALL ORGANIC AND UNSUITABLE MATERIALS AND "PROOF ROLLED". BENCHING MAY BE REQUIRED. MATERIAL IN SOFT SPOTS WITHIN A PROPOSED BUILDING ENVELOPE, PAVED AREA, OR SIDEWALK AREA SHALL BE REMOVED TO THE DEPTH REQUIRED (AS DIRECTED BY THE PROJECT ENGINEER OR THE PROJECT'S GEOTECHNICAL ENGINEER) AND SHALL BE REPLACED WITH SUITABLE BACKFILL.
10. THE CONSTRUCTION OF STRUCTURAL FILLS AND/OR EXCAVATIONS CONNECTED WITH ANY PUBLIC IMPROVEMENTS SHALL BE IN ACCORDANCE WITH THE WRITTEN RECOMMENDATIONS MADE BY THE PROJECT'S GEOTECHNICAL ENGINEER IN AN APPROVED REPORT.
11. COMPACTION TESTS AND REPORTS FOR EACH LOT SHALL BE CONDUCTED BY AN APPROVED TESTING LABORATORY, TEST FREQUENCY SHALL BE PER THE PROJECT ENGINEER, OR PROJECT'S GEOTECHNICAL ENGINEER. TESTING TO COMMENCE WITH FILL ACTIVITIES AND AS A MINIMUM, ONE TEST WILL BE TAKEN FOR EVERY 500 CUBIC YARDS PLACED.
12. IF DUSTY CONDITIONS EXIST, THE PERMITTEE SHALL APPLY A FINE SPRAY OF WATER ON THE SURFACE TO CONTROL THE DUST.
13. ENGINEERED FILL IN THE BUILDING ENVELOPE SHALL BE CERTIFIED BY THE PROJECT ENGINEER. THIS CERTIFICATION SHALL BE SENT TO THE CITY BUILDING OFFICIAL UPON SUBMISSION OF THE BUILDING PERMIT IF IT HAS NOT ALREADY BEEN RECEIVED BY THE CITY BUILDING OFFICIAL.

GENERAL PROJECT GRADING NOTES

1. SITE GRADING AND EARTHWORK SHALL BE PERFORMED BETWEEN MAY 1ST AND OCTOBER 31ST UNLESS OTHERWISE AUTHORIZED PER OCMC 17.44.060(B).
2. SEE LETTER PREPARED BY STU ALBRIGHT, APEX COMPANIES, LLC FOR SLOPE TREATMENT AND EROSION CONTROL RECOMMENDATIONS FOR SLOPES AROUND THE FLOOD CHANNEL AND SLOPES ADJACENT TO COVE.
3. CONTRACTOR TO IDENTIFY AND PROVIDE THE CITY WITH THE DISPOSAL SITE FOR ALL UNSUITABLE MATERIALS NOT USED FOR GRADING.
4. ALL GRADING CUT AND FILL ACTIVITIES ARE TO FOLLOW THE RECOMMENDATION OF THE PROJECT GEOTECH REPORT AND SUPPLEMENTAL MEMOS PREPARED BY GEOPACIFIC DATED 6/29/2016.
5. SEE GEOTECH REPORT AND WALL DESIGN REPORTS FOR WALL TESTING AND INSPECTION REQUIREMENTS.
6. SEE FINAL EXCAVATION PLAN FOR WORK SEQUENCE, STAGING, SAFETY PLAN, AND SCHEDULE; INCLUDING DEMO, SOIL MIXING, FILL PLACEMENT, AND WALL CONSTRUCTION.
7. SEE GROUND IMPROVEMENT PLAN AND REPORT. PREPARED BY GEODESIGN FOR DETAILS AND INFORMATION REGARDING COLUMN PLACEMENT AND STRUCTURAL GRID FOR LOAD TRANSFER.
8. EXCAVATED MATERIALS ARE TO BE EVALUATED BY THE PROJECT GEOTECH FOR DETERMINATION OF SUITABLE MATERIALS FOR FILL PLACEMENT.

GEOTECHNICAL RECOMMENDATIONS FROM GEOPACIFIC REPORT

THE FOLLOWING COMPACTION REQUIREMENTS WERE PROVIDED FROM STUART ALBRIGHT WITH APEX AND ARE SHOWN AS A SUMMARY OF THE COMPACTION REQUIREMENTS AND SPECIFICATIONS FOR THE PROJECT. FULL REQUIREMENTS AND SPECIFICATIONS ARE FOUND IN THE FINAL APEX GEOTECHNICAL ASSESSMENT DATED DECEMBER 19, 2017 AND SHOULD BE REFERRED TO FOR ALL OF THE NECESSARY EARTHWORK RECOMMENDATIONS AND SPECIFICATIONS.

