



THURBER ENGINEERING LTD.

March 5, 2021

File: 30175

Wallenius Wilhelmsen Solutions
#100, 820 Dock Road, Annacis Island
Delta, B.C.
V3M 6A3

Attention: Brent Moore

**WALLENIUS WIELHLMSEN SOLUTIONS ANNACIS TERMINAL
SIDE TWO RAIL EXTENSION
GEOTECHNICAL INVESTIGATION**

Dear Brent:

Thurber has completed a geotechnical investigation for the above project. This report summarizes the results of the investigation and provides preliminary geotechnical recommendations. It is a condition of this letter that Thurber's performance of its professional services is subject to the attached Statement of Limitations and Conditions.

1. INTRODUCTION

The existing Side Two rail yard is located in the south end of the Wallenius Wilhelmsen Solutions (WWS) Annacis terminal. Currently, it has four sets of tracks, Track 5 (west) to Track 8 (east), running approximately in the north-south direction. Available historical aerial photos suggest that the existing tracks were originally constructed in the early 1970s. We understand that WWS plans to construct a rail extension for the Side Two rail yard. The rail extension will add four new tracks, namely Tracks 9 to 12, to the east of and parallel to Track 8. Each new track can accommodate six rail cars, similar to the existing tracks.

We understand that a topographic survey by WWS is underway, but the results were not available at the time of preparing the report. While the Side Two rail yard is generally flat, WWS indicates that there is an approximately 1 m grade separation between the existing and future tracks near the north end of the Side Two rail yard. A review of the available topographic data in the City of Delta GIS map indicates that the existing site grade for the proposed extension is at about El. 3.5 m (geodetic) and that the adjacent site grade is typically within 0.5 m. During our site reconnaissance, some depressions were observed. For preliminary design purposes, we anticipate that placement of nominal site grading fill on the order of 0.5 m to 1 m may be required, depending on the finished rail grades. This should be confirmed during detailed design.

Our scope of work in this phase of the project was to conduct a geotechnical investigation and provide preliminary geotechnical recommendations for design and construction of the rail extension in accordance with the latest standards by SRY Rail Link (SRY). Assessment of soil and groundwater contaminations is not within our scope of work. We can provide such assessment, if required.



2. PROGRAM OF WORK

During our initial review of the historical aerial photos, the Side Two rail yard and the proposed extension appear to be situated at the transition of the historical extent of Annacis Island. Accordingly, we proposed to investigate the proposed extension at eight locations. On February 22, 2021, six test holes (TH21-1 to TH21-6) were drilled using a truck-mounted drill rig operated by Southland Drilling Co. Ltd at locations selected by Thurber. The approximate test hole locations are shown on the attached Dwg. 30175-2. Two proposed test holes (one between TH21-5 and TH21-6 and one south of TH21-3) were not completed due to uncertainties about the existing underground utilities at the proposed locations.

The test holes were advanced using solid-stem augers to depths of 6.1 m to 9.1 m. A dynamic cone penetration test (DCPT) profile was conducted at all test holes to depths of 6.1 to 9.1 m before they were drilled. The DCPT tip is similar in size and shape to the standard penetration test (SPT) split-spoon sampler and is driven using the same hammer energy. The DCPT provides a qualitative estimate of in-situ density of granular soil and is useful for identifying stiffness and strength contrasts within and between soil strata.

The soil and groundwater conditions were logged in the field by a Thurber geotechnical engineer. Representative disturbed soil samples were collected from the continuous auger flights at regular intervals for moisture content testing and routine visual classification in our Vancouver laboratory. One gradation analysis and one Atterberg limits testing were completed on selected samples.

Upon completion of drilling, the test holes were backfilled with drill cuttings and bentonite seals were placed in general accordance with BC groundwater protection regulations. The asphalt surface was patched with cold-mix asphalt.

3. SOIL AND GROUNDWATER CONDITIONS

The results of the investigation and laboratory testing are summarized on the attached test hole logs and charts. The logs provide a complete, detailed description of the soils encountered and should be used in preference to the generalized descriptions given below.

The soil conditions encountered along the proposed extension generally comprise asphalt and granular fill over deltaic sediments to the depths investigated. In general, the asphalt thickness was typically 50 mm, except for TH21-5 and TH21-6 where the asphalt thickness was 38 mm. Below the asphalt, an approximately 75 mm to 125 mm thick layer of gravelly sand fill was encountered in all test holes. The gravelly sand fill was generally in a compact condition.

Below the gravelly sand fill, dredged sand fill was inferred to depths of 3.3 m to 4.5 m. The dredged sand fill was typically in a compact over loose condition on the west side of the proposed tracks and in a compact to dense over loose condition on the east side of the proposed tracks. Based on our understanding, the dredged sand fill was placed circa 1949 as part of the reclamation of Annacis Island.



The dredged sand fill was underlain by native soils comprising river sand, silt and sand to silt in variable sequence. The test holes were all terminated within the river sand. In general, the native soils were in a loose to compact condition with some very loose to loose layers of silt and sand. Where present, the silt and sand layers were non-plastic with moisture contents ranging from 30% to 40%.

