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MEMORANDUM

To: Howard Wells / PBS Engineering and Environmental, Inc.

Date: January 5, 2024

GRI Project No.: 6838-A

From: Scott Schlechter, PE, GE; BC.PE; and Brian Bayne, PE

Re: Geotechnical Engineering Services
Rogue Brewery Seawall
Port of Newport
Newport, Oregon

DRAFT

As requested, GRI completed geotechnical engineering services to assist PBS Engineering and Environmental, Inc. (PBS) in the final design for repair of the existing seawall. Our services consisted of review of available subsurface information, subsurface explorations, and engineering analysis. This memorandum summarizes our findings and provides our geotechnical recommendations for design and construction of the project.

As you know, GRI previously provided an October 7, 2021, memorandum to you for the seawall repair or replacement titled, "Preliminary Geotechnical Consultation, Rogue Brewery Seawall, Port of Newport, Newport, Oregon."

The following information for the project site was reviewed:

BergerABAM, December 2018, "Structural Evaluation Report, Port of Newport, Rogue Brewery Seawall; prepared for Port of Newport."

Dames & Moore, March 8, 1978, "Soils Investigation, South Beach Marina on Yaquina Bay, Newport, Oregon".

Foundation Engineering, Inc., March 23, 2023, "Rogue Ales and Spirits, Wastewater Pretreatment, Newport, Oregon," prepared for Civil West Engineering Services, Inc.

Northwest Testing, Inc., May 7, 2020, "Laboratory Testing – Rogue Brewery; prepared for Stantec."

Stantec, August 20, 2021, "Limited Phase II Environmental Site Assessment and Geotechnical Evaluation, Port of Newport Rogue Brewery Property, 2320 SE Marine Science Drive, Newport, Oregon 97365," prepared for Oregon Cascades West Council of Governments.

SITE DESCRIPTION

The Vicinity Map (Figure 1) shows the general location of the site and previous explorations in the area. The site is located on the south side of Yaquina Bay, south of an existing marina. The seawall is approximately 540 feet long and consists of W18x97 steel piles at about 10-foot spacing, with concrete lagging between piles. A deadman anchor system with an anchor connection at about elevation 10 feet [Mean Lower Low Water (MLLW)] provides lateral support for the wall. The seawall supports the Rogue Work Headquarters building (Rogue Brewery) and a relatively flat asphalt concrete (AC) parking lot/storage area at about elevation 16 feet MLLW. Based on recent Army Corps of Engineers bathymetric data, the mudline on the marina side of the seawall is at about elevation -8 feet to -10 feet MLLW and is relatively flat.

PROJECT DESCRIPTION

As discussed in BergerABAM's 2018 report, corrosion of the steel soldier piles and spalling of the concrete beam/pile cap were observed for the existing seawall. In addition, the report discussed the loss of backfill material through gaps in the concrete lagging, which has likely contributed to the historical settlement of the interior floor slab of the Rogue Brewery. During dropping-tide conditions, relatively heavy seepage can be observed between the piles and concrete lagging, which supports the risk of backfill piping through these joints during the tidal differential head conditions at the site. These conditions have decreased the serviceable life of the existing seawall. The Port has elected to make interim repairs to address the corrosion and piping issues observed at the site. We understand that new steel plates will be welded to the existing piles in the splash zone. To reduce the risk of loss of backfill material through the concrete lagging, two rows of polymer injection grouting are planned immediately behind the face of the bulkhead wall. The injection grouting is generally planned between a bottom elevation -10 feet and top elevation between elevation 13 feet and elevation 16 feet and will be installed on a 4-foot-diameter triangular spacing.

SUBSURFACE CONDITIONS

General

Review of available subsurface information in the vicinity of the project area indicates the site is surfaced with AC pavement underlain by sand fill that extends to depths of about 12 feet to 15 feet underlain by sand. Silt was encountered below a depth of 110 feet in one of the Dames & Moore borings completed near the site. The sand fill is tan to light gray, fine grained, and contains up to a trace of silt and some man-made debris/garbage. Based on Standard Penetration Test (SPT) N-values, the sand fill is typically loose to medium dense. The sand fill was dense at a depth of 10 feet in boring GP-03. A 6-inch-thick layer of gravelly clay fill was encountered within the sand fill at a depth of 3 feet in boring GP-04. Sand was encountered below the fill at a depth of about 12 feet and is typically tan to light gray or gray, fine grained, and contains up to some silt. The sand in boring GP-01 was dark gray to black at a depth of 17 feet. Gravel was encountered in the sand in boring GP-04 between depths of 15 feet and 25 feet. Wood fragments were encountered

in the sand in borings GP-01 and GP-04 at depths of 35 feet and 36.5 feet. The sand is clayey from a depth of 16 feet to 17 feet in boring GP-01. Based on SPT N-values, the sand is typically medium dense to very dense below the fill to a depth of 40 feet and dense to very dense below 40 feet. The sand in boring GP-04 was loose at a depth of 20 feet.

An additional subsurface exploration was completed by GRI on November 27, 2023, to primarily supplement groundwater data at the site. The boring designated B-1 was advanced to a depth of 31.5 feet at the approximate location shown on Figure 1. A log of the boring is provided on Figure 1A in Appendix A. The field and laboratory programs conducted to evaluate the physical engineering properties of the materials encountered in the boring are described in Appendix A. The terms and symbols used to describe the soil encountered in the boring are defined in Table 1A, and the attached legend. After completion of drilling, a 2-inch-diameter slotted polyvinyl chloride (PVC) pipe was installed in the borehole and backfilled with silica sand to allow periodic measurements of groundwater. The PVC pipe was slotted from a depth of 3 feet to 28 feet, the maximum depth at which the PVC pipe could be installed into the borehole.

The subsurface conditions encountered in Stantec, Dames & Moore and Foundation Engineering, Inc. borings are in general agreement with the subsurface information obtained during our recent investigation.

Groundwater

Boring B-1 was advanced using mud-rotary drilling techniques, which do not allow direct measurements of groundwater during drilling. To provide ongoing acquisition of groundwater data, a standpipe was installed within the borehole to a depth of 28 feet to allow manual reading of groundwater. Groundwater depths were measured on November 27, 2023, at 7:00 p.m., and on November 28, 2023, at 9:00 a.m., and measured groundwater depths of 3.7 feet and 9.6 feet below existing ground surface, respectively. The difference in water depths is likely due to tidal fluctuation in the nearby bay and dissipation of water from the mud-rotary drilling process.

In addition, a vibrating-wire piezometer (VWP) was lowered into the standpipe to a depth of 26 feet below existing ground surface elevation. The vibrating-wire piezometer is connected to a data logger system that records the groundwater level at one-hour intervals. Groundwater-level data will be recorded over at least the next month and provided in an updated memorandum. Installation details for the piezometer are described in Appendix A.

We anticipate groundwater levels closely reflecting water levels in the adjacent bay. Groundwater levels in the standpipe and piezometer installed in the borehole are being measured and will be compared against water levels in the bay.

GEOTECHNICAL CONSIDERATIONS

General

Available geotechnical data indicates the project site is mantled by AC pavement underlain by sand fill to depths on the order of 12 feet to 17.5 feet underlain by alluvial sand to depths on the order of 110 feet. The sand is underlain by silt. Groundwater levels at the site will fluctuate in response to precipitation and levels in the nearby Yaquina Bay. The installation of high-density polymer behind the seawall to reduce the risk of loss of backfill through lagging will reduce the permeability of the existing sand soils behind the wall and could increase the risk of larger differential water pressures acting on the wall, particularly following tidal fluctuations. A system of weep holes and horizontal drains extending beyond the proposed high-density polymer is planned to reduce the buildup of hydraulic pressure on the backside of the wall. The following sections of this memorandum provide our conclusions and recommendations for design and construction of the project improvements.

Static Lateral Earth Pressures

Static lateral earth pressures on the existing tied-back seawall can be evaluated using the lateral earth pressure criteria provided on Lateral Earth Pressure Diagram (Figure 2). Additional loading due to surcharge loads should be added in accordance with the criteria shown on Surcharge-Induced Lateral Pressure (Figure 3). Per discussion with PBS, the differential hydrostatic pressure head between both sides of the wall has not been finalized. The recently installed monitoring well in boring B-1 will be monitored over the course of at least one month to evaluate the differential pressure head on the bulkhead wall due to existing conditions.

During and shortly following polymer injection grouting, water levels in the monitoring well will continue to be monitored to evaluate if differential pressure heads are increasing from those observed prior to polymer injection grouting. If differential pressure heads have increased, then additional horizontal drains will be installed to lower differential pressure heads to similar or smaller heads than observed under existing conditions.

Construction Considerations

Two rows of polymer injection grouting are planned behind the bulkhead wall on a 4-foot-on-center triangular spacing. Per discussions with a polymer injection grouting contractor, the polymer will be designed to create an approximate 4-foot-diameter column to reduce the risk of loss of sand backfill through gaps in the concrete lagging and create an approximate 8-foot-wide zone of less permeable sand behind the wall.

To reduce the additional buildup of hydrostatic pressures behind the seawall, the team is proposing the installation of two 4-inch-diameter horizontal drains between each lagged section of the wall at about elevation 3.7 feet. The horizontal drains will extend back at least 10 feet from the face of the wall to allow drainage through the wall. The horizontal drains will be capped with

a 4-inch filtered weep hole cap at the face of the wall, and the drains will be filled with sand to prevent piping from behind the wall.

The horizontal drains will be installed following completion of the polymer injection. Drain installation must be timed to complete the drilling, backfill, and jet filter installation prior to water levels rising above the level of the drain. The horizontal drain contractor should anticipate differential head behind the wall and present a plan to mitigate the risk of piping during installation prior to mobilizing to site.

As discussed above, horizontal drains will be installed following polymer injection grouting. The drains are required to reduce buildup of hydrostatic pressures behind the wall, and the contractor will need to sequence the installation of polymer injection grouting and horizontal drains to reduce additional buildup of hydrostatic pressures. Per discussion with PBS, it is our understanding the polymer injection will be installed in alternating lagged sections of the wall to allow water to dissipate from behind the wall through unimproved sections prior to installation of the horizontal drains. The horizontal drains will be installed through the polymer injection grouting zone prior to polymer injection grouting in the adjacent lagged section of the wall. The polymer injection grouting contractor should provide guidance on the minimum time delay between completion of polymer injection grouting between a lagged section of wall and the installation of horizontal drains through the polymer.

As noted previously, some man-made debris/garbage was observed in the explorations at the site. The polymer injection contractor should have allowances in their construction processes and methodology to address the anticipated debris.

We understand the drain installation will be completed from the waterside face of the wall. The contractor will need containment in place to address the soil and polymer materials removed from the holes.

DESIGN REVIEW AND CONSTRUCTION SERVICES

We welcome the opportunity to review and discuss construction plans and specifications for this project as they are being developed. In addition, GRI should be retained to review all geotechnical-related portions of the plans and specifications to evaluate whether they are in conformance with the recommendations provided in this memorandum. To observe compliance with the intent of our recommendations, the design concepts, and the plans and specifications, it is our opinion that all construction operations dealing with earthwork and retaining walls should be observed by a GRI representative. Our construction-phase services will allow for timely design changes if site conditions are encountered that are different from those described in this memorandum. If we do not have the opportunity to confirm our interpretations, assumptions, and analyses during construction, we cannot be responsible for the application of our recommendations to subsurface conditions different from those described in this memorandum.

LIMITATIONS

This memorandum has been prepared to aid the project team in the design of the project. The scope is limited to the specific project and location described herein, and our description of the project represents our understanding of the significant aspects of the project relevant to wall design and construction. In the event any changes in the design and location of the project elements as outlined in this memorandum are planned, we should be given the opportunity to review the changes and modify or reaffirm the conclusions and recommendations of this memorandum in writing.

The conclusions and recommendations submitted in this memorandum are based on geotechnical data obtained by GRI and others at the locations indicated on Figure 1 and from other sources of information discussed in this memorandum. Information provided by others was reviewed for informational content only. GRI makes no representations or warranties regarding instruments of service completed by others. In the performance of subsurface investigations, specific information is obtained at specific locations at specific times. However, it is acknowledged that variations in soil conditions may exist between exploration locations. This memorandum does not reflect any variations that may occur between these locations. The nature and extent of variation may not become evident until construction. If, during construction, subsurface conditions are different from those described in this report or are observed or encountered, we should be advised at once so that we can observe and review these conditions and reconsider our recommendations where necessary.

We have included the Geoprofessional Business Association (GBA) guidance document "Important Information about This Geotechnical-Engineering Report/Geoenvironmental Report" to assist you and others in understanding the use and limitations of this report, included as Appendix B. We recommend you read this document.

Please contact the undersigned if you have any questions.

Submitted for GRI,

Scott M. Schlechter, PE, GE, BC.PE
Principal

Brian J. Bayne, PE
Associate

This document has been submitted electronically.

6838-A GEOTECHNICAL CONSULTATION MEMORANDUM

Enclosure: Figure 1, Vicinity Map
Figure 2, Lateral Earth Pressure Diagram
Figure 3, Surcharge-Induced Lateral Pressure
Appendix A, Field Explorations and Laboratory Testing
Appendix B, Geoprofessional Business Association Guidance Document

BASEMAP PROVIDED BY ESRI, 2023

BORING COMPLETED BY GRI
(NOVEMBER 27, 2023)

BORING COMPLETED BY STANTEC
(2020)

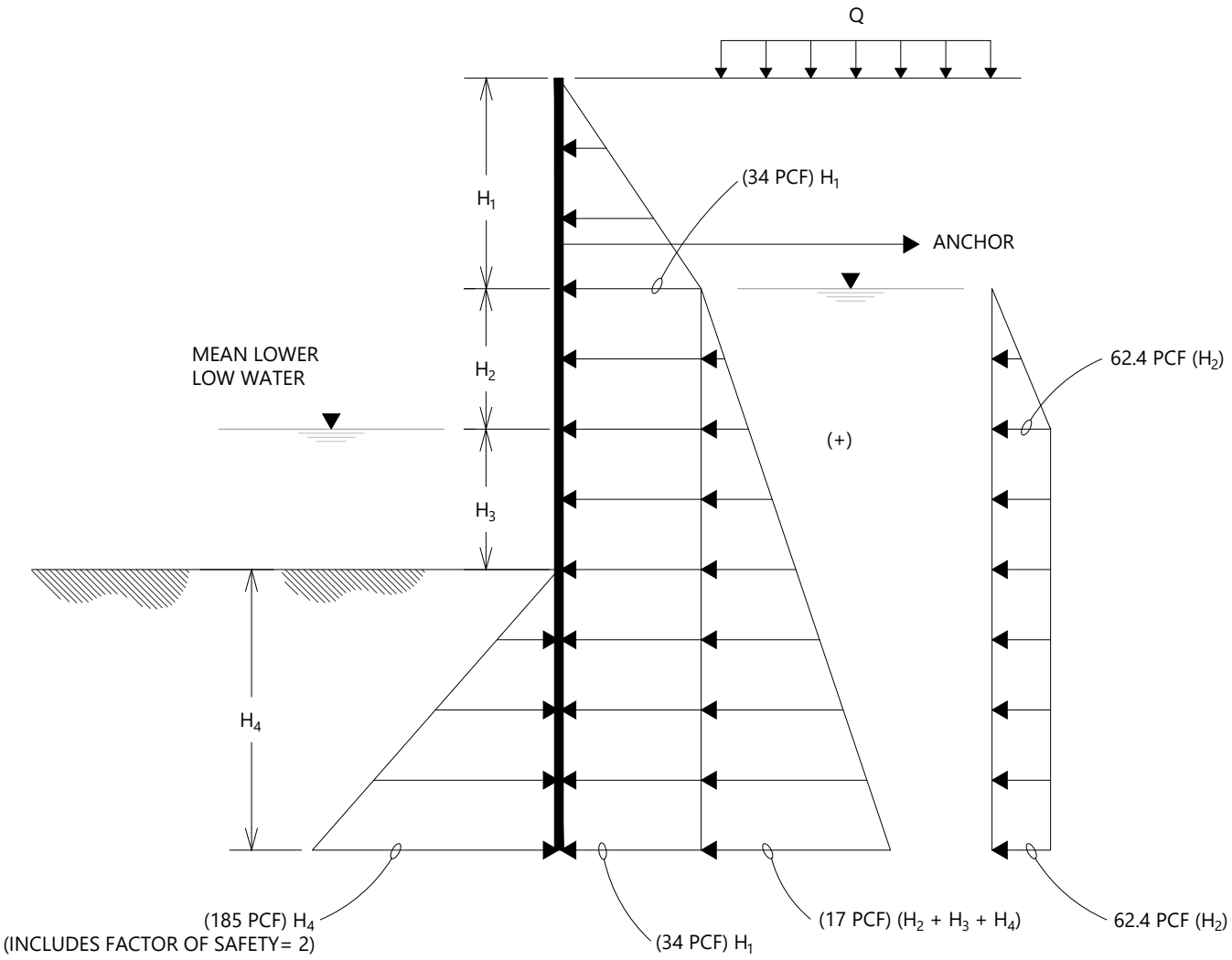
0 100 200
Feet

GRI

PBS
ROGUE BREWERY SEAWALL
NEWPORT, OREGON

VICINITY MAP

JAN. 2024 JOB NO. 6838-A FIG. 1



NOTES:

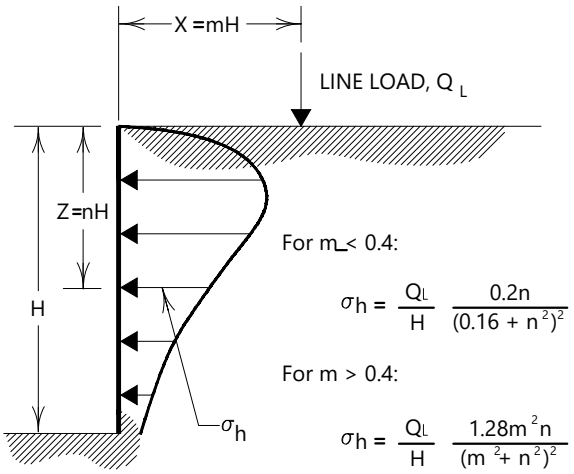
1. ADD A MINIMUM 0.27Q (PSF) HORIZONTAL SURCHARGE PRESSURE TO LAGGED PORTION OF WALL TO ACCOUNT FOR SURCHARGE EFFECTS FROM TRAFFIC AND OTHER LOADS (STORAGE LOADS).
2. ASSUMES HORIZONTAL SLOPE BEHIND AND IN FRONT OF WALL.
3. EARTH PRESSURES ACT OVER ENTIRE LAGGED PORTION OF WALL.
4. EARTH PRESSURES ACT OVER TWO PILE DIAMETERS BELOW LAGGED PORTION OF WALL.

GRI

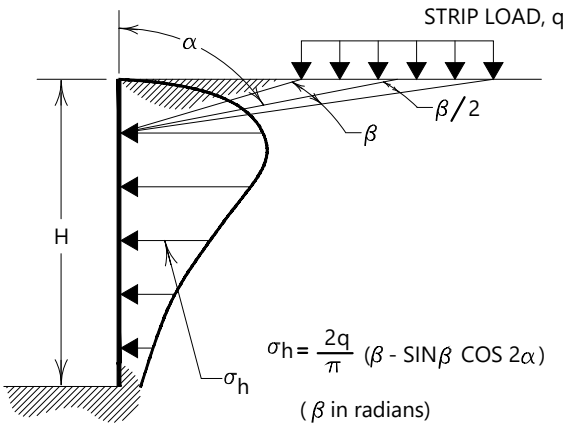
PBS
ROGUE BREWERY SEAWALL
NEWPORT, OREGON

LATERAL EARTH PRESSURE DIAGRAM

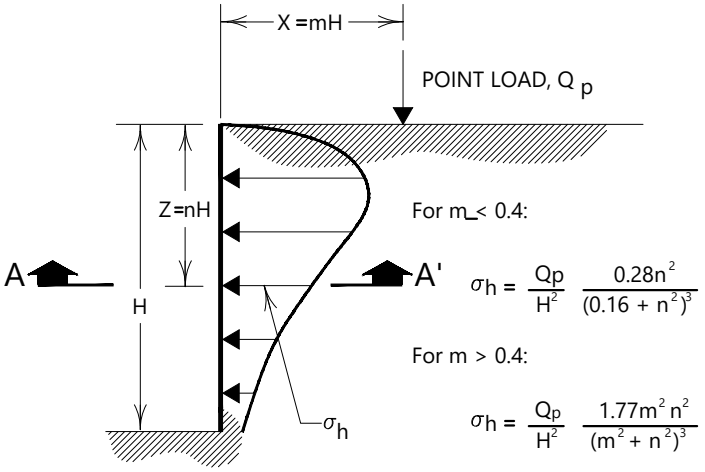
JAN. 2024 JOB NO. 6838-A FIG. 2

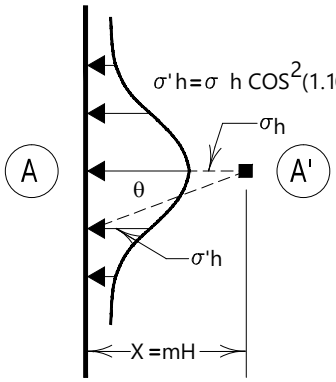


LINE LOAD PARALLEL TO WALL



STRIP LOAD PARALLEL TO WALL





DISTRIBUTION OF HORIZONTAL PRESSURES

VERTICAL POINT LOAD

NOTES:

1. THESE GUIDELINES APPLY TO RIGID WALLS WITH POISSON'S RATIO ASSUMED TO BE 0.5 FOR BACKFILL MATERIALS.

2. LATERAL PRESSURES FROM ANY COMBINATION OF ABOVE LOADS MAY BE DETERMINED BY THE PRINCIPLE OF SUPERPOSITION.

GRI

PBS
ROGUE BREWERY SEAWALL
NEWPORT, OREGON

SURCHARGE-INDUCED LATERAL PRESSURE

JAN. 2024 JOB NO. 6838-A FIG. 3

APPENDIX A

Field Explorations and Laboratory Testing

APPENDIX A

FIELD EXPLORATIONS AND LABORATORY TESTING

A.1 FIELD EXPLORATIONS

A.1.1 General

Subsurface materials and conditions at the site were investigated on November 27, 2023, with one boring, designated B-1. The approximate location of the boring is shown on the Vicinity Map, (Figure 1). The above fieldwork is discussed in more detail below.

A.1.2 Mud-Rotary Borings

The boring was advanced to a depth of 31.5 feet with mud-rotary drilling techniques using a CME 55 truck-mounted drill rig provided and operated by Western States Soil Conservation, Inc., of Hubbard, Oregon. Disturbed soil samples were obtained at 2.5-foot intervals of depth in the upper 15 feet and 5-foot intervals below this depth. Disturbed soil samples were obtained using a 2-inch-outside-diameter standard split-spoon sampler. Samples obtained from the borings were placed in airtight jars and returned to our laboratory for further classification and testing.

The log of the boring is provided on Figure 1A. The log presents a descriptive summary of the various types of materials encountered in the boring and notes the depths at which the materials and/or characteristics of the materials change. To the right of the descriptive summary, the numbers and types of samples taken during the drilling operation are indicated. Further to the right, Standard Penetration Test (SPT) N-values are shown graphically along with the natural moisture contents of soil samples. The terms and symbols used to describe the soil encountered in the boring are defined in Table 1A and the attached legend.

A.2 INSTRUMENTATION

A.2.1 Vibrating-Wire Piezometers

A Geokon Model 4500 ALV low-pressure, vented, vibrating-wire piezometer was installed in boring B-1 at a depth of about 26 feet. At the time of installation, the piezometer was saturated with water and lowered into the slotted PVC standpipe to the desired depth. The installation is equipped with steel flush-mounted monument casings that are cement-grouted into the borehole collar to protect the data logger and readout cable from vandalism and the elements.

A.3 LABORATORY TESTING

A.3.1 General

All samples obtained from the field explorations were returned to our laboratory, where the physical characteristics of the samples were noted, and the field classifications were

modified where necessary. At the time of classification, the natural moisture content of each sample was determined. Additional testing included grain size analysis. The following sections describe the laboratory testing program in more detail.

A.3.2 Natural Moisture Content

Natural moisture content determinations were made in conformance with ASTM International (ASTM) D2216. The results are provided on Figure 1A and in Table 2A.

A.3.3 Grain-Size Analysis

A.3.3.1 Washed-Sieve Method

To assist in classification of the soils, samples of known dry weight were washed over a No. 200 sieve. The material retained on the sieve is oven-dried and weighed. The percentage of material passing the No. 200 sieve is then calculated. The results are summarized on Figure 1A and in Table 2A.

Table 1A

GUIDELINES FOR CLASSIFICATION OF SOIL

Description of Relative Density for Granular (Coarse-Grained) Soil

Relative Density	Standard Penetration Resistance (N-values) blows/foot	3-Inch Sampler (140-lb Hammer) (N-values) blows/foot	3-Inch Sampler (300-lb Hammer) (N-values) blows/foot
Very Loose	0 - 4	0 - 11	0 - 4
Loose	4 - 10	11 - 26	4 - 10
Medium Dense	10 - 30	26 - 74	10 - 30
Dense	30 - 50	74 - 120	30 - 47
Very Dense	over 50	over 120	over 47

Description of Relative Consistency for Cohesive (Fine-Grained) Soils

Consistency	Standard Penetration Resistance (N-values) blows per ft	3-Inch Sampler (140-lb Hammer) (N-values) blows/foot	3-Inch Sampler (300-lb Hammer) (N-values) blows/foot	Torvane or Undrained Shear Strength, tsf
Very Soft	0 - 2	0 - 3	0 - 2	less than 0.125
Soft	2 - 4	3 - 6	2 - 5	0.125 - 0.25
Medium Stiff	4 - 8	6 - 12	5 - 9	0.25 - 0.50
Stiff	8 - 15	12 - 25	9 - 19	0.50 - 1.0
Very Stiff	15 - 30	25 - 65	19 - 31	1.0 - 2.0
Hard	over 30	over 65	over 31	over 2.0

Grain-Size Classification	Modifier for Subclassification		
Boulders: >12 inches *Cobbles:* 3 inches - 12 inches *Gravel:* ¼ inch - ¾ inch (fine) ¾ inch- 3 inches (coarse) *Sand:* No. 200 - No. 40 sieve (fine) No. 40 - No. 10 sieve (medium) No. 10 - No. 4 sieve (coarse) *Silt/Clay:* Pass No. 200 sieve	Adjective	Primary Constituent SAND or GRAVEL Percentage of Other Material (By Weight)	Primary Constituent SILT or CLAY Percentage of Other Material (By Weight)
	trace:	5 - 15 (sand, gravel)	5 - 15 (sand, gravel)
	some:	15 - 30 (sand, gravel)	15 - 30 (sand, gravel)
	sandy, gravelly:	30 - 50 (sand, gravel)	30 - 50 (sand, gravel)
	trace:	<5 (silt, clay)	*Relationship of clay and silt determined by plasticity index test*
	some:	5 - 12 (silt, clay)	
	silty, clayey:	12 - 50 (silt, clay)	

Table 2A

SUMMARY OF LABORATORY RESULTS

Sample Information						Atterberg Limits			
Location	Sample	Depth, ft	Elevation, ft	Moisture Content, %	Dry Unit Weight, pcf	Liquid Limit, %	Plasticity Index, %	Fines Content, %	Soil Type
B-1	S-1	2.5	--	18	--	--	--	--	FILL
	S-2	5.0	--	25	--	--	--	--	FILL
	S-3	7.5	--	25	--	--	--	2	FILL
	S-4	10.0	--	23	--	--	--	--	FILL
	S-5	12.5	--	25	--	--	--	3	FILL
	S-6	15.0	--	28	--	--	--	--	FILL
	S-7	20.0	--	22	--	--	--	5	SAND
	S-8A	25.0	--	22	--	--	--	--	SAND
	S-8B	25.5	--	20	--	--	--	--	SAND
	S-9	30.0	--	21	--	--	--	6	SAND

GRI

BORING AND TEST PIT LOG LEGEND

SOIL SYMBOLS

Symbol	Typical Description
	LANDSCAPE MATERIALS
	FILL
	GRAVEL; clean to some silt, clay, and sand
	Sandy GRAVEL; clean to some silt and clay
	Silty GRAVEL; up to some clay and sand
	Clayey GRAVEL; up to some silt and sand
	SAND; clean to some silt, clay, and gravel
	Gravelly SAND; clean to some silt and clay
	Silty SAND; up to some clay and gravel
	Clayey SAND; up to some silt and gravel
	SILT; up to some clay, sand, and gravel
	Gravelly SILT; up to some clay and sand
	Sandy SILT; up to some clay and gravel
	Clayey SILT; up to some sand and gravel
	CLAY; up to some silt, sand, and gravel
	Gravelly CLAY; up to some silt and sand
	Sandy CLAY; up to some silt and gravel
	Silty CLAY; up to some sand and gravel
	PEAT

BEDROCK SYMBOLS

Symbol	Typical Description
	BASALT
	MUDSTONE
	SILTSTONE
	SANDSTONE

SURFACE MATERIAL SYMBOLS

Symbol	Typical Description
	Asphalt concrete PAVEMENT
	Portland cement concrete PAVEMENT
	Crushed rock BASE COURSE

SAMPLER SYMBOLS

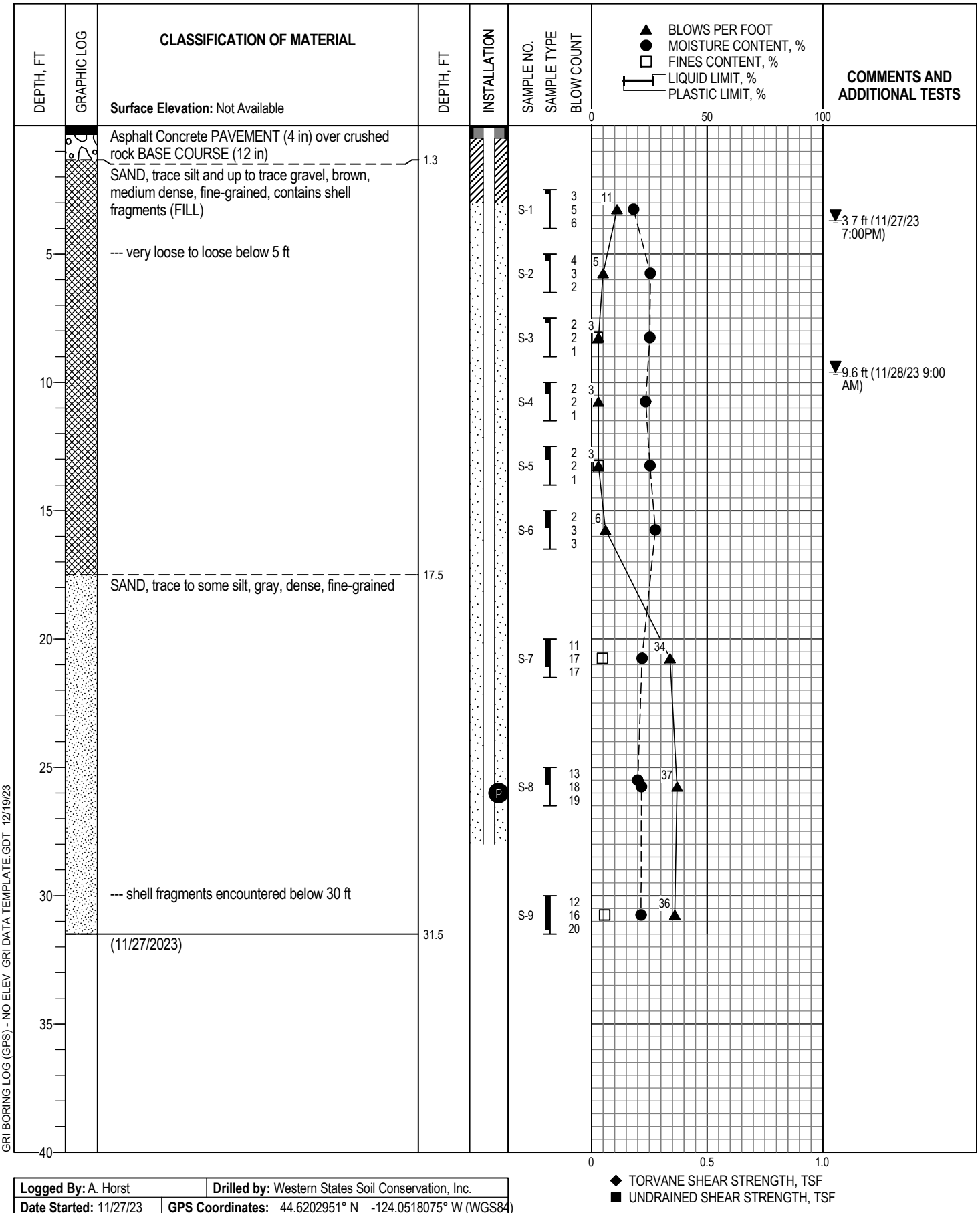
Symbol	Sampler Description
	2.0 in. O.D. split-spoon sampler and Standard Penetration Test with recovery (ASTM D1586)
	Shelby tube sampler with recovery (ASTM D1587)
	3.0 in. O.D. split-spoon sampler with recovery (ASTM D3550)
	Grab Sample
	Rock core sample interval
	Sonic core sample interval
	Push probe sample interval

INSTALLATION SYMBOLS

Symbol	Symbol Description
	Flush-mount monument set in concrete
	Concrete, well casing shown where applicable
	Bentonite seal, well casing shown if applicable
	Filter pack, machine-slotted well casing shown where applicable
	Grout, vibrating-wire transducer cable shown where applicable
	Vibrating-wire pressure transducer
	1-in.-diameter solid PVC
	1-in.-diameter hand-slotted PVC
	Grout, inclinometer casing shown where applicable

FIELD MEASUREMENTS

Symbol	Typical Description
	Groundwater level during drilling and date measured
	Groundwater level after drilling and date measured
	Rock/sonic core or push probe recovery (%)
	Rock quality designation (RQD, %)



GRI BORING LOG (GPS) - NO ELEV GRI DATA TEMPLATE.GDT 12/19/23

Logged By: A. Horst	**Drilled by:** Western States Soil Conservation, Inc.
Date Started: 11/27/23	**GPS Coordinates:** 44.6202951° N -124.0518075° W (WGS84)
Drilling Method: Mud Rotary **Equipment:** CME 55 HT Truck-Mounted Drill Rig **Hole Diameter:** 4 in.	**Hammer Type:** Auto Hammer **Weight:** 140 lb **Drop:** 30 in. **Energy Ratio:** 70%
Note: See Legend for Explanation of Symbols	

BORING B-1

JOB NO. 6838-A FIG. 1A

APPENDIX B

Geoprofessional Business Association Guidance Document

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
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GRI
9750 SW Nimbus Avenue
Beaverton, OR 97008-7172
503-641-3478 | www.gri.com

MEMORANDUM

To: Howard Wells / PBS

Date: October 7, 2021

GRI Project No.: 6179-B

From: Scott Schlechter, PE, GE; and Brian Bayne, PE

Re: Preliminary Geotechnical Consultation
Rogue Brewery Seawall
Port of Newport
Newport, Oregon

At your request, GRI has completed a geotechnical consultation to assist PBS in the preliminary evaluation of potential repair schemes for the existing seawall versus replacement options. The primary purpose of our consultation was to evaluate static lateral earth pressures on the existing wall, evaluate potential seismic considerations for wall replacement, and provide constructability considerations for different wall alternatives.