STRUCTURAL FILLS - 92% ASTM D1557, MODIFIED PROCTOR

NON-STRUCTURAL FILLS - 85% ASTM D1557, MODIFIED PROCTOR

ROAD SUBGRADE - 95% ASTM D1557, MODIFIED PROCTOR

ROAD BASE AGGREGATE - 95% ASTM D1557, MODIFIED PROCTOR

OREGON CITY STANDARD CONSTRUCTION NOTES

1. ALL WORK AND MATERIALS SHALL CONFORM TO MOST RECENT EDITION OF THE OREGON CHAPTER APWA STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AS ADOPTED AND MODIFIED BY THE CITY OF OREGON CITY.
2. CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS AND LICENSES BEFORE STARTING CONSTRUCTION. A CITY BUSINESS LICENSE IS REQUIRED.
3. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION AND ARRANGE FOR THE RELOCATION OF ANY UTILITIES IN CONFLICT WITH THE PROPOSED CONSTRUCTION. THE LOCATIONS, DEPTH AND DESCRIPTION OF EXISTING UTILITIES SHOWN WERE COMPILED FROM AVAILABLE RECORDS AND/OR FIELD SURVEYS. THE ENGINEER OR UTILITY COMPANIES DO NOT GUARANTEE THE ACCURACY OR THE COMPLETENESS OF SUCH RECORDS. ADDITIONAL UTILITIES MAY EXIST WITHIN THE WORK AREA.
4. OREGON LAW REQUIRES THAT THE RULES ADOPTED BY OREGON UTILITY NOTIFICATION CENTER BE FOLLOWED. THOSE RULES ARE SET FORTH IN OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THE RULES BY CALLING THE CENTER OR ACCESSING VIA INTERNET AT WWW.CALLBEFOREYOUDIG.ORG. CALL BEFORE YOU DIG - PORTLAND METRO AREA 503-246-6699
5. THE CONTRACTOR SHALL MAKE PROVISIONS TO KEEP ALL EXISTING UTILITIES IN SERVICE AND PROTECT THEM DURING CONSTRUCTION. CONTRACTOR SHALL IMMEDIATELY REPAIR OR REPLACE ANY DAMAGED UTILITIES USING MATERIALS AND METHODS APPROVED BY THE UTILITY OWNER. NO SERVICE INTERRUPTIONS SHALL BE PERMITTED WITHOUT PRIOR WRITTEN AGREEMENT WITH THE UTILITY PROVIDER.
6. ALL WATER LINE CROSSINGS SHALL BE IN CONFORMANCE WITH OAR CHAPTER 333. THE CITY MAY REQUIRE MORE STRINGENT STANDARDS.
7. CONTRACTOR SHALL NOTIFY PROJECT ENGINEER AND CITY OF OREGON CITY DEVELOPMENT SERVICES STAFF 48 HOURS IN ADVANCE OF STARTING CONSTRUCTION AND 24 HOURS BEFORE RESUMING WORK AFTER SHUTDOWNS, EXCEPT FOR NORMAL RESUMPTION OF WORK FOLLOWING SATURDAYS, SUNDAYS, OR HOLIDAYS.
8. CONTRACTOR SHALL REMOVE AND DEPOSE OF TREES, STUMPS, BRUSH, ROOTS, TOPSOIL, AND OTHER MATERIAL IN THE ROADWAY AND WHERE INDICATED ON THE PLANS. MATERIAL SHALL BE DISPOSED OF IN SUCH A MANNER AS TO MEET ALL APPLICABLE REGULATIONS. CONTRACTOR SHALL ENSURE RECIPIENTS OF FILL MATERIALS REMOVED OFFSITE ARE PERMITTED TO RECEIVE SAID MATERIALS REGARDLESS OF THE RECEIVING JURISDICTION. CITY REQUIRES A GRADING PERMIT PER OREGON CITY MUNICIPAL CODE 15.48 FOR A SINGLE SITE TO RECEIVE OVER 10 CUBIC YARDS OF MATERIAL UNLESS THE GRADING WORK IS ALREADY COVERED IN ANOTHER CONSTRUCTION PERMIT. CONTRACTOR IS RESPONSIBLE FOR MEETING OTHER JURISDICTIONS' GRADING/FILL REQUIREMENTS WHEN APPROPRIATE.
9. CONSTRUCTION VEHICLES INCLUDING TRAILERS SHALL PARK ON THE CONSTRUCTION SITE OR AT A LOCATION(S) INDICATED ON THE APPROVED PLAN. THIS INCLUDES ALL SUBCONTRACTORS' VEHICLES AND TRAILERS. HOURS OF CONSTRUCTION SHALL BE 7 AM TO 6 PM, MONDAY THROUGH FRIDAY; 9 AM TO 6 PM SATURDAY. CONSTRUCTION IS PROHIBITED ON SUNDAY. CONSTRUCTION ACTIVITIES INCLUDE ALL FIELD MAINTENANCE OF EQUIPMENT, REFUELING, AND PICK UP AND DELIVERY OF EQUIPMENT AS WELL AS THE ACTUAL CONSTRUCTION ACTIVITY.
10. THE CONTRACTOR SHALL SUBMIT A 15% MAINTENANCE BOND/GUARANTEE AS REQUIRED BY THE CITY OF OREGON CITY. THE AMOUNT OF THE GUARANTEE IS 15% OF THE PUBLIC IMPROVEMENTS COST.
11. THE CONTRACTOR SHALL KEEP AN APPROVED SET OF PLANS ON THE PROJECT SITE AT ALL TIMES.
12. UPON COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT "REDLINE DRAWINGS" TO PROJECT ENGINEER FOR PREPARATION OF RECORD DRAWINGS. "REDLINE DRAWINGS" DOCUMENT ALL DEVIATIONS AND REVISIONS TO THE APPROVED PLANS. THEY ALSO RECORD A DESCRIPTION OF CONSTRUCTION MATERIALS ACTUALLY USED (PIPE MATERIAL, ETC.). FROM THE INFORMATION CONTAINED ON THESE REDLINE DRAWINGS, AS WELL AS ANY NOTES RECORDED BY THE PROJECT ENGINEER, THE PROJECT ENGINEER SHALL PREPARE AND SUBMIT RECORD DRAWINGS TO DEVELOPMENT SERVICES (PAPER COPY FIRST FOR CITY APPROVAL AND THEN TWO SETS ON 4 MIL MYLAR AS DIRECTED BY CITY STAFF). RECORD DRAWINGS ARE REQUIRED FOR ANY PUBLIC IMPROVEMENTS, AS WELL AS FOR ANY (PUBLIC OR PRIVATE) STORMWATER QUANTITY OR QUALITY CONTROL FACILITY. CITY ACCEPTANCE OF ANY PUBLIC IMPROVEMENTS ARE TIED TO THE SUBMITTAL OF THESE RECORD DRAWINGS. CAD-GENERATED PLANS SHALL ALSO HAVE ELECTRONIC RECORD DRAWINGS SUBMITTED TO THE CITY IN COMPLIANCE WITH THE DIGITAL MAPPING REQUIREMENTS.
13. CONTRACTOR SHALL ERECT AND MAINTAIN TRAFFIC CONTROL PER THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", PART VI, CONSTRUCTION AND MAINTENANCE, AS ADOPTED AND MODIFIED BY ODOT. SHOULD WORK BE IN AN EXISTING PUBLIC RIGHT OF WAY THAT IS OPEN TO TRAFFIC, THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN TO APPROPRIATE CITY, COUNTY, AND STATE PERSONNEL FOR APPROVAL. APPROVALS SHALL BE OBTAINED PRIOR TO START OF WORK.
14. THE CONTRACTOR SHALL PERFORM ALL WORK NECESSARY TO COMPLETE THIS PROJECT IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS INCLUDING SUCH INCIDENTALS AS MAY BE NECESSARY TO MEET THE INTENT OF THE PROJECT CONTRACT DOCUMENTS, APPLICABLE AGENCY REQUIREMENTS AND OTHER WORK AS NECESSARY TO PROVIDE A COMPLETE PROJECT.
15. 15. THERE SHALL BE NO ALTERATION OR VARIANCE FROM THE APPROVED PLANS. THE MINIMUM SUBMITTAL REQUIREMENTS FOR PLAN REVISIONS ARE AS FOLLOWS: PLAN REVISIONS SHALL BE SUBMITTED ON AN 8½" X 11" SHEET (MINIMUM) WITH A 2" BY 2" BLOCK SPACE FOR CITY APPROVAL; AND PLAN REVISION SHALL BE WET STAMPED AND SIGNED BY PROJECT ENGINEER, AND ANY REQUIRED ENGINEERING CALCULATIONS, OR OTHER AGENCY APPROVALS, SHALL BE INCLUDED WITH THE SUBMITTED REVISION. UPON APPROVAL OF THE SUBMITTED REVISIONS, THE CITY ENGINEER SHALL AFFIX AN APPROVAL STAMP TO THE REVISED PLAN SHEETS AND THE PLAN SHALL BE RETURNED TO THE PROJECT ENGINEER. IT IS THE RESPONSIBILITY OF THE PROJECT ENGINEER TO DISTRIBUTE THE APPROVED PLAN REVISION TO ALL PARTIES TO WHOM THE ORIGINAL APPROVED PLANS WERE ISSUED. ALL APPROVED REVISIONS SHALL BE AFFIXED TO THE CONSTRUCTION FIELD PRINTS (ALSO KNOWN AS THE CONTRACTOR'S "REDLINE DRAWINGS").
16. CONTRACTOR SHALL PROVIDE EFFECTIVE EROSION PROTECTION TO INCLUDE, BUT NOT LIMITED TO, GRADING, DITCHING, HAY BALES, SILT FENCING, AND SEDIMENT BARRIERS TO MINIMIZE EROSION AND IMPACT TO ADJACENT PROPERTY. SEE SEPARATE EROSION AND SEDIMENT CONTROL NOTES AND APPROVED PLANS.
17. OPEN TRENCHES SHALL BE STRICTLY LIMITED TO A MAXIMUM OF 100 LINEAR FEET WITHIN ACTIVE STREET RIGHTS-OF-WAY UNLESS LIMITED TO A LESSER AMOUNT BY PERMIT. NO TRENCHES WILL BE ALLOWED TO REMAIN OPEN OVERNIGHT. USE OF STEEL PLATES OVERNIGHT SHALL BE KEPT TO A MINIMUM AND IF USED SHALL BE FIRMLY SECURED WITH COLD OR HOT A/C MIX.
18. CONTRACTOR SHALL MAINTAIN AND COORDINATE ACCESS TO ALL AFFECTED PROPERTIES.
19. ANY PAVEMENT DISTORTION CAUSED BY THE CONSTRUCTION OPERATIONS SHALL BE TEMPORARILY REPAIRED SAME DAY OF OCCURRENCE (OR IN A TIME PERIOD AGREED TO WITH THE CITY INSPECTOR), USING COLD OR HOT A/C MIX. OWNER/CONTRACTOR SHALL BE REQUIRED TO MAINTAIN REPAIRED AREAS UNTIL CITY FINAL ACCEPTANCE IS GRANTED.
20. IF GROUND WATER SPRINGS ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE PROJECT ENGINEER. THE PROJECT ENGINEER SHALL DIRECT THE CONTRACTOR TO TAKE MEASURES TO ENSURE THAT WATER IS NOT CONVEYED THROUGH UTILITY TRENCHES AND THE NATURAL FLOW PATH OF THE SPRING IS ALTERED AS LITTLE AS PRACTICABLE. THE PROJECT ENGINEER SHALL SUBMIT A REPORT SUMMARIZING THE FINDING TO THE CITY. IMPACTS AND MITIGATION SHALL BE ADDRESSED FOR CITY APPROVAL.
21. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VISIT THE SITE AND VERIFY ALL EXISTING CONDITIONS BEFORE THE START OF WORK. THE CONTRACTOR SHALL TAKE ALL NECESSARY FIELD MEASUREMENTS AND OTHERWISE VERIFY ALL DIMENSIONS AND EXISTING CONSTRUCTION CONDITIONS INDICATED AND/OR SHOWN ON THE PLANS. SHOULD ANY ERROR OR INCONSISTENCY EXIST, THE CONTRACTOR SHALL NOT PROCEED WITH THE WORK AFFECTED UNTIL REPORTED TO THE PROJECT ENGINEER FOR CLARIFICATION OR CORRECTION.
22. ANY INSPECTION BY THE CITY, COUNTY, STATE, FEDERAL AGENCY OR PROJECT ENGINEER SHALL NOT, IN ANY WAY, RELIEVE THE CONTRACTOR FROM ANY OBLIGATION TO PERFORM THE WORK IN COMPLIANCE WITH THE APPLICABLE CODES, REGULATIONS, CITY STANDARDS AND PROJECT CONTRACT DOCUMENTS.
23. PROJECT PLANS SHALL ALWAYS HAVE AN ENGINEER-OF-RECORD PERFORMING THE FUNCTION OF PROJECT ENGINEER. IF THE PROJECT ENGINEER IS CHANGED DURING THE COURSE OF THE WORK, THE CITY SHALL BE NOTIFIED IN WRITING AND THE WORK SHALL BE STOPPED UNTIL THE REPLACEMENT ENGINEER HAS AGREED TO ACCEPT THE RESPONSIBILITIES OF THE PROJECT ENGINEER. THE NEW PROJECT ENGINEER SHALL PROVIDE WRITTEN NOTICE OF ACCEPTING PROJECT RESPONSIBILITY TO THE CITY WITHIN 72 HOURS OF ACCEPTING THE POSITION AS PROJECT ENGINEER.

REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 14, 2014
MICHAEL D. TOWLE
PRELIMINARY NOT FOR CONSTRUCTION
EXPIRATION DATE: 06/30/20

DOWL
WWW.DOWL.COM
720 SW Washington Street, #750
Portland, Oregon 97205
971-280-8641

COVE WATERFRONT RESIDENCES
EARLY GRADING DDP

GENERAL NOTES

SECTION 29 T2S R2E W.M.
OREGON CITY, OREGON

PROJECT	14307.01
DATE	12/7/2018

SHEET
C001

LEGEND

50 EXISTING MAJOR (25') CONTOUR

45 EXISTING MINOR (5') CONTOUR

HWY 99E

LOT 1

EXISTING TRAILHEAD PARKING

OREGON CITY SHOPPING CENTER

CLACKAMETTE COVE

CLACKAMAS RIVER

MAIN ST

EXISTING TRAILHEAD PARKING

LOT 2 UNDER CONSTRUCTION

NORTH PARK

LOT 3

LOT 4

LOT 5

LOT 6

LOT 7

TRI-CITIES STOCKPILE

TRI-CITIES TREATMENT PLANT

AGNES AVE

INTERSTATE 205

N

100 0 100 200

SCALE IN FEET

PRELIMINARY NOT FOR CONSTRUCTION

DOWL
WWW.DOWL.COM
720 SW Washington Street, #750
Portland, Oregon 97205
971-280-8641