Groundwater was observed in TH21-4 and TH21-5 at a depth of 3.7 m and 3.9 m, respectively, upon completion of drilling. Based on our experience in the area, groundwater may be encountered at about El. 1.5 m to El. 0 m. Groundwater levels are expected to be heavily influenced by river levels and tidal fluctuations due to the close proximity to the Annacis Channel, as well as infiltration and drainage conditions.

4. PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

4.1 General

We understand that the new tracks are required to be designed and constructed to meet the SRY's standards. SRY advised us that CN's specifications are generally consistent with SRY's standards. and that CN's "Engineering Specifications for Industrial Tracks" can be used where applicable. Accordingly, we have made reference to the CN specification dated January 31, 2019. Additional details are provided below.

According to SRY, the tracks are required to support E80 train loading. The rail height will be 175 mm (7 in.) The track bed below the rail should comprise the following:

- 175 mm (7 in.) deep tie
- Minimum 225 mm (9 in.) thick ballast below the tie
- Minimum 300 mm (12 in.) thick sub-ballast below the ballast

4.2 Subgrade

For preliminary design purposes, we have assumed that the finished grade of the new tracks will be similar to the existing grade i.e. there will be no significant (<1 m) change in site grades. Accordingly, the subgrade will be about 875 mm below the existing ground surface. Based on the available test hole information, we anticipate that the subgrade will be within the compact dredged sand fill.

For site preparation, we anticipate that the existing asphalt will be saw-cut along the east side of the existing Track 8. Then the existing asphalt and gravelly sand fill, as well as the top of the dredged sand fill will be removed to expose the subgrade soil. The exposed granular subgrade should be compacted to at least 95% standard Proctor maximum dry density (SPMDD). Any soft, wet or materials that do not respond to the compaction should be subexcavated and replaced with compacted clean granular fill (such as river sand or similar) prior to placement of additional fill.



In accordance with SRY's recent suggestions, a layer of non-woven geotextile should be placed between the subgrade and the sub-ballast layer under the switches and turnouts to improve the long-term performance of tracks as these areas will be subject to the highest stresses. We suggest Nilex 4552 or approved equivalent be used. This should be reviewed and approved by SRY.

For drainage purposes, the top of the subgrade should be sloped down from the centreline of each set of tracks at an inclination of 1:40 each way in accordance with the CN specification.

Provided that the subgrade is prepared as recommended, we consider it suitable to support E80 train loading.

4.3 Sub-Ballast

The minimum thickness for the sub-ballast should be 300 mm (12 in.). SRY indicated in a recent discussion that it may be possible to reduce the sub-ballast thickness to 225 mm (9 in.) given that the auto racks are not heavy. This should be confirmed with SRY during detailed design. Regardless, the sub-ballast should extend at least 1.2 m (4 ft.) from the edge of ballast.

A layer of triaxial geogrid, Tensar TriAX TX160 or approved equivalent, should be placed in the middle of the sub-ballast layer. The sub-ballast should be compacted to at least 95% SPMD in lifts.

According to SRY, sub-ballast material should comprise well-graded minus 75 mm crushed base material in accordance to type Well-Grade Base (WGB) in Section 202 of the 2020 BC Ministry of Transportation and Infrastructure (MoTI) Standard Specifications for Highway Construction. The gradation specification is provided below. Additional requirements for the WGB material can be found in the 2020 BC MoTI Standard Specifications for Highway Construction.

Sieve Size (mm)	Percent Passing by Weight (%)
75	100
37.5	60 – 100
19	35 – 80
9.5	25 – 60
4.75	20 – 40
2.36	15 – 30
1.18	10 – 20
0.3	3 – 10
0.075	0 - 5



4.4 Ballast (Crushed Gravel)

The minimum thickness for the sub-ballast should be 300 mm (12 in.). The gradation specification provided by SRY for a similar project on Annacis Island is summarized below. Additional information can be found in Section 5.5 of the CN specification.

Sieve Size (mm)	Percent Passing by Weight (%)
50	100
38.1	90 – 100
25.4	20 – 55
19	0 – 15
12.5	-
4.75	-
0.075	0 - 1

4.5 Estimated Settlement

SRY indicated that maximum allowable immediate and long-term settlements are 25 mm and 100 mm, respectively, and that the maximum allowable differential settlement is 25 mm. Based on the soil conditions encountered and the anticipated train loading, the anticipated total and differential settlements for the new tracks are expected to be below the respective maximum allowable values.

We anticipate that settlement induced by fill placement should be relatively small provided that the amount of fill is less than 1 m. Further, settlement induced by fill placement will likely take place relatively quickly after placement given that the underlying soil is primarily granular. For planning purposes, consideration could be given to placing the permanent fill several weeks in advance of the track construction to allow as much settlement induced by fill placement to occur as possible.