The following information for the project site was reviewed:

> BergerABAM, December 2018, "Structural Evaluation Report, Port of Newport, Rogue Brewery Seawall; prepared for Port of Newport."
>
> Stantec, August 20, 2021, "Limited Phase II Environmental Site Assessment and Geotechnical Evaluation, Port of Newport Rogue Brewery Property, 2320 SE Marine Science Drive, Newport, Oregon 97365," prepared for Oregon Cascades West Council of Governments.
>
> Northwest Testing, Inc., May 7, 2020, "Laboratory Testing – Rogue Brewery; prepared for Stantec."

SITE DESCRIPTION

The Vicinity Map, Figure 1, shows the general location of the site and previous explorations in the area. The site is located on the south side of Yaquina Bay, south of an existing marina. The seawall is approximately 540 feet long and consists of W18x97 steel piles at about 10-foot spacing with concrete lagging between piles. A deadman anchor system with an anchor connection at about an elevation of 10 feet [Mean Lower Low Water (MLLW)] provides lateral support for the wall. The seawall supports the Rogue Work Headquarters building (Rogue Brewery) and a relatively flat asphalt concrete (AC) parking lot/storage area at about an elevation of 16 feet MLLW. Based on recent Army Corps of Engineers bathymetric data, the mudline on the marina side of the seawall is at about elevation -8 feet to -10 feet MLLW and is relatively flat.

PROJECT DESCRIPTION

As discussed in BergerABAM's 2018 report, corrosion of the steel soldier piles and spalling of the concrete beam/pile cap was observed for the existing seawall. In addition, the report discussed the loss of backfill material through gaps in the concrete lagging, which may have led to the historical settlement of the interior floor slab of the Rogue Brewery. During dropping tide conditions, relatively heavy seepage can be observed between the piles and concrete lagging, which supports the risk of backfill piping through these joints during the tidal differential head conditions at the site. These conditions have decreased the serviceable life of the existing seawall. PBS was contracted by the Port of Newport further to evaluate the remaining service life of the seawall and develop structure repair alternatives or replacement options initially discussed in BergerABAM's 2018 report and associated cost estimates.

SUBSURFACE CONDITIONS

Our understanding of subsurface conditions at the site is based on our review of available reports summarized above and our observations of shallow-vacuum truck explorations on May 24, 2021.

Available subsurface information indicates the site is surfaced with AC pavement underlain by sand fill that extends to depths of about 12 feet underlain by sand to depths of 76.5 feet, the maximum depth explored in the Stantec borings. The sand fill is tan to light gray, fine grained, and contains up to a trace of silt and man-made debris/garbage. Based on SPT N-values, the sand fill is typically loose to medium dense. The sand fill was dense at a depth of 10 feet in boring GP-03. A 6-inch-thick layer of gravelly clay fill was encountered within the sand fill at a depth of 3 feet in boring GP-04. Sand was encountered below the fill at a depth of about 12 feet and is typically tan to light gray or gray, fine grained, and contains up to some silt. The sand in boring GP-01 was dark gray to black at a depth of 17 feet. Gravel was encountered in the sand in boring GP-04 between depths of 15 feet and 25 feet. Wood fragments were encountered in the sand in borings GP-01 and GP-04 at depths of 35 feet and 36.5 feet. The sand is clayey from a depth of 16 feet to 17 feet in boring GP-01. Based on SPT N-values, the sand is typically medium dense to very dense below the fill to a depth of 40 feet and dense to very dense below 40 feet. The sand in boring GP-04 was loose at a depth of 20 feet.

The sand in borings GP-01 and GP-04 were observed to be wet to saturated below depths of 16 feet and 11.5 feet, respectively, at the time of drilling, indicating possible groundwater depth. Groundwater levels at the site fluctuate in response to precipitation and the level of the nearby bay.

PRELIMINARY GEOTECHNICAL CONSIDERATIONS

Static Lateral Earth Pressures

Static lateral earth pressures on the existing tied-back seawall can be evaluated using the lateral earth pressure criteria provided on Figure 2. Additional loading due to surcharge loads should be added in accordance with the criteria shown on Figure 3.

It is our understanding corrosion of the existing soldier piles has caused a reduction in their moment capacities. To reduce moment demand on the existing piles, PBS has considered installing a row of tieback anchors to supplement the existing deadman anchors at about elevation 5 feet. Based on a preliminary evaluation of subsurface conditions behind the wall, we estimate a tieback anchor can develop an ultimate capacity on the order of 100 kips to 150 kips. It should be noted that the installation of a row of tieback anchors would likely modify the loading pattern on the retained earth portion of Figure 2 to reflect a more traditional apparent earth-pressure diagram for multiple anchor levels. While this modification could increase the assumed overall lateral loading on the wall, we do not anticipate the assumed additional load would exceed the substantial additional resistance provided by a tieback.

To reduce the risk of future loss of soil through the concrete lagging, we understand the team is considering installing high-density polymer injection behind the face of wall. The installation of high-density polymer would reduce the permeability of the existing sand soils behind the wall causing a potential hydraulic pressure gradient between water levels on the front and backsides of the wall following tidal fluctuations. If high-density polymer injection is used extensively behind the wall, the Figure 2 lateral earth pressure diagram would likely require modification to account for the additional differential head, unless a suitable drainage system is installed concurrently with the polymer injection. The need for weep holes or other drainage improvements will need to be evaluated further during the next phase of design if this alternative is advanced.

Seismic Considerations

Our preliminary analysis indicates that during a current code-based earthquake, there is a potential for liquefaction of the submerged loose to medium-dense sand encountered in the recent Stantec borings. Associated liquefaction-induced lateral spreading will result in significant lateral loading on the seawall. We estimate lateral spreading deformations could be in excess of 5 feet to 10 feet during a code-based earthquake. Based on our experience in the area, we anticipate replacement of the wall would require significant effort and costs to mitigate the lateral spreading hazard with ground improvement or similar alternatives. Repair alternatives are less likely to trigger the consideration of seismic mitigation.

Based on our experience in the area, there is a risk of tsunami inundation at the site following a code-based earthquake, which may need to be considered in a replacement alternative.

Preliminary Construction Considerations

As part of the repair alternatives, the construction of a row of tieback anchors installed at about elevation 5 feet is being considered. Installation of a row of tieback anchors would require barge access in the marina due to a lack of drill-rig access to the top of the wall. Containment of drill spoils to prevent them from entering the marina will be an important and likely costly construction consideration and will likely require environmental permitting. Tieback anchors will also require the construction of a waler system on the front of the wall, which may impact the existing floating walkway.

If the wall replacement option is considered, the wall would likely require design to the current seismic code and mitigation of the lateral spreading hazard. The use of ground improvement is commonly used to mitigate lateral spreading hazards in waterfront environments and mitigation of the hazard with only structural improvements at this site would likely be challenging or impractical. Ground improvement would likely require creating a block of improved soil behind the back of the wall either through densification of the existing sand or mixing an additive into the soil to improve its seismic performance. Due to the Rogue Brewery location, installing ground improvement beneath the building would be costly and potentially unfeasible and may require relocation of the brewery. Installation of ground improvement behind the seawall and adjacent to existing deadman anchors may cause damage to the wall and should be further evaluated if the wall replacement option is considered.

LIMITATIONS

This memorandum has been prepared to aid the project team in the conceptual alternatives of the project and associated cost estimates. The scope is limited to the specific project and location described herein, and our description of the project represents our understanding of the significant aspects of the project relevant to wall design. The comments, conclusions, and site-development guidelines presented in this memorandum are preliminary. Depending on the design approach selected, additional subsurface explorations, laboratory testing, and engineering studies are required to provide suitable criteria for the final design.

The conclusions and recommendations submitted in this memorandum are based on geotechnical data obtained by others at the locations indicated on Figure 1 and from other sources of information discussed in this memorandum. In the performance of subsurface investigations, specific information is obtained at specific locations at specific times. However, it is acknowledged that variations in soil conditions may exist between exploration locations. This memorandum does not reflect any variations that may occur between these locations. The nature and extent of variation may not become evident until construction. If, during construction, subsurface conditions are different from those described in this report or are observed or encountered, we should be advised at once so that we can observe and review these conditions and reconsider our recommendations where necessary.

Please contact the undersigned if you have any questions.

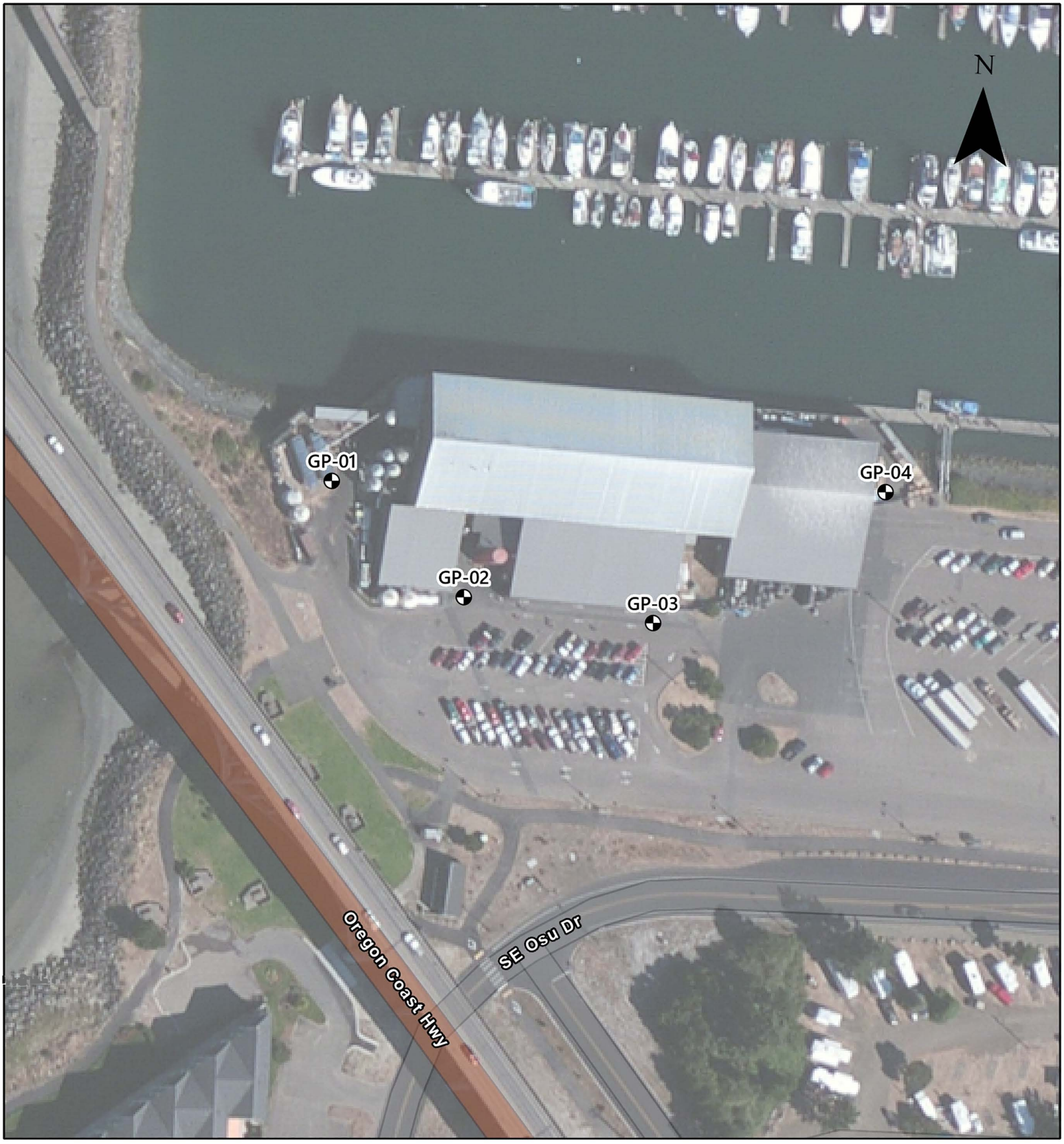
Submitted for GRI,

Renews: 6-2022

Scott M. Schlechter, PE, GE
Principal

Brian J. Bayne, PE
Senior Engineer

This document has been submitted electronically.



Folder: P:\6101-6200\6179 Port of Newport Rogue Seawall\6179-B\GIS\

0 100 200 Feet

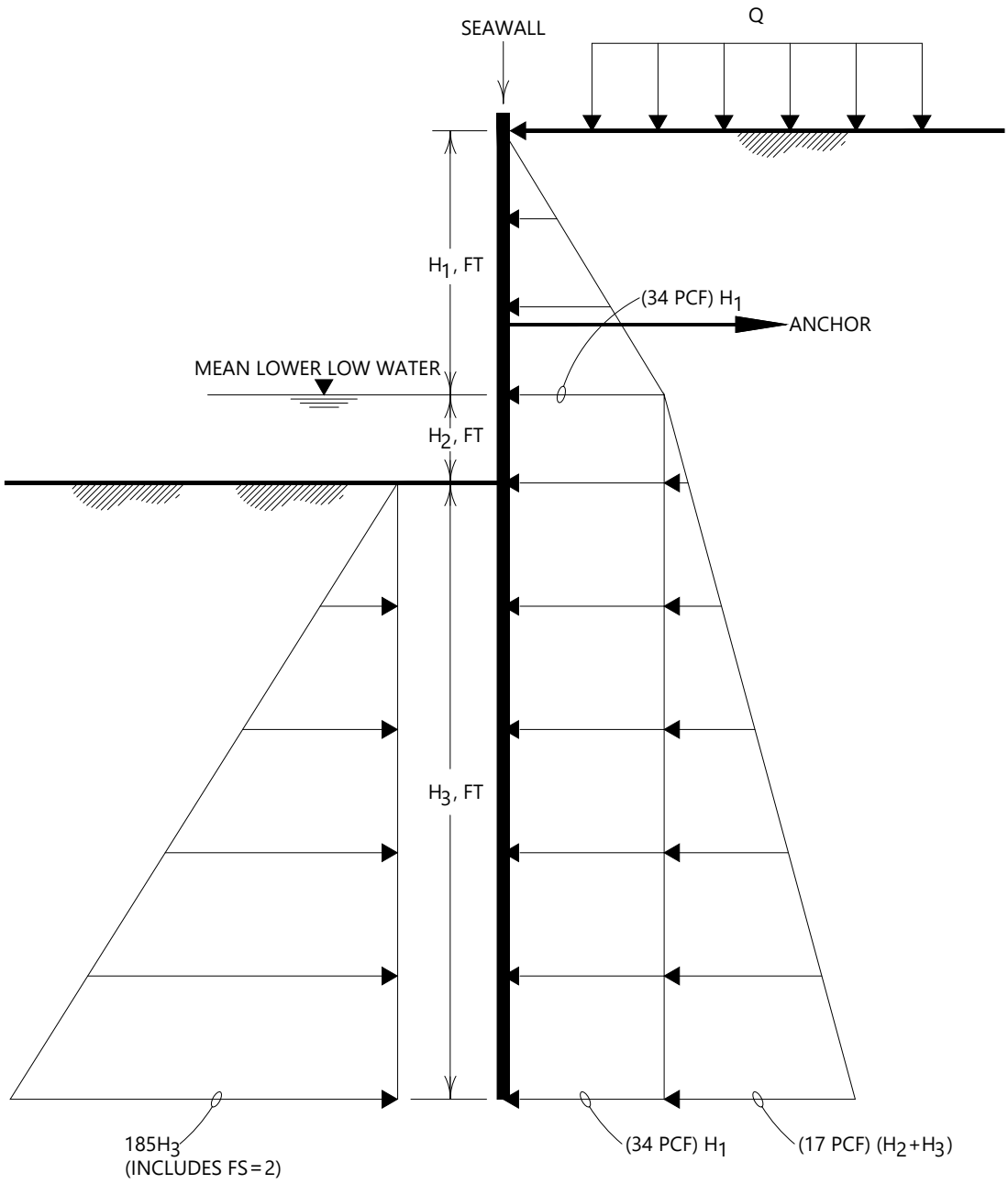
BORING COMPLETED BY STANTEC (2020)

GRI

PBS
ROGUE BREWERY SEAWALL
NEWPORT, OREGON

VICINITY MAP

OCT. 2021 JOB NO. 6179-B FIG. 1



NOTE: 1) ADD A MINIMUM 0.27Q (PSF) HORIZONTAL SURCHARGE PRESSURE TO LAGGED PORTION OF WALL TO ACCOUNT FOR SURCHARGE EFFECTS FROM TRAFFIC AND OTHER LIVE (STORAGE LOADS).

2) ASSUMES HORIZONTAL SLOPE BEHIND AND IN FRONT OF WALL.

3) EARTH PRESSURES ACT OVER ENTIRE LAGGED PORTION OF WALL.

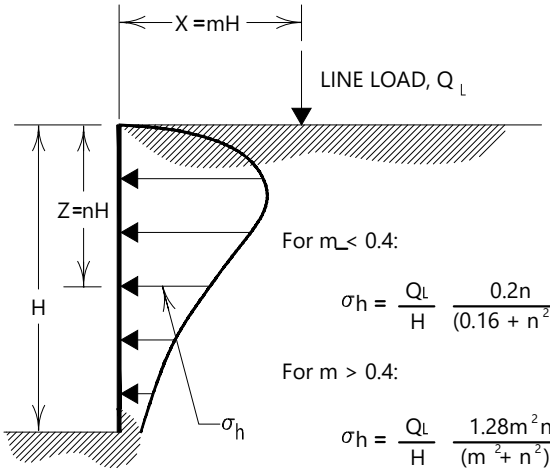
4) EARTH PRESSURES ACT OVER TWO PILE DIAMETERS BELOW LAGGED PORTION OF WALL.

GRI

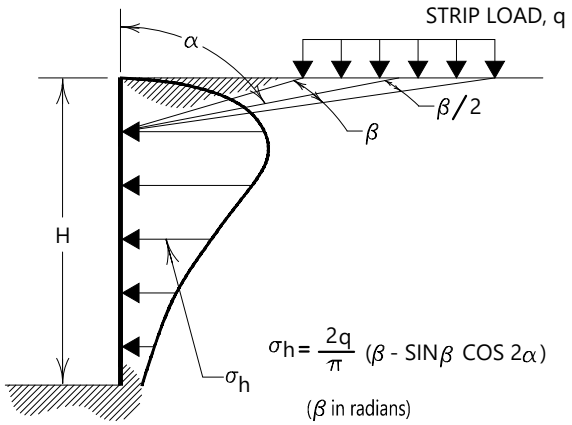
PBS
ROGUE BREWERY SEAWALL
NEWPORT, OREGON

LATERAL EARTH PRESSURES (TIED-BACK WALL - STATIC)

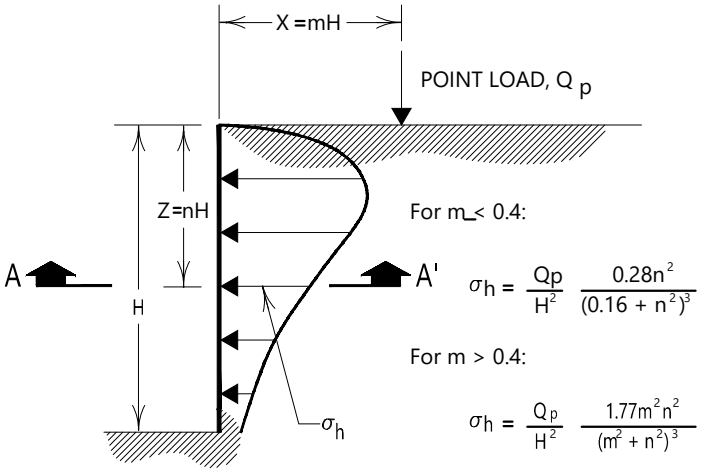
OCT. 2021 JOB NO. 6179-B FIG. 2

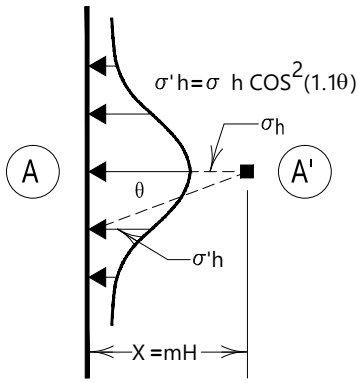


LINE LOAD PARALLEL TO WALL



STRIP LOAD PARALLEL TO WALL





DISTRIBUTION OF HORIZONTAL PRESSURES

VERTICAL POINT LOAD

NOTES:

1. THESE GUIDELINES APPLY TO RIGID WALLS WITH POISSON'S RATIO ASSUMED TO BE 0.5 FOR BACKFILL MATERIALS.

2. LATERAL PRESSURES FROM ANY COMBINATION OF ABOVE LOADS MAY BE DETERMINED BY THE PRINCIPLE OF SUPERPOSITION.

GRI

PBS
ROGUE BREWERY SEAWALL
NEWPORT, OREGON

SURCHARGE-INDUCED LATERAL PRESSURE

OCT. 2021 JOB NO. 6179-B FIG. 3

DRAFT

Geotechnical Investigation

Rogue Ales and Spirits
Wastewater Pretreatment

Newport, Oregon

Prepared for:

Civil West Engineering Services, Inc.

Newport, Oregon

March 23, 2023

Professional Geotechnical Services

Foundation Engineering, Inc.

Foundation Engineering, Inc.
Professional Geotechnical Services

Tim Gross, P.E.
Senior Project Engineer
Civil West Engineering Services, Inc.
609 SW Hurbert Street
Newport, Oregon 97365

March 23, 2023

Rogue Ales and Spirits Wastewater Pretreatment
Geotechnical Investigation
Newport, Oregon

Project No.: 2231013

Dear Mr. Gross:

We have completed the requested geotechnical investigation for the above-referenced project. Our report includes a description of our work, a discussion of the site conditions, a summary of laboratory testing, and a discussion of engineering analyses. Recommendations for site preparation and foundation design and construction for new wastewater storage tanks are also enclosed.

There are numerous values in geotechnical investigations that are approximate, including calculated values, measured lengths and heights, soil and rock layer depths and elevations, and strength measurements. For brevity, the symbol "±" is used throughout this report to represent the words "approximate" or "approximately" when discussing approximate values.

It has been a pleasure assisting you with this phase of your project. Please do not hesitate to contact us if you have any questions or if you require further assistance.

Sincerely,

FOUNDATION ENGINEERING, INC.

Erin J. Gillaspie, P.E.
Project Engineer

David L. Running, P.E., G.E.
Senior Geotechnical Engineer

EJG/DLR/lh
Enclosure

GEOTECHNICAL INVESTIGATION

ROGUE ALES AND SPIRITS WASTEWATER PRETREATMENT
NEWPORT, OREGON

BACKGROUND

Rogue Ale and Spirits (Rogue) plans to construct a new wastewater pretreatment facility at the Rogue Brewery located at 2320 SE Marine Drive in Newport, Oregon. The site location is shown on Figure 1A (Appendix A).

The new wastewater pretreatment facility will be located at the west end of the existing brewery facility. Figure 2A (Appendix A) shows the current site conditions at that location. The site is used for storing materials and currently contains two, ±12-foot diameter plastic tanks, a dumpster, and other equipment.

The planned wastewater pretreatment facility will include two steel wastewater storage tanks immediately west of the existing brewery building. A ±32.7-foot diameter, ±97,000 gallon Aeration Tank and ±23-foot diameter, ±56,000 gallon Equalization Tank are planned further to the west. The Aeration Tank will have a height of ±15.5 feet. A height was not specified for the Equalization tank, however, based on its diameter and planned volume, we anticipate the Equalization Tank will have a height in the range of ±18 to 20 feet. We have assumed the wastewater storage tanks will be bolted steel structures. A preliminary site layout for the wastewater pretreatment facility dated February 23, 2023, is shown on Figure 3A (Appendix A).

Rogue Ales and Spirits is the owner. Cambrian Innovation (Cambrian) is the wastewater pretreatment facility designer and Civil West Engineering Services, Inc. (Civil West) is the civil designer. Civil West retained Foundation Engineering, Inc. to complete a geotechnical investigation for the proposed improvements focusing on the Aeration and Equalization Tanks. Our scope of work was outlined in a proposal dated November 11, 2022, and authorized by a signed Professional Consulting Services Agreement dated January 18, 2023.

FIELD EXPLORATION

We drilled two borings at the site between February 13 and 14, 2023, using a CME 75 truck-mounted drill rig operated by Western States Soil Conservation, Inc. BH-1 was drilled near the planned center of the Aeration Tank and BH-2 was drilled near the planned center of the Equalization Tank. The approximate boring locations are shown on Figures 2A and 3A (Appendix A). We estimated ground surface elevations of ±El. 15.6 at BH-1 and ±El. 16.2 at BH-2, using Lidar imaging data available from the Oregon Department of Geology and Mining Industries (DOGAMI). These elevations reference the North American Vertical Datum of 1988 (NAVD 88).

The borings were advanced to depths of ±76.5 feet (BH-1) and ±36.5 feet (BH-2) using mud-rotary drilling techniques. Soil samples were obtained at 2½-foot intervals to a depth of ±20 feet and at 5-foot intervals thereafter. Sampling was conducted using a split-spoon sampler in conjunction with the Standard Penetration Test (SPT). The SPT, which is performed when the split-spoon sampler is driven, provides an indication of the stiffness or density of the foundation soil. The sampler is driven three consecutive 6-inch increments and the blows required to drive the sampler through each increment are recorded. The number of blows required to drive the sampler the final 12 inches represents the standard penetration resistance or N-value in blows per foot (bpf). SPT refusal is defined by a penetration resistance exceeding 50 blows in a 6-inch increment.

The borings were continually logged during drilling by a Foundation Engineering representative. The final logs (Appendix B) were prepared based on a review of the field logs and the laboratory test results, and an examination of the soil samples in our office. Upon the completion of drilling, the boreholes were backfilled with bentonite in general accordance with Oregon Water Resources Department (OWRD) guidelines. The backfill was capped with crushed gravel and asphaltic concrete (AC) cold patch.

LABORATORY TESTING

The laboratory testing included moisture content determinations and percent fines tests to help classify the soil according to the Unified Classification System (USCS) and estimate their overall engineering properties. The test results are summarized in Table 1C (Appendix C). The moisture contents are also shown on the boring logs. Non-tested samples were visually classified in general accordance with the procedures outlined in ASTM D2487 and ASTM D2488. The USCS symbols shown on the logs for untested samples should be considered approximations.

SURFACE AND SUBSURFACE CONDITIONS

Surface Conditions

The existing ground surface at the site is relatively flat and predominantly covered with AC pavement. The area is currently used for deliveries and for storing equipment and other materials. A soldier pile retaining wall extends across the northern edge of the site along Yaquina Bay. The soldier pile wall is comprised of HP12x53 piles and concrete lagging. The piles are reportedly tied back to deadman anchors buried ±25 to 50 feet behind the wall.

A topographic survey had not been completed at the time this report was prepared. However, Lidar imaging data available from the DOGAMI Lidar viewer indicates ground surface elevations ranging from ±El. 17 at the south end of the proposed facility to ±El. 15.5 at the north end adjacent to the retaining wall. The Lidar data indicates ground surface elevations ranging from ±El. 1.3 to ±El. 1.4 in the bay just north of the retaining wall. These elevations reference NAVD 88.

Subsurface Conditions

A general discussion of the subsurface conditions encountered in the borings is presented in the following sections. More detailed descriptions of the subsurface conditions encountered in each boring are summarized on the boring logs.

Additional information regarding the boring logs and the definitions of symbols and descriptive terms used in the logs are provided on the *Important Information and Symbols*, and the *Common Soil Descriptions Terms* sheets in Appendix B. The sheets also include a discussion of the interpretation of the subsurface profiles at the boring locations and the potential for inherent variations in the subsurface conditions across the site.

Existing Pavement. Both borings were drilled in paved areas. Drilling at BH-1 encountered a pavement section consisting of 3 inches of AC over ±12 inches of sandy gravel (base rock). Drilling at BH-2 encountered a pavement section consisting of 6 inches of AC over ±12 inches of sandy gravel (base rock). The variability in the AC thickness between the borings may be due to overlays and/or pavement patching associated with the construction of underground utilities.

Fill. As-built plans for the retaining wall dated February 1979, indicate the shoreline previously sloped down toward the bay with a ±1.8(H):1(V) slope. Based on the plans and anecdotal information provided by the design team, we presume the wall was backfilled with sand (likely dredge sand). We anticipate dredge fill was also previously placed to the south of the wall location to raise the site grades.

It is difficult to discern the contact between the fill and native soil because they are comprised of similar material. Material indicated as fill in our borings was identified based on the variable density of the soil and the presence of organic matter at some depths. We estimated a fill depth of ±15 feet in both of our borings. The fill consists of medium dense to dense grey-brown, fine sand with trace to some silt and scattered shells.

Beach Deposits. The fill is underlain by beach deposits consisting of grey, fine sand with varying amounts of silt, organics, and shell fragments extending to the maximum depths of the borings. The sand ranges from very loose to very dense to ±35 feet and is dense to very dense thereafter.

Groundwater Conditions

Mud-rotary drilling techniques precluded an accurate measurement of the groundwater in the borings at the time of drilling. Based on the relatively flat, low-lying terrain, proximity of the site to the Yaquina Bay, and the anticipated permeability of the sand encountered in the borings, we anticipate the groundwater level closely follows the water level in the bay. The groundwater level may rise above the bay level during periods of sustained heavy rainfall as runoff drains across the site toward the bay. We anticipate the groundwater level at the site fluctuates seasonally and with the tides and typically lies ±5 to 15 feet below the paved surface. Wet soil conditions were noted in the samples from the borings taken from depths of ±10 to 12 feet.

SEISMIC ANALYSIS AND EVALUATION

Seismic-Geologic Site Hazards

We reviewed potential seismic-geologic site hazards including fault rupture, liquefaction, lateral spread, settlement of non-liquefiable soils, seismic-induced landslides (i.e., slope instability), and flooding or inundation. We also addressed ground subsidence and prepared a design site response spectrum to be used for the structural design of the facility. Discussions of the seismic hazards and our seismic analyses are provided in the following sections.

Seismic Sources

The potential seismic sources, design bedrock accelerations, and earthquake magnitudes were selected based on the current 2014 USGS seismic maps (USGS, 2014). Each seismic source can be identified on the basis of its magnitude (M) and source-to-site distance (R). The sources with the greatest contribution to the overall uniform, seismic hazard are highlighted in a process termed deaggregation. This allows specific earthquake scenarios to be evaluated. The interactive deaggregation on the USGS website (USGS, 2014) indicates the probabilistic seismic risk at the site is dominated by Cascadia Subduction Zone (CSZ) interface earthquakes with a moment magnitude (M_w) between 8.4 and 9.1. A M_w 7 CSZ intraslab earthquake and a M_w 6.1 earthquake on the Yaquina Bay fault are also credible seismic hazards.

Fault Rupture

We reviewed the USGS Interactive Fault Map to identify crustal faults surrounding the project area (USGS, 2006). The nearest mapped potentially active crustal faults identified in the database are the Yaquina Bay fault mapped ±0.1 miles north of the site in Yaquina Bay, the Waldport fault located ±10 miles south of the site, and offshore Cascadia fold and fault belt faults scattered within ±5 to 6 miles northwest of the site. The available data indicates no known active crustal faults crossing beneath the project site, and our previous work in the area suggests the Yaquina Bay fault may be ±0.4 miles north of the site. Therefore, we anticipate the risk of fault rupture directly beneath the facility is low.

Liquefaction-Induced Settlement

Liquefaction occurs when loose, saturated cohesionless soil experiences a significant loss of strength during strong ground shaking. The strength loss is associated with rapid densification of the soil and corresponding development of high pore water pressure, which can lead to the soil behaving like a viscous fluid. Liquefiable soils typically consist of saturated, loose to medium dense sand and silty sand and non-plastic to low plasticity silt with a plasticity index (PI) typically less than 8.

The soil underlying the site includes potentially liquefiable lenses of loose to medium dense sand to a depth of ±17 feet and from depths of ±28 and 33 feet in BH-1. In BH-2, the potentially liquefiable soil includes medium dense sand from ±14 to 18 feet and from ±28 to 33 feet. The sand at other depths is dense to very dense and therefore unlikely to liquefy.

The 2022 Oregon Structural Specialty Code (OSSC) recommends evaluating liquefaction based on the requirements of ASCE 7-16. ASCE 7-16 Section 21.5 requires evaluating the liquefaction hazard using either the probabilistic maximum considered earthquake (MCE) peak ground acceleration (PGA) or a deterministic approach with mean plus one standard deviation (84^{th} percentile) ground motions. We completed analyses using the deterministic approach.

Our deterministic analysis included a M_w 6.1 earthquake on the Yaquina Bay Fault, a M_w 7.0 CSZ intraslab earthquake, and a M_w 9.0 CSZ interface earthquake. The selected magnitude-distance (M-R) pairs for these earthquake sources are summarized in Table 1. For each of the scenarios, the PGA values on rock were calculated using the ground motion prediction equations (GMPEs) and weighting factors used in the development of the 2014 USGS maps with the following exceptions:

- For the crustal earthquake, the PGA on rock was calculated using the weighted average of the current Next Generation GMPEs (NGA West-2) relationships of Abrahamson et al. (2014), Boore et al. (2014), Campbell and Borzognia (2014), Chiou and Youngs (2014), and Idriss (2014). This is consistent with the GMPEs, and weighting used in the development of the USGS 2014 hazard maps.

- For the CSZ intraslab earthquake, PGA values on bedrock were calculated using most of the same GMPEs and weighting used in the development of the USGS 2014 hazard maps, including Atkinson and Boore (2003) Global, Atkinson and Boore (2003) Cascadia, and Zhao et al. (2006). The exception was the updated 2016 version of the BC Hydro GMPE (Abrahamson et al., 2016) was substituted for the 2012 BC Hydro GMPE used in USGS 2014. The 2016 version of the BC Hydro GMPE contains updated data from subduction zone earthquakes in Chile (2010) and Japan (2011) that may better predict a subduction zone earthquake in the Cascadia region.

- For the CSZ interface earthquake, PGA values on bedrock were calculated using most of the same GMPEs and weighting used in the development of the USGS 2014 hazard maps, including Atkinson and Boore (2003) Global, Zhao et al. (2006), and Atkinson and Macias (2009). The exception was the updated 2016 version of the BC Hydro GMPE (Abrahamson et al., 2016) was substituted for the 2012 BC Hydro GMPE for the reasons described previously.

The PGA values at the ground surface were calculated using the estimated peak bedrock accelerations multiplied by F_{pga} factors from ASCE 7-16 Table 11.8-1 with the modifications outlined in the 2022 OSSC. A Site Class D was assumed in selecting the F_{pga} values. This Site Class is consistent with the soil conditions prior to the initiation of liquefaction. Calculated PGA values on bedrock and at the ground surface are summarized in Table 1.

