Owner: Village of Pemberton

(NAME OF OWNER)

Contract: Friendship Pedestrian Bridge

(TITLE OF CONTRACT)

Reference No. 2018-04

(OWNER'S CONTRACT REFERENCE NO.)

To All Tenderers:

Date: April 13, 2018

This addendum shall form part of the original documents for the above noted contract and all other segments of the contract shall remain in force except as noted below:

1. - Geotechnical Review Report

A geotechnical report has been prepared for this project and is included as Attachment #1 to this Addendum. The Contractor is should be aware that this report is for information only and that the Village of Pemberton has retained a geotechnical firm to complete the geotechnical review of the site for additional permitting requirements of the MoTI.

All tenderers shall acknowledge receipt of Addendum #3 (one (1) page) and the following Attachment:

 Attachment #1 – Preliminary Geotechnical Overview Report, Village of Pemberton Pedestrian Bridge Project (eight (8) pages)

by signing in the space provided and submitting this signed addendum including attachments with the tender. Tenders submitted without acknowledgment of this addendum may be considered incomplete.

| day of | , 2018 |
|--------|-----------|
| | |
| | Signature |
| | day of |

END ADDENDUM #3



PRELIMINARY GEOTECHNICAL OVERVIEW REPORT

Village of Pemberton
Pedestrian Bridge Project

Reference No: 2016-01

Prepared for: Village of Pemberton



Prepared by: DWB Consulting Services Ltd.

Prince George Division 1579 – 9th Avenue Prince George BC V2L 3R8 250.562.5541 | www.dwbconsulting.ca

Date: 01.08.2017 | DWB file: 1762-147 | Revisions: 2







Signature Page

DWB Consulting Services Ltd. is pleased to submit this report for your review. This report has been prepared using sound technical and professional judgement, based on our knowledge and experience, applicable regulatory framework, industry best management practices, and current understanding of project conditions, design, and project setting.

Report Title:

Geotechnical Report - Village of Pemberton Friendship Trail Bridge Project

Prepared For:

Village of Pemberton

Revision:

2

Written By:

Adel Alwaily, MASC PFne

Reviewed By:

fodd Wambolt, REng., Megan Lavoie, EIT.

| | | REVIS | SION HISTORY |
|------------|---------|--------------------------|-----------------------------|
| Date | Version | Review Type ¹ | Reviewed by (Name, Company) |
| 30/06/2017 | DRAFT | EDITORIAL | DWB |
| 11/07/2017 | 1 | Professional Review | DWB |
| 01/08/2017 | 2 | Client Review | Dan Estey, ISL |
| 09/30/2017 | 2 | Owner Review | Village of Pemberton |
| | | | |
| | | | |

¹ Editorial Review: Reviewed for formatting, grammar, spelling, etc. Professional Review: Reviewed for content and professional signoff

Client Review: Reviewed by client Owner Review: Reviewed by owner

Regulatory Review: Reviewed by regulatory agency (i.e. DFO) if necessary

Peer Review: Reviewed for content and errors by peer

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| | CLOSURE | |
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1.0 INTRODUCTION

The Village of Pemberton is planning to build a new pedestrian/cycling bridge south of the highway 99 Red Bridge No. 443. DWB Consulting Services Ltd. (DWB) was retained by Village of Pemberton to design the new bridge. The new bridge will be built on two steel pipe pile piers in the water, one out of current wetted area and two abutments. This report provides the foundation engineering recommendations for the foundation design and the slope stability analysis for the bridge abutments.

2.0 INFORMATION AND SITE INVESTIGATION

The bridge pile foundation design is based on the borehole logs for Red Bridge No. 443 provided by the client as shown in Appendix A. Seven soil samples have been taken from the bridge location to understand the surface soil classification and sieve analyses for the samples can be found in Appendix B.

The scope of work for this assessment includes the following:

- 1- Pile analysis and design for the proposed new pedestrian/cycling bridge.
- 2- Abutment slope stability analysis.

From bore holes logs, and for simplicity, the soil profile has been modeled as two layers of soils as described in Table 1 and pile capacity is summarized as shown in table 2 below.

Table 1: Soil Properties used in Pile Design

| Layer | Soil Description | Thickness | Soil Unit weight | Soil Friction Angle | Soil Cohesion |
|---------|------------------|-----------|------------------|---------------------|---------------|
| | | (m) | (γ)(kN/m3) | (φ) (Degree) | (c)(kPa) |
| Layer 1 | Sandy SILT | 8.0 | 20.3 | 29.8 | 29.9 |
| Layer 2 | Compact SAND | 20.0 | 19.2 | 36.8 | 0.0 |

Table 2: Pile Capacity using 406 x 16mm Piles

| Pile Size | Pile | Pile End | Pile Ultimate | Pile Allowable | Pile Lifting |
|-------------|-------------|-----------|---------------|----------------|---------------|
| | Penetration | Condition | Capacity (kN) | Capacity (kN) | Capacity (kN) |
| | depth (m) | | | | |
| 406φ x 16mm | 26m | Closed | 3,700 | 1,850 | 1,465 |
| 406φ x 16mm | 16m | Open | 1,395 | 698 | 756 |

3.0 ENGINEERING ANALYSIS AND RECOMMENDATIONS

The bridge was modeled and analyzed using STAAD Pro software. The structure was designed to ensure strength and serviceability necessary to resist the applied loads in accordance with the applicable building code and the Canadian Highway Bridge Design Code. Appropriate load combinations will be applied according to the 2014 Canadian Highways Bridge Design Code, the pile applied load is shown in Table 3

Table 3: Piles Loading

| | | Piles | |
|---------------------------------------|----------------|----------------|----------------|
| | Abutments | Pier 1 | Pier 2&3 |
| Forces (kN) | Vertical piles | Vertical piles | Vertical piles |
| | 2.4m Spacing | 4.0m Spacing | 4.0m Spacing |
| Service Load (SLS) | 234 | 697 | 697 |
| Ultimate Load (ULS) (Long Term) | 330 | 980 | 980 |
| Ultimate Load (ULS) (Short Term) | 353 | 1,677 | 1,300 |
| Ultimate Load (Uplift) (Short Term) | 14 | 561 | 402 |
| Pile Design | | | |
| Pile Size (mm) | 406φ x 12 mm | 406φ x 16 mm | 406φ x 16 mm |
| Pile Penetration Depth (m) | 20* | 30* | 26 |
| Pile End (Open / Close) | Open | Closed | Closed |
| Geotechnical Capacity (kN) | | | |
| Compression (Ultimate) | 1,395 | 3,700 | 3,700 |
| Uplift (Ultimate) | 756 | 1,465 | 1,465 |
| Compression (Allowable) | 698 | 1,850 | 1,850 |
| Settlement | 1.0 mm | 3.0 mm | 3.0 mm |
| Geotechnical Resistance Factor | | | |
| Service Load (SLS) / Code Limit | 0.34 | 0.38 | 0.38 |
| Ultimate Load (ULS) (Long Term) | 0.24 | 0.26 | 0.26 |
| Ultimate Load (ULS) (Short Term) | 0.25 | 0.35 | 0.35 |
| Ultimate Load (Uplift) (Short Term) | 0.02 | 0.27 | 0.22 |
| Status (As per CHBDC S6-14-Table 6.2) | PASS | PASS | PASS |

Note:-

The pile driving will be performed by using a 6,000lb drop hammer. Pile driving criteria is as shown in Table 4 below:

Table 4: Piles Driving Criteria Using 6,000lb Drop Hammer

| Pile Driving Criteria | 8 | Piles | |
|-----------------------------------|----------|----------|------------|
| | Abutment | Pier 1 | Pier 2&3 |
| Hammer Drop Distance (m / ft) | 1.52 / 5 | 2.13 / 7 | 1.98 / 6.5 |
| Pile Set (Blows/inch) | 4 | 10 | 8 |
| Pile Stress Ratio (WEAP Analysis) | 88% | 92% | 83% |

^{*} Including 4.0m scour

4.0 SLOPE STABILITY ASSESSMENT

1- West Abutment:

The abutment in general is flat; therefore no slope stability assessment is required.