4.6 Other Considerations

Two additional geotechnical related considerations are noted below:

- The originally proposed test hole between TH21-5 and TH21-6 was deleted due to uncertainty of a watermain in this area. Given that the soil conditions encountered at TH21-5 and TH21-6 were relatively consistent, deletion of the test hole between the two is considered not an issue from a geotechnical perspective.
- The original proposed test hole south of TH21-3 was also deleted due to uncertainty of existing Telus lines in the area. This area will likely be the closest to the transition of the historical extent of Annacis Island and will coincide with the locations of the proposed switches and turnouts. To address the uncertainty in this area, a supplementary investigation could be carried out during detailed design. Alternatively, consideration could



be given to assuming similar soil conditions in this area to the remaining extension and to addressing the uncertainty during construction using flexible language in the contract document. This should be further evaluated during detailed design.

5. CLOSURE

We trust that this information is sufficient for your needs. Should you require clarification of any item or additional information, please contact us at your convenience.

Yours truly,
Thurber Engineering Ltd.
Steven Coulter, M.Sc. P.Eng.
Review Engineer

Judy Mei, M.A.Sc., EIT
Project Engineer

Charles Ng, M.Eng., P.Eng.
Associate, Project Engineer

Attachments: Statement of Limitations and Conditions (1 page)
 Dwg. 30175-2 – Test Hole Location Plan (1 page)
 Test Hole Logs (6 pages)
 Plasticity Chart (1 page)
 Grain Size Distribution (1 page)



STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

- a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.
- b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.
- c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.
- d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.



LEGEND:
TEST HOLE / DCPT

NOTES:
1. BASE PLAN TAKEN FROM GOOGLE EARTH.
2. TEST HOLE LOCATIONS ARE APPROXIMATE.

THURBER ENGINEERING LTD.

CLIENT	WALLENIUS WILHELMSSEN SOLUTIONS
TEST HOLE LOCATION PLAN	
ANNACIS TERMINAL SIDE TWO RAIL EXTENSION	DELTA, BC

DESIGNED	DRAWN	APPROVED
AGW	MOM	
DATE	SCALE	
MARCH 1, 2021	1:2500	
PROJECT No.	DWG. No.	REV.
30175	2	0

LOG OF TEST HOLE

TEST HOLE NO.
21-2

LOCATION: See DWG. 30175-2
N 5447675, E 505344 (Est.)



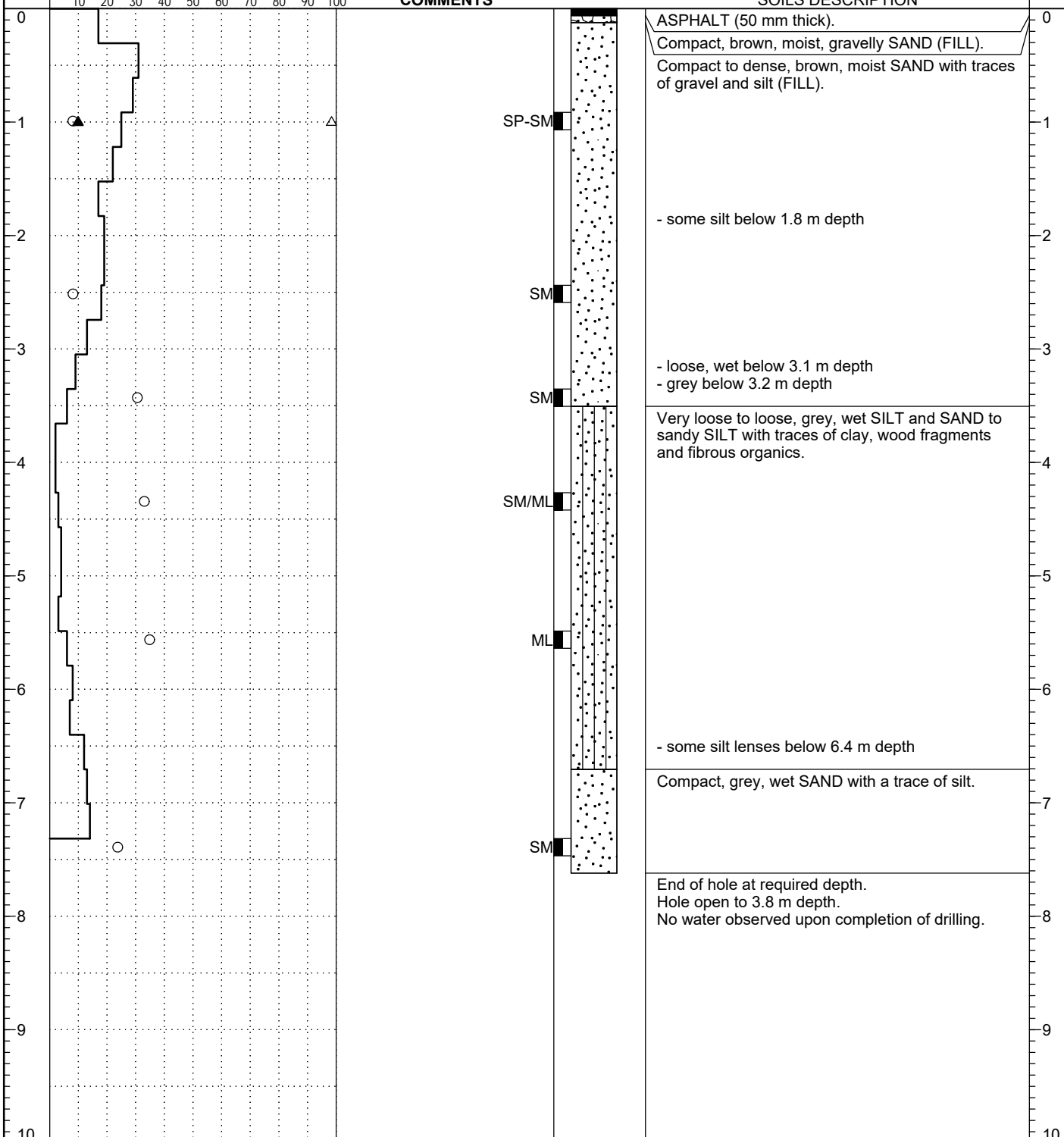
CLIENT: Wallenius Wilhelmsen Solutions
PROJECT: Annacis Terminal
Side Two Rail Extension