Table 1. Selected Magnitude, Distance, and PGA for Liquefaction Analysis

Earthquake Source M-R Pair and Assumed Depth	Ground Motion Criterion	Estimated PGA on Bedrock (g)	F_{pga}	Estimated PGA at Ground Surface (g)
Yaquina Bay Fault M_w = 6.1 R = 1 km D = 0 km	84th Percentile	0.83	1.10	0.91
CSZ Intraslab M_w = 7 R = 50 km D = 50 km	84th Percentile	0.43	1.17	0.51
CSZ Interface M_w = 9 R = 30 km D = 30 km	84th Percentile	0.77	1.10	0.85

Liquefaction analysis was completed using the subsurface profile from the borings and the SPT-based procedures established from the findings of a 1996 National Center for Earthquake Engineering Research (NCEER) workshop and a 1998 NCEER/NSF workshop (Youd et al., 2001) with recent updates by Idriss and Boulanger (2010). The SPT N-values recorded in the boring were corrected for an effective overburden pressure of 1 ton/ft^2 (tsf) and a hammer energy of 60%, as well as additional factors including the type of hammer, borehole diameter, rod length, and sampling method. Groundwater was assumed at a depth of ±10 feet.

The results of the analysis indicate liquefaction of the saturated loose to medium dense sand lenses between depths of ±10 feet (the assumed groundwater level) and ±33 feet for each of the deterministic earthquake scenarios described above. Analysis using a probabilistic maximum considered earthquake (MCE) would indicate the same result.

The methods of Ishihara and Yoshimine (1992) and Tokimatsu and Seed (1987) were used to estimate the settlement of the liquefied soil. Seismic settlement is also anticipated in the unsaturated, very loose to loose sandy soil in the upper ±10 feet of the profile (i.e., above the assumed groundwater level). The Tokimatsu and Seed (1987) method for unsaturated sand was used to estimate the settlement of this material. Our analysis using the BH-1 soil profile indicates liquefaction-induced settlement in the range of ±1 to 3 inches. Similar settlement is anticipated at the BH-2 location.

The as-built plans for the soldier pile wall at the north end of the site indicate the lagging extends to El. -13. We presume the wall was backfilled with sand including sand placed under water. We anticipate the deeper sand was placed with little or no formal compaction. Therefore, additional settlement should be anticipated closer to the retaining wall. Based on the depth of the soil and the anticipated placement method, we anticipate seismic settlement near the wall could be in the range of ±6 to 12 inches.

Lateral Spread

Lateral spread is a liquefaction-induced hazard, which occurs when soil or blocks of soil are displaced downslope or toward a free face (such as a riverbank or shoreline) along a liquefied layer. The liquefiable soil includes very loose silty sand at ±15 feet (±El. 0.6) in BH-1 and medium dense sandy with some silt at ±15 feet (±El. 1.2) in BH-2. DOGAMI Lidar imaging indicates the ground surface in the bay to the north of the site lies at ±El. 1.3 to ±El. 1.4. Therefore, we anticipate it is likely a liquefiable stratum extends into the bay and consequently, the shoreline adjacent to the site is susceptible to lateral spread during or following a moderate to large magnitude earthquake.

The fill at the north end of the site is retained by a tie-back soldier pile wall with lagging up to ±30 feet tall. The presence of the wall would preclude development of lateral spread, presuming the wall is capable of surviving the earthquake. Our work scope does not include a formal evaluation of the stability of the wall. However, we have provided a general discussion regarding the potential performance of the wall based on our review of the as-built plans.

The as-built plans indicate the soldier pile tips extend to El. -44.3 on the tallest sections of the wall. We presume this elevation references the National Geodetic Vertical Datum of 1929 (NGVD 29). This elevation corresponds to El. -43.9 referencing NAVD 88. Therefore, NGVD 29 elevations at the site may be adjusted to NAVD 88 by adding 0.43 feet. The tip elevations for the deeper piles correspond to ±45.3 feet below the current mudline in front of the wall. Considering this penetration depth and the density of the deeper sand in our borings, we anticipate it is unlikely the wall could fail as a result of kickout of the pile tips. The date on the as-built plans (February 1979) indicates the wall is ±44 years old. Given the age of the wall, it was undoubtedly designed without considering seismic loading. Additionally, given the marine environment, it is likely there is significant corrosion on the piles and possibly on the tie-back anchors. Therefore, we anticipate there is a significant risk of failure within the exposed portion of the wall.

If the wall were to fail, lateral displacement should be anticipated behind the wall extending at least back to the deadman anchors. The north side of the planned Aeration Tank footprint is at or close to the deadman anchor locations. The planned Equalization Tank footprint is south of the deadman anchors.

Calculations using lateral spread regression equations and treating the wall as a free face indicate displacements ranging from ±1 to 19 feet within the area of interest for the proposed wastewater pretreatment facility. The calculated displacements reduce with increasing distance from the wall. The lateral spread regression equations do not account for the lateral resistance provided by the wall. Therefore, the actual lateral displacements are likely to be less, but in any case, it should be assumed there will be significant lateral displacement that will result in damage to the facility.

Subsidence

In addition to liquefaction settlement, ground subsidence is anticipated during a CSZ interface earthquake. Ground subsidence is a regional phenomenon. It occurs because the subduction of the oceanic crust beneath the continental crust compresses the continental crust and pushes it upward. Prior to the earthquake, the continental crust is held in this position by friction at the interface. When the earthquake occurs, that frictional bond breaks allowing the continental crust to drop. The ASCE 7 tsunami online tool (ASCE, 2022) indicates ground subsidence of ±5.5 feet at the site based on the mapping used for the ASCE 7-16 design criteria and a ground subsidence of ±6.3 feet based on the mapping used for the ASCE 7-22 design criteria.

Tsunami

Tsunami hazards can occur associated with a large magnitude local CSZ interface earthquake or a distant seismic source (e.g., an Alaskan-Aleutian Subduction Zone earthquake). The size of the tsunami depends on several factors including the height of the tide at the time of the tsunami.

The current Newport South tsunami inundation map for a local CSZ earthquake source (DOGAMI, 2013a) includes inundation lines for small to extra extra-large tsunamis. Small and medium sized tsunamis are smaller but expected to be more frequent, while large to extra-extra-large tsunamis are larger but expected to be less frequent. The current map indicates inundation of the project site for all local CSZ tsunami scenarios. The ASCE 7 tsunami online tool (ASCE, 2022) indicates a recommended design tsunami runup elevation of ±El. 22 feet at the site. The runup elevation from the ASCE 7 tsunami online tool typically corresponds to a large CSZ tsunami. The ground surface at the wastewater pretreatment facility ranges from ±El. 15.5 to ±El. 17. Therefore, the site is expected to be inundated by a tsunami associated with a local CSZ interface earthquake.

The current Newport South tsunami inundation map for a distant earthquake source for (DOGAMI, 2013b) includes inundation limits for the historic M_w 9.2 1964 Alaska earthquake and for a tsunami associated with a maximum Alaskan-Aleutian Subduction Zone earthquake. The inundation map indicates the site is within the limits for a tsunami associated with the distant earthquake source and the inundation limits appear to correspond to ±El. 18. Therefore, the site may also be inundated by a distant-source earthquake.

Site Response Spectra

Because bolted steel tanks are planned, we developed site response spectra for the site in accordance with American Water Works Association (AWWA) D103-19 code for Factory-Coated Bolted Carbon Steel Tanks for Water Storage. The AWWA D103-19 site response is separated into components with an impulsive component representing the structure with 5% damping and a convective component with 0.5% damping representing the fluid contents.

Based on the subsurface profile encountered in the explorations and the recommended site preparation, we anticipate the tanks will be underlain by a compacted crushed rock pad followed by a relatively thick deposit of predominantly medium dense to very dense sand. The soil profile includes lenses of potentially liquefiable loose to medium dense sand. We have concluded the subsurface conditions correspond most closely to a Site Class D. Soil strength loss during and following liquefaction may reduce the spectral accelerations in the period of interest for the structures. Therefore, we have concluded a response spectrum developed for a Site Class D will provide an upper-bound of the site response.

AWWA D103-19 references ASCE 7-05 for seismic design. Seismic design in ASCE 7-05 utilizes USGS 2002 seismic maps. For our evaluation of the tank sites, we used the updated USGS 2014 maps to provide the spectral accelerations consistent with ASCE 7-16 and Section 1613 of the Oregon Structural Specialty Code (OSSC, 2022). Risk-targeted maximum considered earthquake (MCE_R) ground motions on bedrock were obtained using modified USGS 2014 maps with 2% probability of exceedance in 50 years (i.e., a ±2,475-year return period). The modifications include factors to adjust the spectral accelerations to account for directivity and risk. To develop the site response spectra, spectral accelerations at the ground surface are adjusted using F_a and F_v values selected from ASCE 7-16 Tables 11-4-1 and 11-4-2.

The AWWA D103-19 site response spectra for impulsive and convective components with MCE_R ground motions with 2% probability of exceedance in 50 years are shown on Figure 4A (Appendix A).

DISCUSSION OF GEOTECHNICAL CONSIDERATIONS

The following sections provide a discussion of the site soils as they relate to considerations for foundation design and construction. Additional details are provided in the Recommendations section of this report.

Mitigation of Seismic Hazards and Seismic Considerations

As noted in the preceding sections, there are numerous seismic hazards at the site including subsidence, tsunami inundation, liquefaction, and lateral spread. The following sections provide a discussion of the geotechnical considerations and mitigation options as they relate to the site seismic hazards.

Subsidence. Ground subsidence is a regional phenomenon and cannot be mitigated. It should be assumed the ground surface in the area that includes the project site may drop by ±5.5 to 6.3 feet during a large CSZ interface earthquake.

Tsunami Inundation. Inundation of the site as a result of a tsunami is inherent to the site location and elevation. Therefore, it cannot be mitigated. The facility is expected to sustain extensive damage as a result of tsunami associated with a local CSZ earthquake source. A tsunami is likely to occur relatively quickly following a local CSZ interface earthquake. Therefore, we recommend establishing an evacuation plan for the facility consistent with the DOGAMI evacuation map.

The facility may also sustain some damage as a result of tsunami associated with a distant earthquake source. It should be assumed repairs will be needed following a distant tsunami.

Liquefaction-Induced Settlement and Lateral Spread. Our analyses indicate a liquefaction hazard at the site for each of the design earthquake scenarios. The lenses of potentially liquefaction-susceptible loose to medium dense sand extend to a depth of ±33 feet in our borings. Potential liquefaction mitigation measures include supporting structures on deep foundations (e.g., steel pipe piles) extending below the liquefiable soil or using ground improvement methods (e.g., stone columns or soil mixing) to densify the soil and improve its resistance to liquefaction. Mitigation of the lateral spread hazard would require densifying the soil or replacing the existing soldier pile retaining wall with a more robust structure.

The liquefaction and lateral spread hazards were discussed with representatives of the design team. The planned wastewater pretreatment facility is not a critical or hazardous facility. Additionally, the entire brewery facility is susceptible to the same hazards and is likely to sustain significant damage during the design earthquakes. Therefore, it was decided that fully mitigating the risk of damage to the new wastewater pretreatment facility is cost-prohibitive and not practical.

Surcharge Loads on the Retaining Wall

The new Equalization Tank will be set back ±60 feet from the soldier pile retaining wall and the aeration new tank will be set back ±25 feet from the wall. These distances correspond to the setback from the shorter southwest trending wall. Both tanks will be outside the tie-back zone for the wall. Based on the setback distances, we have concluded it is unlikely the static vertical loads associated with the tanks will impart a surcharge load on the wall. For seismic loading, the presence of the tanks should not affect the stability of the wall. Rather, it is more likely the failure of the wall would impact the stability of the tanks.

Site Preparation

Fill was encountered in the borings to a depth of at least 15 feet. The sand fill ranges from loose to medium dense. The variable density of the sand suggests it was placed with variable compactive effort. Fully mitigating the presence of the fill would require excavating the site to a depth of ±15 feet, stockpiling the sandy fill, dewatering and compacting the soil at the bottom of the excavation, and then backfilling the excavation with the stockpiled fill placed in compacted lifts. That work is impractical due to the presence of the deadman anchors for the wall. Therefore, we have concluded the site preparation for the tank foundations will need to focus on the near-surface soil. To improve the foundation support, we recommend reprocessing the medium dense soil in the upper ±2 feet of the profile beneath the new tanks and any other settlement-sensitive structures. This will require excavating the soil to a depth of ±2 feet, stockpiling the suitable soil on site, recompacting the bottom of the excavation, and placing suitable soil back in the excavation in compacted lifts. The reprocessing limits should extend at least 2 feet (measured horizontally) beyond the footprints of the new structures.

Based on the borings, we anticipate the material encountered within the excavations will consist of sand or a combination of sand and gravel. We anticipate the excavated material will be reusable as fill, however, the suitability of reusing the on-site soil will need to be evaluated at the time of construction. Unsuitable material should be hauled off site. Imported fill may be required if there is an insufficient volume of suitable sandy fill on site to grade beneath the structures. Suitable imported fill includes relatively clean sand (e.g., dredge sand) and crushed rock.

The sand is susceptible to disturbance even when compacted. Therefore, we recommend capping the sand with at least 6 inches of compacted Aggregate Base (i.e., ¾ or 1-inch minus crushed rock) beneath the tank ring footings and beneath the foundations for other new structures. We recommend increasing the Aggregate Base thickness to at least 12 inches beneath the tank floors. Aggregate Base should also be used as base rock beneath any new pavements. Foundation preparation details are discussed in the Recommendations section of this report.

Construction Timing

The sandy fill encountered in our borings is comprised of a combination of sand and gravel with a low silt content. Therefore, the earthwork can be completed during wet or dry weather. However, construction during dry weather is preferable because the sandy soil will be more susceptible to erosion and caving in excavations when exposed to rainfall or runoff, and dry weather construction allows more control for moisture-conditioning the fill.

Excavations, Shoring, and Dewatering

Excavations up to 2 feet deep are anticipated in the foundation areas. Deeper excavations may be required elsewhere on site to construct underground utilities. The excavations are expected to extend through variable fill comprised of predominantly medium dense sand. The means and methods for the excavation, shoring, and dewatering of the excavations should be selected by the contractor. The design of shoring systems, if any, should be completed by a qualified engineer licensed in Oregon.

It is the contractor's responsibility to provide and maintain stable cut slopes, benching, or shoring as required by the Oregon Occupational Safety and Health Administration (OR-OSHA). The existing fill corresponds most closely to an OR-OSHA Type C soil. OR-OSHA recommends maximum allowable temporary cut slopes of 1.5(H):1(V) in Type C soil. This slope assumes the excavations will be dewatered. The sandy soil is highly erodible and susceptible to caving and running in the presence of groundwater or surface runoff. The appropriate OR-OSHA Soil Type will need to be confirmed based on the actual conditions at the time of construction.

Shallow groundwater is expected year-round due to the low-lying terrain and the proximity of the site to Yaquina Bay. Shallower perched water associated with runoff may also be encountered during wet weather. Groundwater may be at or above the planned excavation level in utility trenches. Therefore, the contractor should be prepared to dewater utility trenches.

ENGINEERING ANALYSES

The new tanks will be bolted steel structures with diameters of ±23 and 33 feet, heights ranging from ±15 to 20 feet, and a planned finish floor elevation (FFE) of ±El. 16. We understand the tanks will have steel floors supported on a crushed rock pad and concrete perimeter ring footings supporting the walls. We presume the ground surface surrounding the tanks will be paved and a perimeter foundation drain and subfloor drainage will not be required.

The following sections provide a discussion of the site conditions as they relate to site preparation and for foundation design and construction for the tanks. Additional details are provided in the Recommendations section of this report.

Anticipated Foundation Subgrade Conditions

As discussed in a previous section of this report, we recommend demolishing the existing pavement, excavating the tank locations to a depth of ±2 feet, compacting the exposed subgrade, and backfilling the excavations with compacted sand. The sand should be capped with 6 inches of compacted Aggregate Base beneath the footings and 12 inches of compacted Aggregate Base beneath the floors.

Bearing Capacity

We calculated a bearing capacity for the planned tank foundations assuming the ring footings will bear on ±6 inches of compacted Aggregate Base underlain by compacted sand subgrade. An internal friction angle (ϕ) of 34 degrees and a moist unit weight (γ_m) of 115 pcf was assumed. The calculations indicate an allowable bearing pressure of 3,000 psf assuming a typical factor of safety of 3. A one-third increase in the allowable bearing pressure may be used in evaluating short-term seismic loads.

Settlement

We completed settlement analysis for the tanks using the Schmertmann method and soil parameters estimated based on the SPT data. We estimated an average contact pressure of ±1,000 psf at the base of the Aeration Tank (including 97,000 gallons of wastewater) and an average contact pressure of ±1,200 psf at the base of the Equalization Tank (including 56,000 gallons of wastewater). The analyses indicate a total settlement of ±1.1 inches for both tanks. We estimate approximately half of the settlement will occur as the structures are built and initially filled. Therefore, we estimate the post-construction settlement will be on the order of ½ inch. We anticipate differential settlement between the center and edges of the tank will be approximately half of the total settlement.

Sliding Coefficient and Passive Resistance

The footings will bear on compacted crushed rock. For sliding analysis between the base of the concrete ring footings and the Aggregate Base, we recommend using a coefficient of friction of 0.5. A coefficient of friction of 0.3 may be used to calculate the sliding resistance for the steel tank bottom, assuming the tank bottom will bear on clean sand or Aggregate Base.

Passive resistance of the backfill in front of the buried footings was calculated as an equivalent fluid density equal to $\gamma * K_p$, where γ is the unit weight of the backfill and K_p is the passive earth pressure coefficient. We anticipate the footings will be backfilled with compacted sand or Aggregate Base. For these conditions, we calculated the passive pressure on the footings assuming an internal friction angle (ϕ) of 34 degrees and an γ_m of 115 lb/ft^3 (pcf). The calculations indicate the ultimate passive resistance may be modeled as a triangular distribution calculated using an equivalent fluid density of 405 pcf.

The sliding resistance and passive resistance are additive but will develop their full capacity at different displacements. The full sliding resistance will develop with very little lateral movement. Mobilization of the full passive resistance may require a lateral displacement corresponding to 1% of the footing height. The footing dimensions have not been established, but as an example, development of the ultimate passive resistance for a 1.5-foot-tall ring footing corresponds to a horizontal displacement of ±0.2 inches.

RECOMMENDATIONS

Design and construction recommendations for the new tanks are provided in the following sections. We recommend contractors be provided a copy of this report to review the site conditions and recommendations for site preparations and foundation construction.

General Earthwork and Material Specifications

1. Aggregate Base should consist of ¾ or 1-inch minus, clean (i.e., less than 5% passing the #200 U.S. Sieve), well-graded, crushed gravel or rock. We should be provided a gradation sheet for this material for approval prior to delivery to the site.

2. Granular Site Fill should consist of sand, gravel, or rock, or mixtures of the above that are free of high plasticity clay, organic matter, or construction debris. Granular Site Fill may include imported material or granular soil from on-site excavations. We should be provided a gradation sheet for any imported Granular Site Fill for approval prior to delivery to the site. A Foundation Engineering representative should confirm the suitability of reusing on-site materials.

3. Compact the subgrade and fill to a minimum of 95% relative compaction. The maximum dry density of ASTM D698 should be used as the standard for estimating relative compaction. Granular soil typically compacts most efficiently using a smooth drum, vibratory roller. However, walk-behind plate compactors or hoe-mounted compactors may be required in limited access areas. Compact the granular fill in loose lifts not exceeding 12 inches. Thinner, ±6 to 8-inch thick lifts will be required where light or hand-operated equipment is used.

   Field density tests should be run frequently to confirm adequate compaction of the fill used to support structures or pavements. Compaction of fill that is too variable or contains aggregate too coarse for density testing should be evaluated by observing the compaction method and periodic proof-rolling using a loaded 10 yd^3 dump truck or another approved vehicle. Compaction verification with proof-rolling should be evaluated by a Foundation Engineering representative. Areas observed to be pumping or deflecting during the proof-rolls may be reworked, or overexcavated and replaced with compacted Granular Site Fill or Aggregate Base and proof-rolled again.

4. Shore or slope excavations in accordance with OR-OSHA requirements to protect workers. The excavations will extend through predominately sand. This material corresponds to an OR-OSHA Type C soil, assuming the excavations are dewatered. OR-OSHA recommends a maximum temporary cut slope of 1½H:1V in Type C soil. However, appropriate cut slopes should be confirmed in the field at the time of construction.

Foundation Design

5. Design the tanks using the seismic design parameters and response spectra shown on Figure 4A.

6. Design the ring footings using an allowable bearing pressure of 3,000 psf. This value may be increased by one-third for transient loads.

7. Assume the total tank settlement will be 1.1 inch or less with approximately half of the settlement occurring during construction and initial filling of the tanks. Assume differential settlement between the center and edges of the tank will be half of the total settlement.

8. For sliding analysis, use a coefficient of sliding friction of 0.5 between the bottom of the footings and the compacted Aggregate Base and a coefficient of sliding friction of 0.3 between the steel tank bottoms and sand or Aggregate Base.

9. The ultimate passive resistance for the buried ring footing may be calculated using an equivalent fluid density of 405 pcf. Assume sliding friction will develop with very little movement, but a lateral displacement of up to 1% of the buried footing height will be required to mobilize the ultimate passive resistance.

Foundation Preparation

10. Demolish all existing pavement, slabs, and foundations in the tank foundation areas. Haul all construction debris from the site.

11. Excavate the tank foundation areas to a depth of 2 feet. The base of the excavations should extend at least ±2 feet measured horizontally beyond the edges of the tanks.

12. Stockpile suitable soil for reuse as Granular Site Fill. We recommend a Foundation Engineering representative be present to confirm the required excavation depths and review and approve the reuse of any on-site materials as fill. We anticipate the earthwork will need to be done in stages to allow room for stockpiling.

13. Moisture-condition and compact the subgrade at the bottom of the excavation using a smooth drum, vibratory roller. Compaction may not be practical if the soil is too wet of optimum. Therefore, dewatering should be provided as required to facilitate moisture-conditioning.

14. Backfill the excavations to the planned grades using approved Granular Site Fill placed and compacted in lifts as recommended in Item 3. Conduct density testing on the fill where possible. Moisture-condition and recompact any pumping subgrade or overexcavate and replace the soft subgrade with Aggregate Base or Granular Site Fill.

15. Cover the approved subgrade beneath the tank floors with at least 12 inches of Aggregate Base to create granular pads and help protect the sandy soils from disturbance during construction. Compact the Aggregate Base as recommended in Item 3. Do not allow loaded trucks or heavy construction equipment on the completed granular pads.

16. Trench for ring foundations using an excavator equipped with a smooth-edged bucket to limit disturbance to the foundation soil. The excavation should accommodate at least 6 inches of Aggregate Base beneath the footing extending at least ±6 inches beyond the edges of the foundations. Compact the foundation subgrade and backfill the footing trenches with at least 6 inches of Aggregate Base. Compact the Aggregate Base as recommended in Item 3.

Utility Trenches

17. Excavate utility trenches to the required grades. Provide shoring and dewatering as required to protect workers from sloughing or caving soil. Contractors should be aware of the presence of loose sand and elevated groundwater and associated risks of caving or running sand in deep trench excavations.

18. Pump the trenches dry prior to backfilling where groundwater is encountered or where perched water has infiltrated the excavation.

19. Use Aggregate Base as bedding material and backfill in the pipe zone, unless otherwise specified. Use Aggregate Base to backfill above the pipe zone in areas that will support structures or pavement. Granular Site Fill may be used above the pipe zone in undeveloped areas.

20. Place and compact the trench backfill in lifts as recommended in Item 3 and in accordance with the pipe manufacturer's recommendations.

DESIGN REVIEW/CONSTRUCTION OBSERVATION/TESTING

We should be provided the opportunity to review all drawings and specifications that pertain to site preparation and foundation construction. Site preparation will require field confirmation of the subgrade conditions beneath the tanks. That confirmation should be completed by a Foundation Engineering representative. Mitigation of any subgrade pumping will also require engineering review and judgment. Frequent field density tests should be run on all engineered fill. Compaction of fill that is too coarse or variable for density testing should be evaluated by observation of the compaction method and proof-rolling with a loaded dump truck or other approved vehicle.

VARIATION OF SUBSURFACE CONDITIONS, USE OF THIS REPORT AND WARRANTY

The analysis, conclusions and recommendations contained assume the soil profiles encountered in the borings and inferred groundwater levels are representative of the site conditions. The above recommendations assume we will have the opportunity to review final drawings and be present during construction to confirm the assumed foundation conditions. No changes to the enclosed recommendations should be made without our approval. We will assume no responsibility or liability for any engineering judgment, inspection or testing performed by others.

This report was prepared for the exclusive use of the Civil West Engineering Services, Inc. and their design consultants for the Rogue Ales and Spirits Wastewater Pretreatment project in Newport, Oregon. Information contained herein should not be used for other sites or for unanticipated construction without our written consent. This report is intended for planning and design purposes. Contractors using this information to estimate construction quantities or costs do so at their own risk. Our services do not include any survey or assessment of potential surface contamination or contamination of the soil or groundwater by hazardous or toxic materials. We assume those services, if needed, have been completed by others.

Climate conditions in western Oregon typically consist of wet weather for almost half of the year (typically between mid-October and late May). It is assumed adequate drainage will be provided for all construction. The recommendations for site preparation and foundation drainage are not intended to represent any warranty (expressed or implied) against the growth of mold, mildew or other organisms that grow in a humid or moist environment.

Our work was done in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

REFERENCES

Abrahamson, N.A., Silva, W.J., and Kamai. K., 2014, *Summary of the ASK14 Ground Motion Relation for Active Crustal Regions*, Earthquake Spectra, Vol. 30, No. 3, August 2014, pp. 1025-1055.

Abrahamson, N., Gregor, N., and Addo, K., 2016, *BC Hydro Ground Motion Prediciton Equations for Subduction Earthquakes*, Earthquake Spectra, Vol. 32, No.1, February 2016, pp. 22-44.

ASCE/SEI, 2017, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures - ASCE/SEI 7-16*: American Society of Civil Engineers (ASCE)/Structural Engineering Institute (SEI), 800 p.

ASCE, 2022, *ASCE Tsunami Hazard Tool*, American Society of Civil Engineers (ASCE), Version 2022-1.0, website: https://asce7tsunami.online/.

Atkinson, G.M. and Boore, D.M., 2003, *Empirical Ground-Motion Relations for Subduction Zone Earthquakes and Their Application to Cascadia and Other Regions*: Bulletin of the Seismological Society of America, v.93, no.4, p. 1703-1729, August 2003.

Atkinson, G.M. and Macias, M., 2009, *Predicted Ground Motions for Great Interface Earthquakes in the Cascadia Subduction Zone*, Bulletin of the Seismological Society of America, Vol. 99, No. 3, June 2009, pp 1552-1578.

Boore, D,M., Stewart, J.P., Seyhan, E., and Atkinson, G.M., 2014, *NGA-West2 Equations for Predicting PGA, PGV, and 5% Damped PSA for Shallow Crustal Earthquakes*, Earthquake Spectra, Vol. 30, No. 3, August 2014, pp. 1057-1085.

Campbell, K.W and Bozorgnia, Y., 2014, *NGA-West2 Ground Motion Model for the Average Horizontal Components of PGA, PGV, and 5% Damped Linear Acceleration Response Spectra*, Earthquake Spectra, Vol. 30, No. 3 August 2014, pp. 1087-1115.

Chiou, B.S.J, and Youngs., R.R., 2014, Update of the Chiou and Youngs NGA Model for the Average Horizontal Component of Peak Ground Motion and Response Spectra, Earthquake Spectra, Vol. 30, No. 3, August 2014, pp. 1117-1153.

DOGAMI, 2013, *Local Source (Cascadia Subduction Zone) and Distant Source (Alaskan-Aleutian Subduction Zone) Tsunami Inundation Maps - Newport South, Lincoln County, Oregon*: Department of Geology and Mineral Industries (DOGAMI), TIM-Linc-07, 2 Plates, Scale: 1:10,000.

IBC, 2021, *International Building Code (IBC)*: International Code Council, Inc., Sections 1613 and 1803.

Idriss, I.M., 2014, *An NGA-West2 Empirical Model for Estimating the Horizontal Spectral Values Generated by Shallow Crustal Earthquakes*, Earthquake Spectra, Vol. 30, No. 3, August 2014, pp. 1155-1177.

Idriss, I.M. and Boulanger, R.W., 2010, *SPT-Based Liquefaction Triggering Procedures*, Department of Civil and Environmental Engineering, College of Engineering, University of California at Davis, Report No. UCD/CGM-10/02, December 2010.

Ishihara, K., and Yoshimine, M., 1992, *Evaluation of Settlement in Sand Deposits Following Liquefaction During Earthquakes*: Soils and Foundations, Japanese Society of Soil Mechanics and Foundation Engineering, v. 32, no. 1, p. 173-188.

OR-OSHA, 2011, *Oregon Administrative Rules, Chapter 437, Division 3 - Construction, Subdivision P - Excavations*: Oregon Occupational Safety and Health Division (OR-OSHA), 1926.650, www.osha.or/pdf/rules/division3/div3.pdf.

OSSC, 2022, *Oregon Structural Specialty Code (OSSC)*: Based on the International Code Council, Inc., 2018 International Building Code (IBC), Section 1613 and 1803.3.

Tokimatsu, A., and Seed, H. B., 1987, *Evaluation of Settlements in Sands Due to Earthquake Shaking:* Journal of Geotechnical Engineering, Vol. 113, No. 8, August 1997, pp. 861-878.

USGS, 2006, *Quaternary Fault and Fold Database for the United States - Oregon:* U.S. Geological Survey (USGS), accessed January 2023, Web Site: http://earthquake.usgs.gov/hazards/qfaults.

USGS, 2014, *Earthquake Hazards Program, Interactive Deaggregations, Dynamic Conterminous U.S. 2014 (v.4.2.0)*: U.S. Geological Survey (USGS), 2% in 50 years return period (2,475 years) PGA spectral acceleration, latitude/longitude search, reference material has no specific release date, accessed March 2023, website: https://earthquake.usgs.gov/hazards/interactive/index.php.

Youd, T.L. et al., 2001, *Liquefaction resistance of soils: Summary report from the 1996 NCEER and 1998 NCEER/NSF workshops on evaluation of liquefaction resistance of soils:* ASCE Journal of Geotechnical and Environmental Engineering, Vol. 127, No. 10, October 2001, pp. 817-833.

Zhao, J.X., Zhang, J., Asano, A., Ohno, Y., Oouchi, T., Takahashi, T., Ogawa, H., Irikura, K., Thio, H.K. Somerville, P.G., Fukushima, Y., and Fukushima, Y, 2006, *Attenuation Relations of Strong Ground Motion in Japan Using Site Classification Based on Predominant Period:* Bulletin of Seismological Society of America, vol. 96, no. 3, p. 898-913.

Appendix A

Figures

Foundation Engineering, Inc.
Professional Geotechnical Services

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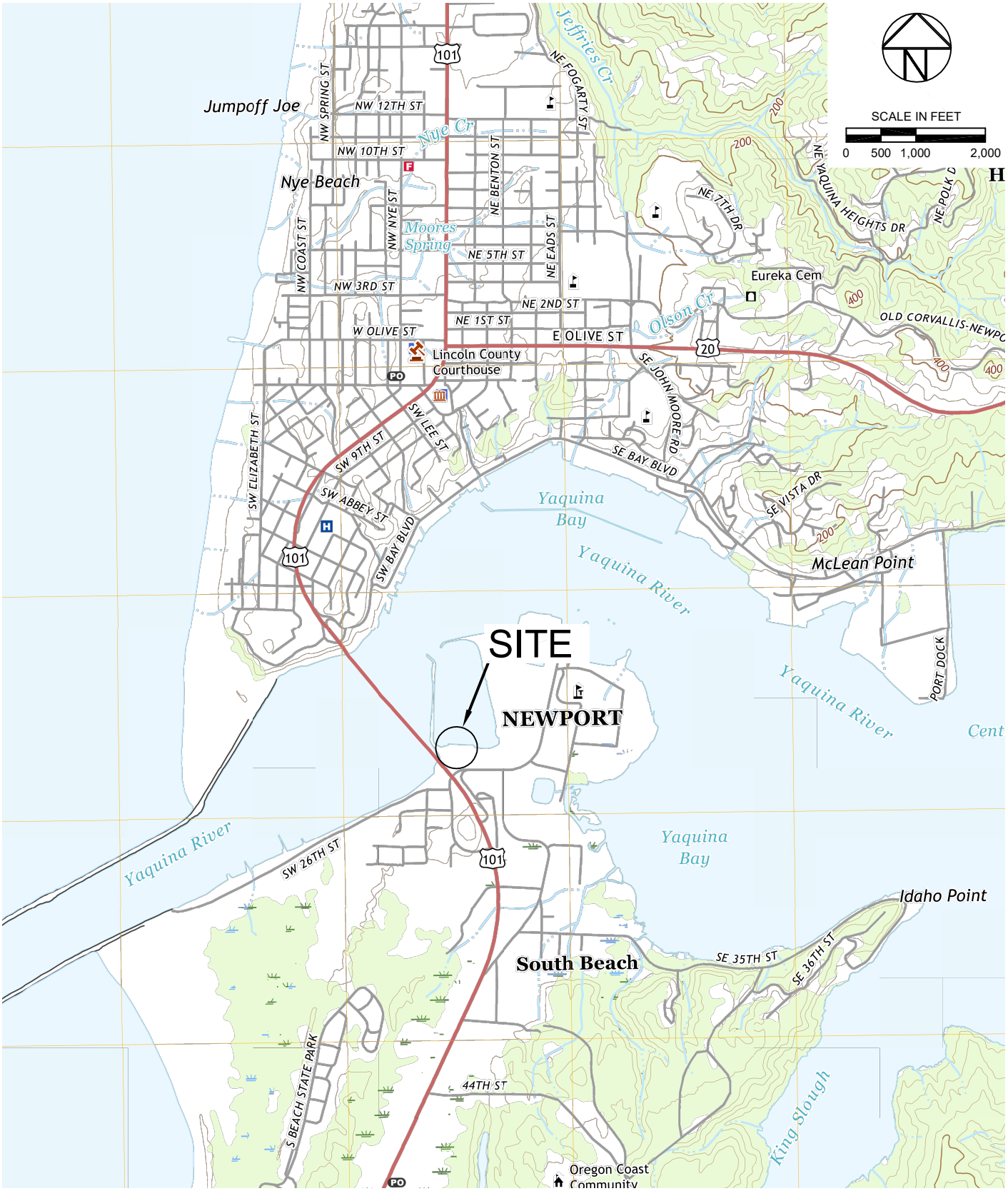
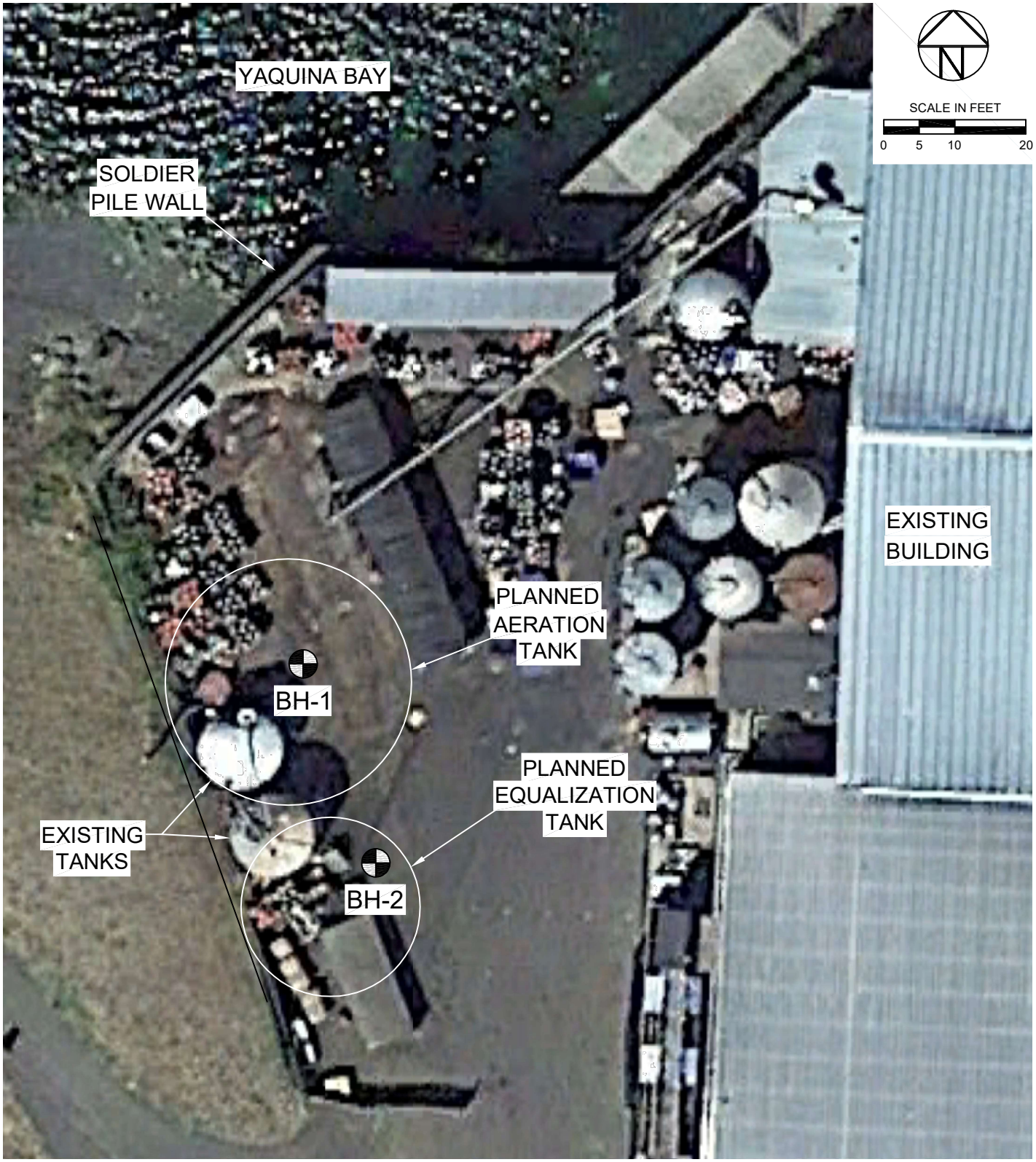


Note: Base map obtained from the USGS website.