2- East Abutment:

Slope stability assessment has been carried out using the soil samples collected from the east abutment pits (E1, E2, and E3).

The local slope stability assessment shows that the achieved mean safety factor for the abutment and the gravel trail are 1.60 and 1.89 respectively. Both exceed the minimum required mean safety factor of 1.5.

The required side slope for the abutment and the trail as shown in the figure 1 below.

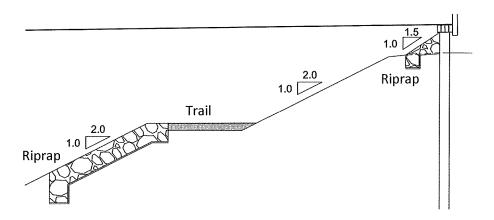


Figure 1: Minimum Side Slope Requirement (Matching Existing Slope)

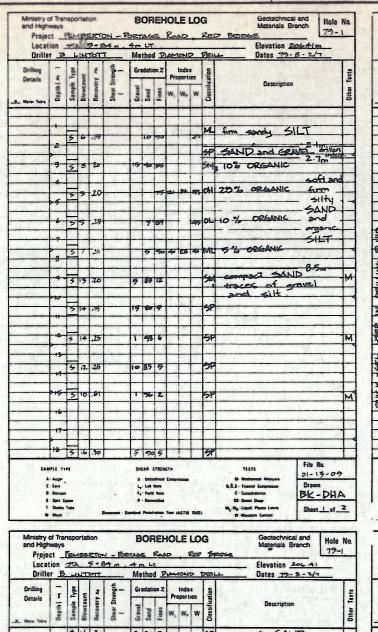
5.0 CONSTRUCTION REVIEW

To be completed

6.0 CLOSURE

To be completed

Appendix A Bore Hole Logs



| Ministry of and High Projes | ways | | | | N - P6 | | | | HOL | | | | Geotechnical and Materials Branch 79-5 | |
|-----------------------------|-------------------|--------|--------|----------|----------|--------|-------|-------|-----------------------|------|-----|-----------|--|---|
| | | | | | 9 m. | | | | | | _ | | Elevation 206.36 | |
| Drille | 2 | 1 | | 7 | - | | | | | | | | Dates 79-7-2-7/2 | Т |
| Drilling Details | = | Type | nut. | 3 | Strength | Gr | adati | m Z | Pro | inde | 100 | ation | | |
| S. Water Table | Depth (| Sample | Blawco | Recevery | Shear S | Gravel | Sand | Fines | Pro W _L | w, | w | Classific | Description | |
| | | - | | | | F | | | | | | | loose GRAVEL, drillers inter. | - |
| | + | | | | | 1. | - | - | | - | | | 1.7 % | ŀ |
| | 3 | > | 8 | .20 | | - | 7 | ~ | 7 | - | 24 | ~ | 5% organic 12m | l |
| -, | , | - | | .34 | | | | 90 | 77 | 77 | 67 | OH | 20% organic | |
| | _ | 12 | - | | | - | - | - | - | | _ | | Soft to | L |
| | + | | - | | | + | - | - | | - | - | | - Sim | ŀ |
| | | 5 | 2 | 20 | | | 15 | Bo | | | * | ML | 5% organic Sandu | 1 |
| | _ | | | | | | | | | | | | SILT | L |
| | 6 | 3 | 9 | .70 | | + | 49 | 97 | - | | 10 | ML | 7121 | 1 |
| <u> </u> | | | | | | - | - | - | | | | | | ŀ |
| | | | | | | | | - | | | M | M | 5% organic | t |
| | 0 | 3 | 3 | ٠,٦ | | | 7 | _ | | | | | | |
| 2 | | | | | | - | _ | _ | _ | - | | | 8.4 | ŀ |
| 3 | 4 | 5 | 16 | .70 | | - | 60 | 40 | - | | | | compact withy SAND | 1 |
| X | | | | | | | | | | | | | | l |
| | | 3 | 21 | | | - | | | | | | 40 | drillers interpretation | |
| 2 | ++- | F | - | | | - | | - | - | | | | | ŀ |
| | | | | | | - | | - | | | | | | ŀ |
| | 12 | 5 | 16 | 20 | | 1 | 75 | 6 | | | | P | compact SAND some | 1 |
| | 19 | | | | | _ | | | | | | | with fine gravel | |
| | | 5 | 19 | 20 | | 17 | 80 | 5 | | | | 20 | some silf | H |
| | - | | | | | 1 | | | | | | | | H |
| 4 | 15 | | | | | | | | | | | | | |
| 3 | | 3 | 14 | .20 | | 19 | 20 | 2 | | | | × | | 1 |
| | 16 | - | - | | | - | | | | | | | | H |
| | - | | | | | | | | | | | | | |
| | 10 | | | | | | | | | | | 8 | dense layer | ŀ |
| | | | 7 | -05 | | _ | 55 | | | | | 4 | File No. | |
| | PLE 11 | | | | | | AA S | | | | | | 16575 |) |
| c | Acqui . Core | | | | | L | - | - | - | | | | 0.6.5 - Transi Companies Drawn | |
| | Onnega Spin Sq | | | | | | Fett | | | | | | S does buy | |
| 1 | Sheder Sheder | | | | | | | _ | Tens of | 5700 | - | | to the last Paretters Short 1 of 2 | |
| | _ | - | - | | | | _ | _ | | | | | U Martin Carta | |

| Drilling | - | T | | E | _ | 1 | otho | | 1 | Inde | _ | T | Uates #6/ | 05/9-10 |
|-----------------|--------------------------|-----------|-------|-------------|-------------|-----|--------------|------|---------|-------|--------|----------------|--|-------------|
| Details | Depth (my | sple Type | MEGUN | Recovery (P | ar Strength | - | T | | Pr | opert | ies | Classification | Description | |
| Water Table | Oep | San | Blox | Rec | Shear | Gra | Sand | Fine | W | W, | W | 8 | | |
| | | 上 | | | | | | | | | | EP | Daller report | ts ravel |
| | - | 3 | 10 | .05 | | 15 | 15 | 75 | | _ | - | _ | | 15 |
| | - | İ | | | | 1 | - | | - | - | - | UM | 52 DEGANIC fin | 1AV |
| | 7 | 4 | 9 | 25 | | _ | 76 | 25 | | | | 5M | | |
| ▽ | | ۲ | - | | | - | 1/3 | 27 | - | - | - | \vdash | loose sitty | SAND |
| | - | - | 10 | 0 | | | | | | | | | | - 4.3 |
| | 5 | 1 | 100 | - | | - | - | - | - | - | - | (22) | Daller reports | |
| | - | 1 | | | | | | | | | | | 5% armonic s | oft sandy |
| | - | 3 | 17 | 35 | | - | 10 | 85 | - | - | 61 | OH | | nic CLAY |
| | | E | | | | | | | | | | | | 70 |
| | 8 | 3 | 4 | -35 | | | 2 | 72 | 57 | 36 | 77 | ML | soft to firm | sandy SI |
| | | | | | | - | - | | - | - | | | and sandy on | BANIC CLA |
| | 7 | 3 | 6 | 30 | | | | 55 | ~ | 77 | 58 | 맲 | | -9.3- |
| | 10 | | - | | | - | - | | - | | - | | very sandy | SIL |
| | - | 5 | n | 23 | | 10 | 85 | 5 | | | | 10 | loose to Co | omoact |
| | _ | | | | | - | - | - | - | - | | | | |
| | 12 | 5 | 9 | -20 | | 9 | 20 | 5 | | | | 50 | sitty , grave | III SAND |
| | 15- | - | | | | - | - | | _ | | | | | |
| | | 3 | 15 | .20 | | 5 | 85 | 10 | | | | 1 | | |
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| | PLE TY | Pt | | | | | AB 5 | | | | | | TESTS | File No. |
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| 3 | Spir Sp | | | | | | Feld Rene | | | | | | C - Constitution DS - Darset Shop | BK- DHA |
| | Shorty 1 Short | | | | | - | Person | - | leer to | 15TH | 15.00) | | W ₁ , W ₂ - Legard , Planter Lands W - Ministern Contains | Sheet_ef_ |