TOP OF HOLE ELEV:
METHOD: Solid Stem Auger / DCPT
DRILLING CO.: Southland Drilling Co. Ltd.
INSPECTOR: JM

DATE: February 22, 2021
FILE NO.: 30175
REVIEWED BY: CN

DEPTH (m)	PENETRATION (blows/300 mm)	WATER CONTENT (%) ○ Disturbed ● Undisturbed	WATER LEVEL ▼ Plastic Limit Liquid Limit	SAMPLES ■ Disturbed ■ Undisturbed ☒ No Recovery	UNDRAINED SHEAR STRENGTH (kPa) ◆ Peak ◇ Residual ◇ Remolded	GRAIN SIZE (%) ▲ Passing #200 sieve △ Passing #4 sieve	SOIL HEADSPACE READING (ppm) ■ GASTECH reading ⊗ PID reading	DEPTH (m)

LOG OF TEST HOLE (COORD EST) 30175.GPJ THURBER_MOM.GDT 1/3/21 - THURBER_MOM.GLB



LOG OF TEST HOLE

TEST HOLE NO.
21-3

LOCATION: See DWG. 30175-2
N 5447604, E 505318 (Est.)

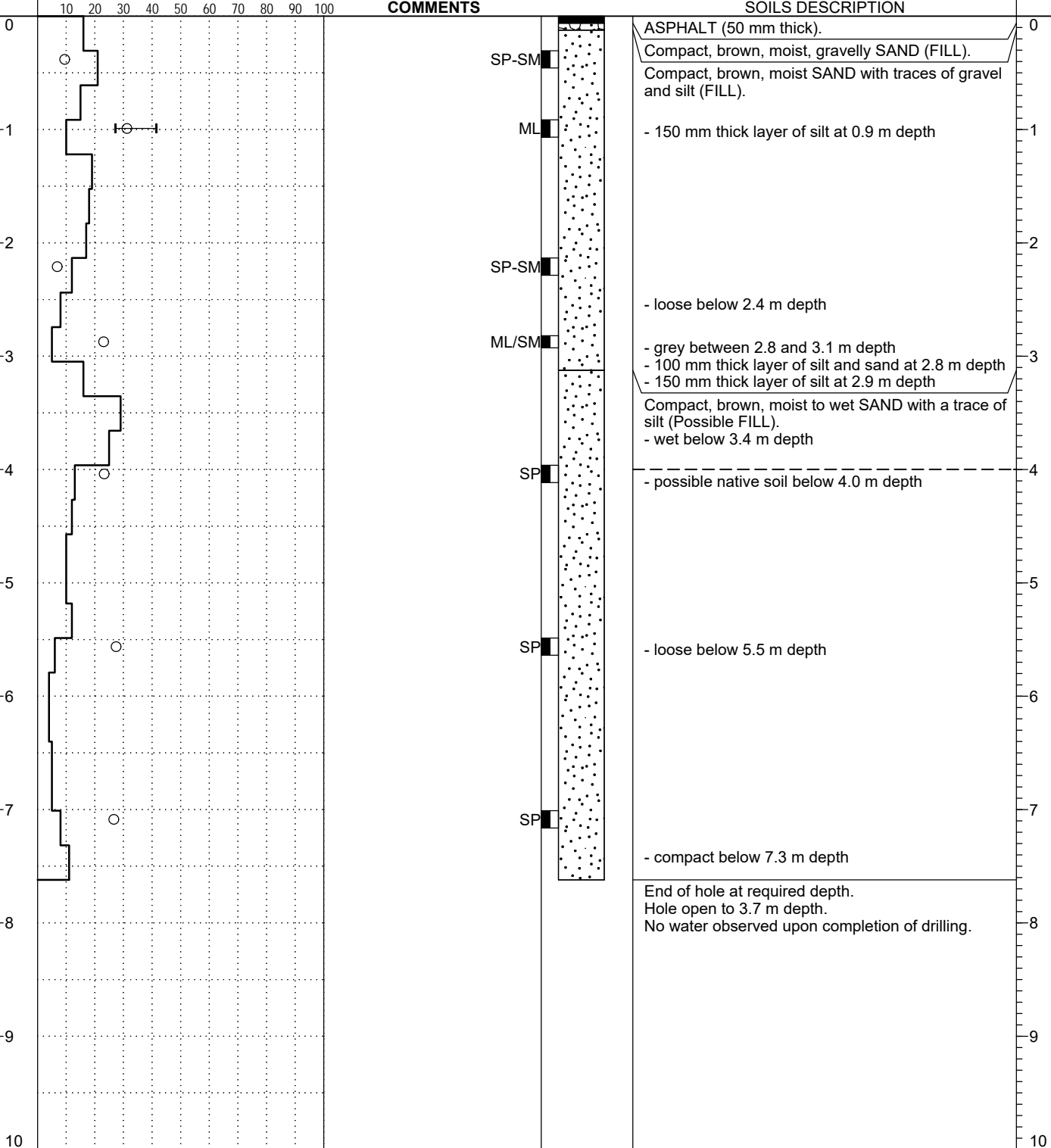


CLIENT: Wallenius Wilhelmsen Solutions
PROJECT: Annacis Terminal
Side Two Rail Extension

TOP OF HOLE ELEV:
METHOD: Solid Stem Auger / DCPT
DRILLING CO.: Southland Drilling Co. Ltd.
INSPECTOR: JM

DATE: February 22, 2021
FILE NO.: 30175
REVIEWED BY: CN

DEPTH (m)	PENETRATION (blows/300 mm)	WATER CONTENT (%)	WATER LEVEL	SAMPLES	UNDRAINED SHEAR STRENGTH (kPa)	GRAIN SIZE (%)	SOIL HEADSPACE READING (ppm)	DEPTH (m)
		○ Disturbed ● Undisturbed	Plastic Limit Liquid Limit	■ Disturbed ■ Undisturbed ☒ No Recovery	◆ Peak ◇ Residual ◇ Remolded	▲ Passing #200 sieve △ Passing #4 sieve	■ GASTECH reading ☒ PID reading	



LOG OF TEST HOLE (COORD EST) 30175.GPJ THURBER_MOM.GDT 1/3/21 - THURBER_MOM.GLB

LOG OF TEST HOLE

TEST HOLE NO.
21-4

LOCATION: See DWG. 30175-2
N 5447566, E 505333 (Est.)



CLIENT: Wallenius Wilhelmsen Solutions
PROJECT: Annacis Terminal
Side Two Rail Extension

TOP OF HOLE ELEV:

METHOD: Solid Stem Auger / DCPT

DATE: February 22, 2021

DRILLING CO.: Southland Drilling Co. Ltd.

