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SOLICITATION AMENDMENT
MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments - Commentaires

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Title - Sujet Potable Water System Upgrade	
Solicitation No. - N° de l'invitation EZ899-133386/A	**Amendment No. - N° modif.** 002
Client Reference No. - N° de référence du client	**Date** 2013-03-27
GETS Reference No. - N° de référence de SEAG PW-$PWY-005-6947	
File No. - N° de dossier PWY-2-35368 (005)	**CCC No./N° CCC - FMS No./N° VME**
Solicitation Closes - L'invitation prend fin **at - à 02:00 PM** **on - le 2013-04-04**	**Time Zone** **Fuseau horaire** Pacific Daylight Saving Time PDT
F.O.B. - F.A.B. **Plant-Usine:** ☐ **Destination:** ☑ **Other-Autre:** ☐	
Address Enquiries to: - Adresser toutes questions à: Pillay, Sal (PWY)	**Buyer Id - Id de l'acheteur** pwy005
Telephone No. - N° de téléphone (604) 775-9386 ( )	**FAX No. - N° de FAX** (604) 775-6633
Destination - of Goods, Services, and Construction: **Destination - des biens, services et construction:** CSC - William Head Institution - Metchosin, BC	

Instructions: See Herein

Instructions: Voir aux présentes

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Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) **Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)** **Signature** **Date**	

Canada

Please review the attached Addendum_1_missing info. For information that was missing in previous addendum.

All other terms and conditions remain unchanged.

Addendum # 1

The following changes to the tender documents are effective immediately. These changes will form part of the tender/contract documents.

This addendum includes the following items:

1) Changes to the contract documents (Drawings and Specifications) as detailed below.
2) Meeting minutes from the tender meeting at William Head Institution on March 21, 2013. Issues discussed at this meeting and recorded in the minutes are now to form part of the tender/contract documents.
3) Attendance Sheet from the Tender Meeting
4) Geotechnical Report from Thurber Engineering.

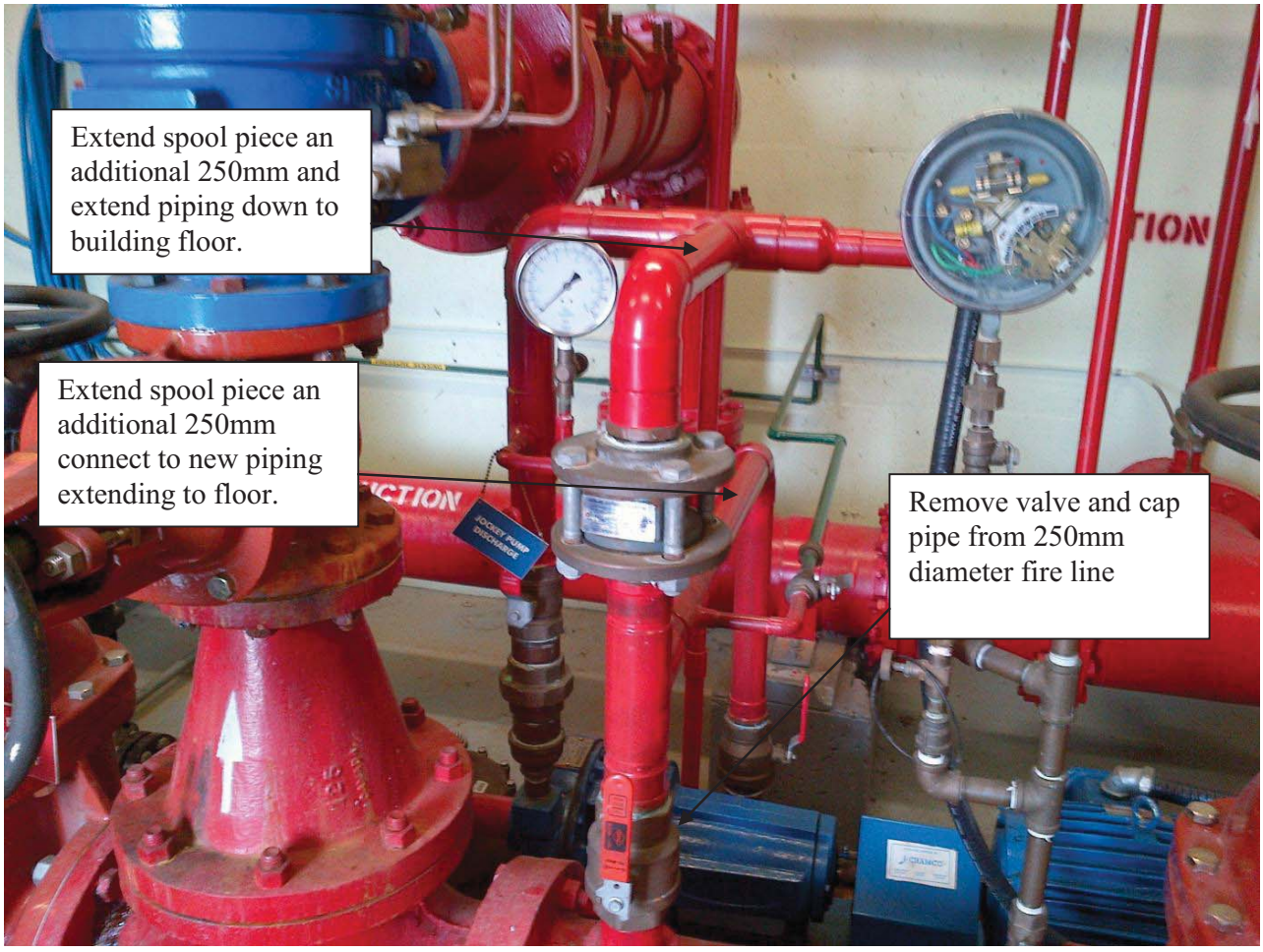
1. Drawing C001 – Civil Site Plan and Details