Foundation Engineering, Inc. Professional Geotechnical Services			VICINITY MAP	FIGURE NO.
PROJECT NO. 2231013	DATE: Mar. 17, 2023	DRAWN BY: EJG	ROGUE ALES AND SPIRITS WASTEWATER PRETREATMENT NEWPORT, OREGON	1A

DRAFT



NOTES:

1. BORING LOCATIONS BASED ON VISUAL REFERENCE WITH SURFACE FEATURES AND ARE APPROXIMATE.
2. AERIAL IMAGE OBTAINED FROM GOOGLE EARTH.
3. SEE REPORT FOR A DISCUSSION OF SUBSURFACE CONDITIONS.

Foundation Engineering, Inc. Professional Geotechnical Services			AERIAL IMAGE AND BORING LOCATIONS	FIGURE NO.
PROJECT NO. 2231013	DATE: Mar. 22, 2023	DRAWN BY: EJG	ROGUE SPIRITS AND ALES WASTEWATER PRETREATMENT NEWPORT, OREGON	2A

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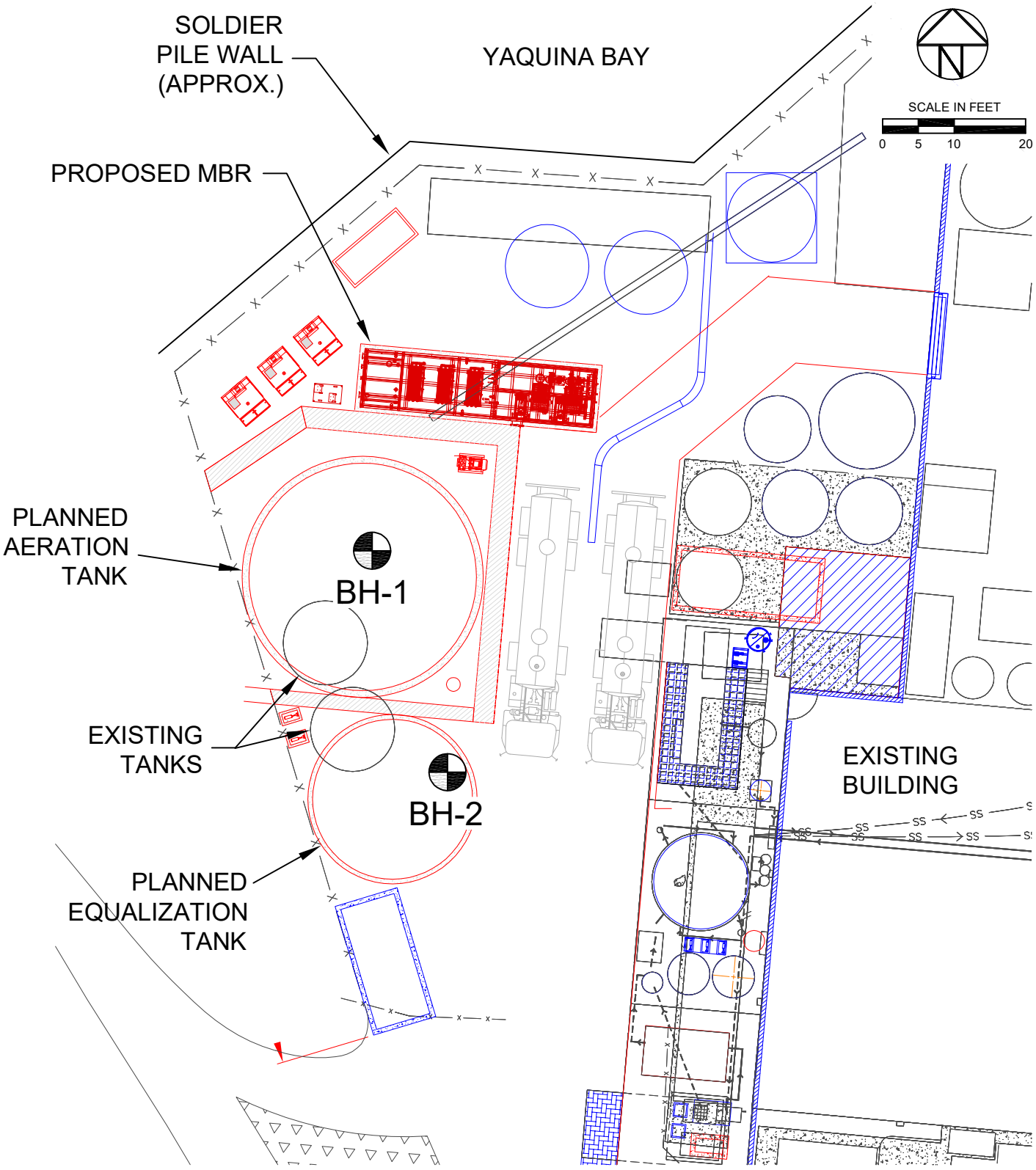
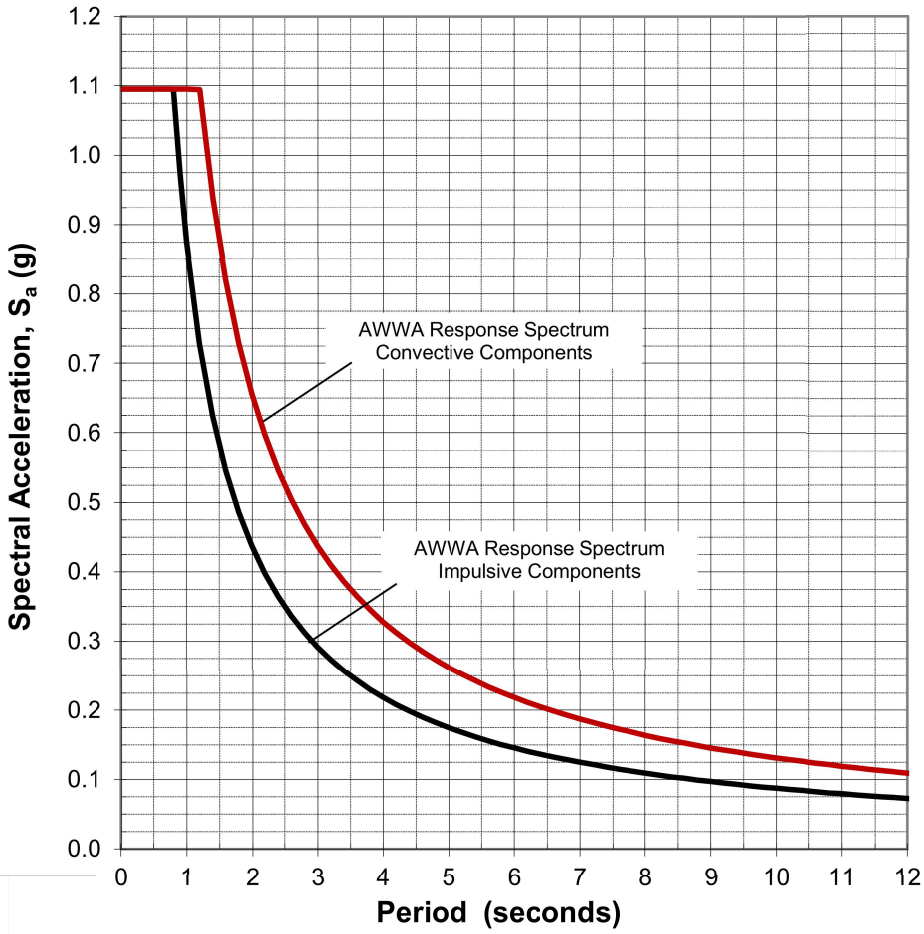


NOTES:

1. BORING LOCATIONS WERE ESTABLISHED USING A METAL TAPE AND PACING AND ARE APPROXIMATE.
2. BASE MAP PROVIDED BY CAMBRIAN.
3. SEE REPORT FOR A DISCUSSION OF SUBSURFACE CONDITIONS.

Foundation Engineering, Inc. Professional Geotechnical Services			SITE LAYOUT AND BORING LOCATIONS	FIGURE NO.
PROJECT NO.	DATE:	DRAWN BY:	ROGUE SPIRITS AND ALES WASTEWATER PRETREATMENT NEWPORT, OREGON	3A
2231013	Mar. 22, 2023	EJG		



Notes:

1. The Design Response Spectra are based on the General Procedure in AWWA D103-19 Section 14.2 with a 2% probability of exceedence in 50 years.
2. The following parameters were used for the impulsive component response spectrum:

   Site Class = D Damping = 5%

S_S =	1.643	F_a =	1.000	S_{MS} =	1.643	S_{DS} =	1.095
S_1 =	0.771	F_v =	1.700	S_{M1} =	1.311	S_{D1} =	0.874

3. S_S and S_1 values indicated in Note 2 are USGS 2014 risk-targeted MCE spectral accelerations available from https//:seismicmaps.org.
4. F_a and F_v were selected from ASCE 7-16 Tables 11.4-1 and 11.4-2 based on the S_S and S_1 values. S_{DS} and S_{D1} values include a 2/3 reduction on S_{MS} and S_{M1} as discussed in AWWA D103-19 Section 14.2.
5. The response spectrum for the convective components was calculated based on AWWA D103-19 Eq. 14-8.
6. Site location is: Latitude 44.6201, Longitude -124.0532.

Foundation Engineering, Inc. Professional Geotechnical Services			OSSC 2022 SITE RESPONSE SPECTRUM	FIGURE NO.
			ROGUE ALES AND SPIRITS WASTEWATER PRETREATMENT NEWPORT, OREGON	4A
PROJECT NO. 2231013	DATE: Mar. 21, 2023	DRAWN BY: EJG		

Appendix B

Boring Logs

Foundation Engineering, Inc.
Professional Geotechnical Services

DISTINCTION BETWEEN FIELD LOGS AND FINAL LOGS

A field log is prepared for each exploration by our field representative. The log contains information concerning sampling depths and the presence of various materials such as gravel, cobbles, and fill, and observations of groundwater. It also contains our interpretation of the soil conditions between samples. The final logs presented in this report represent our interpretation of the contents of the field logs and the results of the sample examinations and laboratory test results. Our recommendations are based on the contents of the final logs and the information contained therein and not on the field logs.

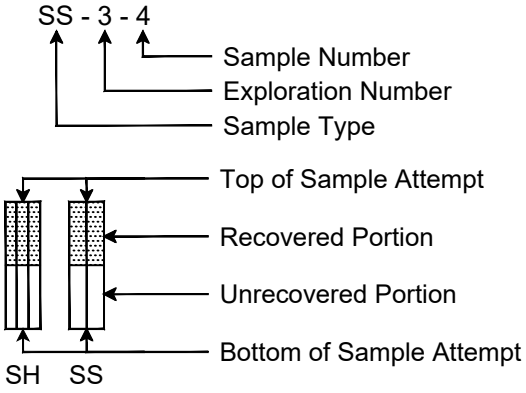
VARIATION IN SOILS BETWEEN EXPLORATIONS

The final log and related information depict subsurface conditions only at the specific location and on the date indicated. Those using the information contained herein should be aware that soil conditions at other locations or on other dates may differ. Actual foundation or subgrade conditions should be confirmed by Foundation Engineering during construction.

TRANSITION BETWEEN SOIL OR ROCK TYPES

The lines designating the interface between soil, fill or rock on the final logs and on subsurface profiles presented in the report are determined by interpolation and are therefore approximate. The transition between the materials may be abrupt or gradual. Only at boring or test pit locations should profiles be considered as reasonably accurate and then only to the degree implied by the notes thereon.

SAMPLE AND TEST SYMBOLS



C - Pavement Core Sample
CS - Rock Core Sample
OS - Oversize Sample (3-inch O.D. split-spoon)
S - Grab Sample
SH - Thin-walled Undisturbed Sample
SS - SPT Sample (2-inch O.D. split-spoon)

▲ Standard Penetration Test resistance equals the number of blows a 140 lb. weight falling 30 in. is required to drive a standard split-spoon sampler 1 ft. Practical refusal is equal to 50 or more blows per 6 in. of sampler penetration.

● Water Content (%)

FIELD SHEAR STRENGTH TEST

Shear strength measurements on test pit side walls, blocks of soil or undisturbed samples are typically made with Torvane or Field Vane shear devices. Values reported as undrained shear strength (S_u) in tsf.

GROUNDWATER

▼ Groundwater Location

(1/31/21) Date of Measurement

TYPICAL SOIL/ROCK SYMBOLS

Concrete
Organics
Clay
Silt
Sand
Gravel
Basalt
Sandstone
Siltstone

UNIFIED SOIL CLASSIFICATION SYMBOLS

G - Gravel
S - Sand
M - Silt
C - Clay
Pt - Peat
W - Well Graded
P - Poorly Graded
L - Low Plasticity
H - High Plasticity
O - Organic

Foundation Engineering, Inc.
Professional Geotechnical Services

EXPLORATION LOG KEY

IMPORTANT INFORMATION AND SYMBOLS

Explanation of Common Terms Used in Soil Descriptions

Field Identification	Cohesive Soils			Granular Soils	
	SPT*	S_u** (tsf)	Term	SPT*	Term
Easily penetrated several inches by fist.	0 - 2	< 0.125	Very Soft	0 - 4	Very Loose
Easily penetrated several inches by thumb.	2 - 4	0.125 - 0.25	Soft	4 - 10	Loose
Can be penetrated several inches by thumb with moderate effort.	4 - 8	0.25 - 0.50	Medium Stiff	10 - 30	Medium Dense
Readily indented by thumb but penetrated only with great effort.	8 - 15	0.50 - 1.0	Stiff	30 - 50	Dense
Readily indented by thumbnail.	15 - 30	1.0 - 2.0	Very Stiff	> 50	Very Dense
Indented with difficulty by thumbnail.	> 30	> 2.0	Hard		

* SPT N-value in blows per foot (bpf)
** Undrained shear strength

Term	Soil Moisture Field Description
Dry	Absence of moisture. Dusty. Dry to the touch.
Damp	Soil has moisture. Cohesive soils are below plastic limit and usually moldable.
Moist	Grains appear darkened, but no visible water. Silt/clay will clump. Sand will bulk. Soils are often at or near plastic limit.
Wet	Visible water on larger grain surfaces. Sand and cohesionless silt exhibit dilatancy. Cohesive soil can be readily remolded. Soil leaves wetness on the hand when squeezed. Soil is wetter than the optimum moisture content and above the plastic limit.

Term	PI	Plasticity Field Test
Non-plastic	0 - 3	Cannot be rolled into a thread at any moisture.
Low Plasticity	3 - 15	Can be rolled into a thread with some difficulty.
Medium Plasticity	15 - 30	Easily rolled into thread.
High Plasticity	> 30	Easily rolled and re-rolled into thread.

Term	Soil Structure Criteria
Stratified	Alternating layers at least ¼ inch thick.
Laminated	Alternating layers less than ¼ inch thick.
Fissured	Contains shears and partings along planes of weakness.
Slickensided	Partings appear glossy or striated.
Blocky	Breaks along surfaces into smaller lumps or blocks. Slickensides may be visible.
Lensed	Contains pockets of different soils.

Term	Soil Cementation Criteria
Weak	Breaks under light finger pressure.
Moderate	Breaks under hard finger pressure.
Strong	Will not break with finger pressure.

Depth (ft)	Soil / Rock Description and Comments	Elev. Depth	Sample Number and Location	SPT N-Value / Moisture (%) / Core Recovery (%) / RQD (%) (0 – 50 – 100)	Backfill/ Installations/ Groundwater
1	ASPHALTIC CONCRETE (±3 inches).	15.4			Capped with AC cold patch and gravel
2	Dense sandy GRAVEL (GW); grey-brown, moist, fine sand, fine to coarse subrounded to rounded gravel, (base rock).	0.3 14.4			
3	Medium dense SAND, trace silt (SP); grey-brown, moist, fine sand, scattered shells, (fill).	1.3	SS-1-1	14	
4					
5			SS-1-2	20	
6					
7	Grey below ±7 feet.				
8			SS-1-3	17	
9					
10	Wet below ±10 feet.		SS-1-4	10	
11					
12					
13			SS-1-5	19	
14					
15	Very loose to medium dense silty SAND, scattered organics (SM); grey, wet, low plasticity silt, organics consist of scattered wood fibers from ±15 to 17 feet, fine sand, (beach deposits).	0.6 15.0	SS-1-6	3	Backfilled with bentonite chips and grout
16					
17					
18			SS-1-7	29	
19					
20	Scattered to trace fine to coarse rounded gravel below ±20 feet.		SS-1-8	24	
21					
22					
23	Wood in cuttings from ±23 to 25 feet.				
24					
25	Very dense below ±25 feet.		SS-1-9	62	
26					
27					
28					
29					
30	Medium dense silty SAND (SM) to SAND some silt, scattered organics (SP-SM); grey to dark grey, wet, fine sand, organics consist of wood fibers in very thin lenses, (beach deposits).	-14.4 30.0	SS-1-10	13	
31					
32					
33					
34					
35	Dense from ±35 to 45 feet.		SS-1-11	38	
36					
37	Scattered to trace fine to coarse rounded gravel from ±37 to 45 feet.				
38					

Project No.: 2231013

Surface Elevation: 15.6 feet (Approx.)

Date of Boring: February 13, 2023

BORING LOG: BH-1

Rogue Ales and Spirits Wastewater Pretreatment

Newport, Oregon

Depth (ft)	Soil / Rock Description and Comments	Log	Elev. Depth	Sample Number and Location	SPT N-Value / Moisture (%) / Core Recovery (%) / RQD (%) (0 – 50 – 100)	Backfill/ Installations/ Groundwater
40	Scattered shells below ±40 feet.			SS-1-12	45	
41						
42						
43						
44						
45	Very dense below ±45 feet.			SS-1-13	70	
46						
47						
48						
49						
50				SS-1-14	78	
51						
52						
53						
54						
55				SS-1-15	59	
56						
57						
58						
59						
60				SS-1-16	69	
61						
62						
63						
64						
65				SS-1-17	92	
66						
67						
68						
69						
70				SS-1-18	97/11½"	
71						
72						
73						
74						
75				SS-1-19	68	
76			-60.9			
	BOTTOM OF BORING		76.5			

Project No.: 2231013

Surface Elevation: 15.6 feet (Approx.)

Date of Boring: February 13, 2023

BORING LOG: BH-1

Rogue Ales and Spirits Wastewater Pretreatment

Newport, Oregon

DRAFT

Depth (ft)	Soil / Rock Description and Comments	Log	Elev. Depth	Sample Number and Location	SPT N-Value / Moisture (%) / Core Recovery (%) / RQD (%)	Backfill/ Installations/ Groundwater
0	ASPHALTIC CONCRETE (±6 inches).		15.7			Capped with AC cold patch and gravel
1	Dense sandy GRAVEL (GW); grey-brown, moist, fine sand, fine to coarse subrounded to rounded gravel, (base rock).		0.5			
2			14.7			
3	Medium dense SAND, trace to some gravel, trace silt (SP); brown, moist, fine sand, fine to coarse subrounded to rounded gravel, scattered shells, (fill).		1.5	SS-2-1	16	Backfilled with bentonite chips (±1 to 12 feet)
4			12.2			
5	Medium dense to dense SAND, trace to some silt (SP-SM); grey-brown, moist, fine sand, scattered shells, (fill).		4.0	SS-2-2	26	
6						
7				SS-2-3	32	
8						
9						
10	Moist to wet from ±10 to 12 feet.			SS-2-4	29	
11						
12	Grey and wet below ±12 feet.					
13				SS-2-5	32	Bentonite grout (±12 to 36.5 feet)
14						
15	Medium dense to very dense SAND, some silt (SP-SM); grey, wet, fine sand, scattered shells, (beach deposits).		1.2			
16			15.0	SS-2-6	15	
17						
18				SS-2-7	31	
19						
20				SS-2-8	55	
21						
22						
23						
24						
25				SS-2-9	52	
26						
27						
28						
29						
30	Medium dense silty SAND to SAND some silt, scattered organics (SP-SM); grey, wet, fine sand, organics consist of wood fibers in very thin lenses, (beach deposits).		-13.8			
31			30.0	SS-2-10	18	
32						
33						
34						
35	Dense and grey to dark grey below ±35 feet.					
36				SS-2-11	31	
	BOTTOM OF BORING		-20.3 36.5			

Project No.: 2231013

Surface Elevation: 16.2 feet (Approx.)

Date of Boring: February 14, 2023

BORING LOG: BH-2

Rogue Ales and Spirits Wastewater Pretreatment

Newport, Oregon

Foundation Engineering, Inc.
Professional Geotechnical Services

BH-2

DRAFT

Appendix C

Laboratory Test Results

Professional Geotechnical Services

Foundation Engineering, Inc.

Table 1C. Moisture Contents (ASTM D2216) and Percent Fines (ASTM D1140)

Sample Number	Sample Depth (ft)	Moisture Content (percent)	Fines Content (percent)
SS-1-1	2.5 – 4.0	12.6	
SS-1-2	5.0 – 6.5	18.4	
SS-1-3	7.5 – 9.0	15.0	
SS-1-4	10.0 – 11.5	20.6	2.4
SS-1-5	12.5 – 14.0	22.4	
SS-1-6	15.0 – 16.5	47.2	30.6
SS-1-7	17.5 – 19.0	22.8	
SS-1-9	25.0 – 26.5	21.4	
SS-1-10	30.0 – 31.5	33.1	14.6
SS-1-11	35.0 – 36.5	21.8	
SS-2-3	7.5 – 9.0	9.3	
SS-2-4	10.0 – 11.5	18.5	
SS-2-5	12.5 – 14.0	20.6	
SS-2-6	15.0 – 16.5	21.7	6.8
SS-2-7	17.5 – 19.0	20.4	
SS-2-10	30.0 – 31.5	24.2	9.4

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BERGER/ABAM
ENGINEERS INC.

PLANNING
ENGINEERING
ENVIRONMENTAL
PROGRAM MANAGEMENT

3 October 2003

Mr. David Hesse /Don Mann
Port of Newport
600 S.E. Bay Blvd
Newport, OR 97365

Subject: Port of Newport - Rogue Ales Brewery Building
Evaluation of Slab-on-Grade Floor - Letter Report
BERGER/ABAM No. PAPOR-04-053

Dear David:

As requested, BERGER/ABAM Engineers Inc, has performed an evaluation of the concrete floor at the building occupied by the Rogue Ales Brewery. This evaluation was requested due to concerns by the Port of Newport and Rogue Ales Brewery regarding cracking and potential movement of the slab-on-grade floor.

This evaluation is based primarily on site observations by BERGER/ABAM personnel, including site visits by David Brown, PE, on September 17, 2003, and by Mark Temple, SE, on September 24, 2003. While at the site, both Mr. Brown and Mr. Temple were accompanied by Mr. Hesse of the Port, and had discussions with Mr. Bill Van Boeyen of Rogue Ales Brewery.

Calculations performed during this evaluation were limited to determining the approximate maximum bearing loads carried by the slab-on-grade and its supporting soil. No destructive or non-destructive testing was performed as part of this evaluation. No analysis for seismic actions on the building or the brewery equipment was performed.

Documents made available to BERGER/ABAM for use during this evaluation include:

- "Plans for the Construction of South Beach Marina, Newport Oregon" (as-built drawings), produced in 1978 and 1979;
- "South Beach Marina Warehouse Floor for Port of Newport", dated February, 1996;
- "Soils Investigation, South Beach Marina on Yaquina Bay, Newport, Oregon", by Dames and Moore, dated March 8, 1978;
- Weights and layouts of existing brewery equipment, included in a facsimile transmittal from Mr. Nathan Warren of Rogue Ales Brewery.

BUILDING BACKGROUND

The Rogue Ales Brewery building is approximately 98'-4" by 240'-0" in plan, with a maximum roof height of approximately 46 feet. The building was built in 1980, and was originally used for dry moorage. The Rogue Ales Brewery occupied the building in approximately 1992, and currently uses the building for the production, packaging and storage of beer. The building consists of a manufactured metal building structure supported by spread footings, with a concrete slab-on-grade floor. The building columns at the north side are supported directly by a steel pile and precast concrete bulkhead. This tied-back bulkhead also prevents lateral movement of a portion of the ground supporting the slab-on-grade for the building.

An approximate 24'-6" wide by 240'-0" long section of the slab-on-grade adjacent to the north bulkhead wall was removed and replaced in 1996, due to undermining of the soil support of the slab. The replacement slab was designed to structurally span approximately 11'-0" from the north wall to an area of ground not affected by the undermining. Several trench drains, running in the east-west direction in the production portion of the building were also added at some time in the past.

OBSERVATIONS AND ANALYSIS

1. Typical Slab-on-Grade

Observation of the slab reveled that the eastern portion of the floor, including the office, storage, shipping, cooler and brew pub area, as well as the northwestern portion of the slab at the bottling line area, are in relatively good condition. Several cracks were observed in the slab at the storage and shipping area, as much as 1/16" wide. The orientation and size of these cracks, as well as the lack of any significant vertical offset, indicate that the cracks are most likely related to shrinkage, or possibly to a small amount of lateral movement of the ground supporting the building. According to Mr. Hesse, the steel reinforcement in the original slab was observed to be located at or near the bottom of the slab when the slab was cut in preparation of the slab repair in 1996. Location of the reinforcement in the lower portion of the slab, as opposed to the center or upper third of the slab depth, would limit the ability of the reinforcing to limit the length and width of the cracks, and would be consist with the cracking observed.

2. Slab-on-Grade at Production Area

Observation of the slab in the production portion of the facility, which is located in an approximate 60 foot by 60 foot area at the southwest corner of the building, revealed some cracking and a significant amount of scaling and spalling of the slab surface. This area of the slab supports elevated tanks that are part of the brew system. These tanks are supported on four or six tubular legs and weight between 18,500 and 35,700 pounds. From visual observations, there does not appear to be a pattern of slab settlement or cracking around the tanks that would indicate significant vertical settlement of the slab.

Assuming that an area of slab approximately equal to the foot print area of each tank is active for vertical support of the tank, the actual bearing pressure transferred to the soil from the slab supporting the tanks was calculated to range from approximately 750 to 1700 psf (pounds per square foot). The original geotechnical report for this project, by Dames and Moore, dated March 8, 1978, indicates that footings supporting column loads on the site soils would settle no more than 5/8 inch when loaded with a 3000 psf bearing pressure. Observations of the slab in the area of the tanks do not indicate vertical movements beyond the 5/8 inch predicted for the larger bearing pressure, leading to the conclusion that the observed vertical slab movement in this part of the floor is within a reasonable range.

The surface of the concrete slab in the production portion of the facility was observed to be spalled and scaled, exposing the coarse aggregate of the concrete mix at some areas. This area of the slab is frequently subjected to standing water, due to the frequent washdown of the area and the lack of adequate slope of the slab. This water in contact with the slab in this area is subjected to chemical cleaners, as well as to the byproducts of the brewing process. The exposure of the slab to the harsh environment appears to be the primary cause for the scaling and spalling, although the slab may have been subjected to one or more cycles of freeze-thaw at some time in the past.

According to Mr. Van Boeyen, a hanger providing lateral support for the grain elevator for the Millhouse, in the brew system area, had to be recently lengthened approximately three inches to allow proper operation of the equipment. The actual weight of this slab supported equipment is unknown, but can be estimated to impart a bearing pressure on the slab and supporting soil between 200 to 400 psf. This is significantly less than the pressures beneath the tanks, and as discussed above, this magnitude of soil bearing pressure should yield very small amounts of vertical settlement. A crack, approximately 1/16 inch in width, was observed around the perimeter of the Millhouse, indicating some movement of the slab in this area. The small width of the crack, the lack of vertical offset at the crack, and the lack of any significant vertical depression in the vicinity of the Millhouse (water was not collecting in that particular area), however, indicates that the slab has not undergone significant vertical movement in this area. The reason for having to recently lengthen the hangers for this equipment is not known at this time, but may be due to the loss (or movement) of support of the equipment between the top of the floor and the bottom of the equipment. From our observations, it appears that the raised floor of the Millhouse is framed from wood supported directly on the concrete floor. The wood floor may have decayed from constant exposure to moisture, causing loss of support of the equipment.

3. Slab Contraction Joints

The contraction joints running in the transverse (north-south) direction are shown on the original construction documents to be a 1/2" wide doweled joint filled with sealant, and are spaced at 40'-0" on-center. At the time of our site visits, several of these joints in the eastern (shipping/storage) portion of the building were observed to be as much as 1-1/4" wide, indicating the slab has moved some amount in the east-west direction. It is unknown how

wide these joints actually were when they were installed, so the actual amount of movement is unknown. Reasonably new, very soft sealant was observed in these joints, and, according to Mr. Van Boeyen, some of the joints had recently been refilled with sealant. These joints are not significantly vertically offset, and are relatively uniform in width through out their length, indicating that the movement is most likely due to shrinkage of the slab, and not due to loss of vertical support (undermining) of the slab.

4. Slab Installed in 1996

The portion of the slab installed in 1996, at the north side of the building, appears to be in very good condition, with little if any signs of distress

5. Exterior Drainage at Southwest Corner

An area of ground adjacent to the south wall, near the southwest corner of the building, was observed to be slightly lower than the adjacent ground, and appeared to have been collecting water in the recent past. According to Mr. Van Boeyen, the gutter for this part of the roof does not drain properly, and rain water runs off of the roof and collects in the depression adjacent to the building. There did not appear to be indications of significant past movement of water beneath this portion of the building foundation.

6. Elevated Brewery Equipment Supports

Whereas the slab-on-grade beneath the elevated tanks in the production area does not appear to have undergone significant vertical movement, at least several of the steel post legs supporting tanks F-9, F-10 and F-11 were observed to be several degrees out-of-plumb and did not appear to be supporting any part of the weight of the tank. These tanks, which were filled at the time of our observation, are supported by six pipe legs equally spaced around the perimeter of the tank, with nine inch diameter base plates at the bottom of the legs.

The base plates are supported directly on top of the slab, without any type of grout leveling bed or any other type of leveling device, and are not mechanically attached to the slab to prevent sliding or overturning of the tanks. Gaps on the order of 1/8 inch were observed between the bottom of the base plates and the top of the slab at several of these legs. The gaps beneath the base plates and the lack of weight bearing on some of these legs could have been caused by very small movements of the slab (well within predicted settlements) or by the entire tank structures being out-of-plumb.

CONCLUSIONS

The movement of the slab-on-grade, as indicated by cracking and joint movement observed in the building, does not appear to be more than anticipated for the original building design, nor more than seen in similar facilities, and is not, in our opinion, a structural concern at

this time. Some short term and long term settlement of soils supporting building footings and slabs-on-grade is inevitable, due to the engineering properties of the soil. Vertical and/or lateral movement of the slab in this building appears to be minimal and well within acceptable limits.

The current support condition of the elevated brewery equipment is not adequate, due to the lack of level supports and the lack of mechanical connections between the equipment and the floor. The current support condition could lead to horizontal movement or overturning of the elevated equipment due to seismic or regular operating loads.

Several areas of minor damage or deterioration to the slab were observed, and repairs to correct these conditions, as well as recommendation for the improvement of brewery equipment supports are discussed in the following section.

RECOMMENDATIONS

To improve the performance and/or lifespan of the facility, we recommend that the following repairs or alterations be undertaken:

- The concrete slab in the production area of the facility (approximately 60 feet by 60 feet in the southwest corner of the building) should have a coating material applied to prevent additional moisture travel through the slab, and to patch spalled and scaled areas. A rapid repair mortar such as EMACO T430, manufactured by Master Builders/ChemRex, should be applied according to the manufacturer's recommendations. This material has a fairly rough finished surface. If a less permeable material with a smoother finish is desired, a polymer modified repair material such as EMACO R310 C1, also manufactured by Master Builders/ChemRex, can be used. Both of these materials can be applied to moist slabs, and require the removal of loose concrete material, the scarification of the slab to a 1/8" depth and the degreasing of the slab prior to installation. The R310 material is considerably more expensive than the T430 material, but will provide a more appropriate floor surface for a brewery. Either material should be applied to a minimum thickness of 1/4 to 3/8 inch.