COVE WATERFRONT RESIDENCES

CONCEPT DEVELOPMENT PLAN AND PRELIMINARY SUBDIVISION

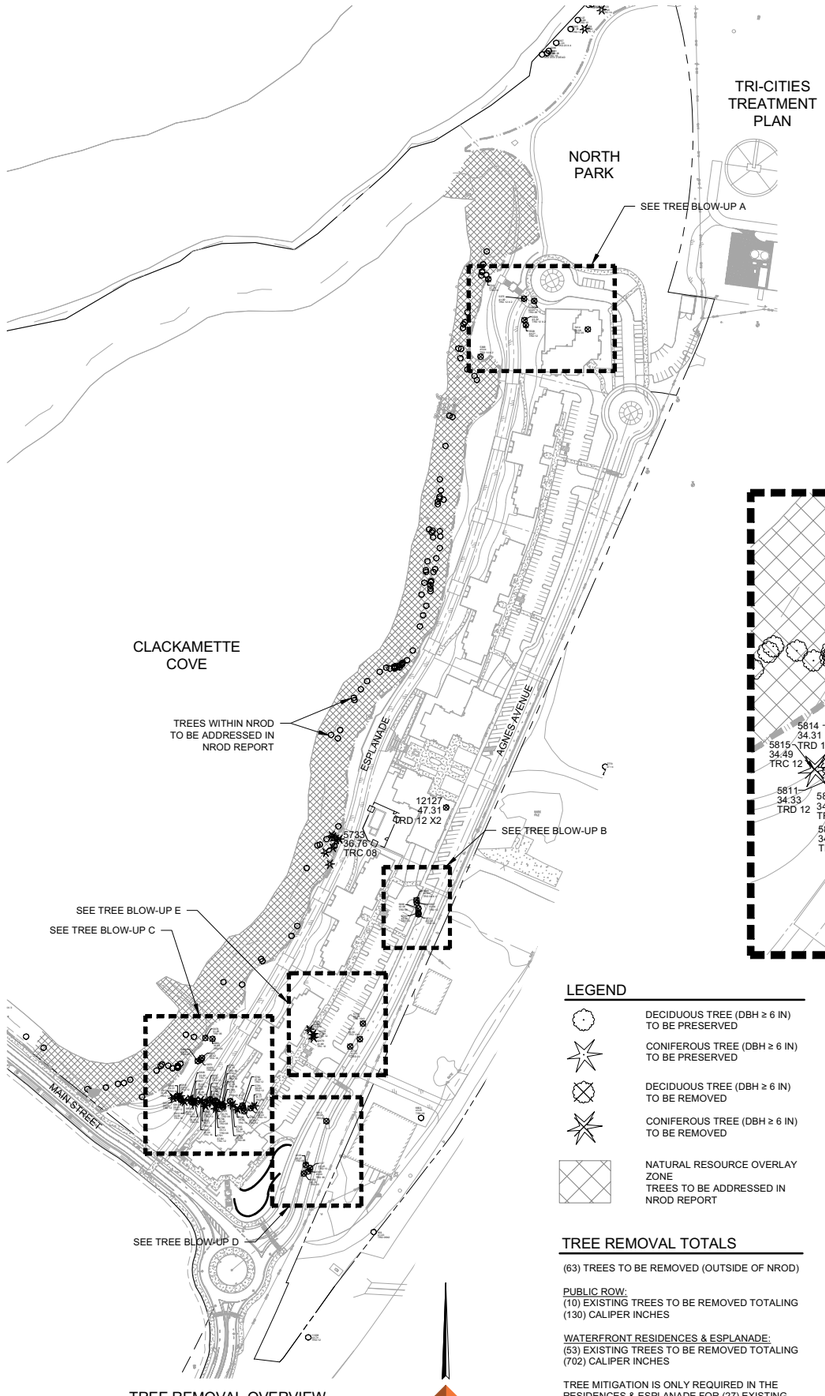
EXISTING CONDITIONS

SECTION 29 T2S R2E W.M.
OREGON CITY, OREGON

PROJECT	14307.01
DATE	12/7/2018

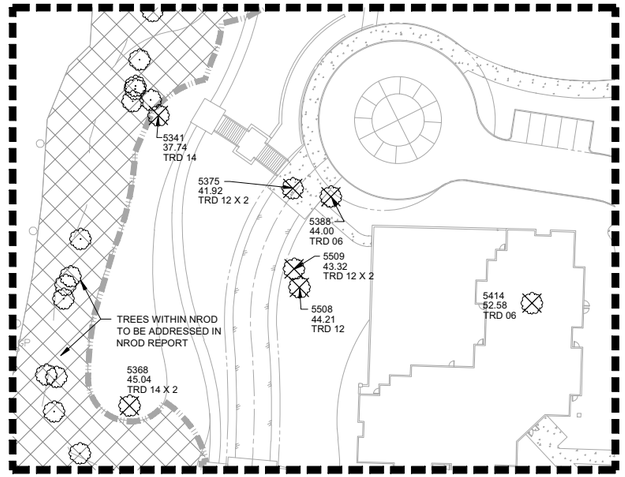
SHEET

C100



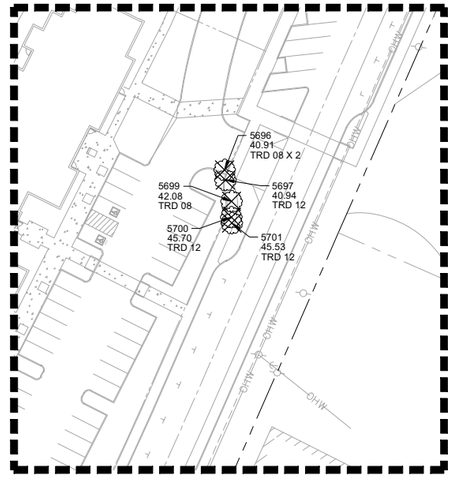
TREE REMOVAL OVERVIEW

SCALE: 1" = 150'



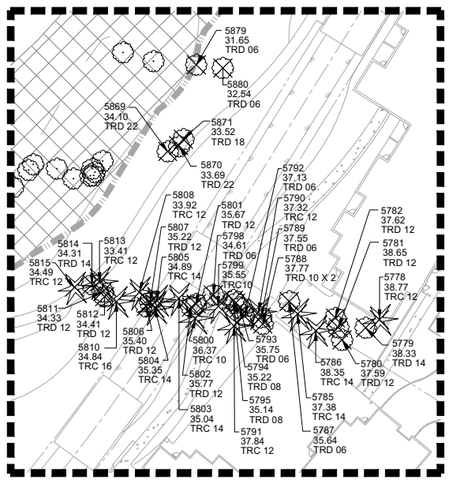
TREE BLOW-UP A

SCALE: 1" = 40'



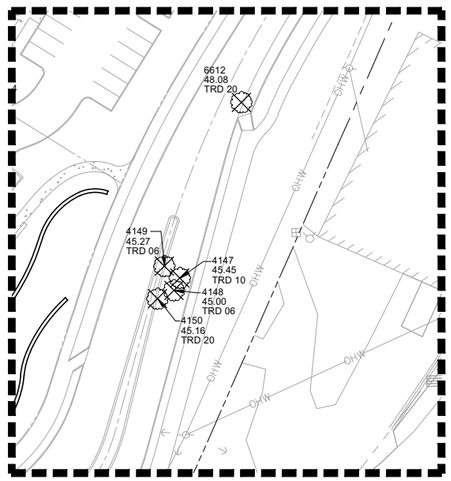
TREE BLOW-UP B

SCALE: 1" = 40'



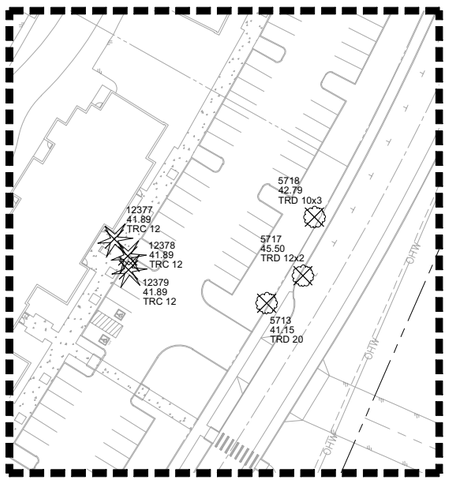
TREE BLOW-UP C

SCALE: 1" = 40'



TREE BLOW-UP D

SCALE: 1" = 40'



TREE BLOW-UP E

SCALE: 1" = 40'

LEGEND

- DECIDUOUS TREE (DBH ≥ 6 IN) TO BE PRESERVED
- CONIFEROUS TREE (DBH ≥ 6 IN) TO BE PRESERVED
- DECIDUOUS TREE (DBH ≥ 6 IN) TO BE REMOVED
- CONIFEROUS TREE (DBH ≥ 6 IN) TO BE REMOVED
- NATURAL RESOURCE OVERLAY ZONE
  TREES TO BE ADDRESSED IN NROD REPORT

TREE REMOVAL TOTALS

(63) TREES TO BE REMOVED (OUTSIDE OF NROD)

PUBLIC ROW:
(10) EXISTING TREES TO BE REMOVED TOTALING (130) CALIPER INCHES

WATERFRONT RESIDENCES & ESPLANADE:
(53) EXISTING TREES TO BE REMOVED TOTALING (702) CALIPER INCHES

TREE MITIGATION IS ONLY REQUIRED IN THE RESIDENCES & ESPLANADE FOR (27) EXISTING TREES THAT FALL OUTSIDE OF NROD, EASEMENTS, AND HARDSCAPE. ALL OTHER TREES DO NOT REQUIRE MITIGATION PER CONDITION OF APPROVAL #13 FOUND WITHIN THE LAND USE DECISION FILE # CP 08-05 / DP 08-13, DATED 01/26/2009.

TREES TO BE REMOVED (OUTSIDE OF NROD)

TREE ID TAG # - TREE DBH - REASON / MITIGATION

REASON/LOCATION
SD = SITE DEVELOPMENT
LA = LANDSCAPING AREA

MITIGATION
EX = EXEMPT (UNDER CP 08-05 / DP 08-13)
MR = MITIGATION REQUIRED

RESIDENCES & ESPLANADE

5368 - 14x2 - LA / MR
5375 - 12x2 - SD / EX

5509 - 12x2 - LA / MR
5696 - 8x2 - SD / EX

5718 - 10x3 - LA / MR

5788 - 10x2 - LA / MR

12127 - 12x2 - SD / EX

AGNES AVE

4147 - 10 - SD / EX
4148 - 6 - SD / EX
4149 - 6 - SD / EX
4150 - 20 - SD / EX
5697 - 12 - SD / EX
5699 - 8 - SD / EX
5700 - 12 - SD / EX
5701 - 12 - SD / EX
5717 - 12X2 - SD / EX
6612 - 20 - SD / EX

SEE NROD REPORT FOR ALL TREES WITHIN THE NROD BOUNDARY

TREE PROTECTION NOTES

EXISTING TREE PROTECTION

1. PROVIDE TEMPORARY FENCING, BARRICADES, AND GUARDS AS NECESSARY OR REQUIRED TO PROTECT TREES WHICH ARE TO REMAIN FROM DAMAGE ABOVE AND BELOW GRADE, PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. CLEARLY DESIGNATE TREE PROTECTION ZONE TO BE CLEAR OF ANY PERSONNEL OR VEHICULAR MOVEMENT.
   A. TREES IDENTIFIED FOR RETENTION SHALL BE MARKED WITH YELLOW FLAGGING TAPE AND PROTECTED BY BARRIER FENCING PLACED NO LESS THAN 10 HORIZONTAL FEET FROM THE OUTSIDE EDGE OF THE TRUNK IN ALL DIRECTIONS OR BENEATH THE TREE DRIPLINE, WHICHEVER IS GREATER. CLUSTERS OF TREES MAY BE PROTECTED BY CONTINUOUS FENCING FOLLOWING THE SAME GUIDELINES.
   B. REQUIRED FENCING SHALL BE A MINIMUM OF SIX FEET TALL, SUPPORTED WITH METAL POSTS PLACED NO FARTHER THAN 10 FEET ON CENTER, SET 24 INCHES (MIN.) INTO GRADE (AVOID DAMAGING ROOTS). FENCING FABRIC SHALL BE CHAIN-LINK OR RED VINYL MESH, AND SHOULD BE INSTALLED FLUSH WITH THE INITIAL UNDISTURBED GRADE. SECURE TOP AND BOTTOM OF FENCING WITH TENSION WIRE SECURED TO POSTS.
   C. NO CONSTRUCTION ACTIVITY SHALL OCCUR WITHIN THE TREE PROTECTION ZONE, INCLUDING, BUT NOT LIMITED TO, DUMPING OR STORAGE OF MATERIALS SUCH AS BUILDING SUPPLIES, SOIL WASTE ITEMS, EQUIPMENT, OR PARKED VEHICLES.
2. PROTECT ROOT SYSTEMS OF TREES TO REMAIN FROM FLOODING, EROSION, OR EXCESSIVE WETTING RESULTING FROM DEWATERING OPERATIONS AND COMPACTION. DO NOT STORE CONSTRUCTION MATERIALS OR PERMIT VEHICLES TO DRIVE OR PARK WITHIN THE DRIP LINE AREA OF ANY TREE TO REMAIN. PROTECT ALL PLANT GROWTH, INCLUDING ROOT SYSTEMS OF TREES, FROM THE DUMPING OF REFUSE OR CHEMICALLY INJURIOUS MATERIAL OR LIQUIDS, AND CONTINUAL PUDDLING OF RUNNING WATER. PROTECT AGAINST UNAUTHORIZED CUTTING, BREAKING, OR SKINNING OF ROOTS AND BRANCHES, SKINNING, AND BRUISING OF BARK. DO NOT ALLOW FIRES ON SITE.
3. MAINTAIN PROTECTION FEATURES THROUGHOUT THE CONSTRUCTION PROCESS. IMMEDIATELY REPAIR ANY ALTERATION TO PROTECTION MEASURES BY CONSTRUCTION PROCESS. AFFECT ALTERATIONS TO PROTECTION MEASURES IMMEDIATELY UPON DIRECTION OF OWNER'S REPRESENTATIVE. MONITOR MAINTENANCE MEASURES DAILY.
4. DO NOT CHANGE THE EXISTING GRADE BENEATH DRIPLINE OF TREES TO REMAIN.
5. ALL EXCAVATION REQUIRED TO OCCUR WITHIN THE DRIPLINE OF ANY EXISTING TREE SHALL BE RESTRICTED TO MANUAL LABOR. THE USE OF TRENCHERS, AUGERS, BACKHOES, TRACTORS OR ANY OTHER TYPE OF MACHINERY/POWER EQUIPMENT IS PROHIBITED.