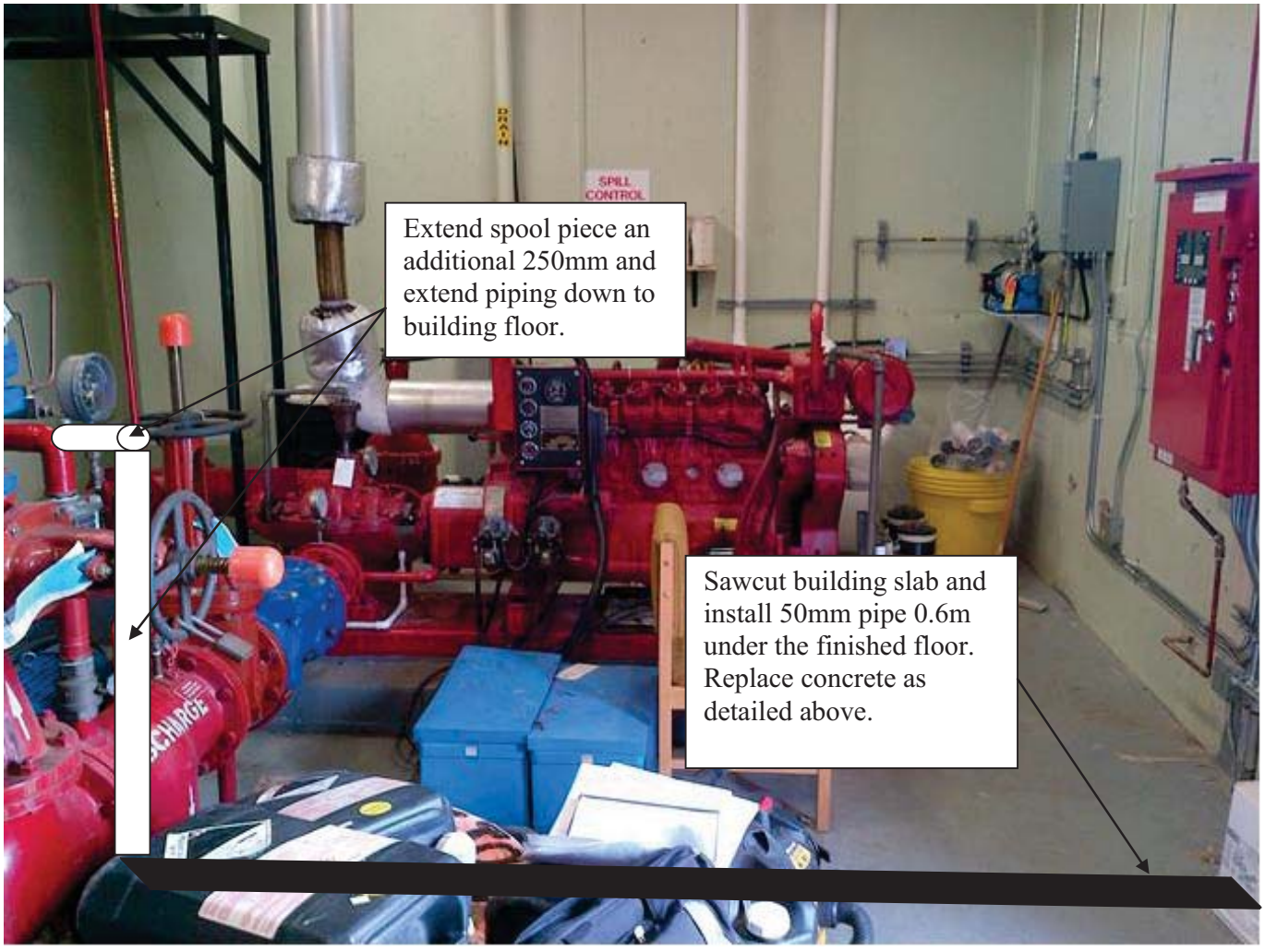
1.1. Delete Construction Note 11. The pre-tender meeting is not mandatory.

1.2. Replace Construction Note 11 with the following:

1.2.1. "*Flow from the booster pump and recirc pump to be disconnected from its current tie-in to the new PRV chamber. Exact alignment of 50mm diameter watermain from Building 110 to New PRV chamber to be confirmed on-site with Departmental Representative. Plumbing work required in Building 110 is as detailed below and indicated on the attached photographs. All piping within building is to be new 50mm diameter PVC Schedule 80:*

- *Remove the valve that connects to the 250mm diameter cast iron discharge piping and cap the pipe from the discharge line.*
- *Extend the spool piece of 50mm pipes that come from the jockey pump and recirc pump discharges an additional 250mm diameter further towards the entrance door of the building prior to connecting to the shared 50mm diameter pipe which extends down to the floor.*
- *Extend the 50mm PVC piping down to the building floor south of the 250mm diameter discharge line. Sawcut and remove the existing building floor (0.6m wide trench) and install new 50mm diameter PVC line at 0.5m depth below finished floor elevation. Align pipe to exit building through doorway to avoid walls.*
- *Replace concrete slab to existing thickness (150mm). Embed and epoxy 15M rebar 150mm minimum into the existing slab 600mm o.c. at mid depth.*
- *Include 15M rebar running parallel to slab sawcut line at 600mm o.c. Include minimum of 2 per trench*
- *Core through the foundation wall for the pipe protrusion.*
- *Install Robar Coupling 1.0m outside building to connect to 50mm diameter PVC pipe outside the building to the new PRV building.*
- *Refer to images on following pages*


Extend spool piece an additional 250mm and extend piping down to building floor.
Extend spool piece an additional 250mm connect to new piping extending to floor.
Remove valve and cap pipe from 250mm diameter fire line


Extend spool piece an additional 250mm and extend piping down to building floor.
Sawcut building slab and install 50mm pipe 0.6m under the finished floor. Replace concrete as detailed above.
SPILL CONTROL
DRAIN

---END---

Meeting Notes

William Head Institution – Potable Water System Upgrade

Tender Meeting
FILE 112311205

Date/Time:	March 21, 2013 10:00 AM
Place:	William Head Institution Entrance Boardroom
Next Meeting:	
Attendees:	See Attached Sign In Sheet
Absentees:	
Distribution:	By Addendum

Item:	Action:
Introductions Roundtable introduction. Daryl Sinclair is the PWGSC Project Manager, Shaun Swarbrick is the Stantec design manager, Alan Ghanam is the Stantec Senior Project Manager.	Info
Overview of the Existing and Proposed System Shaun Swarbrick lead a review through the existing system operation, and the scope of work for the proposed system.	Info
Security Issues Kory Phillips of CSC lead a review through the security requirements of the successful contractor when working within the grounds of the correctional institution. As the contractor will be working outside of the gates, no security clearance documentation is required. Daily check in with the main gate is recommended. No photographs are permitted without the CSC's explicit approval. When Photographs are permitted, CSC will need to check all images before the contractor or consultant leaves the site.	Info
Construction Laydown Areas Kory Phillips indicated that limited laydown areas would be available for temporary storage of construction equipment and materials during the construction period. Contractor is to coordinate with PWGSC and CSC during construction for potential storage areas.	Info

Repiping Required with Building 110 (Existing Pumphouse) Info

Shaun Swarbrick reviewed the piping work required within the existing pumphouse (Building 110). This work was further reviewed during the site walkthrough which followed the meeting, and is addressed in Addendum #1.