FILE NO.: 30175

INSPECTOR: JM

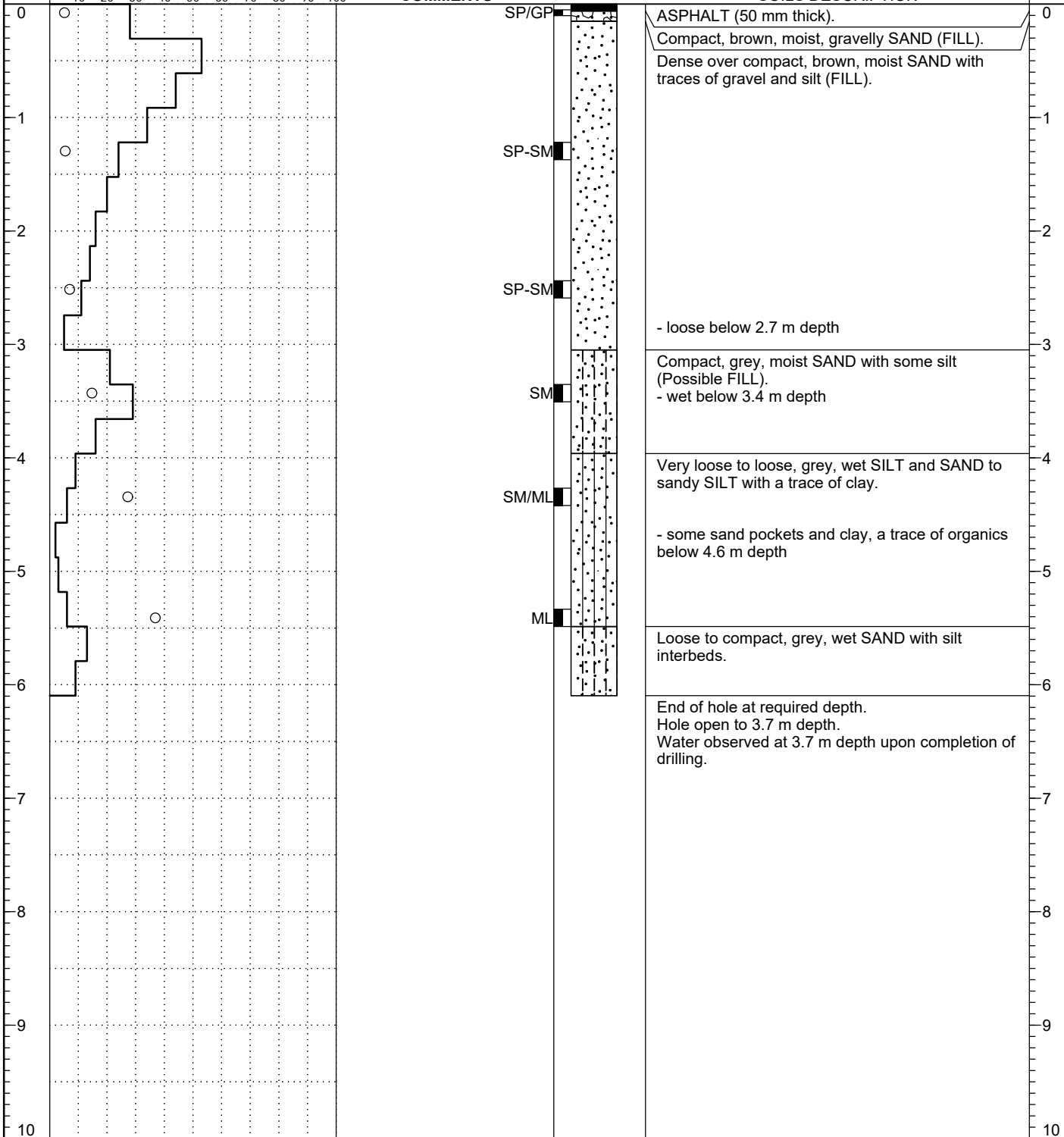
REVIEWED BY: CN

DEPTH (m)	PENETRATION (blows/300 mm)	WATER CONTENT (%)	WATER LEVEL	SAMPLES	UNDRAINED SHEAR STRENGTH (kPa)	GRAIN SIZE (%)	SOIL HEADSPACE READING (ppm)	DEPTH (m)
		○ Disturbed ● Undisturbed	Plastic Limit Liquid Limit	■ Disturbed ■ Undisturbed ⊠ No Recovery	◆ Peak ◇ Residual ◇ Remolded	▲ Passing #200 sieve △ Passing #4 sieve	■ GASTECH reading ⊞ PID reading	

COMMENTS

SOILS DESCRIPTION

LOG OF TEST HOLE (COORD EST) 30175.GPJ THURBER_MOM.GDT 1/3/21 - THURBER_MOM.GLB



LOG OF TEST HOLE

TEST HOLE NO.
21-5

LOCATION: See DWG. 30175-2
N 5447635, E 505353 (Est.)