PRUNING OF EXISTING TREES:

1. WHERE PRUNING APPEARS NECESSARY, REVIEW CONDITIONS WITH ARBORIST OR OWNER'S REPRESENTATIVE BEFORE PROCEEDING AND COMPLY WITH HIS/HER DIRECTIVES. ALL TREE PRUNING OR ROOT CUTTING SHALL BE PERFORMED WITH STERILE SHARP PRUNING INSTRUMENTS; DO NOT BREAK, CHOP OR TEAR. ALL ROOTS 2 INCHES IN DIAMETER OR GREATER THAT REQUIRE PRUNING, SHALL BE DONE BY A STATE-CERTIFIED ARBORIST. NO PRUNING SHALL OCCUR WITHOUT THE EXPLICIT APPROVAL OF THE ARBORIST OR OWNER'S REPRESENTATIVE.
2.

REGISTERED PROFESSIONAL ENGINEER
OREGON
JANUARY 14, 2014
MICHAEL D. TOWLE
PRELIMINARY NOT FOR CONSTRUCTION
EXPIRATION DATE: 06/30/20

DOWL
WWW.DOWL.COM
720 SW Washington Street, #750
Portland, Oregon 97205
971-280-8641

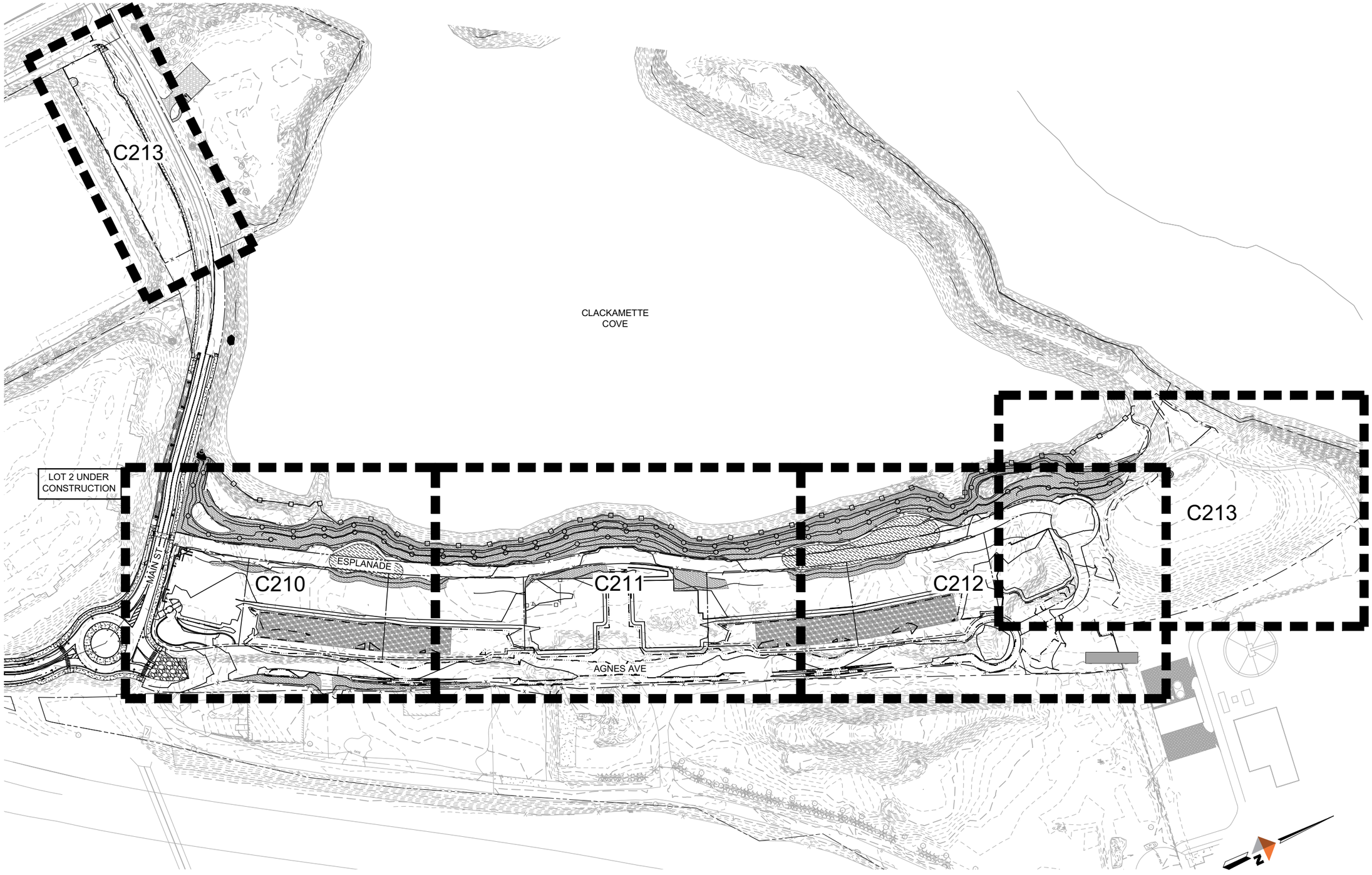
COVE WATERFRONT RESIDENCES
EARLY GRADING DDP
TREE REMOVAL PLAN

SECTION 29 T2S R2E W.M.
OREGON CITY, OREGON

PROJECT	14307.01
DATE	12/7/2018

SHEET
C110

\\bil-fs\bil-projects\22\14307-01\65CAD_ddp - early grading\SC-DDPEG-TR-14307.dwg PLOT DATE 2018-12-7 08:46 SAVED DATE 2018-11-26 16:48 USER: kgilden



PRELIMINARY
NOT FOR
CONSTRUCTION

DOWL
WWW.DOWL.COM
720 SW Washington Street, #750
Portland, Oregon 97205
971-280-8641

COVE WATERFRONT RESIDENCES
CONCEPT DEVELOPMENT PLAN AND PRELIMINARY SUBDIVISION

EARLY GRADING PLAN - OVERALL

SECTION 29 T2S R2E W.M.
OREGON CITY, OREGON

PROJECT	14307.01
DATE	12/7/2018

SHEET
C200

\\bil-fs\bil-projects\22\14307-01\65CAD_ddp — early grading\SC-DDPEG-GR-14307.dwg PLOT DATE 2018-12-7 08:47 SAVED DATE 2018-12-07 07:56 USER: kalldden

EROSION CONTROL NOTES

1. INSTALL SEDIMENT FENCE.
2. INSTALL LOWER LIMIT EC PROTECTION PER SECTION A-A ON SHEET C4.4.
3. INSTALL COMPOST WATTLES
4. INSTALL SLOPE STABILIZATION PER RECOMMENDATION OF GEOTECHNICAL ENGINEER.
5. INSTALL CONSTRUCTION ENTRANCE.
6. CONSTRUCT TEMPORARY SEDIMENT POND PER SECTION ON SHEET C213 (AS NEEDED DURING WET WEATHER).

LEGEND

- PROPOSED MAJOR CONTOUR (SUBGRADE)
- PROPOSED MINOR CONTOUR (SUBGRADE)
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED SEDIMENT FENCE
- PROPOSED LOWER LIMITS EC PROTECTION (SEE SECTIONS ON SHEET C4.4) (PLACED AT ORDINARY HIGH WATER)
- PROPOSED COMPOST WATTLES
- SUBGRADE 100-YR FLOODPLAIN LINE
- PROPOSED SLOPE STABILIZATION MATTING
- PROPOSED MATERIAL/EQUIPMENT STAGING AREA
- PROPOSED TEMPORARY SEDIMENT POND

NOTE: WALL GRADES SHOWN ARE FINAL WALL GRADES FROM FINISHED GRADE SURFACE (NOT SUBGRADE). CONTOURS SHOWN ARE SUBGRADE, AND WILL THEREFORE NOT ALIGN WITH THE WALL GRADES.