Use of "C-Cans" for the Exterior of the New Building Info

The question was asked "Are C-cans permitted as the exterior of the building?". C-Cans will not be permitted.

Size of the Hot Water Tank Info

The question was asked "Is 22L for the Hot water tank sufficient?" Tank to remain as 22L capacity as per specs.

Calibration of Chlorine Equipment Info

It was noted that the Chlorine injection equipment will need to be calibrated by the contractor, as indicated in Spec Section 11 11 00. This must be factored into the tender price.

Building Design Info

Daryl Sinclair noted the Building design to be signed and sealed by a Professional Engineer registered in British Columbia and submitted to Stantec/PWGSC for review.

Drawing Name Typo Info

It was noted that within the unit rate table in the Measurement and Payment spec section, Item 12 refers to the HVAC components detailed on M100. This should read M001.

Testing Costs by Contractor Info

The costs for all material testing will be borne by the contractor. Material testing includes all tests required to prove conformance with the specs, such as concrete, gravel, asphalt and compaction testing.

Water Service Interruptions for Connections Info

The drawings indicate no interruption to the water service to the Institution will be permitted during construction. This was discussed, and it was agreed that minor interruptions for tie ins are acceptable, but these are to be coordinated with the Departmental Representative.

Various Contractor Questions

Various other questions were posed during the meeting and during the site walkthrough. These are summarized below:

- **Is a 12 week construction schedule adequate?** Following further discussion, the 12 week schedule has been increased to 16 weeks.

- **How will Rock excavation be paid for if encountered?** Rock excavation will be paid for with a change order if encountered. Same procedure for over excavation if required.

- **Some of the equipment is detailed in both Division 11 and Division 40. How will this work be divided into the various sub trades?** The contract has been written for a General Contractor. It is the General's responsibility to divide the work up into the various subtrades if pieces of equipment are duplicated in multiple divisions.

- **Local and Remote systems appear to duplicate processor/controller. Is this necessary? Is remote HMI adequate instead?** The remote and local control architecture design is a guideline and is intended to help the contractor design a packaged alarm monitoring system to meet the design intent. Contractor may propose alternate solutions, such as a PLC/HMI solution, provided the design intent is met.

- **How is the contractor to provide costs for conduits and piping?** Contractor to scale distance for all conduits/watermains etc. from drawings.

The meeting adjourned at 11:30 AM.
The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

Stantec Consulting Ltd.

Shaun Swarbrick, P.Eng
Civil Engineer
shaun.swarbrick@stantec.com

Attachment:

c.

Public Works and Government Services
William Head Institution – Potable Water System Upgrade

Tender Meeting
Thursday, March 21 2013 – 10:00am

Sign-In Sheet – Please Print

NAME	REPRESENTING	PHONE	Cell	FAX	E-MAIL
Shaun Swarbrick	Stantec	250-389-2545	250-507-5876	250-382-0514	shaun.swarbrick@stantec.com
Dave McDonald	McDonald Electric	250-474-3234	250-217-3553	250-474-3230	dave@mcdonaldelectric.ca
Garth O'Neill	Ridgeline Mechanical ltd.	250-898-7648		250-334-3493	garthoneill@shaw.ca
Paulo Soares	Excel Contracting	250-388-0047	250-880-0174	250-388-0027	excel.paulo@shaw.ca
Jerry Zakreski	AREX Steel & Gas Ltd.	250-386-2929	250-216-7450	250-386-1612	jerry@apexsteel.ca
Korg Phillips	CSC WHI	250-391-7044			korg.phillips@csc.scc.gc.ca
Bob Wood	Houle Electric	250-661-8389	250-661-8389	250-544-0099	bwood@houle.ca
Jeff Norris	QCA Systems	604-908-0076			jeff@qcasystems.com
Chris Parkinson	QCA Systems	604-908-1722			chrisp@qcasystems.com
Svetlana Vujic	Stantec	604-787-8172			svujic@stantec.com
Alan Ghanam	Stantec	250-388-9161	250-418-0903	250-380-0514	aghanam@stantec.com
Fred York	York Excavating	250-478-7178	250-857-0360	250-478-4776	yorkexcavating@shaw.ca
Scott Cownden	Northridge Excavating	250-479-4373		250-479-4341	scott@northridgegroup.ca

Kieran McDonagh	Corix Water Products	250-475-0055	250-480-9062	250-475-0050	kieran.mcdonagh@corix.com
Adam Dunn	CWP	250-812-1716		250-478-1581	adam.dunn@corix.com
Cheryl Hartman	Brewis Electric	250-383-5157		250-383-2468	didinfo@brewiselectric.com
Daryl Sinclair	PWGSC	604-775-6678			daryl.sinclair@pwgsc.gc.ca

THURBER ENGINEERING LTD.

December 14, 2012 File: 17-308-681

Stantec
400-655 Tyee Road
Victoria, BC V9A 6X5

Attention: Shaun Swarbrick, P.Eng

WILLIAM HEAD INSTITUTE - PRV AND RECHLORINATION BUILDING
GEOTECHNICAL INVESTIGATION

Dear Shaun:

This letter presents the results of a geotechnical investigation carried out for the above noted project. The scope of work was outlined in our proposal letter dated October 22, 2012. Authorization to proceed with the work was given in your e-mail on November 26, 2012.

Use of this report is subject to the attached Statement of Limitations and Conditions. The reader's attention is specifically drawn to these conditions as it is considered essential that they be followed for the proper use and interpretation of this report.

1. PROJECT AND SITE DESCRIPTION

We understand that a new PRV and Rechlorination building is being proposed at the William Head Institute in Metchosin, BC. The proposed building will be an at-grade, single storey, cast in place concrete structure. We also understand that two locations (one preferred and one alternate) have been proposed for the building.

A geotechnical investigation was requested to assess the soil conditions at the two proposed locations and provided foundation recommendations for the new building. An environmental assessment for soil contamination was not included in our scope of work.

The two proposed locations for the building are generally level and grass covered.

2. INVESTIGATION

Prior to conducting the field investigation BC One Call was notified to identify utilities in the vicinity of the investigation area. In addition, Western Utilities Services Ltd was used to scan the underground utilities in the proposed test pit locations. There were a number of existing services in the vicinity of the two proposed locations. At the preferred location, gas, water and hydro lines were found at the site. In addition, a number of existing monitoring wells were located across the preferred building location site. At the alternate site, hydro and communication lines were found north of the excavated test pits.