- To prevent damage to edges of transverse (north-south) slab contraction joints subjected to fork lift or pallet jack traffic (particularly in the storage/shipping area), remove the existing soft sealant currently in the joints and replace with a sealant suitable for this use, such as Iso-Flex 735, manufactured by LymTal International. The joint should be prepared and the sealant installed according to the manufacturer's recommendations. Only the portions of joints subjected to heavy, repeated, concentrated loads need to be replaced.

- The gutter and downspout at the southwest corner of the building should be cleared to allow proper movement of rain away from the foundation of the building. The

depression in the ground adjacent to the south side of the building, near the southwest corner, should be infilled to prevent pooling of water.

To prevent unstable conditions, we recommended that the following alterations and/or verifications be undertaken for the brewery equipment supports:

- All base plates of all floor supported tanks or other heavy equipment should be shimmed to provide full bearing between the base plates and the floor. Lack of bearing on some tank legs could cause an unstable support condition.

- All tanks or other equipment taller than six feet in height should be checked for vertical alignment. Equipment found to be out-of-plumb should be leveled. Equipment significantly out-of-plumb could cause an unstable support condition.

- All base plates of all floor supported tanks or other heavy equipment should be mechanically attached to the floor slab. The preferred method of attachment would be a minimum of two 1/2 inch diameter threaded rods drilled and anchored into the slab with adhesive anchor at each base plate. The design of the actual attachments required between the equipment and the slab, for seismic or other forces, is not in the scope of this report, but should be performed by a qualified engineer.

- Verify the condition of the support for the Millhouse structure. Check for decayed or otherwise damaged material. Repair as required.

If desired, the cracks located in the dry areas of the storage/shipping portion of the building (several cracks primarily in the east-west direction) may be ground out and filled with a sealant such as Iso-Flex 735, manufactured by LymTal International. The cracks should be routed out with a diamond "V" blade, resulting in a 3/8 inch wide by 1/2" deep groove. The routed groove should be prepared, and the sealant installed, according to the manufacturer's recommendations.

To provide additional information about the current condition of the slab and its underlying support, we recommend that at least three saw cut cores, four to six inches in diameter, be taken from the slab in the production area. At least two cores should be located adjacent to tanks F-10 and F-11, and at least one core adjacent to the Millhouse structure. Once the cores have been removed, the slab opening should be observed for voids beneath the slab. Retain the cores for later observation of the condition of the concrete.

While preparing this report, we spoke with Mr. Don Ellsworth of ConTech Services, a contractor specializing in concrete repairs, to obtain information about suitable materials and procedures for the proposed repairs. Mr. Ellsworth can be reached at (503) 223-9817 if additional information about material costs or installation procedures is required.

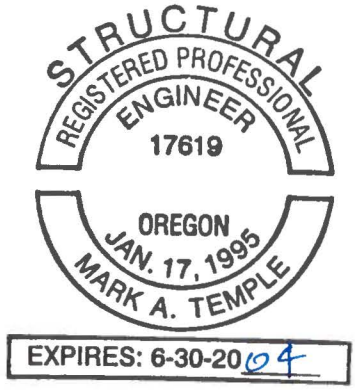
If there are any questions regarding this information or if there is anything else we can do for you, please do not hesitate to call.

Sincerely,

BERGER/ABAM Engineers Inc

Mark Temple

Mark Temple, SE



Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Thursday, April 2, 2020

Graeme Taylor
Stantec Portland
601 SW 2nd Ave Suite 1400
Portland, OR 97204

RE: A0C0717 - Rogue Brewery - 185750579

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A0C0717, which was received by the laboratory on 3/19/2020 at 3:05:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: ldomenighini@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample reciept, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler#1	3.6	degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GP01-0-10	A0C0717-01	Soil	03/18/20 09:30	03/19/20 15:05
GP02-0-10	A0C0717-02	Soil	03/17/20 11:10	03/19/20 15:05
GP03-0-10	A0C0717-03	Soil	03/17/20 10:05	03/19/20 15:05
GP04-0-10	A0C0717-04	Soil	03/17/20 13:10	03/19/20 15:05
GP0XC-0-10	A0C0717-05	Soil	03/17/20 10:30	03/19/20 15:05
EB01-031720	A0C0717-06	Water	03/17/20 17:00	03/19/20 15:05
EB02-031820	A0C0717-07	Water	03/18/20 14:30	03/19/20 15:05
TB01-031720	A0C0717-08	Water	03/17/20 00:00	03/19/20 15:05

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Lisa A Domenighini

Lisa Domenighini, Client Services Manager

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Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Hydrocarbon Identification Screen by NWTPH-HCID

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP01-0-10 (A0C0717-01)				**Matrix: Soil**		**Batch: 0030775**		
Gasoline Range Organics	ND	---	19.8	mg/kg dry	1	03/23/20 22:41	NWTPH-HCID	
Diesel Range Organics	ND	---	49.6	mg/kg dry	1	03/23/20 22:41	NWTPH-HCID	
Oil Range Organics	ND	---	99.1	mg/kg dry	1	03/23/20 22:41	NWTPH-HCID	
Surrogate: o-Terphenyl (Surr)		*Recovery:*	*100 %*	*Limits: 50-150 %*	*1*	*03/23/20 22:41*	*NWTPH-HCID*	
4-Bromofluorobenzene (Surr)			*96 %*	*50-150 %*	*1*	*03/23/20 22:41*	*NWTPH-HCID*	
GP02-0-10 (A0C0717-02)				**Matrix: Soil**		**Batch: 0030775**		
Gasoline Range Organics	ND	---	21.0	mg/kg dry	1	03/23/20 23:02	NWTPH-HCID	
Diesel Range Organics	ND	---	52.6	mg/kg dry	1	03/23/20 23:02	NWTPH-HCID	
Oil Range Organics	DET	---	105	mg/kg dry	1	03/23/20 23:02	NWTPH-HCID	
Surrogate: o-Terphenyl (Surr)		*Recovery:*	*93 %*	*Limits: 50-150 %*	*1*	*03/23/20 23:02*	*NWTPH-HCID*	
4-Bromofluorobenzene (Surr)			*91 %*	*50-150 %*	*1*	*03/23/20 23:02*	*NWTPH-HCID*	
GP03-0-10 (A0C0717-03)				**Matrix: Soil**		**Batch: 0030775**		
Gasoline Range Organics	ND	---	20.3	mg/kg dry	1	03/23/20 23:22	NWTPH-HCID	
Diesel Range Organics	ND	---	50.8	mg/kg dry	1	03/23/20 23:22	NWTPH-HCID	
Oil Range Organics	ND	---	102	mg/kg dry	1	03/23/20 23:22	NWTPH-HCID	
Surrogate: o-Terphenyl (Surr)		*Recovery:*	*97 %*	*Limits: 50-150 %*	*1*	*03/23/20 23:22*	*NWTPH-HCID*	
4-Bromofluorobenzene (Surr)			*95 %*	*50-150 %*	*1*	*03/23/20 23:22*	*NWTPH-HCID*	
GP04-0-10 (A0C0717-04)				**Matrix: Soil**		**Batch: 0030775**		
Gasoline Range Organics	ND	---	21.6	mg/kg dry	1	03/23/20 23:43	NWTPH-HCID	
Diesel Range Organics	ND	---	53.9	mg/kg dry	1	03/23/20 23:43	NWTPH-HCID	
Oil Range Organics	DET	---	108	mg/kg dry	1	03/23/20 23:43	NWTPH-HCID	
Surrogate: o-Terphenyl (Surr)		*Recovery:*	*99 %*	*Limits: 50-150 %*	*1*	*03/23/20 23:43*	*NWTPH-HCID*	
4-Bromofluorobenzene (Surr)			*97 %*	*50-150 %*	*1*	*03/23/20 23:43*	*NWTPH-HCID*	
GP0XC-0-10 (A0C0717-05)				**Matrix: Soil**		**Batch: 0030775**		
Gasoline Range Organics	ND	---	20.1	mg/kg dry	1	03/24/20 00:03	NWTPH-HCID	
Diesel Range Organics	ND	---	50.2	mg/kg dry	1	03/24/20 00:03	NWTPH-HCID	
Oil Range Organics	ND	---	100	mg/kg dry	1	03/24/20 00:03	NWTPH-HCID	
Surrogate: o-Terphenyl (Surr)		*Recovery:*	*101 %*	*Limits: 50-150 %*	*1*	*03/24/20 00:03*	*NWTPH-HCID*	
4-Bromofluorobenzene (Surr)			*98 %*	*50-150 %*	*1*	*03/24/20 00:03*	*NWTPH-HCID*	
EB01-031720 (A0C0717-06)				**Matrix: Water**		**Batch: 0030801**		
Gasoline Range Organics	ND	---	0.114	mg/L	1	03/24/20 05:34	NWTPH-HCID	
Diesel Range Organics	ND	---	0.284	mg/L	1	03/24/20 05:34	NWTPH-HCID	

Apex Laboratories

Lisa Domenighini, Client Services Manager

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Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Hydrocarbon Identification Screen by NWTPH-HCID

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
EB01-031720 (A0C0717-06)				**Matrix: Water**		**Batch: 0030801**		
Oil Range Organics	ND	---	0.284	mg/L	1	03/24/20 05:34	NWTPH-HCID	
Surrogate: o-Terphenyl (Surr)		*Recovery:*	*97 %*	*Limits: 50-150 %*	*1*	*03/24/20 05:34*	*NWTPH-HCID*	
4-Bromofluorobenzene (Surr)			*79 %*	*50-150 %*	*1*	*03/24/20 05:34*	*NWTPH-HCID*	
EB02-031820 (A0C0717-07)				**Matrix: Water**		**Batch: 0030801**		
Gasoline Range Organics	ND	---	0.0980	mg/L	1	03/24/20 05:57	NWTPH-HCID	
Diesel Range Organics	ND	---	0.245	mg/L	1	03/24/20 05:57	NWTPH-HCID	
Oil Range Organics	ND	---	0.245	mg/L	1	03/24/20 05:57	NWTPH-HCID	
Surrogate: o-Terphenyl (Surr)		*Recovery:*	*90 %*	*Limits: 50-150 %*	*1*	*03/24/20 05:57*	*NWTPH-HCID*	
4-Bromofluorobenzene (Surr)			*77 %*	*50-150 %*	*1*	*03/24/20 05:57*	*NWTPH-HCID*	

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601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP02-0-10 (A0C0717-02)				**Matrix: Soil**		**Batch: 0030823**		
Diesel	ND	---	25.0	mg/kg dry	1	03/24/20 22:40	NWTPH-Dx	
Oil	**113**	---	50.0	mg/kg dry	1	03/24/20 22:40	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 85 %*		*Limits: 50-150 %*	*1*	*03/24/20 22:40*	*NWTPH-Dx*	
GP04-0-10 (A0C0717-04)				**Matrix: Soil**		**Batch: 0030823**		
Diesel	ND	---	25.0	mg/kg dry	1	03/24/20 23:03	NWTPH-Dx	
Oil	**564**	---	50.0	mg/kg dry	1	03/24/20 23:03	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 90 %*		*Limits: 50-150 %*	*1*	*03/24/20 23:03*	*NWTPH-Dx*	

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601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260C

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
TB01-031720 (A0C0717-08)				**Matrix: Water**		**Batch: 0030828**		
Acetone	ND	---	20.0	ug/L	1	03/24/20 13:39	EPA 8260C	
Acrylonitrile	ND	---	2.00	ug/L	1	03/24/20 13:39	EPA 8260C	
Benzene	ND	---	0.200	ug/L	1	03/24/20 13:39	EPA 8260C	
Bromobenzene	ND	---	0.500	ug/L	1	03/24/20 13:39	EPA 8260C	
Bromochloromethane	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
Bromodichloromethane	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
Bromoform	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
Bromomethane	ND	---	5.00	ug/L	1	03/24/20 13:39	EPA 8260C	
2-Butanone (MEK)	ND	---	10.0	ug/L	1	03/24/20 13:39	EPA 8260C	
n-Butylbenzene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
sec-Butylbenzene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
tert-Butylbenzene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
Carbon disulfide	ND	---	10.0	ug/L	1	03/24/20 13:39	EPA 8260C	
Carbon tetrachloride	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
Chlorobenzene	ND	---	0.500	ug/L	1	03/24/20 13:39	EPA 8260C	
Chloroethane	ND	---	5.00	ug/L	1	03/24/20 13:39	EPA 8260C	
Chloroform	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
Chloromethane	ND	---	5.00	ug/L	1	03/24/20 13:39	EPA 8260C	
2-Chlorotoluene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
4-Chlorotoluene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
Dibromochloromethane	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	03/24/20 13:39	EPA 8260C	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	03/24/20 13:39	EPA 8260C	
Dibromomethane	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	03/24/20 13:39	EPA 8260C	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	03/24/20 13:39	EPA 8260C	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	03/24/20 13:39	EPA 8260C	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	03/24/20 13:39	EPA 8260C	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	03/24/20 13:39	EPA 8260C	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	03/24/20 13:39	EPA 8260C	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/24/20 13:39	EPA 8260C	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	03/24/20 13:39	EPA 8260C	
1,2-Dichloropropane	ND	---	0.500	ug/L	1	03/24/20 13:39	EPA 8260C	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

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Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260C

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
TB01-031720 (A0C0717-08)				**Matrix: Water**		**Batch: 0030828**		
Ethylbenzene	ND	---	0.500	ug/L	1	03/24/20 13:39	EPA 8260C	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	03/24/20 13:39	EPA 8260C	
2-Hexanone	ND	---	10.0	ug/L	1	03/24/20 13:39	EPA 8260C	
Isopropylbenzene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
4-Isopropyltoluene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
Methylene chloride	ND	---	10.0	ug/L	1	03/24/20 13:39	EPA 8260C	
4-Methyl-2-pentanone (MiBK)	ND	---	10.0	ug/L	1	03/24/20 13:39	EPA 8260C	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
Naphthalene	ND	---	2.00	ug/L	1	03/24/20 13:39	EPA 8260C	
n-Propylbenzene	ND	---	0.500	ug/L	1	03/24/20 13:39	EPA 8260C	
Styrene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	03/24/20 13:39	EPA 8260C	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	03/24/20 13:39	EPA 8260C	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	03/24/20 13:39	EPA 8260C	
Toluene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	03/24/20 13:39	EPA 8260C	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	03/24/20 13:39	EPA 8260C	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	03/24/20 13:39	EPA 8260C	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	03/24/20 13:39	EPA 8260C	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	03/24/20 13:39	EPA 8260C	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	03/24/20 13:39	EPA 8260C	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
Vinyl chloride	ND	---	0.400	ug/L	1	03/24/20 13:39	EPA 8260C	
m,p-Xylene	ND	---	1.00	ug/L	1	03/24/20 13:39	EPA 8260C	
o-Xylene	ND	---	0.500	ug/L	1	03/24/20 13:39	EPA 8260C	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*107 %*	*Limits:*	*80-120 %*	*1*	*03/24/20 13:39*	*EPA 8260C*	
Toluene-d8 (Surr)			*105 %*		*80-120 %*	*1*	*03/24/20 13:39*	*EPA 8260C*	
4-Bromofluorobenzene (Surr)			*99 %*		*80-120 %*	*1*	*03/24/20 13:39*	*EPA 8260C*	

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Lisa Domenighini, Client Services Manager

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Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP01-0-10 (A0C0717-01)				**Matrix: Soil**		**Batch: 0030757**		**C-07**
Aroclor 1016	ND	---	0.0106	mg/kg dry	1	03/24/20 08:19	EPA 8082A	
Aroclor 1221	ND	---	0.0106	mg/kg dry	1	03/24/20 08:19	EPA 8082A	
Aroclor 1232	ND	---	0.0106	mg/kg dry	1	03/24/20 08:19	EPA 8082A	
Aroclor 1242	ND	---	0.0106	mg/kg dry	1	03/24/20 08:19	EPA 8082A	
Aroclor 1248	ND	---	0.0106	mg/kg dry	1	03/24/20 08:19	EPA 8082A	
Aroclor 1254	ND	---	0.0106	mg/kg dry	1	03/24/20 08:19	EPA 8082A	
Aroclor 1260	ND	---	0.0106	mg/kg dry	1	03/24/20 08:19	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 101 %*		*Limits: 60-125 %*	*1*	*03/24/20 08:19*	*EPA 8082A*	
GP02-0-10 (A0C0717-02)				**Matrix: Soil**		**Batch: 0030757**		**C-07**
Aroclor 1016	ND	---	0.00996	mg/kg dry	1	03/24/20 10:40	EPA 8082A	
Aroclor 1221	ND	---	0.00996	mg/kg dry	1	03/24/20 10:40	EPA 8082A	
Aroclor 1232	ND	---	0.00996	mg/kg dry	1	03/24/20 10:40	EPA 8082A	
Aroclor 1242	ND	---	0.00996	mg/kg dry	1	03/24/20 10:40	EPA 8082A	
Aroclor 1248	ND	---	0.00996	mg/kg dry	1	03/24/20 10:40	EPA 8082A	
Aroclor 1254	ND	---	0.00996	mg/kg dry	1	03/24/20 10:40	EPA 8082A	
Aroclor 1260	ND	---	0.00996	mg/kg dry	1	03/24/20 10:40	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 97 %*		*Limits: 60-125 %*	*1*	*03/24/20 10:40*	*EPA 8082A*	
GP03-0-10 (A0C0717-03)				**Matrix: Soil**		**Batch: 0030757**		**C-07**
Aroclor 1016	ND	---	0.00983	mg/kg dry	1	03/24/20 09:30	EPA 8082A	
Aroclor 1221	ND	---	0.00983	mg/kg dry	1	03/24/20 09:30	EPA 8082A	
Aroclor 1232	ND	---	0.00983	mg/kg dry	1	03/24/20 09:30	EPA 8082A	
Aroclor 1242	ND	---	0.00983	mg/kg dry	1	03/24/20 09:30	EPA 8082A	
Aroclor 1248	ND	---	0.00983	mg/kg dry	1	03/24/20 09:30	EPA 8082A	
Aroclor 1254	ND	---	0.00983	mg/kg dry	1	03/24/20 09:30	EPA 8082A	
Aroclor 1260	ND	---	0.00983	mg/kg dry	1	03/24/20 09:30	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 95 %*		*Limits: 60-125 %*	*1*	*03/24/20 09:30*	*EPA 8082A*	
GP04-0-10 (A0C0717-04)				**Matrix: Soil**		**Batch: 0030757**		**C-07**
Aroclor 1016	ND	---	0.0109	mg/kg dry	1	03/24/20 10:05	EPA 8082A	
Aroclor 1221	ND	---	0.0109	mg/kg dry	1	03/24/20 10:05	EPA 8082A	
Aroclor 1232	ND	---	0.0109	mg/kg dry	1	03/24/20 10:05	EPA 8082A	
Aroclor 1242	ND	---	0.0109	mg/kg dry	1	03/24/20 10:05	EPA 8082A	
Aroclor 1248	ND	---	0.0109	mg/kg dry	1	03/24/20 10:05	EPA 8082A	
Aroclor 1254	ND	---	0.0109	mg/kg dry	1	03/24/20 10:05	EPA 8082A	
Aroclor 1260	ND	---	0.0109	mg/kg dry	1	03/24/20 10:05	EPA 8082A	

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Lisa Domenighini, Client Services Manager

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP04-0-10 (A0C0717-04)				**Matrix: Soil**		**Batch: 0030757**		**C-07**
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 86 %*	*Limits: 60-125 %*		*1*	*03/24/20 10:05*	*EPA 8082A*	
GP0XC-0-10 (A0C0717-05)				**Matrix: Soil**		**Batch: 0030757**		**C-07**
Aroclor 1016	ND	---	0.00988	mg/kg dry	1	03/24/20 10:40	EPA 8082A	
Aroclor 1221	ND	---	0.00988	mg/kg dry	1	03/24/20 10:40	EPA 8082A	
Aroclor 1232	ND	---	0.00988	mg/kg dry	1	03/24/20 10:40	EPA 8082A	
Aroclor 1242	ND	---	0.00988	mg/kg dry	1	03/24/20 10:40	EPA 8082A	
Aroclor 1248	ND	---	0.00988	mg/kg dry	1	03/24/20 10:40	EPA 8082A	
Aroclor 1254	ND	---	0.00988	mg/kg dry	1	03/24/20 10:40	EPA 8082A	
Aroclor 1260	ND	---	0.00988	mg/kg dry	1	03/24/20 10:40	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 95 %*	*Limits: 60-125 %*		*1*	*03/24/20 10:40*	*EPA 8082A*	
EB01-031720 (A0C0717-06)				**Matrix: Water**		**Batch: 0030749**		**C-07**
Aroclor 1016	ND	---	0.120	ug/L	1	03/23/20 10:07	EPA 8082A	
Aroclor 1221	ND	---	0.120	ug/L	1	03/23/20 10:07	EPA 8082A	
Aroclor 1232	ND	---	0.120	ug/L	1	03/23/20 10:07	EPA 8082A	
Aroclor 1242	ND	---	0.120	ug/L	1	03/23/20 10:07	EPA 8082A	
Aroclor 1248	ND	---	0.120	ug/L	1	03/23/20 10:07	EPA 8082A	
Aroclor 1254	ND	---	0.120	ug/L	1	03/23/20 10:07	EPA 8082A	
Aroclor 1260	ND	---	0.120	ug/L	1	03/23/20 10:07	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 74 %*	*Limits: 40-135 %*		*1*	*03/23/20 10:07*	*EPA 8082A*	
EB02-031820 (A0C0717-07)				**Matrix: Water**		**Batch: 0030749**		**C-07**
Aroclor 1016	ND	---	0.114	ug/L	1	03/23/20 10:25	EPA 8082A	
Aroclor 1221	ND	---	0.114	ug/L	1	03/23/20 10:25	EPA 8082A	
Aroclor 1232	ND	---	0.114	ug/L	1	03/23/20 10:25	EPA 8082A	
Aroclor 1242	ND	---	0.114	ug/L	1	03/23/20 10:25	EPA 8082A	
Aroclor 1248	ND	---	0.114	ug/L	1	03/23/20 10:25	EPA 8082A	
Aroclor 1254	ND	---	0.114	ug/L	1	03/23/20 10:25	EPA 8082A	
Aroclor 1260	ND	---	0.114	ug/L	1	03/23/20 10:25	EPA 8082A	
Surrogate: Decachlorobiphenyl (Surr)		*Recovery: 68 %*	*Limits: 40-135 %*		*1*	*03/23/20 10:25*	*EPA 8082A*	

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Organochlorine Pesticides by EPA 8081B

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP01-0-10 (A0C0717-01RE1)				**Matrix: Soil**		**Batch: 0030762**		**C-05**
Aldrin	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
alpha-BHC	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
beta-BHC	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
delta-BHC	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
gamma-BHC (Lindane)	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
cis-Chlordane	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
trans-Chlordane	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
4,4'-DDD	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
4,4'-DDE	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
4,4'-DDT	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
Dieldrin	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
Endosulfan I	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
Endosulfan II	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
Endosulfan sulfate	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
Endrin	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
Endrin Aldehyde	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
Endrin ketone	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
Heptachlor	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
Heptachlor epoxide	ND	---	0.00206	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
Methoxychlor	ND	---	0.00619	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
Chlordane (Technical)	ND	---	0.0619	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
Toxaphene (Total)	ND	---	0.0619	mg/kg dry	1	03/23/20 12:49	EPA 8081B	
Surrogate: 2,4,5,6-TCMX (Surr)		*Recovery:*	*76 %*	*Limits: 42-129 %*	*1*	*03/23/20 12:49*	*EPA 8081B*	
Decachlorobiphenyl (Surr)			*104 %*	*55-130 %*	*1*	*03/23/20 12:49*	*EPA 8081B*	
GP02-0-10 (A0C0717-02RE1)				**Matrix: Soil**		**Batch: 0030762**		**C-05**
Aldrin	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
alpha-BHC	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
beta-BHC	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
delta-BHC	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
gamma-BHC (Lindane)	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
cis-Chlordane	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
trans-Chlordane	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
4,4'-DDD	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
4,4'-DDE	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
4,4'-DDT	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
Dieldrin	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
Endosulfan I	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

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Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Organochlorine Pesticides by EPA 8081B

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP02-0-10 (A0C0717-02RE1)				**Matrix: Soil**		**Batch: 0030762**		**C-05**
Endosulfan II	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
Endosulfan sulfate	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
Endrin	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
Endrin Aldehyde	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
Endrin ketone	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
Heptachlor	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
Heptachlor epoxide	ND	---	0.00206	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
Methoxychlor	ND	---	0.00617	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
Chlordane (Technical)	ND	---	0.0617	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
Toxaphene (Total)	ND	---	0.0617	mg/kg dry	1	03/23/20 13:05	EPA 8081B	
Surrogate: 2,4,5,6-TCMX (Surr)		*Recovery:*	*55 %*	*Limits: 42-129 %*	*1*	*03/23/20 13:05*	*EPA 8081B*	
Decachlorobiphenyl (Surr)			*108 %*	*55-130 %*	*1*	*03/23/20 13:05*	*EPA 8081B*	
GP03-0-10 (A0C0717-03RE1)				**Matrix: Soil**		**Batch: 0030762**		**C-05**
Aldrin	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
alpha-BHC	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
beta-BHC	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
delta-BHC	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
gamma-BHC (Lindane)	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
cis-Chlordane	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
trans-Chlordane	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
4,4'-DDD	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
4,4'-DDE	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
4,4'-DDT	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
Dieldrin	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
Endosulfan I	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
Endosulfan II	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
Endosulfan sulfate	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
Endrin	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
Endrin Aldehyde	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
Endrin ketone	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
Heptachlor	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
Heptachlor epoxide	ND	---	0.00199	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
Methoxychlor	ND	---	0.00598	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
Chlordane (Technical)	ND	---	0.0598	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
Toxaphene (Total)	ND	---	0.0598	mg/kg dry	1	03/23/20 13:38	EPA 8081B	
Surrogate: 2,4,5,6-TCMX (Surr)		*Recovery:*	*64 %*	*Limits: 42-129 %*	*1*	*03/23/20 13:38*	*EPA 8081B*	
Decachlorobiphenyl (Surr)			*103 %*	*55-130 %*	*1*	*03/23/20 13:38*	*EPA 8081B*	

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Organochlorine Pesticides by EPA 8081B

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP04-0-10 (A0C0717-04RE1)				**Matrix: Soil**		**Batch: 0030762**		**C-05**
Aldrin	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
alpha-BHC	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
beta-BHC	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
delta-BHC	ND	---	0.00252	mg/kg dry	1	03/23/20 13:55	EPA 8081B	R-02
gamma-BHC (Lindane)	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
cis-Chlordane	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
trans-Chlordane	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
4,4'-DDD	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
4,4'-DDE	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
4,4'-DDT	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
Dieldrin	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
Endosulfan I	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
Endosulfan II	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
Endosulfan sulfate	ND	---	0.00241	mg/kg dry	1	03/23/20 13:55	EPA 8081B	R-02
Endrin	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
Endrin Aldehyde	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
Endrin ketone	ND	---	0.00318	mg/kg dry	1	03/23/20 13:55	EPA 8081B	R-02
Heptachlor	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
Heptachlor epoxide	ND	---	0.00219	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
Methoxychlor	ND	---	0.00658	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
Chlordane (Technical)	ND	---	0.0658	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
Toxaphene (Total)	ND	---	0.0658	mg/kg dry	1	03/23/20 13:55	EPA 8081B	
Surrogate: 2,4,5,6-TCMX (Surr)		*Recovery:*	*79 %*	*Limits: 42-129 %*	*1*	*03/23/20 13:55*	*EPA 8081B*	
Decachlorobiphenyl (Surr)			*125 %*	*55-130 %*	*1*	*03/23/20 13:55*	*EPA 8081B*	
GP0XC-0-10 (A0C0717-05RE1)				**Matrix: Soil**		**Batch: 0030762**		**C-05**
Aldrin	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
alpha-BHC	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
beta-BHC	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
delta-BHC	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
gamma-BHC (Lindane)	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
cis-Chlordane	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
trans-Chlordane	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
4,4'-DDD	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
4,4'-DDE	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
4,4'-DDT	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
Dieldrin	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Organochlorine Pesticides by EPA 8081B

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP0XC-0-10 (A0C0717-05RE1)				**Matrix: Soil**		**Batch: 0030762**		**C-05**
Endosulfan I	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
Endosulfan II	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
Endosulfan sulfate	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
Endrin	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
Endrin Aldehyde	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
Endrin ketone	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
Heptachlor	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
Heptachlor epoxide	ND	---	0.00204	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
Methoxychlor	ND	---	0.00611	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
Chlordane (Technical)	ND	---	0.0611	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
Toxaphene (Total)	ND	---	0.0611	mg/kg dry	1	03/23/20 14:28	EPA 8081B	
Surrogate: 2,4,5,6-TCMX (Surr)		*Recovery:*	*66 %*	*Limits: 42-129 %*	*1*	*03/23/20 14:28*	*EPA 8081B*	
Decachlorobiphenyl (Surr)			*107 %*	*55-130 %*	*1*	*03/23/20 14:28*	*EPA 8081B*	
EB01-031720 (A0C0717-06)				**Matrix: Water**		**Batch: 0030826**		
Aldrin	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
alpha-BHC	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
beta-BHC	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
delta-BHC	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
gamma-BHC (Lindane)	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
cis-Chlordane	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
trans-Chlordane	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
4,4'-DDD	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
4,4'-DDE	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
4,4'-DDT	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
Dieldrin	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
Endosulfan I	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
Endosulfan II	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
Endosulfan sulfate	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
Endrin	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
Endrin Aldehyde	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
Endrin ketone	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
Heptachlor	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
Heptachlor epoxide	ND	---	0.0100	ug/L	1	03/26/20 13:45	EPA 8081B	
Methoxychlor	ND	---	0.0300	ug/L	1	03/26/20 13:45	EPA 8081B	
Chlordane (Technical)	ND	---	0.375	ug/L	1	03/26/20 13:45	EPA 8081B	
Toxaphene (Total)	ND	---	0.375	ug/L	1	03/26/20 13:45	EPA 8081B	
Surrogate: 2,4,5,6-TCMX (Surr)		*Recovery:*	*77 %*	*Limits: 25-140 %*	*1*	*03/26/20 13:45*	*EPA 8081B*	

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

6700 S.W. Sandburg Street
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503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Organochlorine Pesticides by EPA 8081B

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
EB01-031720 (A0C0717-06)				**Matrix: Water**		**Batch: 0030826**		
Surrogate: Decachlorobiphenyl (Surr)			*Recovery: 77 %*	*Limits: 30-135 %*	*1*	*03/26/20 13:45*	*EPA 8081B*	
EB02-031820 (A0C0717-07)				**Matrix: Water**		**Batch: 0030826**		
Aldrin	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
alpha-BHC	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
beta-BHC	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
delta-BHC	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
gamma-BHC (Lindane)	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
cis-Chlordane	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
trans-Chlordane	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
4,4'-DDD	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
4,4'-DDE	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
4,4'-DDT	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
Dieldrin	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
Endosulfan I	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
Endosulfan II	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
Endosulfan sulfate	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
Endrin	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
Endrin Aldehyde	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
Endrin ketone	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
Heptachlor	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
Heptachlor epoxide	ND	---	0.0108	ug/L	1	03/26/20 14:02	EPA 8081B	
Methoxychlor	ND	---	0.0323	ug/L	1	03/26/20 14:02	EPA 8081B	
Chlordane (Technical)	ND	---	0.403	ug/L	1	03/26/20 14:02	EPA 8081B	
Toxaphene (Total)	ND	---	0.403	ug/L	1	03/26/20 14:02	EPA 8081B	
Surrogate: 2,4,5,6-TCMX (Surr)			*Recovery: 74 %*	*Limits: 25-140 %*	*1*	*03/26/20 14:02*	*EPA 8081B*	
Decachlorobiphenyl (Surr)			*77 %*	*30-135 %*	*1*	*03/26/20 14:02*	*EPA 8081B*	

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC
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EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP01-0-10 (A0C0717-01)				**Matrix: Soil**		**Batch: 0030726**		
Acenaphthene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Acenaphthylene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Anthracene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Benz(a)anthracene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Benzo(a)pyrene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Benzo(b)fluoranthene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Benzo(k)fluoranthene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Benzo(g,h,i)perylene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Chrysene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Dibenz(a,h)anthracene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Fluoranthene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Fluorene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Indeno(1,2,3-cd)pyrene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
1-Methylnaphthalene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
2-Methylnaphthalene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Naphthalene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Phenanthrene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Pyrene	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Dibenzofuran	ND	---	0.0101	mg/kg dry	1	03/20/20 11:56	EPA 8270D (SIM)	
Surrogate: 2-Fluorobiphenyl (Surr)		*Recovery:*	*78 %*	*Limits: 46-120 %*	*1*	*03/20/20 11:56*	*EPA 8270D (SIM)*	
p-Terphenyl-d14 (Surr)			*83 %*	*49-126 %*	*1*	*03/20/20 11:56*	*EPA 8270D (SIM)*	
GP02-0-10 (A0C0717-02)				**Matrix: Soil**		**Batch: 0030726**		
Acenaphthene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Acenaphthylene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Anthracene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Benz(a)anthracene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Benzo(a)pyrene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Benzo(b)fluoranthene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Benzo(k)fluoranthene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Benzo(g,h,i)perylene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Chrysene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Dibenz(a,h)anthracene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Fluoranthene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Fluorene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Indeno(1,2,3-cd)pyrene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
1-Methylnaphthalene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
2-Methylnaphthalene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	

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Lisa Domenighini, Client Services Manager

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6700 S.W. Sandburg Street
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503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP02-0-10 (A0C0717-02)				**Matrix: Soil**		**Batch: 0030726**		
Naphthalene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Phenanthrene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Pyrene	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Dibenzofuran	ND	---	0.0101	mg/kg dry	1	03/20/20 12:47	EPA 8270D (SIM)	
Surrogate: 2-Fluorobiphenyl (Surr)		*Recovery:*	*77 %*	*Limits: 46-120 %*	*1*	*03/20/20 12:47*	*EPA 8270D (SIM)*	
p-Terphenyl-d14 (Surr)			*82 %*	*49-126 %*	*1*	*03/20/20 12:47*	*EPA 8270D (SIM)*	
GP03-0-10 (A0C0717-03)				**Matrix: Soil**		**Batch: 0030726**		
Acenaphthene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Acenaphthylene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Anthracene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Benz(a)anthracene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Benzo(a)pyrene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Benzo(b)fluoranthene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Benzo(k)fluoranthene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Benzo(g,h,i)perylene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Chrysene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Dibenz(a,h)anthracene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Fluoranthene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Fluorene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Indeno(1,2,3-cd)pyrene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
1-Methylnaphthalene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
2-Methylnaphthalene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Naphthalene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Phenanthrene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Pyrene	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Dibenzofuran	ND	---	0.0101	mg/kg dry	1	03/20/20 13:12	EPA 8270D (SIM)	
Surrogate: 2-Fluorobiphenyl (Surr)		*Recovery:*	*78 %*	*Limits: 46-120 %*	*1*	*03/20/20 13:12*	*EPA 8270D (SIM)*	
p-Terphenyl-d14 (Surr)			*86 %*	*49-126 %*	*1*	*03/20/20 13:12*	*EPA 8270D (SIM)*	
GP04-0-10 (A0C0717-04)				**Matrix: Soil**		**Batch: 0030726**		
Acenaphthene	ND	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
Acenaphthylene	ND	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
Anthracene	ND	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
Benz(a)anthracene	ND	---	0.0167	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	R-02
Benzo(a)pyrene	ND	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
Benzo(b)fluoranthene	ND	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
Benzo(k)fluoranthene	ND	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	