NOTE: CONTOURS SHOWN UNDER BUILDING FOOTPRINTS ARE GARAGE GRADES

ORDINARY HIGH WATER LINE

SEE SECTION ON SHEET C4.4

CLACKAMETTE COVE

LOT 2 UNDER CONSTRUCTION

ESPLANADE

ELEVATED DECK

BLDG FF: 53.50'

MAIN ST

TEMPORARY SLOPE FOR GARAGE LAYBACK (1.5H:1V MAX)

TW:41.50 BW:41.50

TW:41.50 BW:37.50

TW:51.00 BW:47.00

TW:49.00 BW:46.50

TW:48.89 BW:46.21

TW:49.00 BW:45.50

TW:50.22 BW:50.08

TW:42.50 BW:38.50

4.0' MAX HEIGHT ROCKERY WALL

TW:44.96 BW:44.96

TW:43.50 BW:41.50

TW:44.00 BW:42.00

SUBGRADE 100-YR FLOODPLAIN

AGNES AVE

SEE 4.2 - GRADING PLAN - CENTER

SCALE IN FEET: 30 0 30 60

PRELIMINARY NOT FOR CONSTRUCTION

DOWL
WWW.DOWL.COM
720 SW Washington Street, #750
Portland, Oregon 97205
971-280-8641

COVE WATERFRONT RESIDENCES
CONCEPT DEVELOPMENT PLAN AND PRELIMINARY SUBDIVISION

EARLY GRADING PLAN - SOUTH

SECTION 29 T2S R2E W.M.
OREGON CITY, OREGON

PROJECT	14307.01
DATE	12/7/2018

SHEET
C210

EROSION CONTROL NOTES

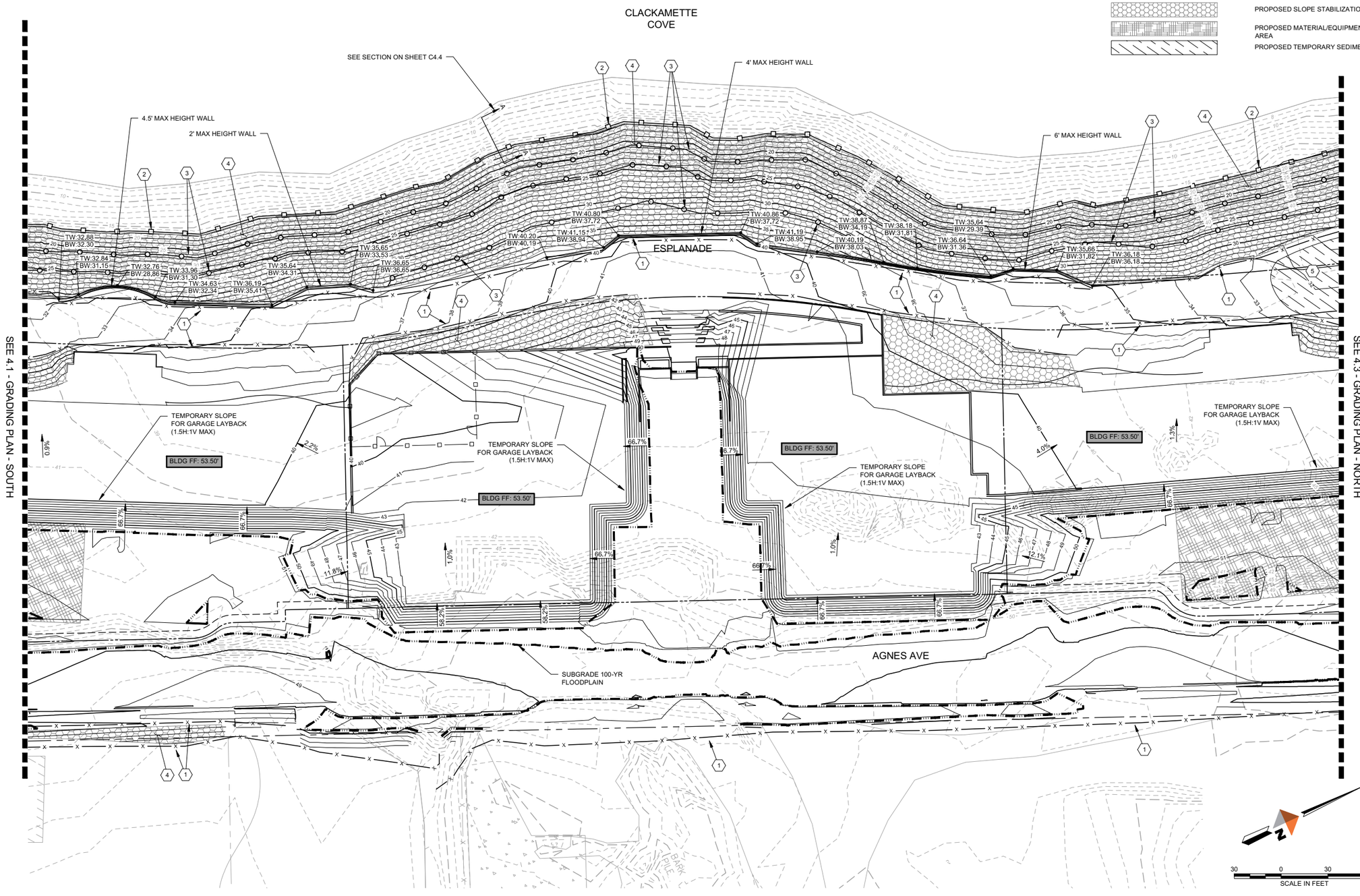
1. INSTALL SEDIMENT FENCE.
2. INSTALL LOWER LIMIT EC PROTECTION PER SECTION A-A ON SHEET C4.4.
3. INSTALL COMPOST WATTLES
4. INSTALL SLOPE STABILIZATION PER RECOMMENDATION OF GEOTECHNICAL ENGINEER.
5. CONSTRUCT TEMPORARY SEDIMENT POND PER SECTION ON SHEET C213 (AS NEEDED DURING WET WEATHER).

NOTE: WALL GRADES SHOWN ARE FINAL WALL GRADES FROM FINISHED GRADE SURFACE (NOT SUBGRADE). CONTOURS SHOWN ARE SUBGRADE, AND WILL THEREFORE NOT ALIGN WITH THE WALL GRADES.

NOTE: CONTOURS SHOWN UNDER BUILDING FOOTPRINTS ARE GARAGE GRADES

LEGEND

- 50 — PROPOSED MAJOR CONTOUR (SUBGRADE)
- 51 — PROPOSED MINOR CONTOUR (SUBGRADE)
- 50 — EXISTING MAJOR CONTOUR
- 49 — EXISTING MINOR CONTOUR
- PROPOSED SEDIMENT FENCE
- PROPOSED LOWER LIMITS EC PROTECTION (SEE SECTIONS ON SHEET C4.4) (PLACED AT ORDINARY HIGH WATER)
- PROPOSED COMPOST WATTLES
- SUBGRADE 100-YR FLOODPLAIN LINE
- PROPOSED SLOPE STABILIZATION MATTING
- PROPOSED MATERIAL/EQUIPMENT STAGING AREA
- PROPOSED TEMPORARY SEDIMENT POND



PRELIMINARY NOT FOR CONSTRUCTION

DOWL
WWW.DOWL.COM
720 SW Washington Street, #750
Portland, Oregon 97205
971-280-8641

COVE WATERFRONT RESIDENCES
CONCEPT DEVELOPMENT PLAN AND PRELIMINARY SUBDIVISION

EARLY GRADING PLAN - CENTER

SECTION 29 T2S R2E W.M.
OREGON CITY, OREGON

PROJECT	14307.01
DATE	12/7/2018

SHEET

C211

EROSION CONTROL NOTES

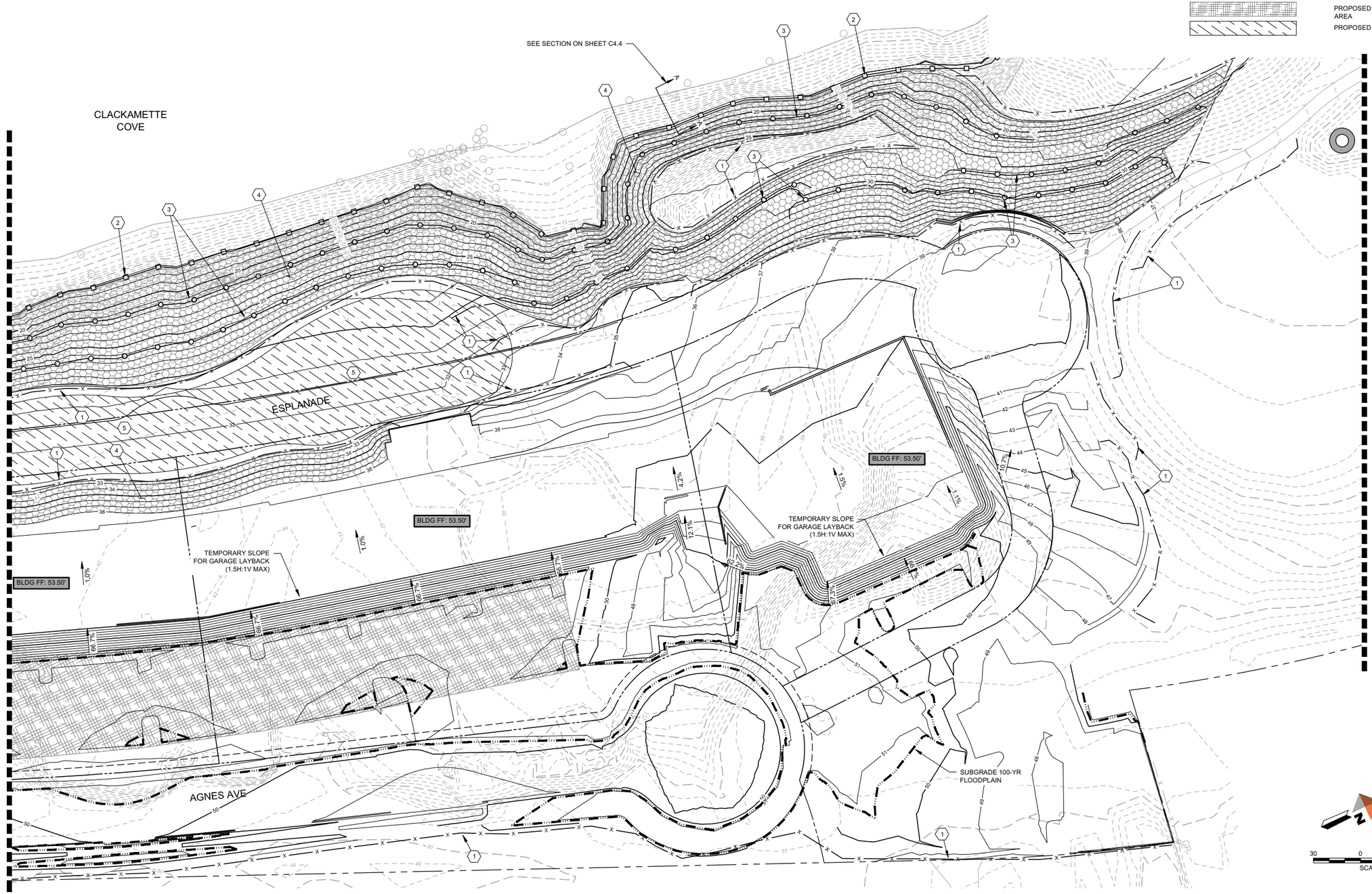
1. INSTALL SEDIMENT FENCE.
2. INSTALL LOWER LIMIT EC PROTECTION PER SECTION A-A ON SHEET C4.4.
3. INSTALL COMPOST WATTLES
4. INSTALL SLOPE STABILIZATION PER RECOMMENDATION OF GEOTECHNICAL ENGINEER.
5. CONSTRUCT TEMPORARY SEDIMENT POND PER SECTION ON SHEET C213 (AS NEEDED DURING WET WEATHER).

NOTE: WALL GRADES SHOWN ARE FINAL WALL GRADES FROM FINISHED GRADE SURFACE (NOT SUBGRADE). CONTOURS SHOWN ARE SUBGRADE, AND WILL THEREFORE NOT ALIGN WITH THE WALL GRADES.