A backhoe operated by Don Mann Excavating Ltd. of Victoria, B.C., was used to dig four pits, two at each of the proposed sites on December 4, 2012. TP12-1 and TP12-2 were excavated at

the preferred building location. TP12-3 and TP12-4 were excavated at the alternate building location. The test pits were excavated to 1.4 m to 2.2 m depth into native soils, or to the point where further excavation was not practical. The soils were logged in the field by a Thurber representative and disturbed samples were obtained at selected depths for visual identification and moisture content determination. The test pits were backfilled with the excavated soil at the completion of the excavations.

The results of the field and laboratory testing were used to compile test pit logs provided in Appendix A. The approximate locations of the test pits are shown on Drawing No. 17-308-647-1, also provided in Appendix A.

3. SOIL CONDITIONS

The soils at the two proposed sites were highly variable. At the preferred building site, the soils encountered generally consist of silty sand and gravel to sand and gravel fill overlying sandy gravel and sand. The thick sand deposit encountered at TP12-2 is likely fill material that was placed during past activities on site, however this could not be confirmed. Based on conversations with site personnel during the field investigation, we understand the site may have been previously remediated due to an environmental concern. The sand encountered may have been placed during this excavation, however it is also possible the entire area was excavated for the installation of the utilities and backfilled with sand fill.

At the alternate building site the soils encountered generally consist of topsoil overlying sand. The sand varies in thickness from 0.2 m to 1.0 m and is underlain by either silty sand or sandy silty clay (till-like material). TP12-3 was terminated at a depth of 2.0 m on possible till-like material.

Seepage was noted in two of the four test pits (TP12-2 and TP12-3) at 1.6 and 0.5 m respectively.

4. GEOTECHNICAL ASSESSMENT & RECOMMENDATIONS

4.1 Site Development

Based on the conditions encountered both sites are considered feasible for the construction of the proposed building, however the conditions at the alternate site are more favourable. The extensive array of utilities at the preferred location will make excavation for the proposed building quite difficult and it is not recommended that the proposed building be placed on top of the existing services. The existing monitoring wells on site will also create challenges during construction. Any wells removed during construction should be decommissioned in accordance with the BC groundwater protection Act.

However, if the proposed building is to be located at the preferred site, all overlying fill materials should be removed to expose the either sandy gravel or clean sand. The subgrade surface should be re-compacted to 100 percent of Standard Proctor Maximum Dry Density (SPMDD) prior to the placement of any additional granular fill materials.

At the alternate site, all topsoil and organic soils should be stripped to expose sand or the underlying till-like materials. The exposed sand should be re-compacted to 100 percent of SPMDD prior to the placement of any additional granular fill materials as noted above.

Backfill used to raise the site grade following fill excavation should consist of 75 mm minus granular fill with less than 5 percent passing the 0.075 mm sieve. The backfill should be placed in lifts with a maximum thickness of 300 mm and compacted to 98 percent SPMDD.

A qualified geotechnical engineer must inspect all foundation excavations and bearing surfaces to confirm the suitability of the subgrade material. Any unsuitable native soils identified at footing locations during the subgrade inspection and/or during construction, should be excavated to approved material and then backfilled in accordance with the recommendations given herein.

4.2 Site Seismicity

The design level earthquake in the 2010 BC Building Code (BCBC) is the 1:2,475 year event. For this site, the peak horizontal ground acceleration is 0.57g.

The depth of the current investigation does not allow for detailed assessment of the Site Class for seismic design, however based on the soils encountered within the test pits, we recommend that the site be classified as Site Class D.

It is possible that seismic induced settlements due to liquefaction may result at both the preferred and alternate building locations due to the sand deposit encountered during the investigation. Although an estimate of the settlement cannot be determined from the available information the settlement potential at the alternate site would be less due to the limited thickness of the sand deposit. The thickness of the sand deposit at the preferred site is unknown. Further investigation would be required to assess this settlement potential. However, reduction of the potential seismic settlements could be achieved by partically sub-excavating the clean sand and replacing with a compacted granular fill.

Figure 1 summarizes the spectral acceleration (Sa) data for the project site, based on information obtained from Natural Resources Canada's seismic hazard value interpolator.

4.3 Foundation Design Recommendations

Based on the soils conditions encountered it is considered feasible to support the proposed building on traditional strip and pad footings, provided seismic induces settlements can be tolerated.

At the preferred building site, footings bearing on compacted sand or sandy gravel can be designed for a serviceability limit state (SLS) bearing resistance of 100 kPa for less than 25 mm settlement and an ultimate limit state (ULS) bearing resistance of 150 kPa. For seismic loading, the SLS bearing resistance can be increased by 33 percent. Seismic induced settlements are possible at the preferred building locations as discussed in Section 4.2.

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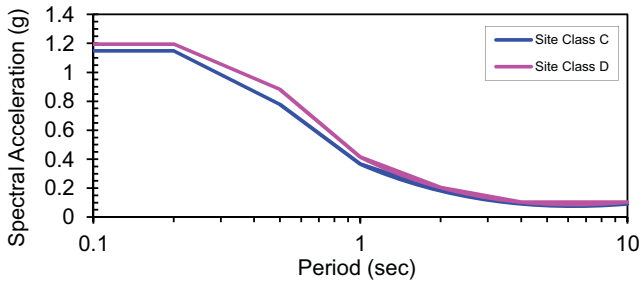
SPECTRAL RESPONSE SUMMARY
WILLIAM HEAD INSTITUTE

	SITE CLASS	Spectral Acceleration, Sa			
		0.2	0.5	1	2
Input ---->>	C	1.148	0.778	0.366	0.181
Calculated --->>	D	1.19	0.88	0.42	0.21



From BC Building Code 2006 - Acceleration Based Site Coefficients, Fa

Site Class	Sa (0.2) - Spectral Acceleration at Period of 0.2 Seconds						
	0.01	0.25	0.5	0.75	1	1.25	10
A	0.7	0.7	0.7	0.8	0.8	0.8	0.8
B	0.8	0.8	0.8	0.9	1	1	1
C	1	1	1	1	1	1	1
D	1.3	1.3	1.2	1.1	1.1	1	1
E	2.1	2.1	1.4	1.1	0.9	0.9	0.9
F	-	-	-	-	-	-	-