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| Oritling Octavis | - 1 | ple Type | tount | Recovery As | Strength | - | Gradatio | | | index operties | | Classification | Description | | |
| _ Water Table | Depth | Sam | Blow | | Shear | Grave | Sand | Fine | WL | w, | W | Cless | | Other | |
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| | 10 | | | | | | | | | | | | and silt | + | |
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| | 25 | | | | | | | | | | | | | | |
| | 24 | | | | | | | | | | | | | | |
| | 25 | 3 | 21 | .50 | | 6 | 90 | 6 | | | | 40 | | | |
| | 26 | | | | | | | | | | - | | | F | |
| | 27. | | | | | | | | | | | | | + | |
| | 20 | 5 | 19 | 30 | | | 94 | 6 | | | - | 50 | | M | |
| | 29 | | | | | | | | | | | | | | |
| | 30 | | | | | | | | | | | - | | | |
| | 31 | 5 | 20 | .61 | | - | 95 | 5 | | | - | P | | - | |
| | 32- | | | | | | | | | | | | | | |
| | 77 | | | | | | | | | | - | - | | | |
| | 34 | 5 | 20 | .30 | | 10- | 65 | 5 | | | 1 | 8 | | | |
| | 35 | | | | | | | | | | 1 | 1 | • | \pm | |
| - | 36 | 3 | 72 | -30 | | | 91 | 9 | | | | CP SM | | М | |
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| | Spir Sp Shelby | | | | | * | Arms | wided | | | | | 95 Brest Sheer W ₁ , W ₂ - Input Plants Limits Sheet 2 | | |

| Ministry and High Proje | ways | | | | J - Pa | | | | | EL | | | SELDES. | Geotechnical and Materials Branch | Hole No. 79-5 |
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| | | | | | 9 . | 100 | L | 1 | | | | | | Elevation 206-5 | |
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| Drilling Details | E | Sample Type | lene | 2 | Strength | - | edeti | on X | | Index | | ication | | Description | Tests |
| St., Water Febre | Depth (| Sampl | Blowcount | Recovery | Shear | Gravel | Sand | Fines | Wt | W, | w | Classification | | | Other |
| | | 2 | 40 | .25 | | 15 | 35 | 10 | - | | | X | dense | layer | |
| | 19 | - | - | | | + | - | - | _ | 1 | _ | 3 | comea | SAND | |
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| 79 8 2 | 20 | | | | | + | - | - | - | - | - | | Brone | - some 5 | AR . |
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| | 35 | | | | | | | | | | | | | | |
| | 34 | 5 | 44 | .20 | | 9 | 13 | 18 | | | | SM | dens | - layer | M |
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| | 26 | 3 | 22 | -61 | | | 99 | 4 | | | | 4 | - 1121 - | - | |
| | Auger | ME | | | | | AR S | | | | NC | 0 | F HOLE | 10-1 | Na 3-09 |
| | Core | | | | | 4 | [20 U | - | | | | | Q.E.S - Treampl | Compressor Draw | |
| 5 | Spirt Sp | | | | | | Field Same | | | | | | C - Consolid DG - Duract SI | | DHA |
| | Shelby I Wesh | ube | | - | recount - Sta | | - | | | | | | W Wy Least P | | 2012 |

| Ministry and High Proje | ways | | | | DN - F | | | | 101 | | | | | hnical and is Branch | Hole No |
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| | 21 | 4 | 2 | 20 | | | 25 | 5 | | | | 58 | | | - |
| | 22 | É | | | | | | | | | | | compact | aithe | |
| | - | - | | | 35 | | | | | | | | | | |
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| 1 | 24 | | | | | | | | | | | | | T. Carlo | |
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| | 51- | 5 | 19 | 20 | | | 27 | 5 | | | | 57 | | | |
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| | 32 | | | | | | | | | | | | | | |
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| | 34 | 5 | 24 | .29 | | | 45 | 5 | | | | 30 | | | |
| | 35 | | | | | | | | | | | 1 | | | |
| | | H | - | - | | - | - | | - | - | - | - | | | - |
| | 76 | 5 | 27 | .25 | | | 45 | 36 | - | - | - | 54. | | | - |
| | 94.9 PLE 141 | _ | | | | | 29 \$ | TOTAL S | | | OC | HOL | | File I | Na. 3-09 |
| c | Core | | | | | W | Lab 1 | 900 | Compre | opiese . | | | M. Machanical Analysis Q.R.S. Trianal Compression | Draw | |
| | Denisen Spir Sp | | | | | | Field Remo | | | | | | C - Concol-dorson DS- Direct Shear | BK. | PHA |
| | Shelbe ! | ube | | | mesent Sta | * | Panato | nten 1 | | | - | | W _L W _p - Legard Plastic Limits W - Mojeture Content | Sheet | 2 01 2 |

SOIL CLASSIFICATION

| MA | ISIONS | SYMBOL | SOIL TYPE | | | | | |
|----------------------|----------------------------|--|---|--|--|--|--|--|
| | 9 | GW | WELL-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES | | | | | |
| | GRAVEL & GRAVELLY SOIL | GP | POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES | | | | | |
| COARSE GRAINED SOILS | GRAN | GM* | SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES | | | | | |
| MINED | 0 | ec. | CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES | | | | | |
| SE GA | | sw | WELL-GRADED SANDS OR GRAVELLY SANDS. LITTLE OR NO FINES | | | | | |
| COAR | SAND & SANDY SOILS | SP | POORLY-GRADED SANDS OR GRAVELLY SANDS LITTLE OR NO FINES | | | | | |
| | SANDY SC | SM* | SILTY SANDS SAND-SILT MIXTURES | | | | | |
| | 2.6 | ac. | CLAYEY SANDS SAND-CLAY MIXTURES | | | | | |
| OILS | 450 <50 | ML | INORGANIC SILTS AND VERY FINE SANDS, ROC FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY | | | | | |
| | SILTS AND CLAYS L.L.<50 | α | INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS | | | | | |
| NED 8 | CLA | OL | ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY | | | | | |
| FINE GRAINED SOILS | SILTS AND CLAYS L.L.>50 | МН | INORGANIC SILTS, MICACEOUS OR DIATOM- ACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS | | | | | |
| Œ | ILTS / | СН | INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS | | | | | |
| | 2 | ОН | ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS | | | | | |
| OR | GANIC ILS | Pt | PEAT AND OTHER HIGHLY ORGANIC SOILS | | | | | |
| то | PSOIL | TS | TOPSOIL WITH ROOTS, ETC. | | | | | |
| co | BBLES | SB | ROCK FRAGMENTS AND COBBLES, PARTICLE SIZE 75 mm TO 300 mm DIAMETER | | | | | |
| 3 00 | LDERS | LB | BOULDERS, PARTICLE SIZE OVER 300 mm IN DIAMETER | | | | | |
| | GM ₂ ; G | C ₁ ; SM ₁ ; S C ₂ ; SM ₂ ; S | SC ₂ : 20 - 30% passing No. 200 since | | | | | |
| | - | C ₃ ; SM ₃ ; S C ₄ ; SM ₄ ; S | 3C ₅ ; 30 – 40% 3C ₆ ; 40 – 50% | | | | | |