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Lisa Domenighini, Client Services Manager

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503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP04-0-10 (A0C0717-04)				**Matrix: Soil**		**Batch: 0030726**		
Benzo(g,h,i)perylene	ND	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
Chrysene	ND	---	0.0178	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	R-02
Dibenz(a,h)anthracene	ND	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
Fluoranthene	ND	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
Fluorene	ND	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
Indeno(1,2,3-cd)pyrene	ND	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
1-Methylnaphthalene	ND	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
2-Methylnaphthalene	**0.0149**	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
Naphthalene	**0.0623**	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
Phenanthrene	**0.0171**	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
Pyrene	ND	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
Dibenzofuran	ND	---	0.0104	mg/kg dry	1	03/20/20 13:38	EPA 8270D (SIM)	
Surrogate: 2-Fluorobiphenyl (Surr)		*Recovery:*	*79 %*	*Limits: 46-120 %*	*1*	*03/20/20 13:38*	*EPA 8270D (SIM)*	
p-Terphenyl-d14 (Surr)			*88 %*	*49-126 %*	*1*	*03/20/20 13:38*	*EPA 8270D (SIM)*	
GP0XC-0-10 (A0C0717-05)				**Matrix: Soil**		**Batch: 0030726**		
Acenaphthene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Acenaphthylene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Anthracene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Benz(a)anthracene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Benzo(a)pyrene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Benzo(b)fluoranthene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Benzo(k)fluoranthene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Benzo(g,h,i)perylene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Chrysene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Dibenz(a,h)anthracene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Fluoranthene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Fluorene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Indeno(1,2,3-cd)pyrene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
1-Methylnaphthalene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
2-Methylnaphthalene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Naphthalene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Phenanthrene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Pyrene	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Dibenzofuran	ND	---	0.0105	mg/kg dry	1	03/20/20 14:03	EPA 8270D (SIM)	
Surrogate: 2-Fluorobiphenyl (Surr)		*Recovery:*	*73 %*	*Limits: 46-120 %*	*1*	*03/20/20 14:03*	*EPA 8270D (SIM)*	
p-Terphenyl-d14 (Surr)			*85 %*	*49-126 %*	*1*	*03/20/20 14:03*	*EPA 8270D (SIM)*	

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Lisa Domenighini, Client Services Manager

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
EB01-031720 (A0C0717-06)				**Matrix: Water**		**Batch: 0030806**		
Acenaphthene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Acenaphthylene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Anthracene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Benz(a)anthracene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Benzo(a)pyrene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Benzo(b)fluoranthene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Benzo(k)fluoranthene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Benzo(g,h,i)perylene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Chrysene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Dibenz(a,h)anthracene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Fluoranthene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Fluorene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Indeno(1,2,3-cd)pyrene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
1-Methylnaphthalene	ND	---	0.0792	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
2-Methylnaphthalene	ND	---	0.0792	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Naphthalene	ND	---	0.0792	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Phenanthrene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Pyrene	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Dibenzofuran	ND	---	0.0396	ug/L	1	03/23/20 17:39	EPA 8270D (SIM)	
Surrogate: 2-Fluorobiphenyl (Surr)		*Recovery:*	*70 %*	*Limits: 53-120 %*	*1*	*03/23/20 17:39*	*EPA 8270D (SIM)*	
p-Terphenyl-d14 (Surr)			*83 %*	*58-132 %*	*1*	*03/23/20 17:39*	*EPA 8270D (SIM)*	
EB02-031820 (A0C0717-07)				**Matrix: Water**		**Batch: 0030806**		
Acenaphthene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Acenaphthylene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Anthracene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Benz(a)anthracene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Benzo(a)pyrene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Benzo(b)fluoranthene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Benzo(k)fluoranthene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Benzo(g,h,i)perylene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Chrysene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Dibenz(a,h)anthracene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Fluoranthene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Fluorene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Indeno(1,2,3-cd)pyrene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
1-Methylnaphthalene	ND	---	0.0825	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
2-Methylnaphthalene	ND	---	0.0825	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	

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Lisa Domenighini, Client Services Manager

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503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
EB02-031820 (A0C0717-07)				**Matrix: Water**		**Batch: 0030806**		
Naphthalene	ND	---	0.0825	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Phenanthrene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Pyrene	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Dibenzofuran	ND	---	0.0412	ug/L	1	03/23/20 18:04	EPA 8270D (SIM)	
Surrogate: 2-Fluorobiphenyl (Surr)		*Recovery:*	*60 %*	*Limits: 53-120 %*	*1*	*03/23/20 18:04*	*EPA 8270D (SIM)*	
p-Terphenyl-d14 (Surr)			*80 %*	*58-132 %*	*1*	*03/23/20 18:04*	*EPA 8270D (SIM)*	

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Lisa A Domenighini

Lisa Domenighini, Client Services Manager

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EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP01-0-10 (A0C0717-01)				**Matrix: Soil**				
Batch: 0030741								
Antimony	ND	---	1.15	mg/kg dry	10	03/20/20 14:21	EPA 6020A	
Arsenic	**2.63**	---	1.15	mg/kg dry	10	03/20/20 14:21	EPA 6020A	
Beryllium	ND	---	0.230	mg/kg dry	10	03/20/20 14:21	EPA 6020A	
Cadmium	ND	---	0.230	mg/kg dry	10	03/20/20 14:21	EPA 6020A	
Chromium	**8.03**	---	1.15	mg/kg dry	10	03/20/20 14:21	EPA 6020A	
Copper	**1.69**	---	1.15	mg/kg dry	10	03/20/20 14:21	EPA 6020A	
Lead	**1.28**	---	0.230	mg/kg dry	10	03/20/20 14:21	EPA 6020A	
Mercury	ND	---	0.0921	mg/kg dry	10	03/20/20 14:21	EPA 6020A	
Nickel	**4.46**	---	1.15	mg/kg dry	10	03/20/20 14:21	EPA 6020A	
Selenium	ND	---	1.15	mg/kg dry	10	03/20/20 14:21	EPA 6020A	
Silver	ND	---	0.230	mg/kg dry	10	03/20/20 14:21	EPA 6020A	
Thallium	ND	---	0.230	mg/kg dry	10	03/20/20 14:21	EPA 6020A	
Zinc	**11.7**	---	4.61	mg/kg dry	10	03/20/20 14:21	EPA 6020A	
GP02-0-10 (A0C0717-02)				**Matrix: Soil**				
Batch: 0030741								
Antimony	ND	---	1.11	mg/kg dry	10	03/20/20 14:27	EPA 6020A	
Arsenic	**2.39**	---	1.11	mg/kg dry	10	03/20/20 14:27	EPA 6020A	
Beryllium	ND	---	0.222	mg/kg dry	10	03/20/20 14:27	EPA 6020A	
Cadmium	ND	---	0.222	mg/kg dry	10	03/20/20 14:27	EPA 6020A	
Chromium	**7.20**	---	1.11	mg/kg dry	10	03/20/20 14:27	EPA 6020A	
Copper	**1.47**	---	1.11	mg/kg dry	10	03/20/20 14:27	EPA 6020A	
Lead	**1.01**	---	0.222	mg/kg dry	10	03/20/20 14:27	EPA 6020A	
Mercury	ND	---	0.0888	mg/kg dry	10	03/20/20 14:27	EPA 6020A	
Nickel	**3.96**	---	1.11	mg/kg dry	10	03/20/20 14:27	EPA 6020A	
Selenium	ND	---	1.11	mg/kg dry	10	03/20/20 14:27	EPA 6020A	
Silver	ND	---	0.222	mg/kg dry	10	03/20/20 14:27	EPA 6020A	
Thallium	ND	---	0.222	mg/kg dry	10	03/20/20 14:27	EPA 6020A	
Zinc	**7.85**	---	4.44	mg/kg dry	10	03/20/20 14:27	EPA 6020A	
GP03-0-10 (A0C0717-03)				**Matrix: Soil**				
Batch: 0030741								
Antimony	ND	---	1.07	mg/kg dry	10	03/20/20 14:32	EPA 6020A	
Arsenic	**2.65**	---	1.07	mg/kg dry	10	03/20/20 14:32	EPA 6020A	
Beryllium	ND	---	0.214	mg/kg dry	10	03/20/20 14:32	EPA 6020A	Q-42
Cadmium	ND	---	0.214	mg/kg dry	10	03/20/20 14:32	EPA 6020A	
Chromium	**9.54**	---	1.07	mg/kg dry	10	03/20/20 14:32	EPA 6020A	

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

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Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP03-0-10 (A0C0717-03)				**Matrix: Soil**				
Copper	**2.10**	---	1.07	mg/kg dry	10	03/20/20 14:32	EPA 6020A	
Lead	**1.15**	---	0.214	mg/kg dry	10	03/20/20 14:32	EPA 6020A	
Mercury	ND	---	0.0857	mg/kg dry	10	03/20/20 14:32	EPA 6020A	
Nickel	**4.80**	---	1.07	mg/kg dry	10	03/20/20 14:32	EPA 6020A	
Selenium	ND	---	1.07	mg/kg dry	10	03/20/20 14:32	EPA 6020A	
Silver	ND	---	0.214	mg/kg dry	10	03/20/20 14:32	EPA 6020A	
Thallium	ND	---	0.214	mg/kg dry	10	03/20/20 14:32	EPA 6020A	
Zinc	**8.65**	---	4.28	mg/kg dry	10	03/20/20 14:32	EPA 6020A	
GP04-0-10 (A0C0717-04)				**Matrix: Soil**				
Batch: 0030741								
Antimony	ND	---	1.14	mg/kg dry	10	03/20/20 14:48	EPA 6020A	
Arsenic	**2.79**	---	1.14	mg/kg dry	10	03/20/20 14:48	EPA 6020A	
Beryllium	ND	---	0.228	mg/kg dry	10	03/20/20 14:48	EPA 6020A	
Cadmium	ND	---	0.228	mg/kg dry	10	03/20/20 14:48	EPA 6020A	
Chromium	**10.1**	---	1.14	mg/kg dry	10	03/20/20 14:48	EPA 6020A	
Copper	**3.47**	---	1.14	mg/kg dry	10	03/20/20 14:48	EPA 6020A	
Lead	**3.97**	---	0.228	mg/kg dry	10	03/20/20 14:48	EPA 6020A	
Mercury	ND	---	0.0912	mg/kg dry	10	03/20/20 14:48	EPA 6020A	
Nickel	**6.39**	---	1.14	mg/kg dry	10	03/20/20 14:48	EPA 6020A	
Selenium	ND	---	1.14	mg/kg dry	10	03/20/20 14:48	EPA 6020A	
Silver	ND	---	0.228	mg/kg dry	10	03/20/20 14:48	EPA 6020A	
Thallium	ND	---	0.228	mg/kg dry	10	03/20/20 14:48	EPA 6020A	
Zinc	**15.3**	---	4.56	mg/kg dry	10	03/20/20 14:48	EPA 6020A	
GP0XC-0-10 (A0C0717-05)				**Matrix: Soil**				
Batch: 0030741								
Antimony	ND	---	1.14	mg/kg dry	10	03/20/20 15:03	EPA 6020A	
Arsenic	**3.49**	---	1.14	mg/kg dry	10	03/20/20 15:03	EPA 6020A	
Beryllium	ND	---	0.227	mg/kg dry	10	03/20/20 15:03	EPA 6020A	
Cadmium	ND	---	0.227	mg/kg dry	10	03/20/20 15:03	EPA 6020A	
Chromium	**7.92**	---	1.14	mg/kg dry	10	03/20/20 15:03	EPA 6020A	
Copper	**1.62**	---	1.14	mg/kg dry	10	03/20/20 15:03	EPA 6020A	
Lead	**1.28**	---	0.227	mg/kg dry	10	03/20/20 15:03	EPA 6020A	
Mercury	ND	---	0.0910	mg/kg dry	10	03/20/20 15:03	EPA 6020A	
Nickel	**4.70**	---	1.14	mg/kg dry	10	03/20/20 15:03	EPA 6020A	
Selenium	ND	---	1.14	mg/kg dry	10	03/20/20 15:03	EPA 6020A	
Silver	ND	---	0.227	mg/kg dry	10	03/20/20 15:03	EPA 6020A	

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Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP0XC-0-10 (A0C0717-05)				**Matrix: Soil**				
Thallium	ND	---	0.227	mg/kg dry	10	03/20/20 15:03	EPA 6020A	
Zinc	**8.76**	---	4.55	mg/kg dry	10	03/20/20 15:03	EPA 6020A	
EB01-031720 (A0C0717-06)				**Matrix: Water**				
Batch: 0030853								
Antimony	ND	---	1.00	ug/L	1	03/31/20 18:53	EPA 6020A	
Arsenic	ND	---	1.00	ug/L	1	03/31/20 18:53	EPA 6020A	
Beryllium	ND	---	0.200	ug/L	1	03/31/20 18:53	EPA 6020A	
Cadmium	ND	---	0.200	ug/L	1	03/31/20 18:53	EPA 6020A	
Chromium	ND	---	1.00	ug/L	1	03/31/20 18:53	EPA 6020A	
Copper	ND	---	2.00	ug/L	1	03/31/20 18:53	EPA 6020A	
Lead	ND	---	0.200	ug/L	1	03/31/20 18:53	EPA 6020A	
Mercury	ND	---	0.0800	ug/L	1	03/31/20 18:53	EPA 6020A	
Nickel	ND	---	2.00	ug/L	1	03/31/20 18:53	EPA 6020A	
Selenium	ND	---	1.00	ug/L	1	03/31/20 18:53	EPA 6020A	
Silver	ND	---	0.200	ug/L	1	03/31/20 18:53	EPA 6020A	
Thallium	ND	---	0.200	ug/L	1	03/31/20 18:53	EPA 6020A	
Zinc	ND	---	4.00	ug/L	1	03/31/20 18:53	EPA 6020A	
EB02-031820 (A0C0717-07)				**Matrix: Water**				
Batch: 0030853								
Antimony	ND	---	1.00	ug/L	1	03/31/20 18:58	EPA 6020A	
Arsenic	ND	---	1.00	ug/L	1	03/31/20 18:58	EPA 6020A	
Beryllium	ND	---	0.200	ug/L	1	03/31/20 18:58	EPA 6020A	
Cadmium	ND	---	0.200	ug/L	1	03/31/20 18:58	EPA 6020A	
Chromium	ND	---	1.00	ug/L	1	03/31/20 18:58	EPA 6020A	
Copper	ND	---	2.00	ug/L	1	03/31/20 18:58	EPA 6020A	
Lead	ND	---	0.200	ug/L	1	03/31/20 18:58	EPA 6020A	
Mercury	ND	---	0.0800	ug/L	1	03/31/20 18:58	EPA 6020A	
Nickel	ND	---	2.00	ug/L	1	03/31/20 18:58	EPA 6020A	
Selenium	ND	---	1.00	ug/L	1	03/31/20 18:58	EPA 6020A	
Silver	ND	---	0.200	ug/L	1	03/31/20 18:58	EPA 6020A	
Thallium	ND	---	0.200	ug/L	1	03/31/20 18:58	EPA 6020A	
Zinc	ND	---	4.00	ug/L	1	03/31/20 18:58	EPA 6020A	

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

ANALYTICAL SAMPLE RESULTS

Anions by Ion Chromatography

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP01-0-10 (A0C0717-01)				**Matrix: Soil**				
Batch: 0030739								
Chloride	ND	---	10.3	mg/kg dry	1	03/20/20 14:32	EPA 9056A	
Sulfate	**11.0**	---	10.3	mg/kg dry	1	03/20/20 14:32	EPA 9056A	
GP02-0-10 (A0C0717-02)				**Matrix: Soil**				
Batch: 0030739								
Chloride	ND	---	10.2	mg/kg dry	1	03/20/20 15:37	EPA 9056A	
Sulfate	ND	---	10.2	mg/kg dry	1	03/20/20 15:37	EPA 9056A	
GP03-0-10 (A0C0717-03)				**Matrix: Soil**				
Batch: 0030739								
Chloride	ND	---	10.4	mg/kg dry	1	03/20/20 15:58	EPA 9056A	
Sulfate	ND	---	10.4	mg/kg dry	1	03/20/20 15:58	EPA 9056A	
GP04-0-10 (A0C0717-04)				**Matrix: Soil**				
Batch: 0030739								
Chloride	**12.1**	---	10.8	mg/kg dry	1	03/20/20 16:20	EPA 9056A	
Sulfate	**15.6**	---	10.8	mg/kg dry	1	03/20/20 16:20	EPA 9056A	
GP0XC-0-10 (A0C0717-05)				**Matrix: Soil**				
Batch: 0030739								
Chloride	ND	---	10.3	mg/kg dry	1	03/20/20 16:42	EPA 9056A	
Sulfate	ND	---	10.3	mg/kg dry	1	03/20/20 16:42	EPA 9056A	

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ANALYTICAL SAMPLE RESULTS

Conventional Chemistry Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP01-0-10 (A0C0717-01)				**Matrix: Soil**				
Batch: 0030737								
Soil pH (measured in H2O)	**8.81**	---		pH Units	1	03/20/20 11:38	EPA 9045D	**pH_S**
pH Temperature (deg C)	**22.7**	---		pH Units	1	03/20/20 11:38	EPA 9045D	**pH_S**
GP02-0-10 (A0C0717-02)				**Matrix: Soil**				
Batch: 0030737								
Soil pH (measured in H2O)	**9.01**	---		pH Units	1	03/20/20 11:40	EPA 9045D	**pH_S**
pH Temperature (deg C)	**22.5**	---		pH Units	1	03/20/20 11:40	EPA 9045D	**pH_S**
GP03-0-10 (A0C0717-03)				**Matrix: Soil**				
Batch: 0030737								
Soil pH (measured in H2O)	**8.98**	---		pH Units	1	03/20/20 11:41	EPA 9045D	**pH_S**
pH Temperature (deg C)	**22.5**	---		pH Units	1	03/20/20 11:41	EPA 9045D	**pH_S**
GP04-0-10 (A0C0717-04)				**Matrix: Soil**				
Batch: 0030737								
Soil pH (measured in H2O)	**8.30**	---		pH Units	1	03/20/20 11:42	EPA 9045D	**pH_S**
pH Temperature (deg C)	**22.5**	---		pH Units	1	03/20/20 11:42	EPA 9045D	**pH_S**
GP0XC-0-10 (A0C0717-05)				**Matrix: Soil**				
Batch: 0030737								
Soil pH (measured in H2O)	**8.99**	---		pH Units	1	03/20/20 11:43	EPA 9045D	**pH_S**
pH Temperature (deg C)	**22.4**	---		pH Units	1	03/20/20 11:43	EPA 9045D	**pH_S**

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ANALYTICAL SAMPLE RESULTS

Percent Dry Weight

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
GP01-0-10 (A0C0717-01)				**Matrix: Soil**		**Batch: 0030740**		
% Solids	**92.8**	---	1.00	%	1	03/23/20 07:58	EPA 8000C	
GP02-0-10 (A0C0717-02)				**Matrix: Soil**		**Batch: 0030740**		
% Solids	**93.1**	---	1.00	%	1	03/23/20 07:58	EPA 8000C	
GP03-0-10 (A0C0717-03)				**Matrix: Soil**		**Batch: 0030740**		
% Solids	**94.3**	---	1.00	%	1	03/23/20 07:58	EPA 8000C	
GP04-0-10 (A0C0717-04)				**Matrix: Soil**		**Batch: 0030740**		
% Solids	**90.1**	---	1.00	%	1	03/23/20 07:58	EPA 8000C	
GP0XC-0-10 (A0C0717-05)				**Matrix: Soil**		**Batch: 0030740**		
% Solids	**94.8**	---	1.00	%	1	03/23/20 07:58	EPA 8000C	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Hydrocarbon Identification Screen by NWTPH-HCID

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030775 - NWTPH-HCID (Soil)											Soil	
Blank (0030775-BLK1)		Prepared: 03/23/20 06:58		Analyzed: 03/23/20 08:04								
NWTPH-HCID												
Gasoline Range Organics	ND	---	18.2	mg/kg wet	1	---	---	---	---	---	---	
Diesel Range Organics	ND	---	45.5	mg/kg wet	1	---	---	---	---	---	---	
Oil Range Organics	ND	---	90.9	mg/kg wet	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)		*Recovery:*	*106 %*	*Limits:*	*50-150 %*		*Dilution:*	*1x*				
4-Bromofluorobenzene (Surr)			*104 %*		*50-150 %*			*"*				
Batch 0030801 - EPA 3510C (Fuels/Acid Ext.)											Water	
Blank (0030801-BLK1)		Prepared: 03/23/20 11:32		Analyzed: 03/23/20 22:44								
NWTPH-HCID												
Gasoline Range Organics	ND	---	0.0909	mg/L	1	---	---	---	---	---	---	
Diesel Range Organics	ND	---	0.227	mg/L	1	---	---	---	---	---	---	
Oil Range Organics	ND	---	0.227	mg/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)		*Recovery:*	*89 %*	*Limits:*	*50-150 %*		*Dilution:*	*1x*				
4-Bromofluorobenzene (Surr)			*74 %*		*50-150 %*			*"*				

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QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030823 - EPA 3546 (Fuels)							**Soil**					
Blank (0030823-BLK1)		Prepared: 03/24/20 07:04		Analyzed: 03/24/20 08:36								
NWTPH-Dx												
Diesel	ND	---	25.0	mg/kg wet	1	---	---	---	---	---	---	
Oil	ND	---	50.0	mg/kg wet	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)		*Recovery: 95 %*		*Limits: 50-150 %*			*Dilution: 1x*					
LCS (0030823-BS1)		Prepared: 03/24/20 07:04		Analyzed: 03/24/20 08:56								
NWTPH-Dx												
Diesel	120	---	25.0	mg/kg wet	1	125	---	96	73 - 115%	---	---	
Surr: o-Terphenyl (Surr)		*Recovery: 108 %*		*Limits: 50-150 %*			*Dilution: 1x*					

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QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260C

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030828 - EPA 5030B							**Water**					
Blank (0030828-BLK1)		Prepared: 03/24/20 08:15		Analyzed: 03/24/20 10:03								
EPA 8260C												
Acetone	ND	---	20.0	ug/L	1	---	---	---	---	---	---	
Acrylonitrile	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Bromobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Bromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromodichloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromoform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Bromomethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
2-Butanone (MEK)	ND	---	10.0	ug/L	1	---	---	---	---	---	---	
n-Butylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
sec-Butylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
tert-Butylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Carbon disulfide	ND	---	10.0	ug/L	1	---	---	---	---	---	---	
Carbon tetrachloride	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Chlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Chloroethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
Chloroform	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Chloromethane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
2-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
4-Chlorotoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Dibromochloromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromo-3-chloropropane	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dibromomethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,4-Dichlorobenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Dichlorodifluoromethane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
cis-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
trans-1,2-Dichloroethene	ND	---	0.400	ug/L	1	---	---	---	---	---	---	

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Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260C

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030828 - EPA 5030B							**Water**					
Blank (0030828-BLK1)		Prepared: 03/24/20 08:15		Analyzed: 03/24/20 10:03								
1,2-Dichloropropane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,3-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
2,2-Dichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Hexachlorobutadiene	ND	---	5.00	ug/L	1	---	---	---	---	---	---	
2-Hexanone	ND	---	10.0	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
4-Isopropyltoluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Methylene chloride	ND	---	10.0	ug/L	1	---	---	---	---	---	---	
4-Methyl-2-pentanone (MiBK)	ND	---	10.0	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
n-Propylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Styrene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,1,1,2-Tetrachloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
Trichlorofluoromethane	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Vinyl chloride	ND	---	0.400	ug/L	1	---	---	---	---	---	---	
m,p-Xylene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
o-Xylene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)		*Recovery: 105 %*		*Limits: 80-120 %*				*Dilution: 1x*				

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QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260C

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030828 - EPA 5030B												**Water**
Blank (0030828-BLK1)			Prepared: 03/24/20 08:15 Analyzed: 03/24/20 10:03									
Surr: Toluene-d8 (Surr)			*Recovery: 105 %*	*Limits: 80-120 %*				*Dilution: 1x*				
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*				*"*				
LCS (0030828-BS1)			Prepared: 03/24/20 08:15 Analyzed: 03/24/20 09:09									
EPA 8260C												
Acetone	38.2	---	20.0	ug/L	1	40.0	---	95	80 - 120%	---	---	
Acrylonitrile	22.2	---	2.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
Benzene	21.5	---	0.200	ug/L	1	20.0	---	108	80 - 120%	---	---	
Bromobenzene	21.6	---	0.500	ug/L	1	20.0	---	108	80 - 120%	---	---	
Bromochloromethane	22.3	---	1.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
Bromodichloromethane	21.7	---	1.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
Bromoform	21.0	---	1.00	ug/L	1	20.0	---	105	80 - 120%	---	---	
Bromomethane	22.4	---	5.00	ug/L	1	20.0	---	112	80 - 120%	---	---	
2-Butanone (MEK)	42.7	---	10.0	ug/L	1	40.0	---	107	80 - 120%	---	---	
n-Butylbenzene	23.1	---	1.00	ug/L	1	20.0	---	116	80 - 120%	---	---	
sec-Butylbenzene	22.3	---	1.00	ug/L	1	20.0	---	112	80 - 120%	---	---	
tert-Butylbenzene	21.4	---	1.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
Carbon disulfide	21.5	---	10.0	ug/L	1	20.0	---	108	80 - 120%	---	---	
Carbon tetrachloride	22.7	---	1.00	ug/L	1	20.0	---	114	80 - 120%	---	---	
Chlorobenzene	21.0	---	0.500	ug/L	1	20.0	---	105	80 - 120%	---	---	
Chloroethane	20.6	---	5.00	ug/L	1	20.0	---	103	80 - 120%	---	---	
Chloroform	21.6	---	1.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
Chloromethane	19.2	---	5.00	ug/L	1	20.0	---	96	80 - 120%	---	---	
2-Chlorotoluene	21.2	---	1.00	ug/L	1	20.0	---	106	80 - 120%	---	---	
4-Chlorotoluene	21.8	---	1.00	ug/L	1	20.0	---	109	80 - 120%	---	---	
Dibromochloromethane	22.1	---	1.00	ug/L	1	20.0	---	110	80 - 120%	---	---	
1,2-Dibromo-3-chloropropane	17.1	---	5.00	ug/L	1	20.0	---	85	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	22.9	---	0.500	ug/L	1	20.0	---	114	80 - 120%	---	---	
Dibromomethane	21.9	---	1.00	ug/L	1	20.0	---	110	80 - 120%	---	---	
1,2-Dichlorobenzene	21.7	---	0.500	ug/L	1	20.0	---	109	80 - 120%	---	---	
1,3-Dichlorobenzene	21.7	---	0.500	ug/L	1	20.0	---	109	80 - 120%	---	---	
1,4-Dichlorobenzene	20.7	---	0.500	ug/L	1	20.0	---	103	80 - 120%	---	---	
Dichlorodifluoromethane	22.1	---	1.00	ug/L	1	20.0	---	110	80 - 120%	---	---	
1,1-Dichloroethane	20.9	---	0.400	ug/L	1	20.0	---	105	80 - 120%	---	---	

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EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260C

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030828 - EPA 5030B							**Water**					
LCS (0030828-BS1)		Prepared: 03/24/20 08:15		Analyzed: 03/24/20 09:09								
1,2-Dichloroethane (EDC)	21.2	---	0.400	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,1-Dichloroethene	21.7	---	0.400	ug/L	1	20.0	---	109	80 - 120%	---	---	
cis-1,2-Dichloroethene	21.1	---	0.400	ug/L	1	20.0	---	105	80 - 120%	---	---	
trans-1,2-Dichloroethene	21.9	---	0.400	ug/L	1	20.0	---	109	80 - 120%	---	---	
1,2-Dichloropropane	21.5	---	0.500	ug/L	1	20.0	---	107	80 - 120%	---	---	
1,3-Dichloropropane	21.5	---	1.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
2,2-Dichloropropane	23.8	---	1.00	ug/L	1	20.0	---	119	80 - 120%	---	---	
1,1-Dichloropropene	22.2	---	1.00	ug/L	1	20.0	---	111	80 - 120%	---	---	
cis-1,3-Dichloropropene	20.5	---	1.00	ug/L	1	20.0	---	103	80 - 120%	---	---	
trans-1,3-Dichloropropene	21.7	---	1.00	ug/L	1	20.0	---	108	80 - 120%	---	---	
Ethylbenzene	20.9	---	0.500	ug/L	1	20.0	---	105	80 - 120%	---	---	
Hexachlorobutadiene	21.4	---	5.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
2-Hexanone	41.0	---	10.0	ug/L	1	40.0	---	102	80 - 120%	---	---	
Isopropylbenzene	20.8	---	1.00	ug/L	1	20.0	---	104	80 - 120%	---	---	
4-Isopropyltoluene	21.9	---	1.00	ug/L	1	20.0	---	110	80 - 120%	---	---	
Methylene chloride	20.2	---	10.0	ug/L	1	20.0	---	101	80 - 120%	---	---	
4-Methyl-2-pentanone (MiBK)	45.0	---	10.0	ug/L	1	40.0	---	112	80 - 120%	---	---	
Methyl tert-butyl ether (MTBE)	21.4	---	1.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
Naphthalene	19.5	---	2.00	ug/L	1	20.0	---	97	80 - 120%	---	---	
n-Propylbenzene	22.0	---	0.500	ug/L	1	20.0	---	110	80 - 120%	---	---	
Styrene	21.3	---	1.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
1,1,1,2-Tetrachloroethane	21.3	---	0.400	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,1,2,2-Tetrachloroethane	22.3	---	0.500	ug/L	1	20.0	---	111	80 - 120%	---	---	
Tetrachloroethene (PCE)	22.2	---	0.400	ug/L	1	20.0	---	111	80 - 120%	---	---	
Toluene	21.1	---	1.00	ug/L	1	20.0	---	106	80 - 120%	---	---	
1,2,3-Trichlorobenzene	21.9	---	2.00	ug/L	1	20.0	---	109	80 - 120%	---	---	
1,2,4-Trichlorobenzene	21.8	---	2.00	ug/L	1	20.0	---	109	80 - 120%	---	---	
1,1,1-Trichloroethane	21.6	---	0.400	ug/L	1	20.0	---	108	80 - 120%	---	---	
1,1,2-Trichloroethane	21.3	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	
Trichloroethene (TCE)	22.3	---	0.400	ug/L	1	20.0	---	111	80 - 120%	---	---	
Trichlorofluoromethane	22.3	---	2.00	ug/L	1	20.0	---	112	80 - 120%	---	---	
1,2,3-Trichloropropane	22.5	---	1.00	ug/L	1	20.0	---	113	80 - 120%	---	---	
1,2,4-Trimethylbenzene	22.4	---	1.00	ug/L	1	20.0	---	112	80 - 120%	---	---	
1,3,5-Trimethylbenzene	22.9	---	1.00	ug/L	1	20.0	---	114	80 - 120%	---	---	

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EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260C

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030828 - EPA 5030B							**Water**					
LCS (0030828-BS1)		Prepared: 03/24/20 08:15		Analyzed: 03/24/20 09:09								
Vinyl chloride	21.7	---	0.400	ug/L	1	20.0	---	108	80 - 120%	---	---	
m,p-Xylene	42.6	---	1.00	ug/L	1	40.0	---	106	80 - 120%	---	---	
o-Xylene	20.8	---	0.500	ug/L	1	20.0	---	104	80 - 120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)		*Recovery: 101 %*		*Limits: 80-120 %*			*Dilution: 1x*					
Toluene-d8 (Surr)			*98 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*98 %*		*80-120 %*		*"*					

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601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030749 - EPA 3510C (Neutral pH)							**Water**					
Blank (0030749-BLK1)		Prepared: 03/20/20 11:34		Analyzed: 03/23/20 08:04								**C-07**
EPA 8082A												
Aroclor 1016	ND	---	0.0909	ug/L	1	---	---	---	---	---	---	
Aroclor 1221	ND	---	0.0909	ug/L	1	---	---	---	---	---	---	
Aroclor 1232	ND	---	0.0909	ug/L	1	---	---	---	---	---	---	
Aroclor 1242	ND	---	0.0909	ug/L	1	---	---	---	---	---	---	
Aroclor 1248	ND	---	0.0909	ug/L	1	---	---	---	---	---	---	
Aroclor 1254	ND	---	0.0909	ug/L	1	---	---	---	---	---	---	
Aroclor 1260	ND	---	0.0909	ug/L	1	---	---	---	---	---	---	
Surr: Decachlorobiphenyl (Surr)		*Recovery: 75 %*		*Limits: 40-135 %*			*Dilution: 1x*					
LCS (0030749-BS1)		Prepared: 03/20/20 11:34		Analyzed: 03/23/20 08:22								**C-07**
EPA 8082A												
Aroclor 1016	1.32	---	0.100	ug/L	1	2.50	---	53	46 - 129%	---	---	
Aroclor 1260	1.73	---	0.100	ug/L	1	2.50	---	69	45 - 134%	---	---	
Surr: Decachlorobiphenyl (Surr)		*Recovery: 69 %*		*Limits: 40-135 %*			*Dilution: 1x*					
LCS Dup (0030749-BSD1)		Prepared: 03/20/20 11:34		Analyzed: 03/23/20 08:39								**C-07, Q-19**
EPA 8082A												
Aroclor 1016	1.35	---	0.100	ug/L	1	2.50	---	54	46 - 129%	2	30%	
Aroclor 1260	1.70	---	0.100	ug/L	1	2.50	---	68	45 - 134%	2	30%	
Surr: Decachlorobiphenyl (Surr)		*Recovery: 68 %*		*Limits: 40-135 %*			*Dilution: 1x*					