From BC Building Code 2006 - Velocity Based Site Coefficients, Fv

Site Class	Sa (1.0) - Spectral Acceleration at Period of 1.0 Second						
	0.01	0.1	0.2	0.3	0.4	0.5	1
A	0.5	0.5	0.5	0.5	0.6	0.6	0.6
B	0.6	0.6	0.7	0.7	0.8	0.8	0.8
C	1	1	1	1	1	1	1
D	1.4	1.4	1.3	1.2	1.1	1.1	1.1
E	2.1	2.1	2	1.9	1.7	1.7	1.7
F	-	-	-	-	-	-	-

Calculated Site Coefficients From Spectral Acceleration Provided by NRC

Site Class	T (sec)	
	0.2	1
	Fa or Fv	
	Fa	Fv
A	0.80	0.566
B	1	0.766
C	1	1
D	1.04	1.134
E	0.90	1.768

Calculated DESIGN Spectral Accelerations

Site Class	T (sec)						
	0.01	0.2	0.5	1	2	4	10
A	0.92	0.92	0.44	0.21	0.10	0.05	0.05
B	1.15	1.15	0.60	0.28	0.14	0.07	0.07
C	1.15	1.15	0.78	0.37	0.18	0.09	0.09
D	1.19	1.19	0.88	0.42	0.21	0.10	0.10
E	1.03	1.03	1.03	0.65	0.32	0.16	0.16

FIGURE 1

Client: Stantec
FIle No.: 17-308-681
E-File: 17-308-681_Spectral Response Summary.xlsx

Date: 14/12/2012

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At the alternate building site, footings bearing on sand can be designed for a serviceability limit state (SLS) bearing resistance of 100 kPa for less than 25 mm settlement and an ultimate limit state (ULS) bearing resistance of 150 kPa.

However, if the footings are placed on the sandy silty clay material they can be designed for a serviceability limit state (SLS) bearing resistance of 150 kPa for less than 25 mm settlement and an ultimate limit state (ULS) bearing resistance of 225 kPa. For seismic loading, the SLS bearing resistance can be increased by 33 percent.

Footings should be founded at a depth of at least 0.5 m below the finished grade for frost protection.

4.4 Drainage

Standard perimeter drains should be provided around the entire perimeter of the building. The foundation drainage system should be completely separate from any surface water collection system including roof drains. The final site grade should be shaped to direct water away from the building.

4.5 Temporary Excavations

All temporary excavations during construction should be constructed in accordance with Part 20 of the Occupational Health and Safety Regulation of British Columbia. Temporary slopes in the fill or sand and gravel materials should be excavated no steeper than 1H:1V. Temporary slopes in the sandy, silty clay should be excavated no steeper than 0.75H:1V

5. CLOSURE

We trust the above provides the information you require at this time. If you have any questions regarding this assessment or require clarification of any item, please contact either of the undersigned at your earliest convenience.

Yours truly,
Thurber Engineering Ltd.
Kevin Sterne, M.Sc., P.Eng.
Review Principal

J. Suzanne Powell, Ph.D., EIT
Project Engineer

Attachment

THURBER

STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering or environmental consulting practices in this area. No other warranty, expressed or implied, is 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 us by the Client, communications between us and the Client, and to any other reports, writings, proposals or documents prepared by us for the Client relative to the specific site described herein, all of which 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. WE CANNOT BE 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 us by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document, subject to the limitations provided herein, are only valid to the extent that this Report expressly addresses proposed development, design objectives and purposes, and then only to the extent there has been no material alteration to or variation from any of the said descriptions provided to us unless we are specifically requested by the Client to review and revise the Report in light of such alteration or variation or to consider such representations, information and instructions.

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 OUR WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS WE MAY EXPRESSLY APPROVE. The contents of the Report remain our copyright property. The Client may not give, lend or, sell the Report, or otherwise make the Report, or any portion thereof, available to any person without our prior written permission. Any use which a third party makes of the Report, are the sole responsibility of such third parties. Unless expressly permitted by us, no person other than the Client is entitled to rely on this Report. We accept no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without our 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 this report is delivered on 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. Where 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 us. We have relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, we cannot 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 us. We are entitled to rely on such representations, information and instructions and are not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

(see over …)

INTERPRETATION OF THE REPORT *(continued. . .)*

c) Design Services: The Report may form part of the design and construction documents for information purposes even though it may have been issued prior to the final design being completed. We should be retained to review the final design, project plans and documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the report recommendations and the final design detailed in the contract documents should be reported to us immediately so that we can address potential conflicts.

d) Construction Services: During construction we must be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions 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. RISK LIMITATION

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause an accidental release of those substances. In consideration of the provision of the services by us, which are for the Client's benefit, the Client agrees to hold harmless and to indemnify and defend us and our directors, officers, servants, agents, employees, workmen and contractors (hereinafter referred to as the "Company") from and against any and all claims, losses, damages, demands, disputes, liability and legal investigative costs of defence, whether for personal injury including death, or any other loss whatsoever, regardless of any action or omission on the part of the Company, that result from an accidental release of pollutants or hazardous substances occurring as a result of carrying out this Project. This indemnification shall extend to all Claims brought or threatened against the Company under any federal or provincial statute as a result of conducting work on this Project. In addition to the above indemnification, the Client further agrees not to bring any claims against the Company in connection with any of the aforementioned causes.

7. SERVICES OF SUBCONSULTANTS AND CONTRACTORS

The conduct of engineering and environmental studies frequently requires hiring the services of individuals and companies with special expertise and/or services which we do not provide. We may arrange the hiring of these services as a convenience to our Clients. As these services are for the Client's benefit, the Client agrees to hold the Company harmless and to indemnify and defend us from and against all claims arising through such hirings to the extent that the Client would incur had he hired those services directly. This includes responsibility for payment for services rendered and pursuit of damages for errors, omissions or negligence by those parties in carrying out their work. In particular, these conditions apply to the use of drilling, excavation and laboratory testing services.

8. CONTROL OF WORK AND JOBSITE SAFETY

We are responsible only for the activities of our employees on the jobsite. The presence of our personnel on the site shall not be construed in any way to relieve the Client or any contractors on site from their responsibilities for site safety. The Client acknowledges that he, his representatives, contractors or others retain control of the site and that we never occupy a position of control of the site. The Client undertakes to inform us of all hazardous conditions, or other relevant conditions of which the Client is aware. The Client also recognizes that our activities may uncover previously unknown hazardous conditions or materials and that such a discovery may result in the necessity to undertake emergency procedures to protect our employees as well as the public at large and the environment in general. These procedures may well involve additional costs outside of any budgets previously agreed to. The Client agrees to pay us for any expenses incurred as the result of such discoveries and to compensate us through payment of additional fees and expenses for time spent by us to deal with the consequences of such discoveries. The Client also acknowledges that in some cases the discovery of hazardous conditions and materials will require that certain regulatory bodies be informed and the Client agrees that notification to such bodies by us will not be a cause of action or dispute.

9. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on our interpretation of conditions revealed through limited investigation conducted within a defined scope of services. We cannot 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.

THURBER

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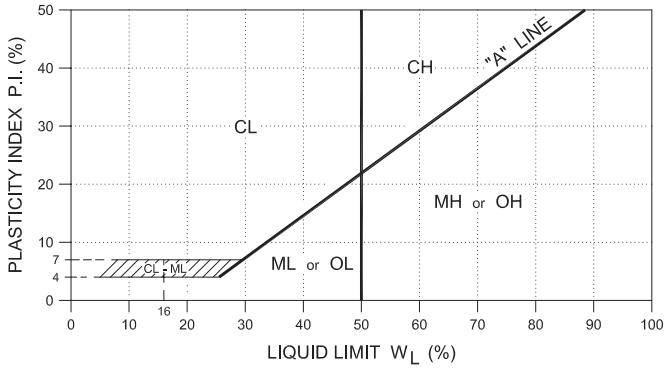
UNIFIED CLASSIFICATION SYSTEM FOR SOILS (ASTM D2487)

MAJOR DIVISION			SYMBOLS GROUP	SYMBOLS GRAPH	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA
COARSE-GRAINED SOILS (MORE THAN 50% BY WEIGHT RETAINED ON No. 200 SIEVE)	GRAVELS MORE THAN 50% COARSE FRACTION RETAINED ON No. 4 SIEVE	CLEAN GRAVELS (< 5% FINES)	GW		WELL GRADED GRAVEL and WELL GRADED GRAVEL with SAND.	$C_U = \frac{D_{60}}{D_{10}} \geq 4$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ to } 3$
			GP		POORLY GRADED GRAVEL and POORLY GRADED GRAVEL with SAND.	NOT MEETING ABOVE REQUIREMENTS
		GRAVELS WITH FINES (> 12% FINES)	GM		SILTY GRAVEL, GRAVEL - SAND - SILT MIXTURES.	FINES CLASSIFY AS ML or MH (3)
			GC		CLAYEY GRAVEL, GRAVEL - SAND - CLAY MIXTURES.	FINES CLASSIFY AS CL or CH (3)
	SANDS MORE THAN 50% COARSE FRACTION PASSES No. 4 SIEVE	CLEAN SANDS (< 5% FINES)	SW		WELL GRADED SAND and WELL GRADED SAND with GRAVEL	$C_U = \frac{D_{60}}{D_{10}} \geq 6$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ to } 3$
			SP		POORLY GRADED SAND and POORLY GRADED SAND with GRAVEL.	NOT MEETING ABOVE REQUIREMENTS
		SANDS WITH FINES (> 12% FINES)	SM		SILTY SAND, SAND - SILT MIXTURES.	FINES CLASSIFY AS ML or MH (3)
			SC		CLAYEY SAND, SAND - CLAY MIXTURES.	FINES CLASSIFY AS CL or CH (3)
FINE-GRAINED SOILS (MORE THAN 50% BY WEIGHT PASSES No. 200 SIEVE)	SILTS BELOW "A" LINE NEGLIGIBLE ORGANIC CONTENT	W_L < 50%	ML		INORGANIC SILTS, SILTS with SAND and SILTS with GRAVEL and SANDY or GRAVELLY SILTS.	P.I. < 4 or PLOTS BELOW THE "A" LINE
		W_L > 50%	MH		INORGANIC SILTS, SILTS with SAND & SILTS with GRAVEL & SANDY or GRAVELLY SILTS, FINE SANDY or SILTY SOILS.	P.I. PLOTS BELOW THE "A" LINE
	CLAYS ABOVE "A" LINE ON PLASTICITY CHART NEGLIGIBLE ORGANIC CONTENT	W_L < 50%	CL		INORGANIC CLAYS of LOW PLASTICITY, GRAVELLY, SANDY, or SILTY CLAYS, LEAN CLAYS.	P.I. > 7 and PLOTS ON OR ABOVE THE "A" LINE
		W_L near 50%	CL-CH		BORDERLINE INORGANIC CLAYS and SILTY CLAYS with LIQUID LIMITS NEAR 50%.	(only used for visual identification)
		W_L > 50%	CH		INORGANIC CLAYS of HIGH PLASTICITY, FAT CLAYS.	P.I. PLOTS ON OR ABOVE THE "A" LINE
	ORGANIC SILTS and CLAYS	W_L < 50%	OL		ORGANIC SILTS and ORGANIC SILTY CLAYS of LOW PLASTICITY.	$\frac{W_L \text{ (oven dried)}}{W_L \text{ (not dried)}} < 0.75$
		W_L > 50%	OH		ORGANIC CLAYS OF HIGH PLASTICITY.	$\frac{W_L \text{ (oven dried)}}{W_L \text{ (not dried)}} < 0.75$
HIGHLY ORGANIC SOILS			PT		PEAT and other HIGHLY ORGANIC SOILS.	STRONG COLOR OR ODOR, AND OFTEN FIBROUS TEXTURE.

PLASTICITY CHART FOR SOILS PASSING No. 40 SIEVE



NOTES:

1. ALL SIEVE SIZES ARE U.S. STANDARD, A.S.T.M. E11-04.
2. COARSE GRAINED SOILS WITH 5 TO 12% FINES REQUIRE DUAL SYMBOLS (GW-GM, GW-GC, GP-GM, GP-GC, SW-SM, SW-SC, SP-SM, SP-SC).
3. IF FINES CLASSIFY CL-ML USE DUAL SYMBOL (GC-GM or SC-SM).
4. WHERE TESTING IS NOT CARRIED OUT, THE IDENTIFICATIONS ARE DETERMINED BY VISUAL-MANUAL PROCEDURES DESCRIBED IN ASTM D2488-06.