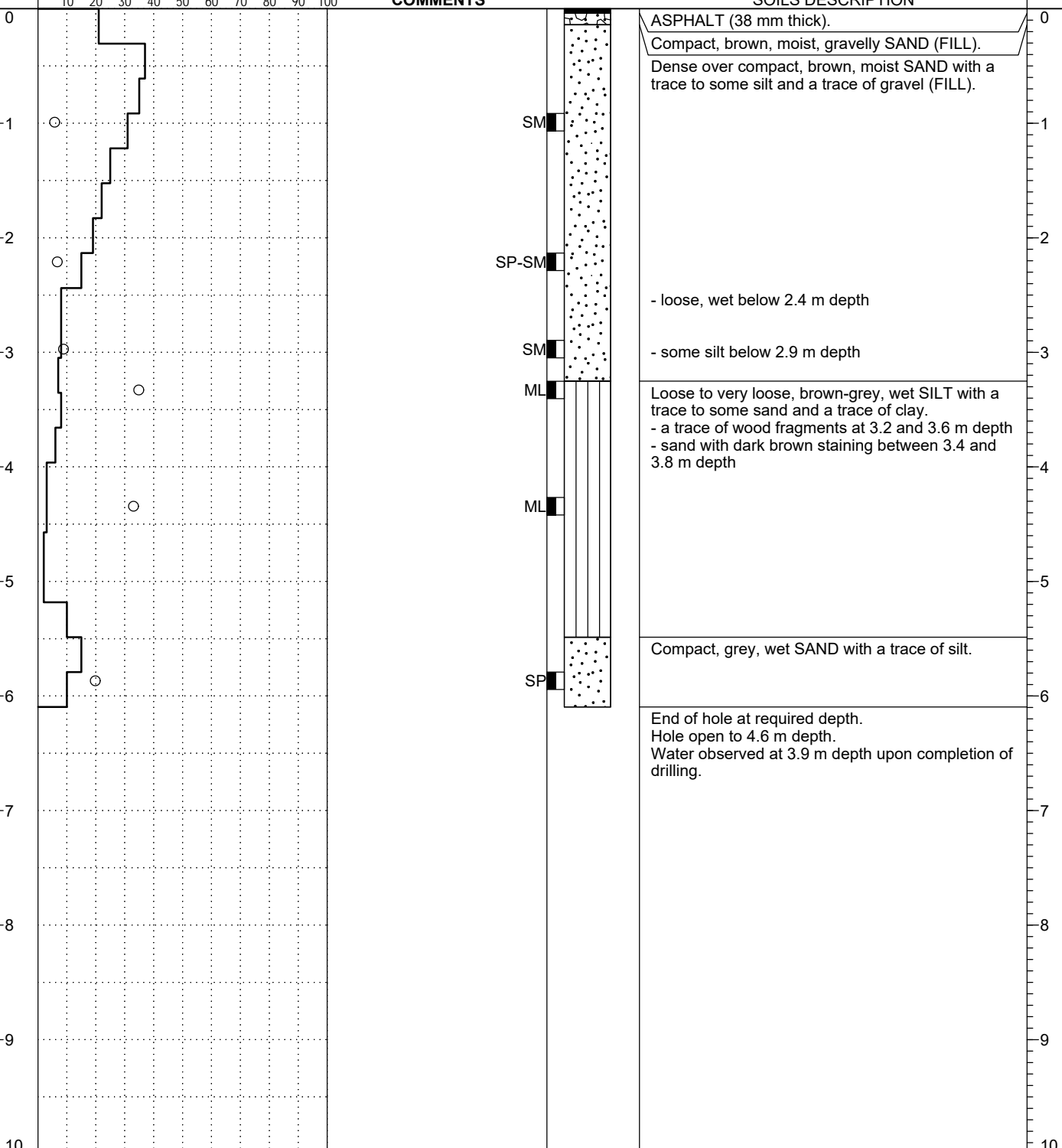


CLIENT: Wallenius Wilhelmsen Solutions
PROJECT: Annacis Terminal
Side Two Rail Extension

TOP OF HOLE ELEV:
METHOD: Solid Stem Auger / DCPT
DRILLING CO.: Southland Drilling Co. Ltd.
INSPECTOR: JM

DATE: February 22, 2021
FILE NO.: 30175
REVIEWED BY: CN

DEPTH (m)	PENETRATION (blows/300 mm)	WATER CONTENT (%)	WATER LEVEL	SAMPLES	UNDRAINED SHEAR STRENGTH (kPa)	GRAIN SIZE (%)	SOIL HEADSPACE READING (ppm)	DEPTH (m)