| | | | | | 1 | | | |
|------|---|---|---|----------------------------------|---|--|--|--|
| Date | | REVISIONS | | | | | | |
| | | BRANCH | R | 92091 | - | | | |
| | | HNICAL & MATERIALS | INDEX | MEG. WO. | - | | | |
| | P | REPARED BY: | | DRAWING | N | | | |
| | P - Pitcher Sampler S - Split Spoon T - Shelby Tube W - Wash | R - Remoulded woount - Standard Penetration Test | | d Plastic Limits ture Content | | | | |
| | D - Denison | F _v - Field Vane | C - Con | | | | | |
| | A - Augur C - Core | U - Unconfined Compression L, - Lab Vane | M - Mechanical Analysis Q RS - Triaxial Compression | | | | | |
| | SAMPLE TYPE | SHEAR STRENGTH | TESTS | | | | | |

PREPARED UNDER THE DIRECTION OF DATE SCALE

26.07.14

BRIDGE ENGINEERING BRANCH

DRAWN DHA SHOLOG CHECKED

NEG No

DATE DRAWING No.

NORTH VANCOUVER DISTRICT PEMBERTON PORTAGE ROAD RED BRIDGE BOREHOLE DATA - SHEET I

> DATE ACCEPTED FOR CONSTRUCTION MGEISTAN SHEOTON OF ENGA

DRAWING NO. INDEX NEG NO. SHT NO. R 92091 1 ort

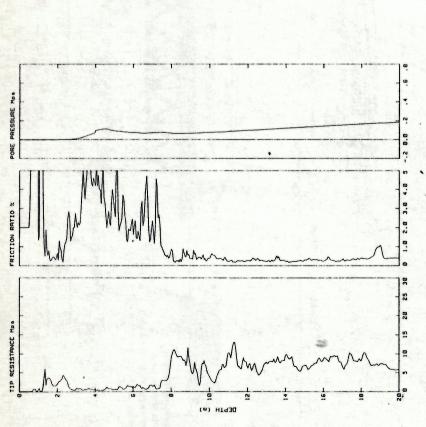
Ministry of Transportation CONE PENETROMETER LOG Georgenhical and HOLE NO and Highways

Project RED BRIDGE

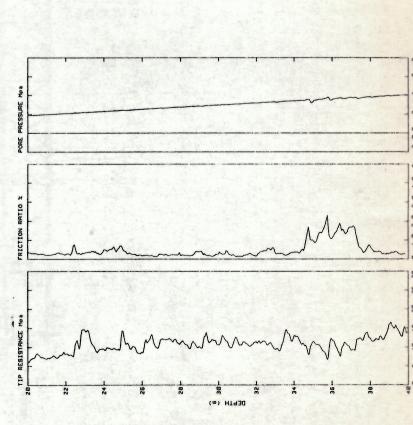
Frie No Location SIN: 5 + 67 0/5: 0.4 n. RT

Engineer IOM OXLAND

Date 64/21/96 14:37



| HOLE NC 86-01 | 4:37 | ě |
|--|--|--------------------|
| Geotechnical and Materials Branch | Elevation 2005 905 Date 04/21/86 14:37 | PORE PRESSURE MP a |
| | t I | HT10 x |
| CONE PENETROMETER LOG | 0/5: 0.4. F | FRICTION RATIO X |
| | Location STN: 5 + 65 0/S: 0.4. RT Engineer TOM OXLAND | 4 5 |
| Min.stry of Transportation and Highways Project RFD BRIDGE | Location STN: 5 + 67 Engineer TOM OXLRND | TIP RESISTANCE Has |



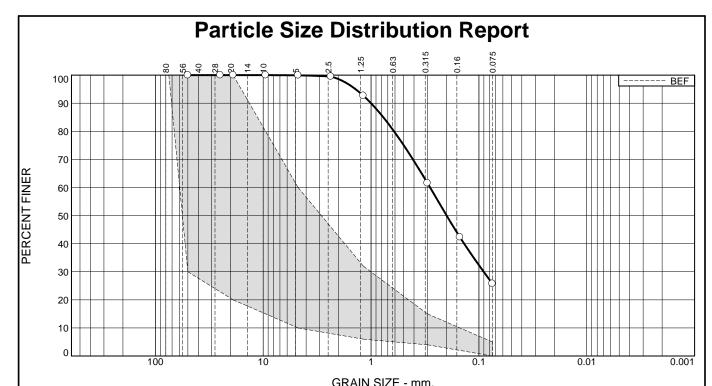
SOIL CLASSIFICATION

| SOIL TYPE | AVELS OR GRAVEL-SAND OR NO FINES | GRAVELS OR GRAVEL-SAND OR NO FINES | GRAVEL-SAND-SILT | GRAVEL-SAND-CLAY | NDS OR GRAVELLY SANDS. | SANDS OF GRAVELLY SANDS. | 1ES | RES | AND VERY FINE SANDS, ROCK CLAYEY FINE SANDS OR H SLIGHT PLASTICITY | S OF LOW TO MEDIUM VVELLY CLAYS, SANDY AYS, LEAN CLAYS | 0 | MICACEOUS OR DIATOM- IDY OR SILTY SOILS. | OF HIGH PLASTICITY. | OF MEDIUM TO HIGH ANIC SILTS | AND OTHER HIGHLY ORGANIC SOILS | ROOTS, ETC. | S AND COBBLES, PARTICLE | CLE SIZE OVER 300 mm | | nameiro Mr. 200 ainea | |
|-----------|-------------------------------------|---------------------------------------|------------------------------|----------------------------|------------------------|---------------------------------|-----------------------------------|---------------------------------|--|--|---------------|---|------------------------------|-------------------------------------|--------------------------------|-----------------|-------------------------------------|----------------------------------|-------------|-----------------------|--|
| | WELL-GRADED GR MIXTURES, LITTLE | POOPLY-GRADED MIXTURES, LITTLE | SILTY GRAVELS, G MIXTURES | CLAYEY GRAVELS MIXTURES | WELL-GRADED SAN | POOPLY-GRADED LITTLE OR NO FINE | SILTY SANDS SAND-SILT MIXTURES | CLAYEY SANDS SAND-CLAY MIXTURES | FLOUR, SILTS AN CLAYEY SILTS WITH | ASTICITY, GRAAYS, SILTY CL | GANIC SILTS A | ACEOUS FINE SAN ELASTIC SILTS | INORGANIC CLAYS FAT CLAYS | ORGANIC CLAYS O PLASTICITY, ORGA | PEAT AND OTHER | TOPSOIL WITH RO | ROCK FRAGMENTS SIZE 75 mm TO 300 | BOULDERS, PARTICL IN DIAMETER | SC,: 12-20% | SC2; 20-30% | SC ₅ ; 30 - 40% SC ₄ ; 40 - 50% |
| SYMBOL | GW. | 90 | GM. | .29 | SW | ds | SM | sc. | M. | ರ | 8 | ¥ | 8 | 8 | 2 | TS | 8 | 9 | .; SM; | SM2: | S. SM. |
| MAJOR | s. | TA RON | | | | SOIFS | | | | SOILS SOILS | IS | C > 50 ND NE GEV | NETS A | | ORGANIC | TOPSOIL | COBBLES | BOULDERS | . GM,: GC,: | GM2: GC2: | GM, GC, |