THURBER

SYMBOLS AND TERMS USED ON TEST LOGS

1. PARTICLE SIZE CLASSIFICATION OF MINERAL SOILS

DESCRIPTION		APPARENT PARTICLE SIZE
BOULDERS		> 200 mm
COBBLES		75 mm to 200 mm
GRAVEL	course	19 mm to 75 mm
	fine	4.75 mm to 19 mm
SAND	course	2 mm to 4.75 mm
	medium	0.475 mm to 2 mm
	fine	0.075 mm to 0.475 mm
SILT		Non-plastic particles, not visible to the naked eye
CLAY		Plastic particles, not visible to the naked eye

NOTE: Metric Conversion is approximate only

2. TERMS DESCRIBING CONSISTENCY (Cohesive Soils Only)

DESCRIPTION	APPROXIMATE UNDRAINED SHEAR STRENGTH
Very Soft	Less than 10 kPa (250 psf)
Soft	10 to 25 kPa (250 - 500 psf)
Firm	25 to 50 kPa (500 - 1000 psf)
Stiff	50 to 100 kPa (1000 - 2000 psf)
Very Stiff	100 to 200 kPa (2000 - 4000 psf)
Hard	Greater than 200 kPa (4000 psf)

NOTE: Metric Conversion is approximate only

3. TERMS DESCRIBING DENSITY (Cohesionless Soils Only)

DESCRIPTION	STANDARD PENETRATION TEST Number of blows per foot (300 mm) *
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	over 50

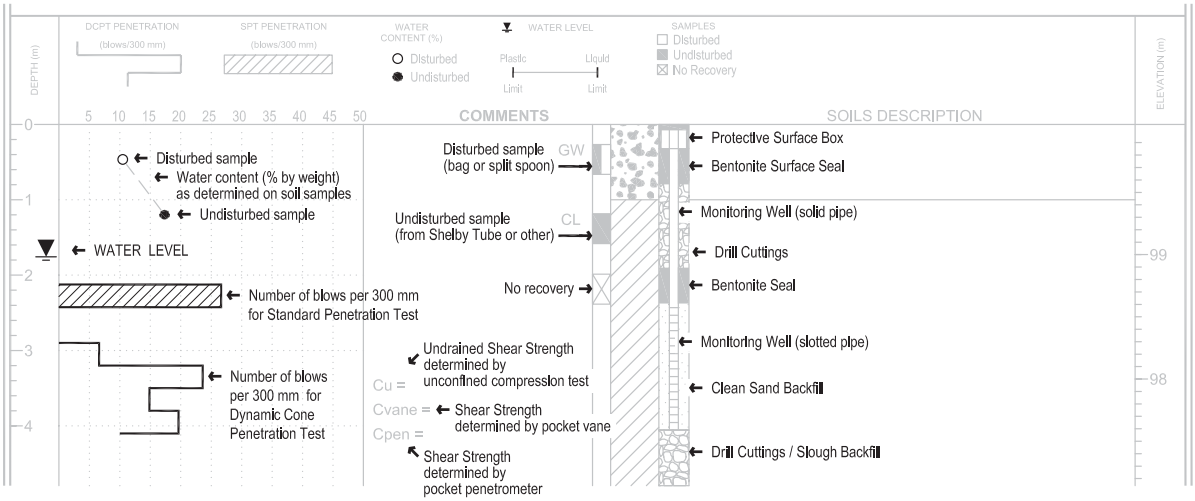
** Directly applicable to sands and, with interpretation, to gravels*

4. PROPORTION OF MINOR COMPONENTS BY WEIGHT

DESCRIPTION	PECENT BY WEIGHT
and	35 to 50 %
y / ey	20 to 35 %
some	10 to 20 %
trace	less than 10 %

EXAMPLE: Silty SAND, trace of gravel = Sand with 20 to 35% silt and up to 10% gravel, by dry weight. (Percentages of secondary materials are estimates based on visual and tactile assessment of samples).

5. LEGEND FOR TEST HOLE LOGS *(Typical only showing commonly included elements)*



Sheet 1 of 1

LOG OF TEST PIT

TEST PIT NO. **TP12-1**

LOCATION See Drawing No. 17-308-681-1

TOP OF PIT ELEV:

METHOD: Backhoe

EXCAVATOR: Don Mann Excavating

INSPECTOR: JH

THURBER

CLIENT: STANTEC

PROJECT: William Head Institute
PRV & Rechlorination Building
Geotechnical Investigation

DATE: 4-Dec-2012

FILE NO.: 17-308-681

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 ✤ CPen reading | GRAIN SIZE (%): ▲ Passing #200 sieve △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): ■ GASTECH reading ⊠ PID reading

5 10 15 20 25 30 35 40 45 50

COMMENTS

SOILS DESCRIPTION

DEPTH (m)		SOILS DESCRIPTION
0		Moist, black to brown, silty SAND and GRAVEL (FILL); angular rock pieces to 200 mm diameter; concrete debris
1	SP	Dense, moist, brown, sandy GRAVEL; gravel to 75 mm diameter; trace silt; trace organics
2	GP/SP	Backhoe refusal at 1.9 m depth on large boulder. Upon completion of excavation: No free water encountered. Test Pit backfilled with excavated materials.
3		
4		
5		

Sheet 1 of 1

TEST PIT NO.
TP12-2

LOG OF TEST PIT

LOCATION See Drawing No. 17-308-681-1

TOP OF PIT ELEV:

METHOD: Backhoe

EXCAVATOR: Don Mann Excavating

INSPECTOR: JH

THURBER

CLIENT: STANTEC

PROJECT: William Head Institute
PRV & Rechlorination Building
Geotechnical Investigation

DATE: 4-Dec-2012

FILE NO.: 17-308-681

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 ✤ CPen reading | GRAIN SIZE (%): ▲ Passing #200 sieve △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): ■ GASTECH reading ⊠ PID reading

5 10 15 20 25 30 35 40 45 50

DEPTH (m)	COMMENTS	SOILS DESCRIPTION
0		Moist, grey, sandy GRAVEL (FILL)
1	SW	Moist to wet, grey SAND (possible FILL); trace to some gravel to 20 mm diameter
2		End of Test Pit at 2.2 m depth; pit walls caving. Upon completion of excavation: Seepage noted at 1.6 m depth. Test Pit backfilled with excavated materials.
3		
4		
5		

Sheet 1 of 1

LOG OF TEST PIT

TEST PIT NO. **TP12-3**

LOCATION See Drawing No. 17-308-681-1

TOP OF PIT ELEV:

METHOD: Backhoe

EXCAVATOR: Don Mann Excavating

INSPECTOR: JH

THURBER

CLIENT: STANTEC

PROJECT: William Head Institute
PRV & Rechlorination Building
Geotechnical Investigation

DATE: 4-Dec-2012

FILE NO.: 17-308-681

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 ✤ CPen reading | GRAIN SIZE (%): ▲ Passing #200 sieve △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): ■ GASTECH reading ⊠ PID reading