NOTE: CONTOURS SHOWN UNDER BUILDING FOOTPRINTS ARE GARAGE GRADES

LEGEND

- PROPOSED MAJOR CONTOUR (SUBGRADE)
- PROPOSED MINOR CONTOUR (SUBGRADE)
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED SEDIMENT FENCE
- PROPOSED LOWER LIMITS EC PROTECTION (SEE SECTIONS ON SHEET C4.4) (PLACED AT ORDINARY HIGH WATER)
- PROPOSED COMPOST WATTLES
- RESULTING 100-YR FLOODPLAIN LINE
- PROPOSED SLOPE STABILIZATION MATTING
- PROPOSED MATERIAL/EQUIPMENT STAGING AREA
- PROPOSED TEMPORARY SEDIMENT POND



PRELIMINARY NOT FOR CONSTRUCTION

DOWL
WWW.DOWL.COM
720 SW Washington Street, #750
Portland, Oregon 97205
971-280-8641

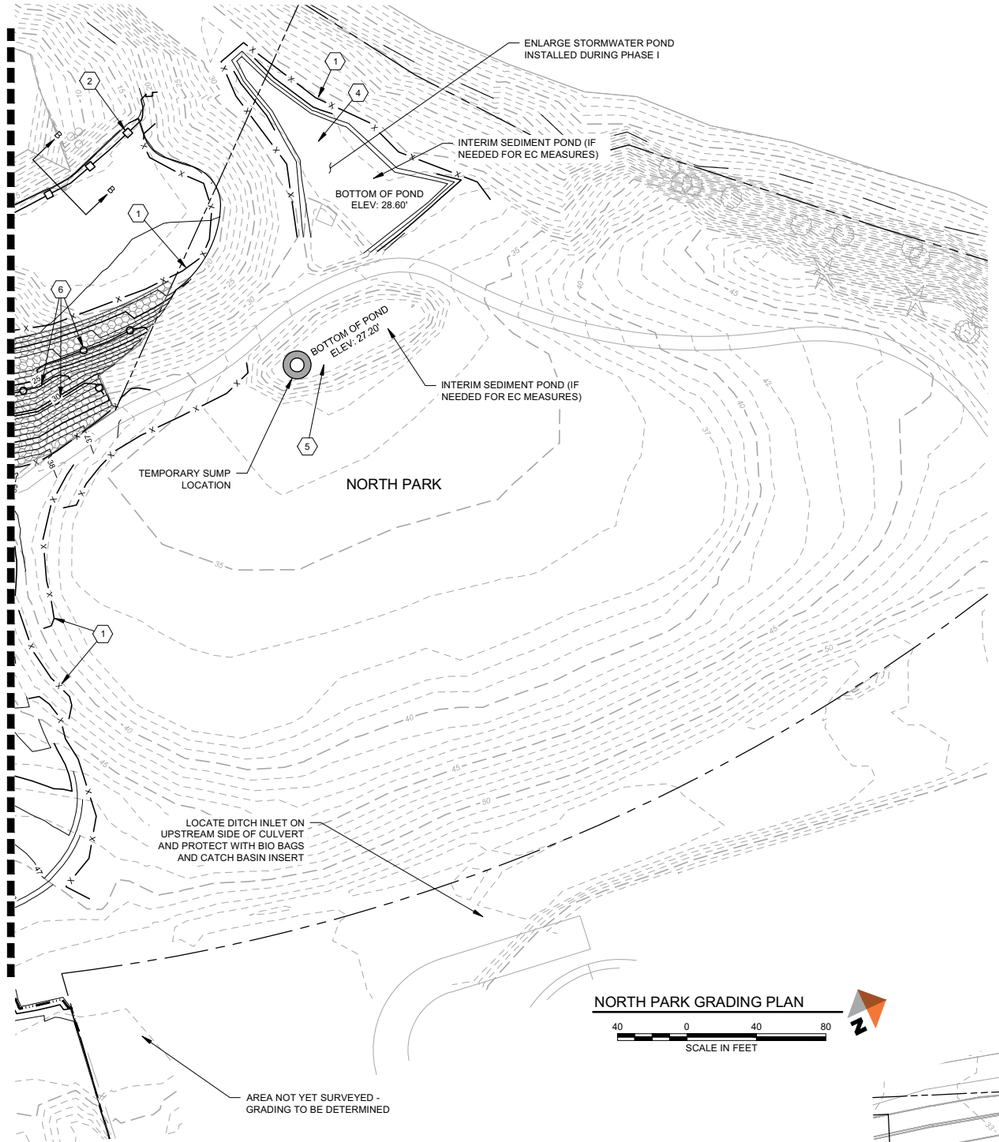
COVE WATERFRONT RESIDENCES
CONCEPT DEVELOPMENT PLAN AND PRELIMINARY SUBDIVISION

EARLY GRADING PLAN - NORTH

SECTION 29 T2S R2E W.M.
OREGON CITY, OREGON

PROJECT	14307.01
DATE	12/7/2018

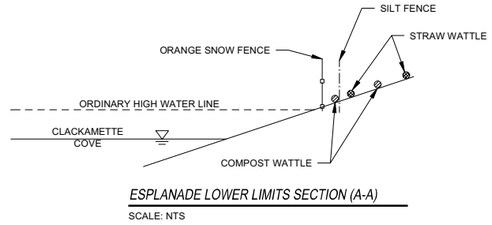
SHEET
C212



NORTH PARK GRADING PLAN

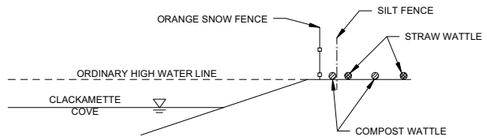
40 0 40 80

SCALE IN FEET



ESPLANADE LOWER LIMITS SECTION (A-A)

SCALE: NTS



NORTH PARKLOWER LIMITS SECTION (B-B)

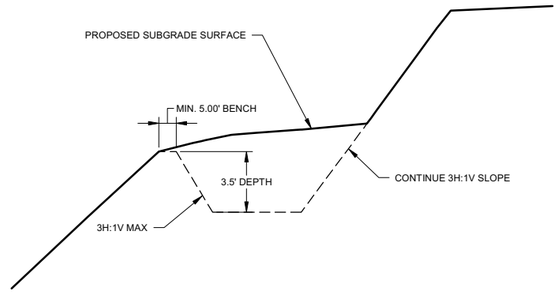
SCALE: NTS

LEGEND

50	PROPOSED MAJOR CONTOUR (SUBGRADE)
51	PROPOSED MINOR CONTOUR (SUBGRADE)
50	EXISTING MAJOR CONTOUR
49	EXISTING MINOR CONTOUR
x x x	PROPOSED SEDIMENT FENCE
	PROPOSED LOWER LIMITS EC PROTECTION (SEE SECTIONS ON SHEET C4.3)
	PROPOSED COMPOST WATTLES
	SUBGRADE 100-YR FLOODPLAIN LINE
	PROPOSED SLOPE STABILIZATION MATTING
	PROPOSED MATERIAL/EQUIPMENT STAGING AREA

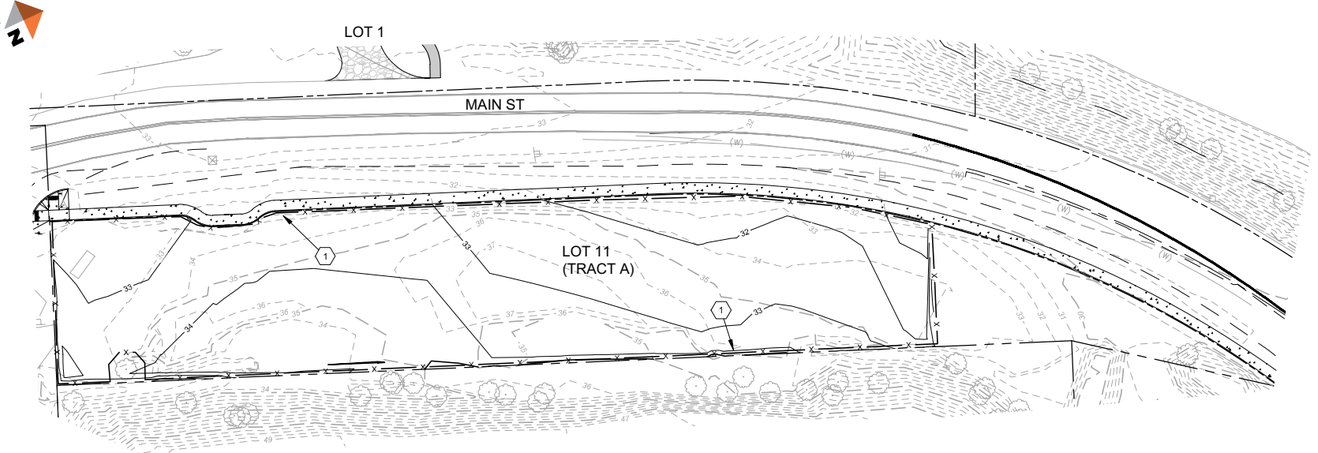
EROSION CONTROL NOTES

1. INSTALL SEDIMENT FENCE.
2. INSTALL LOWER LIMIT EC PROTECTION PER SECTION B-B THIS SHEET.
3. INSTALL SLOPE STABILIZATION PER RECOMMENDATION OF GEOTECHNICAL ENGINEER.
4. MAINTAIN/EXPAND EXISTING TEMPORARY HOLDING/OVERFLOW PREVENTION POND. STORED WATER TO BE DEPLETED VIA PORTABLE PUMP AND DIVERTED TO UPPER POND.
5. MAINTAIN UPPER POND. STORED WATER IN UPPER POND TO BE DEPLETED AS NECESSARY TO BAKER TANKS.
6. INSTALL COMPOST WATTLES.