| TESTS | O R S - Triaxial Compression C - Consolidation D S - Direct Shear W _L W _p - Liquid Pleatic Limit W - Mosture Content | DRAWING NO. | INDEX NEG NO. | | R 92092 Las | \$1 | |
|----------------|---|-------------|---------------|--------------------------|-------------|-----------|-------------|
| SHEAR STRENGTH | U - Unconfined Compression M - Me L, - Lab Vane F, - Faid Vane C - Co R - Remouded DS - Din W - Lop W - Mo Domount - Standard Panatration Test (AST M 1566) | | PHEPAHED BY: | GEOTECHNICAL & MATERIALS | BRANCH | REVISIONS | Description |
| SAMPLE TYPE | A - Auger C - Core D - Denison P - Phorer Sampler S - Sull Spoon T - Shelby Tube W - Weeth | | | GEOTEC | | | Dete |

| PREPARED UNDER THE DIRECTION OF DATE SCALE | DATE | SCALE | | NEG No | |
|--|----------|---------------------------|------------------|-----------------|---------|
| NATURAL OSCINCAL CHARGE | 86.06 | DRAWN THA | 00 | 6/04/06 CHECKED | |
| PECOMMENDED | DATE | ACCEPTED FOR CONSTRUCTION | MON | DATE | DRAWING |
| 2. C. Johnson | 21.02.14 | MCELETA ERECTOR OF E | Consideration of | 500 | 443-2 |
| | | | | | |

Appendix B Sieve Analysis



| | | | | INAIN OIZE - | 111111. | | | |
|-----------|--------|------|--------|--------------|---------|---------|------|--|
| % Cobbles | % Gı | avel | % Sand | | | % Fines | | |
| % Cobbles | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay | |
| 0.0 | 0.0 | 0.1 | 1.3 | 27.6 | 45.2 | 25.8 | | |

| | TEST RI | ESULTS | |
|---------|---------|--------------|----------|
| Opening | Percent | Spec.* | Pass? |
| Size | Finer | (Percent) | (X=Fail) |
| 50 mm | 100.0 | 30.0 - 100.0 | |
| 25mm | 100.0 | | |
| 19mm | 100.0 | 20.0 - 100.0 | |
| 9.5mm | 100.0 | | |
| 4.75mm | 99.9 | 10.0 - 60.0 | X |
| 2.36mm | 99.5 | | |
| 1.18mm | 92.7 | 6.0 - 32.0 | X |
| 0.3mm | 61.6 | 4.0 - 15.0 | X |
| 0.15mm | 42.3 | | |
| 0.075mm | 25.8 | 0.0 - 5.0 | X |
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| | Material Desc | <u>cription</u> |
|---|---|---|
| silty SAND | | |
| | | |
| Atte | erberg Limits (A | STM D 4318) |
| PL= | LL= | Pl= |
| USCS (D 2487)= | <u>Classifica</u> AASI | <u>tion</u> HTO (M 145)= |
| D ₉₀ = 1.0008 D ₅₀ = 0.1991 D ₁₀ = | Coefficie D ₈₅ = 0.7703 D ₃₀ = 0.0903 C _u = | D ₆₀ = 0.2837 D ₁₅ = C _c = |
| Natural Moisture | Remark: 5.0% | s |
| Date Received: | * | ate Tested: June 26, 2017 |
| Checked By: | | |
| Title: | | |

Location: Side-bar 50m U/S **Sample Number:** 1

BEF

Date Sampled: June 20, 2017

DWB Consulting Services Ltd.

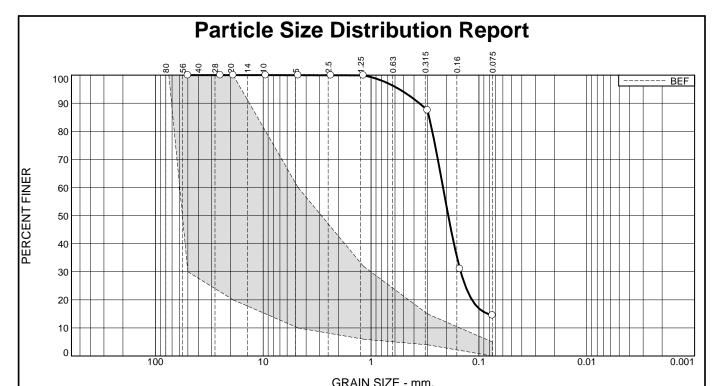
Client: SURESPAN

Project: Pemberton Pedestrian Bridge

Prince George, BC

Project No: 1762-147

Figure



| | | | | INAIN OIZE - | 111111. | | | |
|-----------|--------|------|--------|--------------|---------|---------|------|--|
| % Cobbles | % Gı | avel | % Sand | | | % Fines | | |
| % Copples | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay | |
| 0.0 | 0.0 | 0.0 | 0.1 | 7.7 | 77.7 | 14.5 | | |

| | TEST RE | SULTS | |
|---------|---------|--------------|----------|
| Opening | Percent | Spec.* | Pass? |
| Size | Finer | (Percent) | (X=Fail) |
| 50 mm | 100.0 | 30.0 - 100.0 | |
| 25mm | 100.0 | | |
| 19mm | 100.0 | 20.0 - 100.0 | |
| 9.5mm | 100.0 | | |
| 4.75mm | 100.0 | 10.0 - 60.0 | X |
| 2.36mm | 100.0 | | |
| 1.18mm | 99.9 | 6.0 - 32.0 | X |
| 0.3mm | 87.5 | 4.0 - 15.0 | X |
| 0.15mm | 31.0 | | |
| 0.075mm | 14.5 | 0.0 - 5.0 | X |
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| | Material Descrip | <u>tion</u> |
|--|---|--|
| SAND with some fi | nes | |
| | | |
| | | |
| | berg Limits (AST | |
| PL= | LL= | PI= |
| | Classification | _ |
| USCS (D 2487)= | AASHTO |) (M 145)= |
| | Coefficients | |
| D₉₀= 0.3572 | D₈₅= 0.2893 | D₆₀= 0.2150 |
| D₅₀= 0.1923 D₁₀= | D ₃₀ = 0.1475 C ₁₁ = | D ₁₅ = 0.0822 C _c = |
| D ₁₀ - | | OC- |
| NI 1 Martin 20 | Remarks | |
| Natural Moisture 22 | 2.8% | |
| | | |
| | | - |
| | ine 25, 2017 Date | Tested: June 26, 2017 |
| Tested By: J2 | Z | |
| Checked By: _ | | |
| Title: | | |
| | | = |

Location: Bed Materials #2, Boat Launch, W side **Sample Number:** 1

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DWB Consulting Services Ltd.