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Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030757 - EPA 3546							**Soil**					
Blank (0030757-BLK1)		Prepared: 03/20/20 12:30		Analyzed: 03/24/20 07:44								**C-07**
EPA 8082A												
Aroclor 1016	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Aroclor 1221	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Aroclor 1232	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Aroclor 1242	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Aroclor 1248	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Aroclor 1254	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Aroclor 1260	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Surr: Decachlorobiphenyl (Surr)		*Recovery: 101 %*		*Limits: 60-125 %*			*Dilution: 1x*					
LCS (0030757-BS1)		Prepared: 03/20/20 12:30		Analyzed: 03/24/20 08:02								**C-07**
EPA 8082A												
Aroclor 1016	0.203	---	0.0100	mg/kg wet	1	0.250	---	81	47 - 134%	---	---	
Aroclor 1260	0.236	---	0.0100	mg/kg wet	1	0.250	---	94	53 - 140%	---	---	
Surr: Decachlorobiphenyl (Surr)		*Recovery: 100 %*		*Limits: 60-125 %*			*Dilution: 1x*					
Duplicate (0030757-DUP1)		Prepared: 03/20/20 12:30		Analyzed: 03/24/20 08:54								**C-07**
QC Source Sample: GP01-0-10 (A0C0717-01)												
EPA 8082A												
Aroclor 1016	ND	---	0.0107	mg/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1221	ND	---	0.0107	mg/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1232	ND	---	0.0107	mg/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1242	ND	---	0.0107	mg/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1248	ND	---	0.0107	mg/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1254	ND	---	0.0107	mg/kg dry	1	---	ND	---	---	---	30%	
Aroclor 1260	ND	---	0.0107	mg/kg dry	1	---	ND	---	---	---	30%	
Surr: Decachlorobiphenyl (Surr)		*Recovery: 101 %*		*Limits: 60-125 %*			*Dilution: 1x*					
Matrix Spike (0030757-MS1)		Prepared: 03/20/20 12:30		Analyzed: 03/24/20 11:15								**C-07**
QC Source Sample: GP0XC-0-10 (A0C0717-05)												
EPA 8082A												
Aroclor 1016	0.204	---	0.00987	mg/kg dry	1	0.247	ND	83	47 - 134%	---	---	
Aroclor 1260	0.229	---	0.00987	mg/kg dry	1	0.247	ND	93	53 - 140%	---	---	

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Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polychlorinated Biphenyls by EPA 8082A

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030757 - EPA 3546												**Soil**
Matrix Spike (0030757-MS1)			Prepared: 03/20/20 12:30		Analyzed: 03/24/20 11:15							**C-07**
QC Source Sample: GP0XC-0-10 (A0C0717-05)												
Surr: Decachlorobiphenyl (Surr)			*Recovery: 102 %*		*Limits: 60-125 %*							*Dilution: 1x*

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Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by EPA 8081B

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030762 - EPA 3546/3640A (GPC)							**Soil**					
Blank (0030762-BLK1)		Prepared: 03/20/20 07:18		Analyzed: 03/23/20 12:16								**C-05**
EPA 8081B												
Aldrin	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
alpha-BHC	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
beta-BHC	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
delta-BHC	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
gamma-BHC (Lindane)	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
cis-Chlordane	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
trans-Chlordane	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDD	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDE	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDT	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
Dieldrin	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
Endosulfan I	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
Endosulfan II	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
Endosulfan sulfate	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
Endrin	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
Endrin Aldehyde	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
Endrin ketone	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
Heptachlor	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
Heptachlor epoxide	ND	---	0.00200	mg/kg wet	1	---	---	---	---	---	---	
Methoxychlor	ND	---	0.00600	mg/kg wet	1	---	---	---	---	---	---	
Chlordane (Technical)	ND	---	0.0600	mg/kg wet	1	---	---	---	---	---	---	
Toxaphene (Total)	ND	---	0.0600	mg/kg wet	1	---	---	---	---	---	---	
Surr: 2,4,5,6-TCMX (Surr)		*Recovery: 69 %*		*Limits: 42-129 %*			*Dilution: 1x*					
Decachlorobiphenyl (Surr)		*113 %*		*55-130 %*			*"*					
LCS (0030762-BS1)		Prepared: 03/20/20 07:18		Analyzed: 03/23/20 12:32								**C-05**
EPA 8081B												
Aldrin	0.0274	---	0.00200	mg/kg wet	1	0.0500	---	55	45 - 136%	---	---	
alpha-BHC	0.0302	---	0.00200	mg/kg wet	1	0.0500	---	60	45 - 137%	---	---	
beta-BHC	0.0328	---	0.00200	mg/kg wet	1	0.0500	---	66	50 - 136%	---	---	
delta-BHC	0.0384	---	0.00200	mg/kg wet	1	0.0500	---	77	47 - 139%	---	---	
gamma-BHC (Lindane)	0.0325	---	0.00200	mg/kg wet	1	0.0500	---	65	49 - 135%	---	---	Q-41
cis-Chlordane	0.0371	---	0.00200	mg/kg wet	1	0.0500	---	74	54 - 133%	---	---	

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601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by EPA 8081B

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030762 - EPA 3546/3640A (GPC)							**Soil**					
LCS (0030762-BS1)		Prepared: 03/20/20 07:18		Analyzed: 03/23/20 12:32								**C-05**
trans-Chlordane	0.0388	---	0.00200	mg/kg wet	1	0.0500	---	78	53 - 135%	---	---	
4,4'-DDD	0.0587	---	0.00200	mg/kg wet	1	0.0500	---	117	56 - 139%	---	---	Q-41
4,4'-DDE	0.0460	---	0.00200	mg/kg wet	1	0.0500	---	92	56 - 134%	---	---	
4,4'-DDT	0.0625	---	0.00200	mg/kg wet	1	0.0500	---	125	50 - 141%	---	---	
Dieldrin	0.0489	---	0.00200	mg/kg wet	1	0.0500	---	98	56 - 136%	---	---	
Endosulfan I	0.0439	---	0.00200	mg/kg wet	1	0.0500	---	88	53 - 132%	---	---	
Endosulfan II	0.0581	---	0.00200	mg/kg wet	1	0.0500	---	116	53 - 134%	---	---	
Endosulfan sulfate	0.0555	---	0.00200	mg/kg wet	1	0.0500	---	111	55 - 136%	---	---	
Endrin	0.0525	---	0.00200	mg/kg wet	1	0.0500	---	105	57 - 140%	---	---	
Endrin Aldehyde	0.0492	---	0.00200	mg/kg wet	1	0.0500	---	98	35 - 137%	---	---	
Endrin ketone	0.0595	---	0.00200	mg/kg wet	1	0.0500	---	119	55 - 136%	---	---	Q-41
Heptachlor	0.0328	---	0.00200	mg/kg wet	1	0.0500	---	66	47 - 136%	---	---	Q-41
Heptachlor epoxide	0.0394	---	0.00200	mg/kg wet	1	0.0500	---	79	52 - 136%	---	---	
Methoxychlor	0.0714	---	0.00600	mg/kg wet	1	0.0500	---	143	52 - 143%	---	---	Q-41
Surr: 2,4,5,6-TCMX (Surr)			*Recovery: 55 %*		*Limits: 42-129 %*							
Decachlorobiphenyl (Surr)			*107 %*		*55-130 %*							
Duplicate (0030762-DUP1)		Prepared: 03/20/20 07:18		Analyzed: 03/23/20 13:22								**C-05**
QC Source Sample: GP02-0-10 (A0C0717-02RE1)												
EPA 8081B												
Aldrin	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
alpha-BHC	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
beta-BHC	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
delta-BHC	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
gamma-BHC (Lindane)	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
cis-Chlordane	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
trans-Chlordane	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
4,4'-DDD	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
4,4'-DDE	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
4,4'-DDT	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
Dieldrin	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
Endosulfan I	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
Endosulfan II	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
Endosulfan sulfate	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	

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EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by EPA 8081B

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030762 - EPA 3546/3640A (GPC)							**Soil**					
Duplicate (0030762-DUP1)		Prepared: 03/20/20 07:18	Analyzed: 03/23/20 13:22									**C-05**
QC Source Sample: GP02-0-10 (A0C0717-02RE1)												
Endrin	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
Endrin Aldehyde	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
Endrin ketone	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
Heptachlor	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
Heptachlor epoxide	ND	---	0.00206	mg/kg dry	1	---	ND	---	---	---	30%	
Methoxychlor	ND	---	0.00617	mg/kg dry	1	---	ND	---	---	---	30%	
Chlordane (Technical)	ND	---	0.0617	mg/kg dry	1	---	ND	---	---	---	30%	
Toxaphene (Total)	ND	---	0.0617	mg/kg dry	1	---	ND	---	---	---	30%	
Surr: 2,4,5,6-TCMX (Surr)			*Recovery: 51 %*	*Limits: 42-129 %*			*Dilution: 1x*					
Decachlorobiphenyl (Surr)			*100 %*	*55-130 %*			*"*					
Matrix Spike (0030762-MS1)		Prepared: 03/20/20 07:18	Analyzed: 03/23/20 14:11									**C-05**
QC Source Sample: GP04-0-10 (A0C0717-04RE1)												
EPA 8081B												
Aldrin	0.0456	---	0.00220	mg/kg dry	1	0.0550	ND	83	45 - 136%	---	---	
alpha-BHC	0.0440	---	0.00220	mg/kg dry	1	0.0550	ND	80	45 - 137%	---	---	
beta-BHC	0.0582	---	0.00220	mg/kg dry	1	0.0550	ND	106	50 - 136%	---	---	
delta-BHC	0.0628	---	0.00253	mg/kg dry	1	0.0550	ND	114	47 - 139%	---	---	R-02
gamma-BHC (Lindane)	0.0492	---	0.00220	mg/kg dry	1	0.0550	ND	90	49 - 135%	---	---	Q-41
cis-Chlordane	0.0540	---	0.00220	mg/kg dry	1	0.0550	ND	98	54 - 133%	---	---	
trans-Chlordane	0.0575	---	0.00220	mg/kg dry	1	0.0550	ND	105	53 - 135%	---	---	
4,4'-DDD	0.0705	---	0.00220	mg/kg dry	1	0.0550	ND	128	56 - 139%	---	---	
4,4'-DDE	0.0630	---	0.00220	mg/kg dry	1	0.0550	ND	115	56 - 134%	---	---	
4,4'-DDT	0.0701	---	0.00220	mg/kg dry	1	0.0550	ND	128	50 - 141%	---	---	
Dieldrin	0.0526	---	0.00220	mg/kg dry	1	0.0550	ND	96	56 - 136%	---	---	
Endosulfan I	0.0557	---	0.00220	mg/kg dry	1	0.0550	ND	101	53 - 132%	---	---	
Endosulfan II	0.0565	---	0.00220	mg/kg dry	1	0.0550	ND	103	53 - 134%	---	---	
Endosulfan sulfate	0.0571	---	0.00242	mg/kg dry	1	0.0550	ND	104	55 - 136%	---	---	R-02
Endrin	0.0674	---	0.00220	mg/kg dry	1	0.0550	ND	123	57 - 140%	---	---	
Endrin Aldehyde	0.0535	---	0.00220	mg/kg dry	1	0.0550	ND	97	35 - 137%	---	---	
Endrin ketone	0.0595	---	0.00319	mg/kg dry	1	0.0550	ND	108	55 - 136%	---	---	R-02
Heptachlor	0.0547	---	0.00220	mg/kg dry	1	0.0550	ND	100	47 - 136%	---	---	Q-41
Heptachlor epoxide	0.0549	---	0.00220	mg/kg dry	1	0.0550	ND	100	52 - 136%	---	---	

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by EPA 8081B

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030762 - EPA 3546/3640A (GPC)							**Soil**					
Matrix Spike (0030762-MS1)		Prepared: 03/20/20 07:18		Analyzed: 03/23/20 14:11								**C-05**
QC Source Sample: GP04-0-10 (A0C0717-04RE1)												
Methoxychlor	0.0811	---	0.00660	mg/kg dry	1	0.0550	ND	**148**	**52 - 143%**	---	---	Q-41
Surr: 2,4,5,6-TCMX (Surr)			*Recovery: 69 %*	*Limits: 42-129 %*			*Dilution: 1x*					
Decachlorobiphenyl (Surr)			*125 %*	*55-130 %*			*"*					

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Lisa A Domenighini

Lisa Domenighini, Client Services Manager

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Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by EPA 8081B

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030826 - EPA 3510C (Neutral pH)							**Water**					
Blank (0030826-BLK1)		Prepared: 03/24/20 07:16		Analyzed: 03/26/20 12:53								
EPA 8081B												
Aldrin	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
alpha-BHC	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
beta-BHC	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
delta-BHC	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
gamma-BHC (Lindane)	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
cis-Chlordane	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
trans-Chlordane	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
4,4'-DDD	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
4,4'-DDE	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
4,4'-DDT	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
Dieldrin	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
Endosulfan I	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
Endosulfan II	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
Endosulfan sulfate	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
Endrin	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
Endrin Aldehyde	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
Endrin ketone	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
Heptachlor	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
Heptachlor epoxide	ND	---	0.00909	ug/L	1	---	---	---	---	---	---	
Methoxychlor	ND	---	0.0273	ug/L	1	---	---	---	---	---	---	
Chlordane (Technical)	ND	---	0.341	ug/L	1	---	---	---	---	---	---	
Toxaphene (Total)	ND	---	0.341	ug/L	1	---	---	---	---	---	---	
Surr: 2,4,5,6-TCMX (Surr)			*Recovery: 54 %*		*Limits: 25-140 %*				*Dilution: 1x*			
Decachlorobiphenyl (Surr)			*73 %*		*30-135 %*				*"*			
LCS (0030826-BS1)		Prepared: 03/24/20 07:16		Analyzed: 03/26/20 13:11								
EPA 8081B												
Aldrin	0.302	---	0.0100	ug/L	1	0.500	---	60	45 - 134%	---	---	
alpha-BHC	0.432	---	0.0100	ug/L	1	0.500	---	86	54 - 138%	---	---	
beta-BHC	0.430	---	0.0100	ug/L	1	0.500	---	86	56 - 136%	---	---	
delta-BHC	0.506	---	0.0100	ug/L	1	0.500	---	101	52 - 142%	---	---	
gamma-BHC (Lindane)	0.450	---	0.0100	ug/L	1	0.500	---	90	59 - 134%	---	---	
cis-Chlordane	0.418	---	0.0100	ug/L	1	0.500	---	84	60 - 129%	---	---	

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Lisa Domenighini, Client Services Manager

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EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by EPA 8081B

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030826 - EPA 3510C (Neutral pH)							**Water**					
LCS (0030826-BS1)		Prepared: 03/24/20 07:16		Analyzed: 03/26/20 13:11								
trans-Chlordane	0.424	---	0.0100	ug/L	1	0.500	---	85	56 - 136%	---	---	
4,4'-DDD	0.471	---	0.0100	ug/L	1	0.500	---	94	56 - 143%	---	---	
4,4'-DDE	0.421	---	0.0100	ug/L	1	0.500	---	84	57 - 135%	---	---	
4,4'-DDT	0.463	---	0.0100	ug/L	1	0.500	---	93	51 - 143%	---	---	
Dieldrin	0.487	---	0.0100	ug/L	1	0.500	---	97	60 - 136%	---	---	
Endosulfan I	0.466	---	0.0100	ug/L	1	0.500	---	93	62 - 126%	---	---	
Endosulfan II	0.505	---	0.0100	ug/L	1	0.500	---	101	52 - 135%	---	---	
Endosulfan sulfate	0.502	---	0.0100	ug/L	1	0.500	---	100	62 - 133%	---	---	
Endrin	0.521	---	0.0100	ug/L	1	0.500	---	104	60 - 138%	---	---	
Endrin Aldehyde	0.440	---	0.0100	ug/L	1	0.500	---	88	51 - 132%	---	---	
Endrin ketone	0.512	---	0.0100	ug/L	1	0.500	---	102	58 - 134%	---	---	
Heptachlor	0.374	---	0.0100	ug/L	1	0.500	---	75	54 - 130%	---	---	
Heptachlor epoxide	0.454	---	0.0100	ug/L	1	0.500	---	91	61 - 133%	---	---	
Methoxychlor	0.486	---	0.0300	ug/L	1	0.500	---	97	54 - 145%	---	---	
Surr: 2,4,5,6-TCMX (Surr)		*Recovery: 60 %*		*Limits: 25-140 %*			*Dilution: 1x*					
Decachlorobiphenyl (Surr)		*68 %*		*30-135 %*			*"*					
LCS Dup (0030826-BSD1)		Prepared: 03/24/20 07:16		Analyzed: 03/26/20 13:28								**Q-19**
EPA 8081B												
Aldrin	0.313	---	0.0100	ug/L	1	0.500	---	63	45 - 134%	4	30%	
alpha-BHC	0.476	---	0.0100	ug/L	1	0.500	---	95	54 - 138%	10	30%	
beta-BHC	0.461	---	0.0100	ug/L	1	0.500	---	92	56 - 136%	7	30%	
delta-BHC	0.508	---	0.0100	ug/L	1	0.500	---	102	52 - 142%	0.4	30%	
gamma-BHC (Lindane)	0.475	---	0.0100	ug/L	1	0.500	---	95	59 - 134%	5	30%	
cis-Chlordane	0.436	---	0.0100	ug/L	1	0.500	---	87	60 - 129%	4	30%	
trans-Chlordane	0.430	---	0.0100	ug/L	1	0.500	---	86	56 - 136%	1	30%	
4,4'-DDD	0.474	---	0.0100	ug/L	1	0.500	---	95	56 - 143%	0.6	30%	
4,4'-DDE	0.429	---	0.0100	ug/L	1	0.500	---	86	57 - 135%	2	30%	
4,4'-DDT	0.442	---	0.0100	ug/L	1	0.500	---	88	51 - 143%	5	30%	
Dieldrin	0.488	---	0.0100	ug/L	1	0.500	---	98	60 - 136%	0.2	30%	
Endosulfan I	0.475	---	0.0100	ug/L	1	0.500	---	95	62 - 126%	2	30%	
Endosulfan II	0.506	---	0.0100	ug/L	1	0.500	---	101	52 - 135%	0.3	30%	
Endosulfan sulfate	0.497	---	0.0100	ug/L	1	0.500	---	99	62 - 133%	1	30%	
Endrin	0.512	---	0.0100	ug/L	1	0.500	---	102	60 - 138%	2	30%	

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601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Organochlorine Pesticides by EPA 8081B

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030826 - EPA 3510C (Neutral pH)							**Water**					
LCS Dup (0030826-BSD1)		Prepared: 03/24/20 07:16		Analyzed: 03/26/20 13:28								**Q-19**
Endrin Aldehyde	0.463	---	0.0100	ug/L	1	0.500	---	93	51 - 132%	5	30%	
Endrin ketone	0.517	---	0.0100	ug/L	1	0.500	---	103	58 - 134%	0.9	30%	
Heptachlor	0.398	---	0.0100	ug/L	1	0.500	---	80	54 - 130%	6	30%	
Heptachlor epoxide	0.453	---	0.0100	ug/L	1	0.500	---	91	61 - 133%	0.4	30%	
Methoxychlor	0.487	---	0.0300	ug/L	1	0.500	---	97	54 - 145%	0.3	30%	
Surr: 2,4,5,6-TCMX (Surr)		*Recovery: 69 %*		*Limits: 25-140 %*			*Dilution: 1x*					
Decachlorobiphenyl (Surr)		*72 %*		*30-135 %*			*"*					

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EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030726 - EPA 3546							**Soil**					
Blank (0030726-BLK1)		Prepared: 03/20/20 07:17		Analyzed: 03/20/20 11:06								
EPA 8270D (SIM)												
Acenaphthene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Acenaphthylene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Anthracene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Benz(a)anthracene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Benzo(a)pyrene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Chrysene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Fluoranthene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Fluorene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Indeno(1,2,3-cd)pyrene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
1-Methylnaphthalene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
2-Methylnaphthalene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Naphthalene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Phenanthrene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Pyrene	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Dibenzofuran	ND	---	0.00909	mg/kg wet	1	---	---	---	---	---	---	
Surr: 2-Fluorobiphenyl (Surr)			*Recovery: 88 %*		*Limits: 46-120 %*			*Dilution: 1x*				
p-Terphenyl-d14 (Surr)			*99 %*		*49-126 %*			*"*				
LCS (0030726-BS1)		Prepared: 03/20/20 07:17		Analyzed: 03/20/20 11:31								
EPA 8270D (SIM)												
Acenaphthene	0.687	---	0.0100	mg/kg wet	1	0.800	---	86	44 - 120%	---	---	
Acenaphthylene	0.682	---	0.0100	mg/kg wet	1	0.800	---	85	39 - 120%	---	---	
Anthracene	0.681	---	0.0100	mg/kg wet	1	0.800	---	85	50 - 120%	---	---	
Benz(a)anthracene	0.663	---	0.0100	mg/kg wet	1	0.800	---	83	54 - 122%	---	---	
Benzo(a)pyrene	0.616	---	0.0100	mg/kg wet	1	0.800	---	77	50 - 125%	---	---	
Benzo(b)fluoranthene	0.694	---	0.0100	mg/kg wet	1	0.800	---	87	53 - 128%	---	---	
Benzo(k)fluoranthene	0.742	---	0.0100	mg/kg wet	1	0.800	---	93	56 - 123%	---	---	
Benzo(g,h,i)perylene	0.692	---	0.0100	mg/kg wet	1	0.800	---	86	49 - 127%	---	---	
Chrysene	0.703	---	0.0100	mg/kg wet	1	0.800	---	88	57 - 120%	---	---	

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601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030726 - EPA 3546							**Soil**					
LCS (0030726-BS1)		Prepared: 03/20/20 07:17		Analyzed: 03/20/20 11:31								
Dibenz(a,h)anthracene	0.719	---	0.0100	mg/kg wet	1	0.800	---	90	50 - 129%	---	---	
Fluoranthene	0.691	---	0.0100	mg/kg wet	1	0.800	---	86	55 - 120%	---	---	
Fluorene	0.685	---	0.0100	mg/kg wet	1	0.800	---	86	47 - 120%	---	---	
Indeno(1,2,3-cd)pyrene	0.684	---	0.0100	mg/kg wet	1	0.800	---	85	49 - 130%	---	---	
1-Methylnaphthalene	0.649	---	0.0100	mg/kg wet	1	0.800	---	81	43 - 120%	---	---	
2-Methylnaphthalene	0.648	---	0.0100	mg/kg wet	1	0.800	---	81	39 - 120%	---	---	
Naphthalene	0.640	---	0.0100	mg/kg wet	1	0.800	---	80	38 - 120%	---	---	
Phenanthrene	0.685	---	0.0100	mg/kg wet	1	0.800	---	86	49 - 120%	---	---	
Pyrene	0.700	---	0.0100	mg/kg wet	1	0.800	---	87	55 - 120%	---	---	
Dibenzofuran	0.701	---	0.0100	mg/kg wet	1	0.800	---	88	35 - 120%	---	---	
Surr: 2-Fluorobiphenyl (Surr)			*Recovery: 87 %*		*Limits: 46-120 %*				*Dilution: 1x*			
p-Terphenyl-d14 (Surr)			*88 %*		*49-126 %*				*"*			
Duplicate (0030726-DUP1)		Prepared: 03/20/20 07:17		Analyzed: 03/20/20 12:22								
QC Source Sample: GP01-0-10 (A0C0717-01)												
EPA 8270D (SIM)												
Acenaphthene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Acenaphthylene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Anthracene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Benz(a)anthracene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Benzo(a)pyrene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Benzo(b)fluoranthene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Benzo(k)fluoranthene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Benzo(g,h,i)perylene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Chrysene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Dibenz(a,h)anthracene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Fluoranthene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Fluorene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Indeno(1,2,3-cd)pyrene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
1-Methylnaphthalene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
2-Methylnaphthalene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Naphthalene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Phenanthrene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Pyrene	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030726 - EPA 3546							**Soil**					
Duplicate (0030726-DUP1)		Prepared: 03/20/20 07:17		Analyzed: 03/20/20 12:22								
QC Source Sample: GP01-0-10 (A0C0717-01)												
Dibenzofuran	ND	---	0.0105	mg/kg dry	1	---	ND	---	---	---	30%	
Surr: 2-Fluorobiphenyl (Surr)		*Recovery: 73 %*		*Limits: 46-120 %*			*Dilution: 1x*					
p-Terphenyl-d14 (Surr)		*81 %*		*49-126 %*			*"*					
Matrix Spike (0030726-MS1)		Prepared: 03/20/20 07:17		Analyzed: 03/20/20 14:28								
QC Source Sample: GP0XC-0-10 (A0C0717-05)												
EPA 8270D (SIM)												
Acenaphthene	0.620	---	0.0105	mg/kg dry	1	0.841	ND	74	44 - 120%	---	---	
Acenaphthylene	0.621	---	0.0105	mg/kg dry	1	0.841	ND	74	39 - 120%	---	---	
Anthracene	0.586	---	0.0105	mg/kg dry	1	0.841	ND	70	50 - 120%	---	---	
Benz(a)anthracene	0.567	---	0.0105	mg/kg dry	1	0.841	ND	67	54 - 122%	---	---	
Benzo(a)pyrene	0.530	---	0.0105	mg/kg dry	1	0.841	ND	63	50 - 125%	---	---	
Benzo(b)fluoranthene	0.592	---	0.0105	mg/kg dry	1	0.841	ND	70	53 - 128%	---	---	
Benzo(k)fluoranthene	0.618	---	0.0105	mg/kg dry	1	0.841	ND	73	56 - 123%	---	---	
Benzo(g,h,i)perylene	0.547	---	0.0105	mg/kg dry	1	0.841	ND	65	49 - 127%	---	---	
Chrysene	0.611	---	0.0105	mg/kg dry	1	0.841	ND	73	57 - 120%	---	---	
Dibenz(a,h)anthracene	0.603	---	0.0105	mg/kg dry	1	0.841	ND	72	50 - 129%	---	---	
Fluoranthene	0.613	---	0.0105	mg/kg dry	1	0.841	ND	73	55 - 120%	---	---	
Fluorene	0.621	---	0.0105	mg/kg dry	1	0.841	ND	74	47 - 120%	---	---	
Indeno(1,2,3-cd)pyrene	0.562	---	0.0105	mg/kg dry	1	0.841	ND	67	49 - 130%	---	---	
1-Methylnaphthalene	0.577	---	0.0105	mg/kg dry	1	0.841	ND	69	43 - 120%	---	---	
2-Methylnaphthalene	0.575	---	0.0105	mg/kg dry	1	0.841	ND	68	39 - 120%	---	---	
Naphthalene	0.572	---	0.0105	mg/kg dry	1	0.841	ND	68	38 - 120%	---	---	
Phenanthrene	0.586	---	0.0105	mg/kg dry	1	0.841	ND	70	49 - 120%	---	---	
Pyrene	0.602	---	0.0105	mg/kg dry	1	0.841	ND	72	55 - 120%	---	---	
Dibenzofuran	0.619	---	0.0105	mg/kg dry	1	0.841	ND	74	35 - 120%	---	---	
Surr: 2-Fluorobiphenyl (Surr)		*Recovery: 72 %*		*Limits: 46-120 %*			*Dilution: 1x*					
p-Terphenyl-d14 (Surr)		*78 %*		*49-126 %*			*"*					

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Lisa Domenighini, Client Services Manager

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Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030806 - EPA 3510C (Acid Extraction)									Water			
Blank (0030806-BLK1)		Prepared: 03/23/20 12:02		Analyzed: 03/23/20 16:23								
EPA 8270D (SIM)												
Acenaphthene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Acenaphthylene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Anthracene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Benz(a)anthracene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Benzo(a)pyrene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Benzo(b)fluoranthene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Benzo(k)fluoranthene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Benzo(g,h,i)perylene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Chrysene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Dibenz(a,h)anthracene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Fluoranthene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Fluorene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Indeno(1,2,3-cd)pyrene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
1-Methylnaphthalene	ND	---	0.0364	ug/L	1	---	---	---	---	---	---	
2-Methylnaphthalene	ND	---	0.0364	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	---	0.0364	ug/L	1	---	---	---	---	---	---	
Phenanthrene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Pyrene	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Dibenzofuran	ND	---	0.0182	ug/L	1	---	---	---	---	---	---	
Surr: 2-Fluorobiphenyl (Surr)			*Recovery: 61 %*	*Limits: 53-120 %*			*Dilution: 1x*					
p-Terphenyl-d14 (Surr)			*80 %*	*58-132 %*			*"*					
LCS (0030806-BS1)		Prepared: 03/23/20 12:02		Analyzed: 03/23/20 16:49								
EPA 8270D (SIM)												
Acenaphthene	2.45	---	0.0200	ug/L	1	4.00	---	61	48 - 120%	---	---	
Acenaphthylene	2.42	---	0.0200	ug/L	1	4.00	---	60	35 - 121%	---	---	
Anthracene	2.51	---	0.0200	ug/L	1	4.00	---	63	53 - 120%	---	---	
Benz(a)anthracene	2.63	---	0.0200	ug/L	1	4.00	---	66	59 - 120%	---	---	
Benzo(a)pyrene	2.39	---	0.0200	ug/L	1	4.00	---	60	53 - 120%	---	---	
Benzo(b)fluoranthene	2.78	---	0.0200	ug/L	1	4.00	---	69	53 - 126%	---	---	
Benzo(k)fluoranthene	2.85	---	0.0200	ug/L	1	4.00	---	71	54 - 125%	---	---	
Benzo(g,h,i)perylene	2.45	---	0.0200	ug/L	1	4.00	---	61	44 - 128%	---	---	
Chrysene	2.72	---	0.0200	ug/L	1	4.00	---	68	57 - 120%	---	---	

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Lisa Domenighini, Client Services Manager

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503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030806 - EPA 3510C (Acid Extraction)							**Water**					
LCS (0030806-BS1)		Prepared: 03/23/20 12:02		Analyzed: 03/23/20 16:49								
Dibenz(a,h)anthracene	2.75	---	0.0200	ug/L	1	4.00	---	69	44 - 131%	---	---	
Fluoranthene	2.76	---	0.0200	ug/L	1	4.00	---	69	58 - 120%	---	---	
Fluorene	2.51	---	0.0200	ug/L	1	4.00	---	63	50 - 120%	---	---	
Indeno(1,2,3-cd)pyrene	2.58	---	0.0200	ug/L	1	4.00	---	65	48 - 130%	---	---	
1-Methylnaphthalene	2.22	---	0.0400	ug/L	1	4.00	---	55	41 - 120%	---	---	
2-Methylnaphthalene	2.18	---	0.0400	ug/L	1	4.00	---	54	39 - 120%	---	---	
Naphthalene	2.20	---	0.0400	ug/L	1	4.00	---	55	43 - 120%	---	---	
Phenanthrene	2.59	---	0.0200	ug/L	1	4.00	---	65	53 - 120%	---	---	
Pyrene	2.71	---	0.0200	ug/L	1	4.00	---	68	53 - 121%	---	---	
Dibenzofuran	2.45	---	0.0200	ug/L	1	4.00	---	61	35 - 120%	---	---	
Surr: 2-Fluorobiphenyl (Surr)		*Recovery: 59 %*		*Limits: 53-120 %*			*Dilution: 1x*					
p-Terphenyl-d14 (Surr)		*72 %*		*58-132 %*			*"*					
LCS Dup (0030806-BSD1)		Prepared: 03/23/20 12:02		Analyzed: 03/23/20 17:14								**Q-19**
EPA 8270D (SIM)												
Acenaphthene	2.50	---	0.0200	ug/L	1	4.00	---	62	48 - 120%	2	30%	
Acenaphthylene	2.50	---	0.0200	ug/L	1	4.00	---	63	35 - 121%	3	30%	
Anthracene	2.63	---	0.0200	ug/L	1	4.00	---	66	53 - 120%	4	30%	
Benz(a)anthracene	2.73	---	0.0200	ug/L	1	4.00	---	68	59 - 120%	4	30%	
Benzo(a)pyrene	2.44	---	0.0200	ug/L	1	4.00	---	61	53 - 120%	2	30%	
Benzo(b)fluoranthene	2.85	---	0.0200	ug/L	1	4.00	---	71	53 - 126%	3	30%	
Benzo(k)fluoranthene	2.94	---	0.0200	ug/L	1	4.00	---	74	54 - 125%	3	30%	
Benzo(g,h,i)perylene	2.49	---	0.0200	ug/L	1	4.00	---	62	44 - 128%	2	30%	
Chrysene	2.79	---	0.0200	ug/L	1	4.00	---	70	57 - 120%	2	30%	
Dibenz(a,h)anthracene	2.80	---	0.0200	ug/L	1	4.00	---	70	44 - 131%	2	30%	
Fluoranthene	2.85	---	0.0200	ug/L	1	4.00	---	71	58 - 120%	3	30%	
Fluorene	2.60	---	0.0200	ug/L	1	4.00	---	65	50 - 120%	4	30%	
Indeno(1,2,3-cd)pyrene	2.61	---	0.0200	ug/L	1	4.00	---	65	48 - 130%	1	30%	
1-Methylnaphthalene	2.28	---	0.0400	ug/L	1	4.00	---	57	41 - 120%	2	30%	
2-Methylnaphthalene	2.23	---	0.0400	ug/L	1	4.00	---	56	39 - 120%	2	30%	
Naphthalene	2.29	---	0.0400	ug/L	1	4.00	---	57	43 - 120%	4	30%	
Phenanthrene	2.66	---	0.0200	ug/L	1	4.00	---	66	53 - 120%	2	30%	
Pyrene	2.76	---	0.0200	ug/L	1	4.00	---	69	53 - 121%	2	30%	
Dibenzofuran	2.55	---	0.0200	ug/L	1	4.00	---	64	35 - 120%	4	30%	

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EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030806 - EPA 3510C (Acid Extraction)												**Water**
LCS Dup (0030806-BSD1)			Prepared: 03/23/20 12:02 Analyzed: 03/23/20 17:14									**Q-19**
Surr: 2-Fluorobiphenyl (Surr)			*Recovery: 60 %*	*Limits: 53-120 %*	*Dilution: 1x*							
p-Terphenyl-d14 (Surr)			*73 %*	*58-132 %*	*"*							

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EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030741 - EPA 3051A							Soil					
Blank (0030741-BLK1)		Prepared: 03/20/20 10:31		Analyzed: 03/20/20 13:38								
EPA 6020A												
Antimony	ND	---	0.962	mg/kg wet	10	---	---	---	---	---	---	
Arsenic	ND	---	0.962	mg/kg wet	10	---	---	---	---	---	---	
Beryllium	ND	---	0.192	mg/kg wet	10	---	---	---	---	---	---	
Cadmium	ND	---	0.192	mg/kg wet	10	---	---	---	---	---	---	
Chromium	ND	---	0.962	mg/kg wet	10	---	---	---	---	---	---	
Copper	ND	---	0.962	mg/kg wet	10	---	---	---	---	---	---	
Lead	ND	---	0.192	mg/kg wet	10	---	---	---	---	---	---	
Mercury	ND	---	0.0769	mg/kg wet	10	---	---	---	---	---	---	
Nickel	ND	---	0.962	mg/kg wet	10	---	---	---	---	---	---	
Selenium	ND	---	0.962	mg/kg wet	10	---	---	---	---	---	---	
Silver	ND	---	0.192	mg/kg wet	10	---	---	---	---	---	---	
Thallium	ND	---	0.192	mg/kg wet	10	---	---	---	---	---	---	
Zinc	ND	---	3.85	mg/kg wet	10	---	---	---	---	---	---	
LCS (0030741-BS1)		Prepared: 03/20/20 10:31		Analyzed: 03/20/20 13:43								
EPA 6020A												
Antimony	26.4	---	1.00	mg/kg wet	10	25.0	---	106	80 - 120%	---	---	
Arsenic	50.3	---	1.00	mg/kg wet	10	50.0	---	101	80 - 120%	---	---	
Beryllium	24.6	---	0.200	mg/kg wet	10	25.0	---	99	80 - 120%	---	---	
Cadmium	50.4	---	0.200	mg/kg wet	10	50.0	---	101	80 - 120%	---	---	
Chromium	49.3	---	1.00	mg/kg wet	10	50.0	---	99	80 - 120%	---	---	
Copper	52.8	---	1.00	mg/kg wet	10	50.0	---	106	80 - 120%	---	---	
Lead	53.6	---	0.200	mg/kg wet	10	50.0	---	107	80 - 120%	---	---	
Mercury	1.05	---	0.0800	mg/kg wet	10	1.00	---	105	80 - 120%	---	---	
Nickel	52.1	---	1.00	mg/kg wet	10	50.0	---	104	80 - 120%	---	---	
Selenium	26.0	---	1.00	mg/kg wet	10	25.0	---	104	80 - 120%	---	---	
Silver	26.8	---	0.200	mg/kg wet	10	25.0	---	107	80 - 120%	---	---	
Thallium	26.3	---	0.200	mg/kg wet	10	25.0	---	105	80 - 120%	---	---	
Zinc	50.9	---	4.00	mg/kg wet	10	50.0	---	102	80 - 120%	---	---	
Duplicate (0030741-DUP1)		Prepared: 03/20/20 10:31		Analyzed: 03/20/20 14:37								
QC Source Sample: GP03-0-10 (A0C0717-03)												
EPA 6020A												