SEDIMENT POND TYPICAL SECTION

SCALE: NTS



TRACT A GRADING PLAN

40 0 40 80

SCALE IN FEET

PRELIMINARY NOT FOR CONSTRUCTION

DOWL
WWW.DOWL.COM
720 SW Washington Street, #750
Portland, Oregon 97205
971-280-8641

COVE WATERFRONT RESIDENCES
CONCEPT DEVELOPMENT PLAN AND PRELIMINARY SUBDIVISION

EARLY GRADING PLAN - NORTH PARK & TRACT A

SECTION 29 T2S R2E W.M.
OREGON CITY, OREGON

PROJECT	14307.01
DATE	12/7/2018

SHEET

C213

\\bil-fs\bil-projects\22\14307-01\65CAD_ddp - early grading\SC-DDPEG-GR-14307.dwg PLOT DATE 2018-12-7 08:47 SAVED DATE 2018-12-07 07:56 USER: kgilsdorf

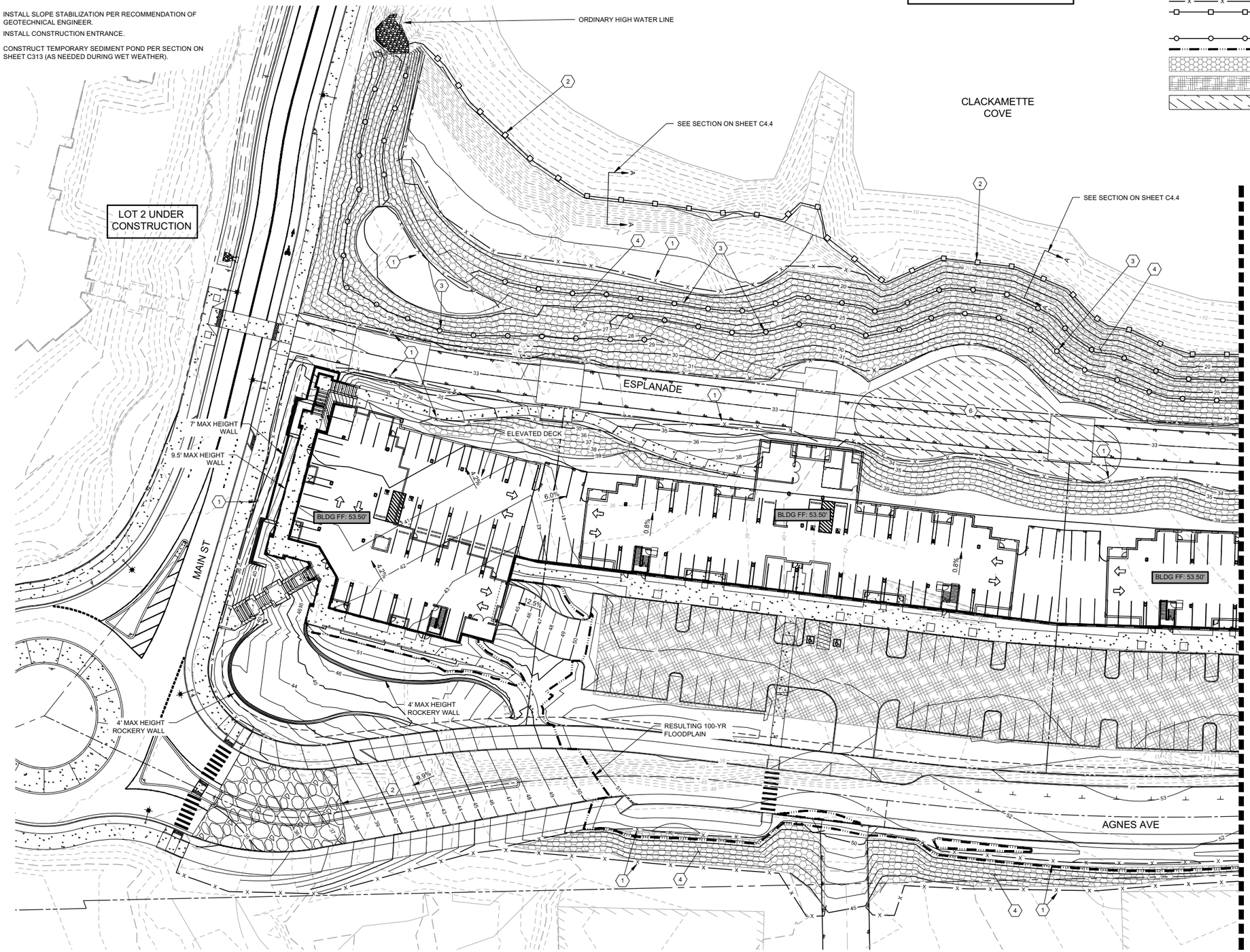
EROSION CONTROL NOTES

1. INSTALL SEDIMENT FENCE.
2. INSTALL LOWER LIMIT EC PROTECTION PER SECTION A-A ON SHEET C4.4.
3. INSTALL COMPOST WATTLES
4. INSTALL SLOPE STABILIZATION PER RECOMMENDATION OF GEOTECHNICAL ENGINEER.
5. INSTALL CONSTRUCTION ENTRANCE.
6. CONSTRUCT TEMPORARY SEDIMENT POND PER SECTION ON SHEET C313 (AS NEEDED DURING WET WEATHER).

NOTE: CONTOURS SHOWN UNDER BUILDING FOOTPRINTS ARE GARAGE GRADES

LEGEND

- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED SEDIMENT FENCE
- PROPOSED LOWER LIMITS EC PROTECTION (SEE SECTIONS ON SHEET C4.4) (PLACED AT ORDINARY HIGH WATER)
- PROPOSED COMPOST WATTLES
- RESULTING 100-YR FLOODPLAIN LINE
- PROPOSED SLOPE STABILIZATION MATTING
- PROPOSED MATERIAL/EQUIPMENT STAGING AREA
- PROPOSED TEMPORARY SEDIMENT POND



30 0 30 60
SCALE IN FEET

PRELIMINARY NOT FOR CONSTRUCTION

DOWL
WWW.DOWL.COM
720 SW Washington Street, #750
Portland, Oregon 97205
971-280-8641

COVE WATERFRONT RESIDENCES
CONCEPT DEVELOPMENT PLAN AND PRELIMINARY SUBDIVISION

FUTURE GRADING PLAN - SOUTH

SECTION 29 T2S R2E W.M.
OREGON CITY, OREGON

PROJECT	14307.01
DATE	12/7/2018

SHEET
C310

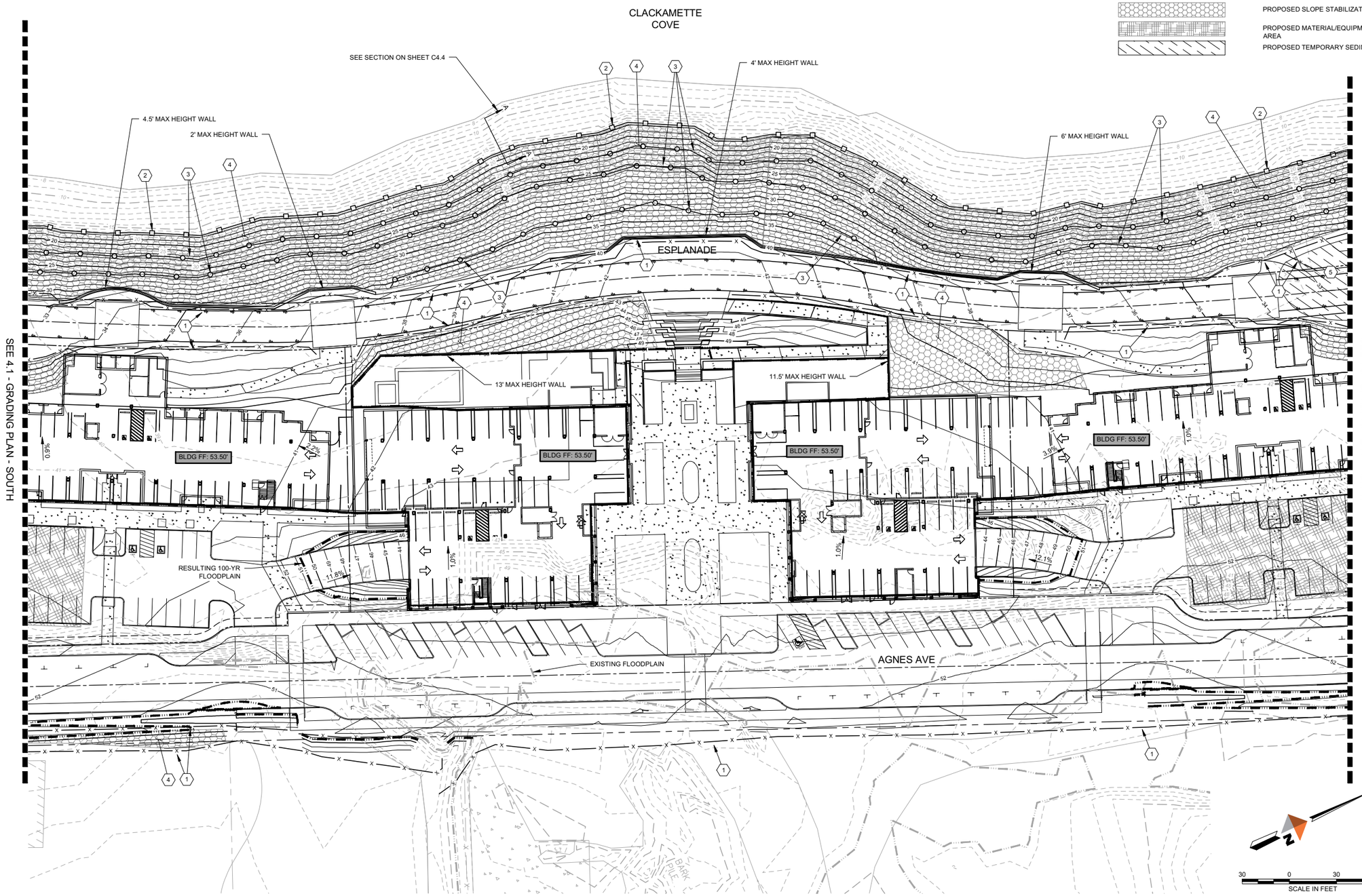
EROSION CONTROL NOTES

1. INSTALL SEDIMENT FENCE.
2. INSTALL LOWER LIMIT EC PROTECTION PER SECTION A-A ON SHEET C4.4.
3. INSTALL COMPOST WATTLES
4. INSTALL SLOPE STABILIZATION PER RECOMMENDATION OF GEOTECHNICAL ENGINEER.
5. CONSTRUCT TEMPORARY SEDIMENT POND PER SECTION ON SHEET C313 (AS NEEDED DURING WET WEATHER).

NOTE: CONTOURS SHOWN UNDER BUILDING FOOTPRINTS ARE GARAGE GRADES

LEGEND

- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED SEDIMENT FENCE
- PROPOSED LOWER LIMITS EC PROTECTION (SEE SECTIONS ON SHEET C4.4) (PLACED AT ORDINARY HIGH WATER)
- PROPOSED COMPOST WATTLES
- RESULTING 100-YR FLOODPLAIN LINE
- PROPOSED SLOPE STABILIZATION MATTING
- PROPOSED MATERIAL/EQUIPMENT STAGING AREA
- PROPOSED TEMPORARY SEDIMENT POND



PRELIMINARY NOT FOR CONSTRUCTION

DOWL
WWW.DOWL.COM
720 SW Washington Street, #750
Portland, Oregon 97205
971-280-9641

COVE WATERFRONT RESIDENCES
CONCEPT DEVELOPMENT PLAN AND PRELIMINARY SUBDIVISION

FUTURE GRADING PLAN - CENTER

SECTION 29 T2S R2E W.M.
OREGON CITY, OREGON

PROJECT	14307.01
DATE	12/7/2018

SHEET

C311

EROSION CONTROL NOTES

1. INSTALL SEDIMENT FENCE.
2. INSTALL LOWER LIMIT EC PROTECTION PER SECTION A-A ON SHEET C4.4.
3. INSTALL COMPOST WATTLES
4. INSTALL SLOPE STABILIZATION PER RECOMMENDATION OF GEOTECHNICAL ENGINEER.
5. CONSTRUCT TEMPORARY SEDIMENT POND PER SECTION ON SHEET C313 (AS NEEDED DURING WET WEATHER).