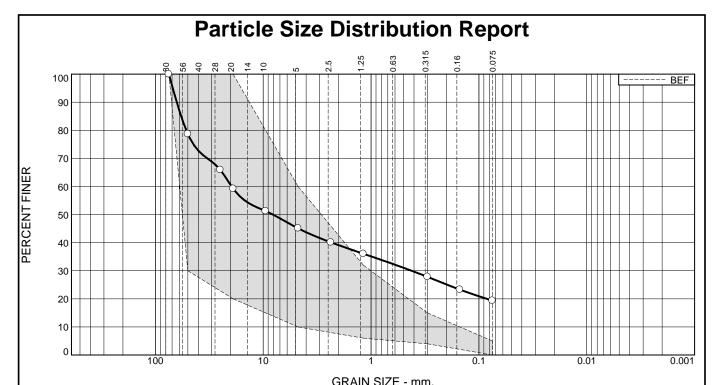
Client: SURESPAN

Project: Pemberton Pedestrian Bridge

Prince George, BC

Project No: 1762-147

Figure



| GRAIN SIZE - IIIII. | | | | | | | |
|---------------------|-------------------------|------|--------|--------|------|------|------|
| 0/ Cabbles | % Gravel % Sand % Fines | | | | | | |
| % Cobbles | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 40.7 | 14.2 | 6.0 | 9.0 | 10.7 | 19.4 | |

| | TEST RE | ESULTS | |
|----------|---------|--------------|----------|
| Opening | Percent | Spec.* | Pass? |
| Size | Finer | (Percent) | (X=Fail) |
| 75 mm | 100.0 | 100.0 | |
| 50 mm | 78.7 | 30.0 - 100.0 | |
| 25 mm | 65.9 | | |
| 19 mm | 59.2 | 20.0 - 100.0 | |
| 9.5 mm | 51.2 | | |
| 4.75 mm | 45.1 | 10.0 - 60.0 | |
| 2.36 mm | 40.1 | | |
| 1.18 mm | 36.1 | 6.0 - 32.0 | X |
| 0.3 mm | 27.8 | 4.0 - 15.0 | X |
| 0.15 mm | 23.3 | | |
| 0.075 mm | 19.4 | 0.0 - 5.0 | X |
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| | Material Descripti | <u>ion</u> |
|--|--------------------------------|--------------------------------|
| sandy GRAVEL wi | ith some fines | |
| | | |
| | | |
| | rberg Limits (ASTN | |
| PL= | LL= | PI= |
| | Classification | |
| USCS (D 2487)= | AASHTO | (M 145)= |
| | Coefficients | |
| D₉₀= 63.2795 D₅₀= 8.1423 | D₈₅= 57.6342 | D₆₀= 19.6258 |
| | D₃₀= 0.4211 | D ₁₅ = |
| D ₁₀ = | c _u = | c _c = |
| | Remarks | |
| Natural Moisture: 6 | 5.0% | |
| Sampling Location: | :10U 516459 | |
| 55737 | 792 | |
| Date Received: Ju | une 25, 2017 Date 1 | Tested: June 26, 2017 |
| Tested By: JZ | Z | , i |
| Checked By: | | |
| - | | |
| Title: _ | | |
| | | |

Location: West Abutment Pit W1 Sample Number: 1

BEF

DWB Consulting Services Ltd.

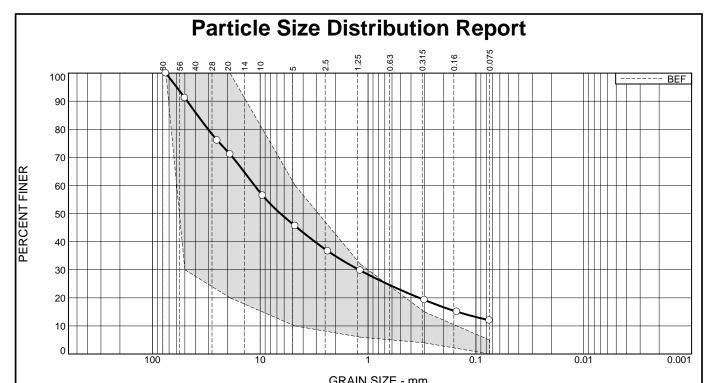
Client: SURESPAN

Project: Pemberton Pedestrian Bridge

Prince George, BC

Project No: 1762-147

Figure



| GRAIN SIZE - IIIII. | | | | | | | |
|---------------------|--------|------|--------|--------|------|---------|------|
| 0/ Cabbles | % Gı | avel | | % Sand | | % Fines | |
| % Cobbles | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 28.9 | 25.5 | 10.8 | 13.2 | 9.6 | 12.0 | |

| TEST RESULTS | | | | | | | | |
|--------------|---------|--------------|----------|--|--|--|--|--|
| Opening | Percent | Spec.* | Pass? | | | | | |
| Size | Finer | (Percent) | (X=Fail) | | | | | |
| 75 mm | 100.0 | 100.0 | | | | | | |
| 50 mm | 91.2 | 30.0 - 100.0 | | | | | | |
| 25 mm | 76.1 | | | | | | | |
| 19 mm | 71.1 | 20.0 - 100.0 | | | | | | |
| 9.5 mm | 56.4 | | | | | | | |
| 4.75 mm | 45.6 | 10.0 - 60.0 | | | | | | |
| 2.36 mm | 36.6 | | | | | | | |
| 1.18 mm | 29.7 | 6.0 - 32.0 | | | | | | |
| 0.3 mm | 19.2 | 4.0 - 15.0 | X | | | | | |
| 0.15 mm | 15.1 | | | | | | | |
| 0.075 mm | 12.0 | 0.0 - 5.0 | X | | | | | |
| | | | | | | | | |
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| <u>Material Description</u> | |
|--|---|
| sandy GRAVEL with some fines | |
| | |
| | |
| Atterberg Limits (ASTM D 4318) PL= LL= Pl= | |
| FL= LL= FI= | |
| Classification | |
| USCS (D 2487)= AASHTO (M 145)= | |
| <u>Coefficients</u> | |
| D ₉₀ = 47.4529 D ₈₅ = 38.1183 D ₆₀ = 11.2920 D ₅₀ = 6.4916 D ₃₀ = 1.2159 D ₁₅ = 0.1484 | |
| $D_{10} = 0.4910$ $D_{30} = 1.2139$ $D_{15} = 0.1404$ $D_{10} = C_{c} = 0.1404$ | |
| Remarks | |
| Moisture Content: 5.7% | |
| Sampling Location: 10U 516455 | |
| 5573795 | |
| Date Received: Jun 23, 2017 Date Tested: Jun 25, 2017 | , |
| Tested By: JZ | |
| Checked By: | _ |
| - | - |
| Title: | _ |

Location: West Abutment Pit W2 Sample Number: 1

BEF

DWB Consulting Services Ltd.

d.∥ ^{Che}

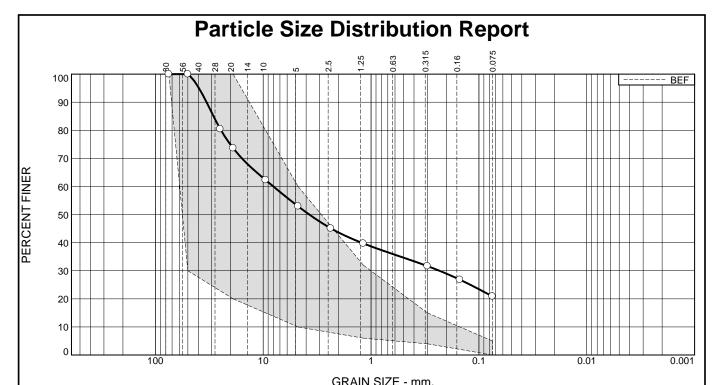
Client: SURESPAN

Project: Pemberton Pedestrian Bridge

Prince George, BC

Project No: 1762-147

Figure



| GRAIN SIZE - IIIII. | | | | | | | |
|---------------------|-------------------|------|---------|--------|------|------|------|
| 0/ Cabbles | % Gravel % Sand % | | % Fines | | | | |
| % Cobbles | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 26.3 | 20.8 | 9.3 | 9.9 | 12.8 | 20.9 | |

| <u>Material</u> | <u>Description</u> |
|--|--|
| sandy gravel with some fines | |
| | its (ASTM D 4318) |
| PL= LL= | PI= |
| USCS (D 2487)= | sification AASHTO (M 145)= |
| D ₉₀ = 33.5308 D ₈₅ = 28 D ₅₀ = 3.7365 D ₃₀ = 0.2 D ₁₀ = C _u = | fficients .8705 D ₆₀ = 8.0495 2325 D ₁₅ = C _c = |
| ••• | emarks on coordinates 516470, 5573793 |
| Date Received: June 24, 201 Tested By: \underline{JZ} | 7 Date Tested: June 26, 2017 |
| Checked By: | |
| Title: | |