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Lisa Domenighini, Client Services Manager

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EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030741 - EPA 3051A							**Soil**					
Duplicate (0030741-DUP1)		Prepared: 03/20/20 10:31		Analyzed: 03/20/20 14:37								
QC Source Sample: GP03-0-10 (A0C0717-03)												
Antimony	ND	---	1.03	mg/kg dry	10	---	ND	---	---	---	40%	
Arsenic	**2.47**	---	1.03	mg/kg dry	10	---	2.65	---	---	7	40%	
Beryllium	ND	---	0.205	mg/kg dry	10	---	ND	---	---	**---**	**40%**	Q-05
Cadmium	ND	---	0.205	mg/kg dry	10	---	ND	---	---	---	40%	
Chromium	**8.58**	---	1.03	mg/kg dry	10	---	9.54	---	---	11	40%	
Copper	**1.56**	---	1.03	mg/kg dry	10	---	2.10	---	---	29	40%	
Lead	**1.21**	---	0.205	mg/kg dry	10	---	1.15	---	---	5	40%	
Mercury	ND	---	0.0822	mg/kg dry	10	---	ND	---	---	---	40%	
Nickel	**4.45**	---	1.03	mg/kg dry	10	---	4.80	---	---	8	40%	
Selenium	ND	---	1.03	mg/kg dry	10	---	ND	---	---	---	40%	
Silver	ND	---	0.205	mg/kg dry	10	---	ND	---	---	---	40%	
Thallium	ND	---	0.205	mg/kg dry	10	---	ND	---	---	---	40%	
Zinc	**8.65**	---	4.11	mg/kg dry	10	---	8.65	---	---	0.07	40%	
Matrix Spike (0030741-MS1)		Prepared: 03/20/20 10:31		Analyzed: 03/20/20 14:43								
QC Source Sample: GP03-0-10 (A0C0717-03)												
EPA 6020A												
Antimony	24.8	---	1.03	mg/kg dry	10	25.6	ND	97	75 - 125%	---	---	
Arsenic	49.7	---	1.03	mg/kg dry	10	51.3	2.65	92	75 - 125%	---	---	
Beryllium	24.3	---	0.205	mg/kg dry	10	25.6	ND	95	75 - 125%	---	---	
Cadmium	48.8	---	0.205	mg/kg dry	10	51.3	ND	95	75 - 125%	---	---	
Chromium	54.5	---	1.03	mg/kg dry	10	51.3	9.54	88	75 - 125%	---	---	
Copper	51.3	---	1.03	mg/kg dry	10	51.3	2.10	96	75 - 125%	---	---	
Lead	52.1	---	0.205	mg/kg dry	10	51.3	1.15	99	75 - 125%	---	---	
Mercury	1.03	---	0.0820	mg/kg dry	10	1.03	ND	101	75 - 125%	---	---	
Nickel	53.8	---	1.03	mg/kg dry	10	51.3	4.80	96	75 - 125%	---	---	
Selenium	24.7	---	1.03	mg/kg dry	10	25.6	ND	97	75 - 125%	---	---	
Silver	25.4	---	0.205	mg/kg dry	10	25.6	ND	99	75 - 125%	---	---	
Thallium	25.4	---	0.205	mg/kg dry	10	25.6	ND	99	75 - 125%	---	---	
Zinc	56.7	---	4.10	mg/kg dry	10	51.3	8.65	94	75 - 125%	---	---	

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Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Total Metals by EPA 6020A (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030853 - EPA 3015A							**Water**					
Blank (0030853-BLK1)		Prepared: 03/24/20 11:24		Analyzed: 03/31/20 16:40								
EPA 6020A												
Antimony	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Arsenic	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Beryllium	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Cadmium	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Chromium	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Copper	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
Lead	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Mercury	ND	---	0.0800	ug/L	1	---	---	---	---	---	---	
Nickel	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
Selenium	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Silver	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Thallium	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Zinc	ND	---	4.00	ug/L	1	---	---	---	---	---	---	
LCS (0030853-BS1)		Prepared: 03/24/20 11:24		Analyzed: 03/31/20 16:36								
EPA 6020A												
Antimony	27.4	---	1.00	ug/L	1	27.8	---	99	80 - 120%	---	---	
Arsenic	53.0	---	1.00	ug/L	1	55.6	---	95	80 - 120%	---	---	
Beryllium	27.5	---	0.200	ug/L	1	27.8	---	99	80 - 120%	---	---	
Cadmium	51.1	---	0.200	ug/L	1	55.6	---	92	80 - 120%	---	---	
Chromium	54.0	---	1.00	ug/L	1	55.6	---	97	80 - 120%	---	---	
Copper	57.6	---	2.00	ug/L	1	55.6	---	104	80 - 120%	---	---	
Lead	55.5	---	0.200	ug/L	1	55.6	---	100	80 - 120%	---	---	
Mercury	1.11	---	0.0800	ug/L	1	1.11	---	100	80 - 120%	---	---	
Nickel	57.3	---	2.00	ug/L	1	55.6	---	103	80 - 120%	---	---	
Selenium	25.3	---	1.00	ug/L	1	27.8	---	91	80 - 120%	---	---	
Silver	28.0	---	0.200	ug/L	1	27.8	---	101	80 - 120%	---	---	
Thallium	26.3	---	0.200	ug/L	1	27.8	---	95	80 - 120%	---	---	
Zinc	51.7	---	4.00	ug/L	1	55.6	---	93	80 - 120%	---	---	

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601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Anions by Ion Chromatography

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030739 - DI Leach							**Soil**					
Blank (0030739-BLK1)		Prepared: 03/20/20 09:51		Analyzed: 03/20/20 13:49								
EPA 9056A												
Chloride	ND	---	10.0	mg/kg wet	1	---	---	---	---	---	---	
Sulfate	ND	---	10.0	mg/kg wet	1	---	---	---	---	---	---	
LCS (0030739-BS1)		Prepared: 03/20/20 09:51		Analyzed: 03/20/20 14:11								
EPA 9056A												
Chloride	78.8	---	10.0	mg/kg wet	1	80.0	---	99	90 - 110%	---	---	
Sulfate	80.3	---	10.0	mg/kg wet	1	80.0	---	100	90 - 110%	---	---	
Duplicate (0030739-DUP1)		Prepared: 03/20/20 09:51		Analyzed: 03/20/20 14:54								
QC Source Sample: GP01-0-10 (A0C0717-01)												
EPA 9056A												
Chloride	ND	---	10.2	mg/kg dry	1	---	ND	---	---	---	15%	
Sulfate	**11.5**	---	10.2	mg/kg dry	1	---	11.0	---	---	4	15%	
Matrix Spike (0030739-MS1)		Prepared: 03/20/20 09:51		Analyzed: 03/20/20 15:15								
QC Source Sample: GP01-0-10 (A0C0717-01)												
EPA 9056A												
Chloride	88.4	---	10.7	mg/kg dry	1	86.0	ND	103	80 - 120%	---	---	
Sulfate	98.0	---	10.7	mg/kg dry	1	86.0	11.0	101	80 - 120%	---	---	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Conventional Chemistry Parameters

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030737 - DI Leach												**Soil**
Duplicate (0030737-DUP1)		Prepared: 03/20/20 09:36		Analyzed: 03/20/20 11:39								
QC Source Sample: GP01-0-10 (A0C0717-01)												
EPA 9045D												
Soil pH (measured in H2O)	**8.90**	---		pH Units	1	---	8.81	---	---	1	5%	pH_S
pH Temperature (deg C)	**22.5**	---		pH Units	1	---	22.7	---	---	0.9	30%	pH_S
Reference (0030737-SRM1)		Prepared: 03/20/20 09:36		Analyzed: 03/20/20 11:36								
EPA 9045D												
Soil pH (measured in H2O)	6.03	---		pH Units	1	6.00		100	98.33333 - 101.6667%	---	---	
pH Temperature (deg C)	21.8	---		pH Units	1	20.0		109	50 - 200%	---	---	
Reference (0030737-SRM2)		Prepared: 03/20/20 09:36		Analyzed: 03/20/20 11:44								
EPA 9045D												
Soil pH (measured in H2O)	7.98	---		pH Units	1	8.00		100	98.75 - 101.25%	---	---	
pH Temperature (deg C)	21.9	---		pH Units	1	20.0		110	50 - 200%	---	---	

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Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 0030740 - Total Solids (Dry Weight)												**Soil**

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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SAMPLE PREPARATION INFORMATION

Hydrocarbon Identification Screen by NWTPH-HCID

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030801							
A0C0717-06	Water	NWTPH-HCID	03/17/20 17:00	03/23/20 12:54	880mL/5mL	1000mL/5mL	1.14
A0C0717-07	Water	NWTPH-HCID	03/18/20 14:30	03/23/20 12:54	1020mL/5mL	1000mL/5mL	0.98

Prep: NWTPH-HCID (Soil)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030775							
A0C0717-01	Soil	NWTPH-HCID	03/18/20 09:30	03/23/20 12:57	10.87g/10mL	10g/10mL	0.92
A0C0717-02	Soil	NWTPH-HCID	03/17/20 11:10	03/23/20 12:57	10.21g/10mL	10g/10mL	0.98
A0C0717-03	Soil	NWTPH-HCID	03/17/20 10:05	03/23/20 12:57	10.43g/10mL	10g/10mL	0.96
A0C0717-04	Soil	NWTPH-HCID	03/17/20 13:10	03/23/20 12:57	10.3g/10mL	10g/10mL	0.97
A0C0717-05	Soil	NWTPH-HCID	03/17/20 10:30	03/23/20 12:57	10.51g/10mL	10g/10mL	0.95

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3546 (Fuels)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030823							
A0C0717-02	Soil	NWTPH-Dx	03/17/20 11:10	03/24/20 13:04	10.67g/5mL	10g/5mL	0.94
A0C0717-04	Soil	NWTPH-Dx	03/17/20 13:10	03/24/20 13:04	10.46g/5mL	10g/5mL	0.96

Volatile Organic Compounds by EPA 8260C

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030828							
A0C0717-08	Water	EPA 8260C	03/17/20 00:00	03/24/20 09:43	5mL/5mL	5mL/5mL	1.00

Polychlorinated Biphenyls by EPA 8082A

Prep: EPA 3510C (Neutral pH)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030749							
A0C0717-06	Water	EPA 8082A	03/17/20 17:00	03/20/20 12:23	830mL/5mL	1000mL/5mL	1.20
A0C0717-07	Water	EPA 8082A	03/18/20 14:30	03/20/20 12:23	880mL/5mL	1000mL/5mL	1.14

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601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

SAMPLE PREPARATION INFORMATION

Polychlorinated Biphenyls by EPA 8082A

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030757							
A0C0717-01	Soil	EPA 8082A	03/18/20 09:30	03/20/20 12:30	10.16g/5mL	10g/5mL	0.98
A0C0717-02	Soil	EPA 8082A	03/17/20 11:10	03/20/20 12:30	10.78g/5mL	10g/5mL	0.93
A0C0717-03	Soil	EPA 8082A	03/17/20 10:05	03/20/20 12:30	10.78g/5mL	10g/5mL	0.93
A0C0717-04	Soil	EPA 8082A	03/17/20 13:10	03/20/20 12:30	10.18g/5mL	10g/5mL	0.98
A0C0717-05	Soil	EPA 8082A	03/17/20 10:30	03/20/20 12:30	10.68g/5mL	10g/5mL	0.94

Organochlorine Pesticides by EPA 8081B

Prep: EPA 3510C (Neutral pH)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030826							
A0C0717-06	Water	EPA 8081B	03/17/20 17:00	03/24/20 07:16	1000mL/5mL	1000mL/5mL	1.00
A0C0717-07	Water	EPA 8081B	03/18/20 14:30	03/24/20 07:16	930mL/5mL	1000mL/5mL	1.08

Prep: EPA 3546/3640A (GPC)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030762							
A0C0717-01RE1	Soil	EPA 8081B	03/18/20 09:30	03/20/20 07:18	10.44g/10mL	10g/5mL	1.92
A0C0717-02RE1	Soil	EPA 8081B	03/17/20 11:10	03/20/20 07:18	10.45g/10mL	10g/5mL	1.91
A0C0717-03RE1	Soil	EPA 8081B	03/17/20 10:05	03/20/20 07:18	10.63g/10mL	10g/5mL	1.88
A0C0717-04RE1	Soil	EPA 8081B	03/17/20 13:10	03/20/20 07:18	10.12g/10mL	10g/5mL	1.98
A0C0717-05RE1	Soil	EPA 8081B	03/17/20 10:30	03/20/20 07:18	10.37g/10mL	10g/5mL	1.93

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Prep: EPA 3510C (Acid Extraction)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030806							
A0C0717-06	Water	EPA 8270D (SIM)	03/17/20 17:00	03/23/20 12:02	1010mL/2mL	1000mL/2mL	0.99
A0C0717-07	Water	EPA 8270D (SIM)	03/18/20 14:30	03/23/20 12:02	970mL/2mL	1000mL/2mL	1.03

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030726							
A0C0717-01	Soil	EPA 8270D (SIM)	03/18/20 09:30	03/20/20 07:17	10.67g/5mL	10g/5mL	0.94
A0C0717-02	Soil	EPA 8270D (SIM)	03/17/20 11:10	03/20/20 07:17	10.67g/5mL	10g/5mL	0.94

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601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

SAMPLE PREPARATION INFORMATION

Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A0C0717-03	Soil	EPA 8270D (SIM)	03/17/20 10:05	03/20/20 07:17	10.47g/5mL	10g/5mL	0.96
A0C0717-04	Soil	EPA 8270D (SIM)	03/17/20 13:10	03/20/20 07:17	10.63g/5mL	10g/5mL	0.94
A0C0717-05	Soil	EPA 8270D (SIM)	03/17/20 10:30	03/20/20 07:17	10.09g/5mL	10g/5mL	0.99

Total Metals by EPA 6020A (ICPMS)

Prep: EPA 3015A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030853							
A0C0717-06	Water	EPA 6020A	03/17/20 17:00	03/24/20 11:24	45mL/50mL	45mL/50mL	1.00
A0C0717-07	Water	EPA 6020A	03/18/20 14:30	03/24/20 11:24	45mL/50mL	45mL/50mL	1.00

Prep: EPA 3051A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030741							
A0C0717-01	Soil	EPA 6020A	03/18/20 09:30	03/20/20 10:31	0.468g/50mL	0.5g/50mL	1.07
A0C0717-02	Soil	EPA 6020A	03/17/20 11:10	03/20/20 10:31	0.484g/50mL	0.5g/50mL	1.03
A0C0717-03	Soil	EPA 6020A	03/17/20 10:05	03/20/20 10:31	0.495g/50mL	0.5g/50mL	1.01
A0C0717-04	Soil	EPA 6020A	03/17/20 13:10	03/20/20 10:31	0.487g/50mL	0.5g/50mL	1.03
A0C0717-05	Soil	EPA 6020A	03/17/20 10:30	03/20/20 10:31	0.464g/50mL	0.5g/50mL	1.08

Anions by Ion Chromatography

Prep: DI Leach

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030739							
A0C0717-01	Soil	EPA 9056A	03/18/20 09:30	03/20/20 09:51	5.2145g/50mL	5g/50mL	0.96
A0C0717-02	Soil	EPA 9056A	03/17/20 11:10	03/20/20 09:51	5.2583g/50mL	5g/50mL	0.95
A0C0717-03	Soil	EPA 9056A	03/17/20 10:05	03/20/20 09:51	5.0811g/50mL	5g/50mL	0.98
A0C0717-04	Soil	EPA 9056A	03/17/20 13:10	03/20/20 09:51	5.1238g/50mL	5g/50mL	0.98
A0C0717-05	Soil	EPA 9056A	03/17/20 10:30	03/20/20 09:51	5.1313g/50mL	5g/50mL	0.97

Conventional Chemistry Parameters

Prep: DI Leach

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030737							

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SAMPLE PREPARATION INFORMATION

Conventional Chemistry Parameters

Prep: DI Leach

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A0C0717-01	Soil	EPA 9045D	03/18/20 09:30	03/20/20 09:36	10.0486g/10mL	10g/10mL	NA
A0C0717-02	Soil	EPA 9045D	03/17/20 11:10	03/20/20 09:36	10.1126g/10mL	10g/10mL	NA
A0C0717-03	Soil	EPA 9045D	03/17/20 10:05	03/20/20 09:36	10.3777g/10mL	10g/10mL	NA
A0C0717-04	Soil	EPA 9045D	03/17/20 13:10	03/20/20 09:36	10.2969g/10mL	10g/10mL	NA
A0C0717-05	Soil	EPA 9045D	03/17/20 10:30	03/20/20 09:36	10.2884g/10mL	10g/10mL	NA

Percent Dry Weight

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 0030740							
A0C0717-01	Soil	EPA 8000C	03/18/20 09:30	03/20/20 10:14			NA
A0C0717-02	Soil	EPA 8000C	03/17/20 11:10	03/20/20 10:14			NA
A0C0717-03	Soil	EPA 8000C	03/17/20 10:05	03/20/20 10:14			NA
A0C0717-04	Soil	EPA 8000C	03/17/20 13:10	03/20/20 10:14			NA
A0C0717-05	Soil	EPA 8000C	03/17/20 10:30	03/20/20 10:14			NA

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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

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C-05	Extract has undergone a GPC (Gel-Permeation Chromatography) cleanup per EPA 3640A. Reporting levels may be raised due to dilution necessary for cleanup. Sample Final Volume includes the GPC dilution factor, see the Prep page for details.
C-07	Extract has undergone Sulfuric Acid Cleanup by EPA 3665A, Sulfur Cleanup by EPA 3660B, and Florisil Cleanup by EPA 3620B in order to minimize matrix interference.
pH_S	Method recommends preparation 'as soon as possible'. See Sample Preparation Information section of report for details. Consult regulator or permit manager to determine the usability of data for intended purpose.
Q-05	Analyses are not controlled on RPD values from sample and duplicate concentrations that are below 5 times the reporting level.
Q-19	Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
Q-41	Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
Q-42	Matrix Spike and/or Duplicate analysis was performed on this sample. % Recovery or RPD for this analyte is outside laboratory control limits. (Refer to the QC Section of Analytical Report.)
R-02	The Reporting Limit for this analyte has been raised to account for interference from coeluting organic compounds present in the sample.

Apex Laboratories

Lisa Domenighini, Client Services Manager

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Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Stantec Portland	Project: **Rogue Brewery**	
601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported.

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

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REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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LABORATORY ACCREDITATION INFORMATION

TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Lisa Domenighini, Client Services Manager

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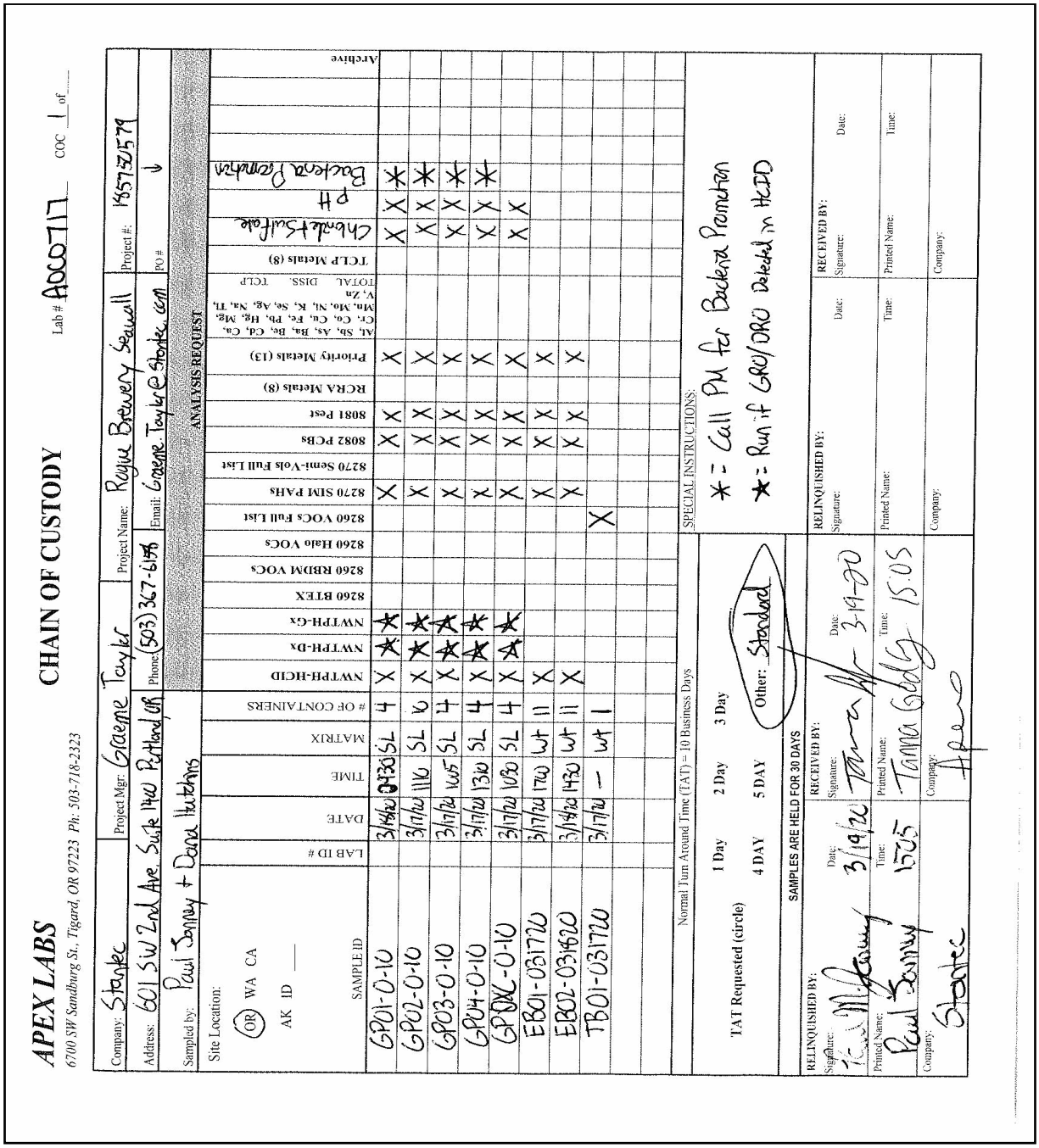

APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # A0C0717 COC 1 of 1

Company: Stantec | Project Mgr: Graeme Taylor | Project Name: Rogue Brewery Seawall | Project #: 185735579
Address: 601 SW 2nd Ave. Suite 1400 Portland OR | Phone: (503) 367-6954 | Email: Graeme.Taylor@Stantec.com | PO #
Sampled by: Paul Tommy + Dave Hutchins

Site Location: (OR) WA CA AK ID ____

ANALYSIS REQUEST

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS. TCLP	TCLP Metals (8)	Chloride + Sulfate	pH	Bacteria Presumptive	Archive
GP01-0-10		3/16/20	0930	SL	4	X	✱	✱					X		X	X		X		X	X		
GP02-0-10		3/17/20	1116	SL	6	X	✱	✱					X		X	X		X		X	X		
GP03-0-10		3/17/20	1405	SL	4	X	✱	✱					X		X	X		X		X	X		
GP04-0-10		3/17/20	1330	SL	4	X	✱	✱					X		X	X		X		X	X		
GP04X-0-10		3/17/20	1020	SL	4	X	✱	✱					X		X	X		X		X	X		
EB01-031720		3/17/20	1720	WT	11	X							X		X	X		X					
EB02-031620		3/16/20	1430	WT	11	X							X		X	X		X					
TB01-031720		3/17/20	—	WT	1	X						X											

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: Standard

SPECIAL INSTRUCTIONS:
✱ = Call PM for Bacteria Premium
✱ = Run if GRO/DRO Detected in HCID

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	Date:	RECEIVED BY:	Date:	RELINQUISHED BY:	Date:	RECEIVED BY:	Date:
Signature:		Signature:		Signature:		Signature:	
Printed Name:	Time:	Printed Name:	Time:	Printed Name:	Time:	Printed Name:	Time:
Company:		Company:		Company:		Company:	

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601 SW 2nd Ave Suite 1400	Project Number: **185750579**	**Report ID:**
Portland, OR 97204	Project Manager: **Graeme Taylor**	**A0C0717 - 04 02 20 0852**

APEX LABS COOLER RECEIPT FORM

Client: Stantec Element WO#: A0C0717

Project/Project #: Rogue Brewery Seawall / 185750579

Delivery Info:

Date/time received: 3-19-20 @ 15:05 By: TMH

Delivered by: Apex ___ Client X ESS ___ FedEx ___ UPS ___ Swift ___ Senvoy ___ SDS ___ Other ___

Cooler Inspection Date/time inspected: 3-19-20 @ 15:05 By: TMH

Chain of Custody included? Yes X No ___ Custody seals? Yes ___ No X

Signed/dated by client? Yes X No ___

Signed/dated by Apex? Yes X No ___

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	3.4						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	N						
Ice type: (Gel/Real/Other)	Real						
Condition:	good						

Cooler out of temp? (Y/N) Possible reason why:

If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA

Out of temperature samples form initiated? Yes/No/NA

Samples Inspection: Date/time inspected: 3-19-20 @ 17:57 By: TMH

All samples intact? Yes X No ___ Comments:

Bottle labels/COCs agree? Yes ~~X~~ TMH 3-19-20 No X Comments: COC Stated 4 carts received 3 for 6DOXC-0-10

COC/container discrepancies form initiated? Yes ___ No ___ NA X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments:

Do VOA vials have visible headspace? Yes ___ No X NA ___

Comments

Water samples: pH checked: Yes X No ___ NA ___ pH appropriate? Yes ___ No ___ NA X

Comments: EB01 031720 ph=7

Additional information: TB#2251

Labeled by: Witness: Cooler Inspected by: See Project Contact Form: Y

Apex Laboratories

Lisa A Domenighini

Lisa Domenighini, Client Services Manager

Northwest Testing, Inc.
A Division of Northwest Geotech, Inc.
9120 SW Pioneer Court, Suite B, Wilsonville, Oregon 97070 | ph: 503.682.1880 fax: 503.682.2753 | www.nwgeotech.com

TECHNICAL REPORT

Report To:	Mr. Graeme Taylor Stantec 601 SW Second Avenue, Suite 1400 Portland, Oregon 97204-3128	**Date:** **Lab No.:**	05/07/2020 20-062
Project:	Laboratory Testing – Rogue Brewery	**Project No.:**	3351.1.1

Report of: Atterberg limits, moisture content, dry density, particle size analysis, minimum resistivity, and No. 200 wash.

Sample Identification

NTI completed Atterberg limits, moisture content, dry density, particle size analysis, minimum resistivity, and No. 200 wash testing on soil samples delivered to our laboratory on March 19, 2020. Testing was performed in accordance with the standards indicated. Our laboratory test results are summarized on the following tables and attached pages.

Laboratory Testing

Atterberg Limits (ASTM D4318)			
Sample ID	**Liquid Limit**	**Plastic Limit**	**Plasticity Index**
GP 01 @ 16.5 – 17.5 ft.	NP	NP	NP

Attachments: Laboratory Test Results
Hydrometer Sieve Test Results
Consolidation Test Results
Specialty Analytical Report 1903040

Copies: Addressee

REVIEWED BY: Mike Ginsbach MG

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TECHNICAL REPORT

Report To:	Mr. Graeme Taylor Stantec 601 SW Second Avenue, Suite 1400 Portland, Oregon 97204-3128	**Date:**	05/07/2020
		Lab No.:	20-062
Project:	Laboratory Testing – Rogue Brewery	**Project No.:**	3351.1.1

Laboratory Testing

Moisture Content of Soils (ASTM D 2216)			
Sample ID	**Moisture Content (%)**	**Sample ID**	**Moisture Content (%)**
GP 01 @ 4.0 – 5.5 ft.	5.3	GP 03 @ 2.5 – 4.0 ft.	3.5
GP 01 @ 15.0 – 16.5 ft.	28.5	GP 04 @ 4.0 – 5.5 ft.	6.3
GP 01 @ 18.0 – 19.5 ft.	26.1	GP 04 @ 15.0 – 16.5 ft.	21.3
GP 01 @ 25.0 – 26.5 ft.	22.1	GP 04 @ 20.0 – 21.5 ft.	25.4
GP 01 @ 30.0 – 31.5 ft.	26.6	GP 04 @ 25.0 – 26.5 ft.	18.4
GP 01 @ 35.0 – 36.5 ft.	22.6	GP 04 @ 30.0 – 31.5 ft.	24.5
GP 01 @ 40.0 – 41.5 ft.	21.1	GP 04 @ 35.0 – 36.5 ft.	18.6
GP 01 @ 45.0 – 46.5 ft.	25.9	GP 04 @ 40.0 – 41.5 ft.	22.8
GP 01 @ 50.0 – 51.5 ft.	24.5	GP 04 @ 45.0 – 46.5 ft.	23.3
GP 01 @ 55.0 – 56.5 ft.	25.1	GP 04 @ 50.0 – 51.0 ft.	23.4
GP 01 @ 60.0 – 61.5 ft.	22.9	GP 04 @ 55.0 – 56.5 ft.	22.5
GP 01 @ 65.0 – 66.5 ft.	22.6	GP 04 @ 60.0 – 61.5 ft.	24.1
GP 01 @ 70.0 – 71.5 ft.	22.7	GP 04 @ 65.0 – 66.5 ft.	22.7
GP 01 @ 75.0 – 76.5 ft.	23.3	GP 04 @ 70.0 – 71.5 ft.	19.6
GP 02 @ 4.0 – 5.5 ft.	4.5	GP 04 @ 75.0 – 76.5 ft.	24.7

Moisture Content and Dry Density of Soils (ASTM D 2216/ D7263)		
Sample ID	**Moisture Content (%)**	**Dry Density (pcf)**
GP 01 @ 8.0 – 10.0 ft.	3.7	110.8
GP 01 @ 16.5 – 17.5 ft.	22.0	105.4
GP 02 @ 8.0 – 9.5 ft.	5.7	110.9
GP 03 @ 8.0 – 9.5 ft.	4.7	110.5
GP 04 @ 8.0 – 10.0 ft.	13.8	101.4

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TECHNICAL REPORT

Report To:	Mr. Graeme Taylor Stantec 601 SW Second Avenue, Suite 1400 Portland, Oregon 97204-3128	**Date:** **Lab No.:**	05/07/2020 20-062
Project:	Laboratory Testing – Rogue Brewery	**Project No.:**	3351.1.1

Laboratory Testing

Particle Size Analysis of Soil (ASTM D422)		
Sieve Size	**GP 01 @ 4.0 – 5.5 ft. & GP 01 @ 8.0 – 10.0 ft. Combined Percent Passing**	**GP 02 @ 4.0 – 5.5 ft. & GP 02 @ 8.0 – 9.5 ft. Combined Percent Passing**
1"	100	- -
¾"	97	- -
½"	97	- -
⅜"	97	100
¼"	96	99
#4	95	99
#8	93	99
#10	93	99
#16	92	99
#30	91	98
#40	90	97
#50	86	92
#100	10	8
#200	1.5	0.6

Particle Size Analysis of Soil (ASTM D422)		
Sieve Size	**GP 03 @ 2.5 – 4.0 ft. & GP 03 @ 8.0 – 9.5 ft. Combined Percent Passing**	**GP 04 @ 4.0 – 5.5 ft. & GP 04 @ 8.0 – 10.0 ft. Combined Percent Passing**
½"	- -	100
⅜"	- -	99
¼"	- -	99
#4	- -	98
#8	- -	98
#10	- -	98
#16	100	97
#30	99	97
#40	98	96
#50	91	88
#100	9	14
#200	2.0	3.6

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TECHNICAL REPORT

Report To:	Mr. Graeme Taylor Stantec 601 SW Second Avenue, Suite 1400 Portland, Oregon 97204-3128	**Date:** **Lab No.:**	05/07/2020 20-062
Project:	Laboratory Testing – Rogue Brewery	**Project No.:**	3351.1.1

Laboratory Testing

Resistivity of Soil (AASHTO T288)	
Sample ID	**Minimum Resistivity (Ω-cm)**
GP 01 @ 4.0 – 4.5 ft. & GP 01 @ 8.0 – 10 ft. Combined	15,548
GP 02 @ 4.0 – 4.5 ft. & GP 02 @ 8.0 – 9.5 ft. Combined	18,928
GP 03 @ 2.5 – 4.0 ft. & GP 03 @ 8.0 – 9.5 ft. Combined	17,576
GP 04 @ 4.0 – 4.5 ft. & GP 04 @ 8.0 – 10.0 ft. Combined	13,520

Amount of Material Finer than the No. 200 Sieve (ASTM D1140)			
Sample ID	**Percent Passing the No. 200 Sieve**	**Sample ID**	**Percent Passing the No. 200 Sieve**
GP 01 @ 16.5 – 17.5 ft.	2.0	GP 04 @ 20.0 – 21.5 ft.	2.1
GP 01 @ 25.0 – 26.5 ft.	4,3	GP 04 @ 30.0 – 31.5 ft.	3.6
GP 01 @ 35.0 – 36.5 ft.	5.2	GP 04 @ 35.0 – 36.5 ft.	3.9
GP 01 @ 45.0 – 46.5 ft.	7.8	GP 04 @ 45.0 – 46.5 ft.	5.1
GP 01 @ 65.0 – 66.5 ft.	5.9	GP 04 @ 55.0 – 56.5 ft.	7.1
GP 02 @ 4.0 – 4.5 ft.	0.2	GP 04 @ 70.0 – 71.5 ft.	8.4
GP 03 @ 8.0 – 10.0 ft.	0.2	GP 04 @ 30.0 – 31.5 ft.	3.6
GP 04 @ 8.0 – 10.0 ft.	0.3		