		○ Disturbed ● Undisturbed	Plastic Limit Liquid Limit	■ Disturbed ■ Undisturbed ☒ No Recovery	◆ Peak ◇ Residual ◇ Remolded	▲ Passing #200 sieve △ Passing #4 sieve	■ GASTECH reading ☒ PID reading	



LOG OF TEST HOLE (COORD EST) 30175.GPJ THURBER_MOM.GDT 1/3/21 - THURBER MOM.GLB

LOG OF TEST HOLE

TEST HOLE NO.
21-6

LOCATION: See DWG. 30175-2
N 5447788, E 505409 (Est.)



CLIENT: Wallenius Wilhelmsen Solutions
PROJECT: Annacis Terminal
Side Two Rail Extension

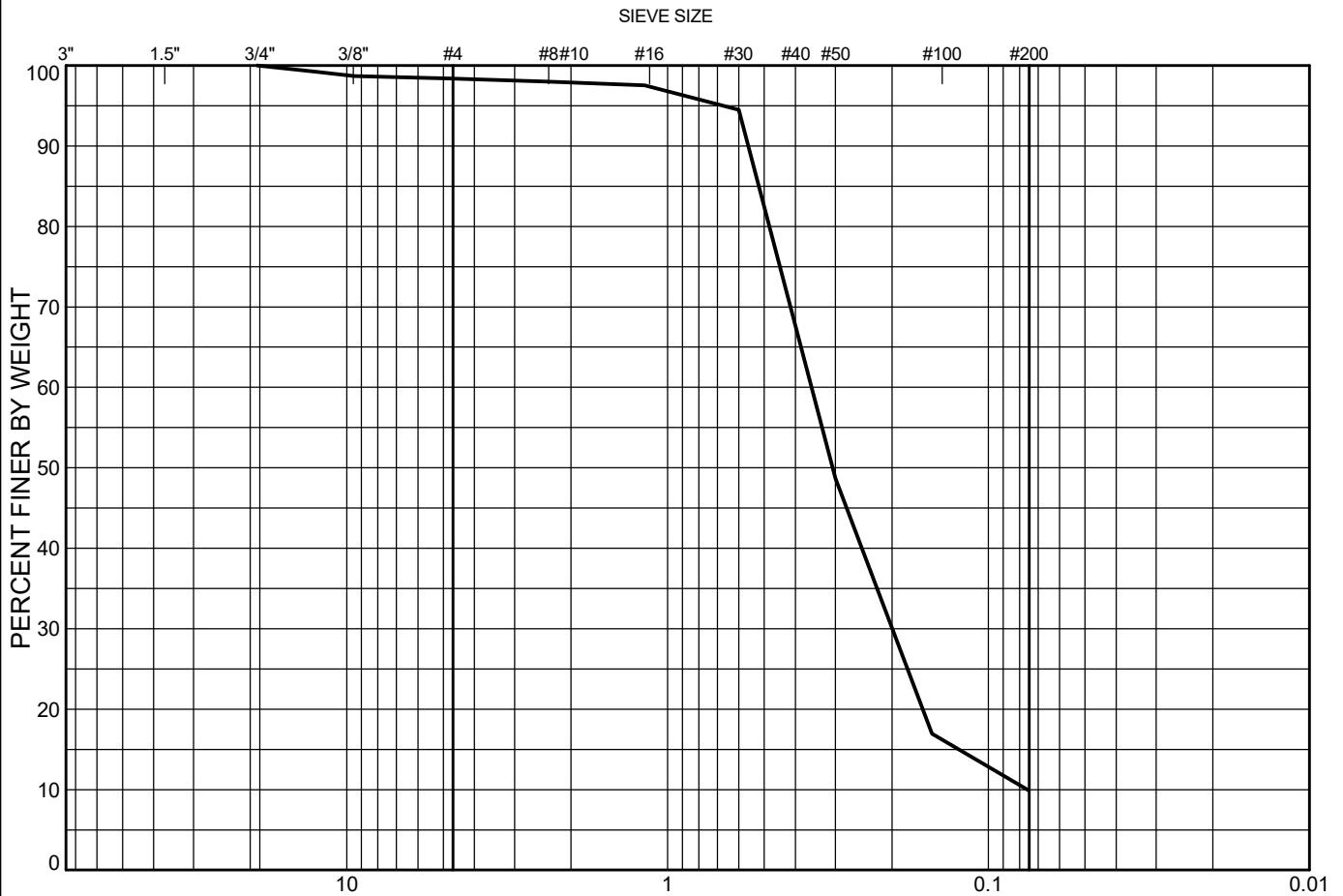
TOP OF HOLE ELEV:
METHOD: Solid Stem Auger / DCPT
DRILLING CO.: Southland Drilling Co. Ltd.
INSPECTOR: JM