Location: W Abutment Pit W3 Sample Number: 1

BEF

Client: SURESPAN

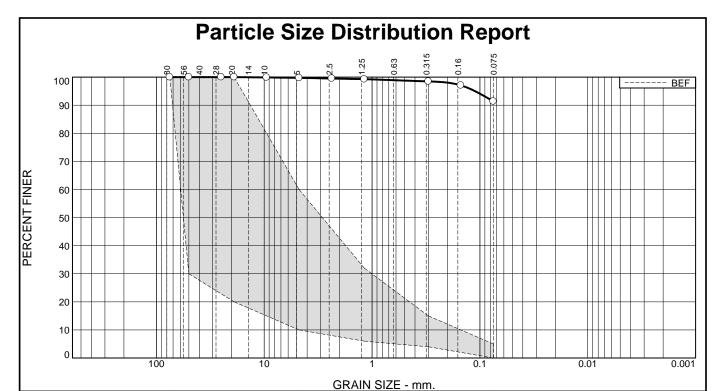
DWB Consulting Services Ltd.

Project: Pemberton Pedestrian Bridge

Prince George, BC

Project No: 1762-147

Figure



| % Cobbles | % Gravel % Sand | | % Sand | | | % Fines | |
|-----------|-----------------|------|--------|--------|------|---------|------|
| % Cobbles | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.3 | 0.2 | 0.8 | 7.3 | 91.4 | |

| TEST RESULTS | | | | | | | | |
|--------------|---------|--------------|----------|--|--|--|--|--|
| Opening | Percent | Spec.* | Pass? | | | | | |
| Size | Finer | (Percent) | (X=Fail) | | | | | |
| 75 mm | 100.0 | 100.0 | | | | | | |
| 50 mm | 100.0 | 30.0 - 100.0 | | | | | | |
| 25 mm | 100.0 | | | | | | | |
| 19 mm | 100.0 | 20.0 - 100.0 | | | | | | |
| 9.5 mm | 99.9 | | | | | | | |
| 4.75 mm | 99.7 | 10.0 - 60.0 | X | | | | | |
| 2.36 mm | 99.5 | | | | | | | |
| 1.18 mm | 99.3 | 6.0 - 32.0 | X | | | | | |
| 0.3 mm | 98.5 | 4.0 - 15.0 | X | | | | | |
| 0.15 mm | 97.1 | | | | | | | |
| 0.075 mm | 91.4 | 0.0 - 5.0 | X | | | | | |
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| | Material Description | | | | |
|-------------------------------------|---|--|---|--|--|
| FINES with trace of gravel and sand | | | | | |
| | 8 | | | | |
| | | | | | |
| | | | | | |
| | | s (ASTM D 4318) | | | |
| PL= | LL= | PI= | | | |
| | Classi | ication | | | |
| USCS (D 2487 | | ASHTO (M 145)= | | | |
| 5555 (B 2401) | ,- | | | | |
| | <u>Coeff</u> i | <u>cients</u> | | | |
| D ₉₀ = | D ₈₅ = | D ₆₀ = D ₁₅ = C _c = | | | |
| D ₅₀ = | D ₃₀ = | D ₁₅ = | | | |
| | | | | | |
| D ₁₀ = | c _u = | C _C = | | | |
| υ ₁₀ = | u | | | | |
| .0 | Rem | arks | | | |
| Moisture Conte | Rement: 14.8% Sample | | | | |
| Moisture Conte | Rem | arks | | | |
| Moisture Conte | Rement: 14.8% Sample | arks | | | |
| Moisture Conte | Rement: 14.8% Sample 5573801 | ng Location: 10U 516488 | | | |
| Moisture Conte | Rement: 14.8% Sample 5573801 | ng Location: 10U 516488 | | | |
| Moisture Conte | Rement: 14.8% Sample 5573801 | ng Location: 10U 516488 | _ | | |
| Moisture Conte | Rement: 14.8% Sample 5573801 d: Jun 24, 2017 | ng Location: 10U 516488 | | | |
| Moisture Conte | Rem 14.8% Sample 5573801 d: Jun 24, 2017 y: JZ | ng Location: 10U 516488 | | | |
| Moisture Conte | Rem 14.8% Sample 5573801 d: Jun 24, 2017 y: JZ | ng Location: 10U 516488 | _ | | |

Date Sampled: Jun 20, 2017

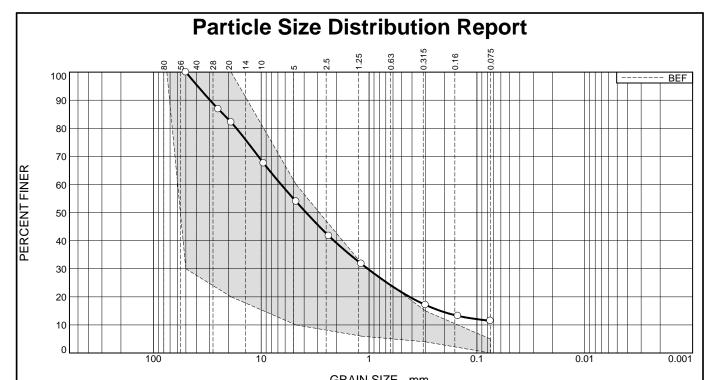
Location: West Pier Pit W4 Sample Number: 1

BEF

DWB Consulting Services Ltd. | Client: SURESPAN

Project: Pemberton Pedestrian Bridge

Prince George, BC Project No: 1762-147 Figure



| | GRAIN SIZE - MM. | | | | | | | |
|------------|------------------|------|--------|--------|--------|------|---------|--|
| 0/ Cabbles | | % G | ravel | | % Sand | d | % Fines | |
| % Cobbles | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay | |
| | 0.0 | 17.8 | 28.3 | 14.8 | 19.0 | 8.6 | 11.5 | |

| | TEST RESULTS | | | | | | | | |
|---------|--------------|--------------|----------|--|--|--|--|--|--|
| Opening | Percent | Spec.* | Pass? | | | | | | |
| Size | Finer | (Percent) | (X=Fail) | | | | | | |
| 50 mm | 100.0 | 30.0 - 100.0 | | | | | | | |
| 25mm | 86.9 | | | | | | | | |
| 19mm | 82.1 | 20.0 - 100.0 | | | | | | | |
| 9.5mm | 67.6 | | | | | | | | |
| 4.75mm | 53.9 | 10.0 - 60.0 | | | | | | | |
| 2.36mm | 41.7 | | | | | | | | |
| 1.18mm | 31.8 | 6.0 - 32.0 | | | | | | | |
| 0.3mm | 17.1 | 4.0 - 15.0 | X | | | | | | |
| 0.15mm | 13.2 | | | | | | | | |
| 0.075mm | 11.5 | 0.0 - 5.0 | X | | | | | | |
| | | | | | | | | | |
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| | Material Descrip | Material Description | | | | | |
|---------------------------------|---------------------------|-------------------------------|--|--|--|--|--|
| gravel and sand with some fines | | | | | | | |
| 8 | | | | | | | |
| | | | | | | | |
| Attori | hara Limita (ACT | M D 4249) | | | | | |
| PL= | berg Limits (AST | NI D 43 16) PI= | | | | | |
| rL= | LL= | ri= | | | | | |
| | Classification | <u>1</u> | | | | | |
| USCS (D 2487)= | AASHTO |) (M 145)= | | | | | |
| | Coefficients | | | | | | |
| D₉₀= 29.8092 | D ₈₅ = 22.4021 | D ₆₀ = 6.5392 | | | | | |
| D ₅₀ = 3.8324 | D ₃₀ = 1.0287 | D₁₅= 0.2179 | | | | | |
| D ₁₀ = | Cu= | C _c = | | | | | |
| | Remarks | | | | | | |
| Natural Moisture 8.6 | | | | | | | |
| Location Coordinate | | | | | | | |
| Location Coordinate | 5573815 | | | | | | |
| | 33/3813 | | | | | | |
| Date Received: Ju | ne 26, 2017 Date | Tested: June 27, 2017 | | | | | |
| Tested By: JZ | | | | | | | |
| , | | | | | | | |
| Checked By: _ | | | | | | | |
| Title: | | | | | | | |
| | | | | | | | |