NOTE: CONTOURS SHOWN UNDER BUILDING FOOTPRINTS ARE GARAGE GRADES

LEGEND

- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED SEDIMENT FENCE
- PROPOSED LOWER LIMITS EC PROTECTION (SEE SECTIONS ON SHEET C4.4) (PLACED AT ORDINARY HIGH WATER)
- PROPOSED COMPOST WATTLES
- RESULTING 100-YR FLOODPLAIN LINE
- PROPOSED SLOPE STABILIZATION MATTING
- PROPOSED MATERIAL/EQUIPMENT STAGING AREA
- PROPOSED TEMPORARY SEDIMENT POND

PEDESTRIAN CONNECTION TO BEACH

SEE SECTION ON SHEET C4.4

CLACKAMETTE COVE

ESPLANADE

BLDG FF: 53.50'

BLDG FF: 53.50'

BLDG FF: 53.50'

1.0%

1.0%

4.2%

10.7%

1.5%

RESULTING 100-YR FLOODPLAIN

EXISTING FLOODPLAIN

AGNES AVE

SEE 4.2 - GRADING PLAN - CENTER

SEE 4.4 - GRADING PLAN - NORTH PARK AND TRACT A

30 0 30 60

SCALE IN FEET

PRELIMINARY NOT FOR CONSTRUCTION

DOWL
WWW.DOWL.COM
720 SW Washington Street, #750
Portland, Oregon 97205
971-280-8641

COVE WATERFRONT RESIDENCES
CONCEPT DEVELOPMENT PLAN AND PRELIMINARY SUBDIVISION

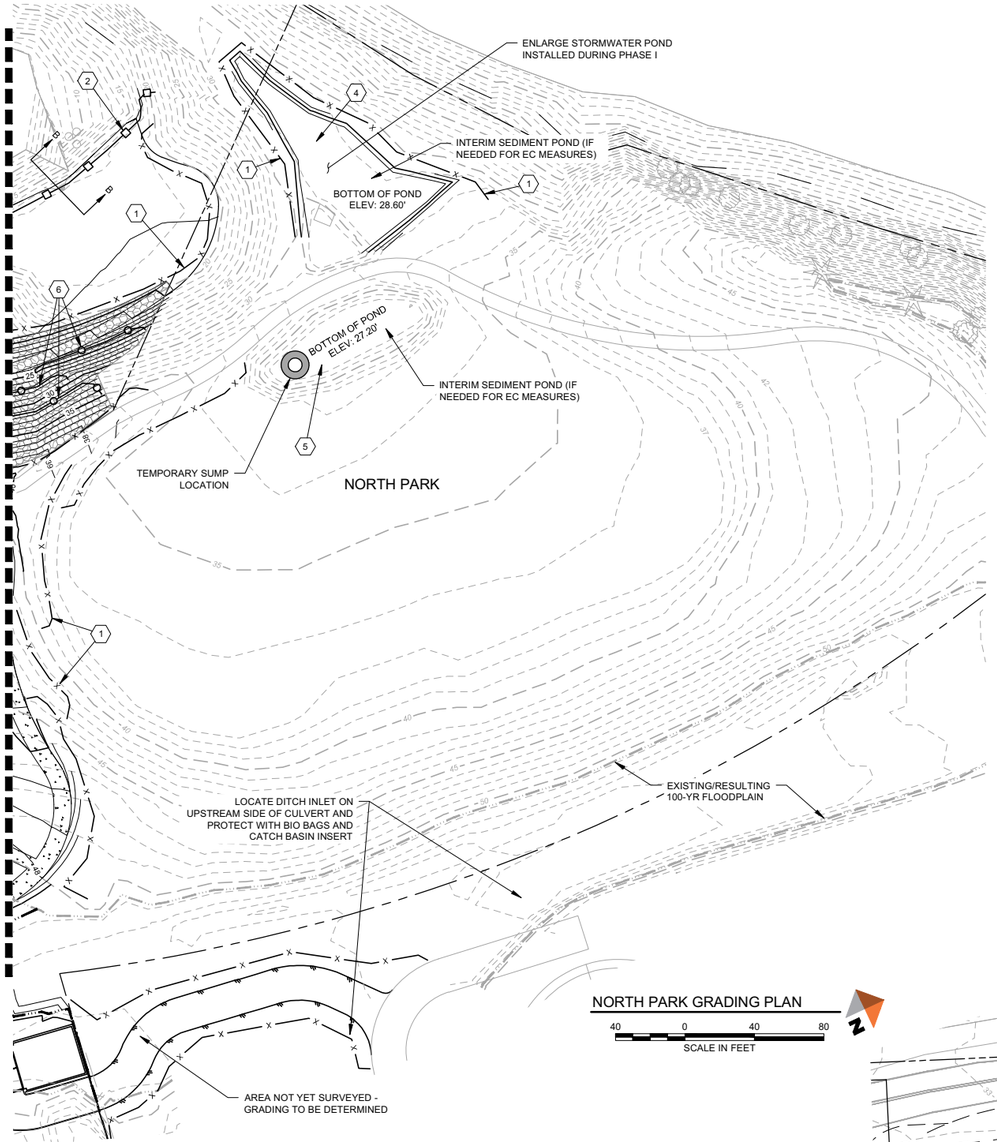
FUTURE GRADING PLAN - NORTH

SECTION 29 T2S R2E W.M.
OREGON CITY, OREGON

PROJECT	14307.01
DATE	12/7/2018

SHEET

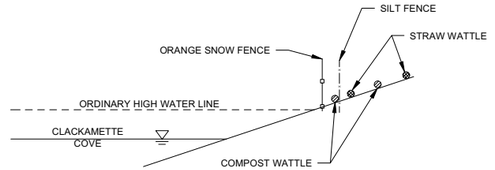
C312



NORTH PARK GRADING PLAN

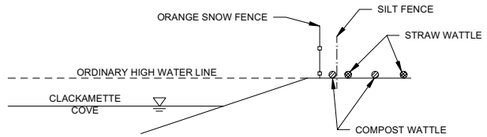
40 0 40 80

SCALE IN FEET



ESPLANADE LOWER LIMITS SECTION (A-A)

SCALE: NTS



NORTH PARKLOWER LIMITS SECTION (B-B)

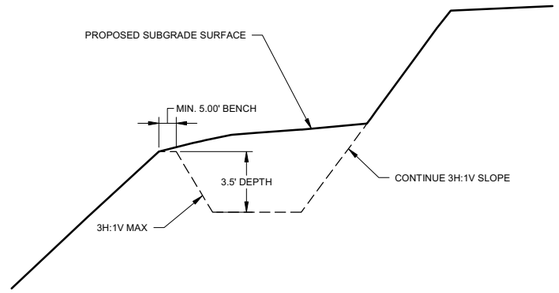
SCALE: NTS

LEGEND

- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED SEDIMENT FENCE
- PROPOSED LOWER LIMITS EC PROTECTION (SEE SECTIONS ON SHEET C4.3)
- PROPOSED COMPOST WATTLES
- RESULTING 100-YR FLOODPLAIN LINE
- PROPOSED SLOPE STABILIZATION MATTING
- PROPOSED MATERIAL/EQUIPMENT STAGING AREA

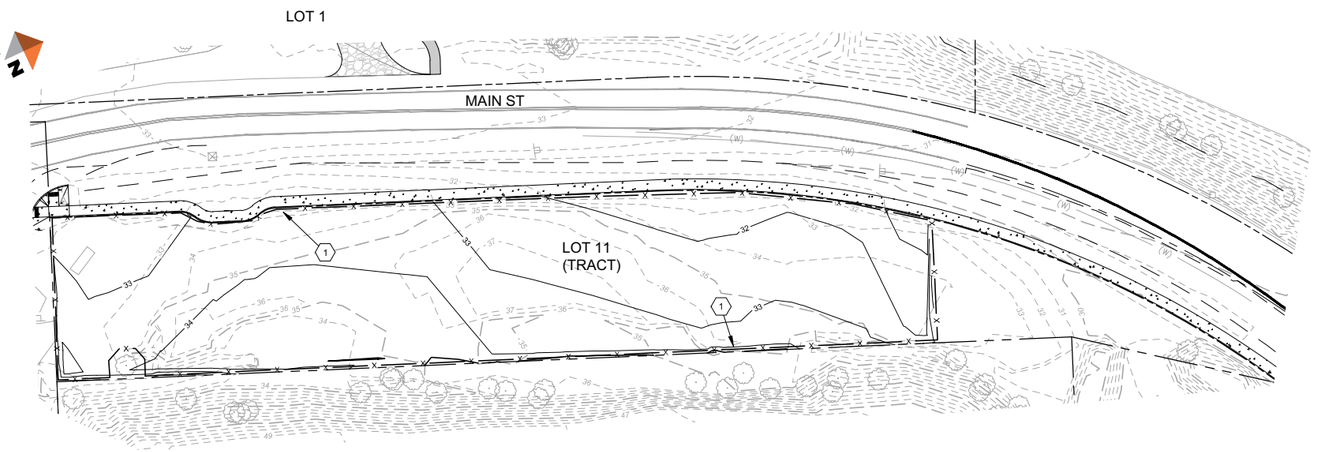
EROSION CONTROL NOTES

1. INSTALL SEDIMENT FENCE.
2. INSTALL LOWER LIMIT EC PROTECTION PER SECTION B-B THIS SHEET.
3. INSTALL SLOPE STABILIZATION PER RECOMMENDATION OF GEOTECHNICAL ENGINEER.
4. MAINTAIN/EXPAND EXISTING TEMPORARY HOLDING/OVERFLOW PREVENTION POND. STORED WATER TO BE DEPLETED VIA PORTABLE PUMP AND DIVERTED TO UPPER POND.
5. MAINTAIN UPPER POND. STORED WATER IN UPPER POND TO BE DEPLETED AS NECESSARY TO BAKER TANKS.
6. INSTALL COMPOST WATTLES.



SEDIMENT POND TYPICAL SECTION

SCALE: NTS



TRACT A GRADING PLAN

40 0 40 80

SCALE IN FEET

PRELIMINARY NOT FOR CONSTRUCTION

DOWL
WWW.DOWL.COM
720 SW Washington Street, #750
Portland, Oregon 97205
971-280-8641

COVE WATERFRONT RESIDENCES
CONCEPT DEVELOPMENT PLAN AND PRELIMINARY SUBDIVISION

FUTURE GRADING PLAN - NORTH PARK & TRACT A

SECTION 29 T2S R2E W.M.
OREGON CITY, OREGON

PROJECT	14307.01
DATE	12/7/2018

SHEET

C313