DATE: February 22, 2021
FILE NO.: 30175
REVIEWED BY: CN

DEPTH (m)	PENETRATION (blows/300 mm)	WATER CONTENT (%)	WATER LEVEL	SAMPLES	UNDRAINED SHEAR STRENGTH (kPa)	GRAIN SIZE (%)	SOIL HEADSPACE READING (ppm)	DEPTH (m)
		○ Disturbed ● Undisturbed	Plastic Limit Liquid Limit	■ Disturbed ■ Undisturbed ☒ No Recovery	◆ Peak ◇ Residual ◇ Remolded	▲ Passing #200 sieve △ Passing #4 sieve	■ GASTECH reading ☒ PID reading	

DEPTH (m)	PENETRATION (blows/300 mm)	WATER CONTENT (%)	WATER LEVEL	COMMENTS	SOILS DESCRIPTION	DEPTH (m)
0					ASPHALT (38 mm thick).	0
0.5					Compact, brown, moist, gravelly SAND (FILL). Compact to dense, brown, moist SAND with a trace to some silt and a traces of gravel (FILL).	0.5
1.0				SP-SM		1.0
2.5				SP-SM	- loose, silty below 2.7 m depth Compact, brown, moist SAND with traces of silt and gravel (Possible FILL).	2.5
3.4					- grey below 3.4 m depth	3.4
4.5				SP-SM		4.5
4.8				ML/SM	- wet below 4.5 m depth Very loose to loose, grey, wet SILT with some sand to sandy and traces of clay and organics.	4.8
6.0				ML		6.0
7.0				ML		7.0
8.0					Compact, grey, wet SAND with silty seams.	8.0
8.0					End of hole at required depth. Hole open to 3.7 m depth. No water observed upon completion of drilling.	8.0

LOG OF TEST HOLE (COORD EST) 30175.GPJ THURBER_MOM.GDT 1/3/21 - THURBER MOM.GLB



GRAIN SIZE IN MILLIMETRES

GRAVEL		SAND			SILT
coarse	fine	coarse	medium	fine	

Sample Location: **21-2**
 Sample: 1
 Sample Depth: 0.9 m
 Date Sampled: February 22, 2021
 Sampled By: JM
 Date Received: February 23, 2021
 Date Tested: February 25, 2021
 Tested By: KM
 Test Method: ASTM C136 and C117
 Specification: _____

Gravel	1.6%
Sand	88.5%
Fines	9.9%
Moisture Content	8.1%
D10	0.076
D30	0.199
D60	0.356
Cu	4.70
Cc	1.47

Sieve Size	Percent Passing
inches	mm
3	75
1.5	37.5
0.75	19
0.375	9.5
#4	4.75
#8	2.36
#16	1.18
#30	0.6
#50	0.3
#100	0.15
#200	0.075

Description: SAND, trace of silt (SP-SM).

 Comments: _____

The results are for the sole use of the designated client only. This report constitutes a testing service only and does not represent any interpretation or opinion regarding the specification compliance or material suitability. Engineering interpretation will be provided by Thurber upon request.

GRAIN SIZE 30175.GPJ CAN_LAB.GDT 25/2/21 - THURBER BC.GLB



Thurber Engineering Ltd.
 #900 - 1281 West Georgia Street
 Vancouver, BC V6E 3J7
 Telephone: (604) 684-4384
 Fax: (604) 684-5124

GRAIN SIZE DISTRIBUTION

CLIENT: Wallenius Wilhelmsen Solutions
PROJECT: Annacis Terminal
 Side Two Rail Extension
FILE NO.: 30175