Date Sampled: June 20, 2017

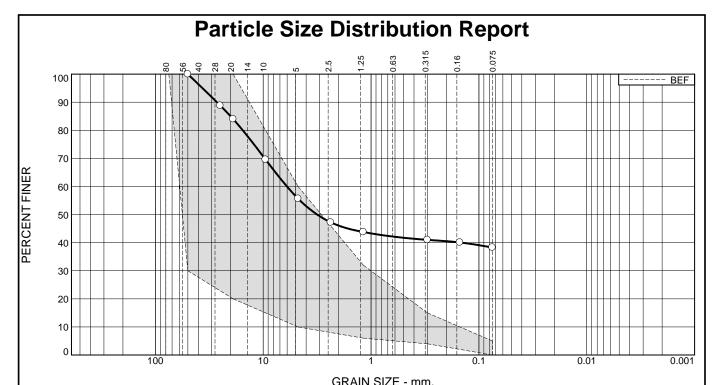
Location: E Abutment Pit E1 Sample Number: 1

BEF

DWB Consulting Services Ltd. Client: SURESPAN

Project: Pemberton Pedestrian Bridge

Prince George, BC Project No: 1762-147 Figure



| | GRAIN SIZE - IIIII. | | | | | | | |
|-----------|---------------------|--------|-------|--------|--------|------|---------|------|
| | 0/ Cabbles | % Gı | ravel | | % Sand | i | % Fines | |
| % Cobbles | | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| | 0.0 | 15.9 | 28.4 | 9.6 | 4.6 | 3.2 | 38.3 | |

| TEST RESULTS | | | | | | | | |
|--------------|---------|--------------|----------|--|--|--|--|--|
| Opening | Percent | Spec.* | Pass? | | | | | |
| Size | Finer | (Percent) | (X=Fail) | | | | | |
| 50 mm | 100.0 | 30.0 - 100.0 | | | | | | |
| 25mm | 88.8 | | | | | | | |
| 19mm | 84.0 | 20.0 - 100.0 | | | | | | |
| 9.5mm | 69.6 | | | | | | | |
| 4.75mm | 55.7 | 10.0 - 60.0 | | | | | | |
| 2.36mm | 47.2 | | | | | | | |
| 1.18mm | 43.8 | 6.0 - 32.0 | X | | | | | |
| 0.3mm | 41.0 | 4.0 - 15.0 | X | | | | | |
| 0.15mm | 40.1 | | | | | | | |
| 0.075mm | 38.3 | 0.0 - 5.0 | X | | | | | |
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| | - 1 | | | | | |
|---|-----|--|--|--|--|--|
| gravel and silt with some sand | | | | | | |
| | | | | | | |
| | | | | | | |
| Atterberg Limits (ASTM D 4318) | | | | | | |
| PL= LL= Pl= | | | | | | |
| <u>Classification</u> | | | | | | |
| USCS (D 2487)= AASHTO (M 145)= | | | | | | |
| Coefficients | | | | | | |
| D₉₀= 26.8942 D₈₅= 20.0588 D₆₀= 6.0242 | | | | | | |
| D ₅₀ = 3.1607 D ₃₀ = D ₁₅ = | | | | | | |
| D_{10} = C_u = C_c = | | | | | | |
| Remarks | | | | | | |
| Natural Moisture 9.9% | | | | | | |
| Location Coordinates 10U 516509 | | | | | | |
| 5573808 | | | | | | |
| Date Received: June 26, 2017 Date Tested: June 27, 2017 | , | | | | | |
| Tested By: JZ | | | | | | |
| Checked By: | | | | | | |
| | - | | | | | |
| Title: |] | | | | | |

Location: E Abutment Edge Row/Toe of Fill Pit 2 **Sample Number:** 1

BEF

DWB Consulting Services Ltd.

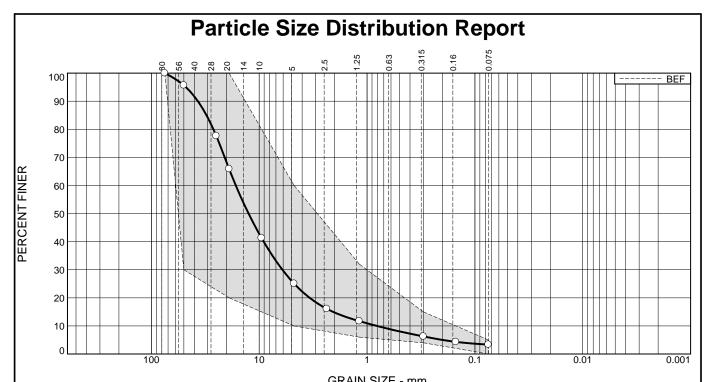
Client: SURESPAN

Project: Pemberton Pedestrian Bridge

Prince George, BC

Project No: 1762-147

Figure



| GRAIN SIZE - MM. | | | | | | | |
|------------------|--------|------|--------|--------|------|---------|------|
| 0/ Cabbles | % Gı | avel | | % Sand | | % Fines | |
| % Cobbles | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 34.0 | 40.9 | 10.3 | 7.3 | 4.1 | 3.4 | |

| TEST RESULTS | | | | | | | |
|--------------|---------|--------------|----------|--|--|--|--|
| Opening | Percent | Spec.* | Pass? | | | | |
| Size | Finer | (Percent) | (X=Fail) | | | | |
| 75 mm | 100.0 | 100.0 | | | | | |
| 50 mm | 95.7 | 30.0 - 100.0 | | | | | |
| 25 mm | 77.6 | | | | | | |
| 19 mm | 65.9 | 20.0 - 100.0 | | | | | |
| 9.5 mm | 41.3 | | | | | | |
| 4.75 mm | 25.1 | 10.0 - 60.0 | | | | | |
| 2.36 mm | 16.1 | | | | | | |
| 1.18 mm | 11.7 | 6.0 - 32.0 | | | | | |
| 0.3 mm | 6.3 | 4.0 - 15.0 | | | | | |
| 0.15 mm | 4.3 | | | | | | |
| 0.075 mm | 3.4 | 0.0 - 5.0 | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| * BEF | | 1 | | | | | |

| sandy GRAVEL w | sandy GRAVEL with trace fines | | | | | | | |
|---|-------------------------------|--|--|--|--|--|--|--|
| Atterberg Limits (ASTM D 4318) PL= LL= Pl= | | | | | | | | |
| USCS (D 2487)= Classification AASHTO (M 145)= | | | | | | | | |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | | | | | | | |
| Natural Moisture 2.3% | | | | | | | | |
| Date Received: June 24, 2017 Date Tested: June 26, 2017 Tested By: JZ | | | | | | | | |
| Checked By: | | | | | | | | |
| Title: | | | | | | | | |
| | | | | | | | | |

Material Description

Location: E Abutment Pit- E3 Sample Number: 1

DWB Consulting Services Ltd. | Client: SURESPAN

Project: Pemberton Pedestrian Bridge

Prince George, BC

Project No: 1762-147

Figure