5 10 15 20 25 30 35 40 45 50

COMMENTS

SOILS DESCRIPTION

DEPTH (m)		COMMENTS	SOILS DESCRIPTION
0			Wet, black, organic SILT (TOPSOIL)
1	SP		Wet, brown SAND; some gravel to 75 mm diameter; trace silt
2	SM		Wet, brown, silty SAND; trace to some gravel to 75 mm diameter
3			End of Test Pit at 2.0 m depth on possible till-like material. Upon completion of excavation: Seepage noted at 0.5 m depth. Test Pit backfilled with excavated materials.
4			
5			

LOG OF TEST PIT (NO EST.) RRS_17-308-681_WILLIAMS HEAD_2012 TEST PIT LOGS.GPJ THURBER BC.GDT 14/12/12- THURBER VICTORIA FEBRUARY 2012.GLB

Sheet 1 of 1

LOG OF TEST PIT

TEST PIT NO. **TP12-4**

LOCATION See Drawing No. 17-308-681-1

TOP OF PIT ELEV:

METHOD: Backhoe

EXCAVATOR: Don Mann Excavating

INSPECTOR: JH

THURBER

CLIENT: STANTEC

PROJECT: William Head Institute
PRV & Rechlorination Building
Geotechnical Investigation

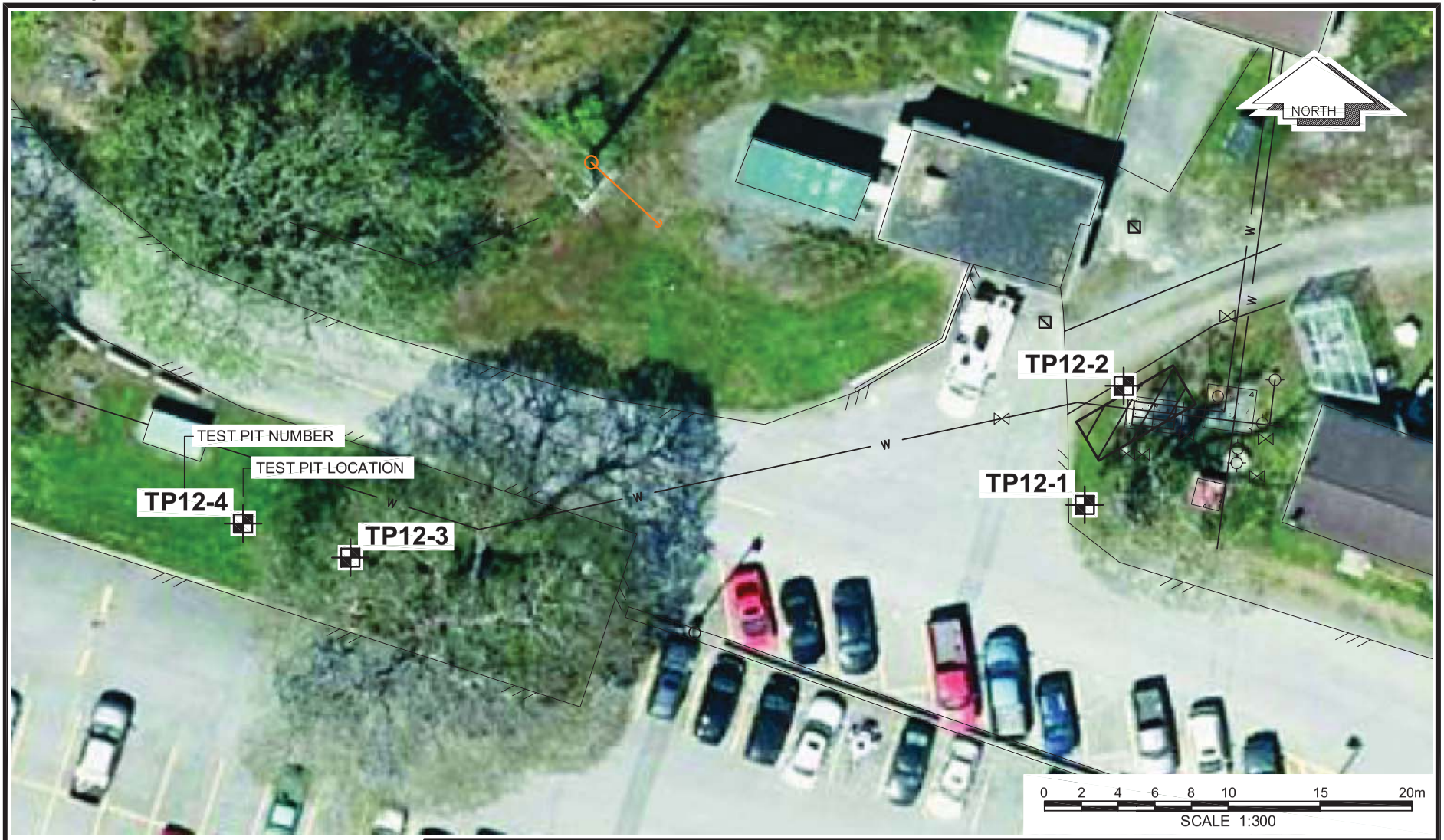
DATE: 4-Dec-2012

FILE NO.: 17-308-681

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 ✤ CPen reading | GRAIN SIZE (%): ▲ Passing #200 sieve △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): ■ GASTECH reading ⊠ PID reading

DEPTH (m)	5 10 15 20 25 30 35 40 45 50	COMMENTS		SOILS DESCRIPTION	DEPTH (m)
0				Wet, black, organic SAND and GRAVEL (TOPSOIL)	0
				Loose, wet, brown SAND	
1	○		CL	Moist, brown, sandy, silty CLAY (till-like); cemented; fine grained sand; trace gravel to 35 mm diameter	1
				End of Test Pit at 1.4 m depth. Upon completion of excavation: No free water encountered. Test Pit backfilled with excavated materials.	
2					2
3					3
4					4
5					5

LOG OF TEST PIT (NO EST.) RRS_17-308-681_WILLIAMS HEAD_2012 TEST PIT LOGS.GPJ THURBER BC.GDT 14/12/12- THURBER VICTORIA FEBRUARY 2012.GLB



NOTES:

1. Test Pit locations are approximate only.
2. Digital base provided by client; orthophotograph from C.R.D. Natural Areas Atlas.

DESIGNED	JSP
DRAWN	RRS
DATE	DECEMBER 13, 2012
APPROVED	JSP
SCALE	1:300

STANTEC

TEST PIT LOCATION PLAN

WILLIAM HEAD INSTITUTE
PRV & RECHLORINATION BUILDING
METCHOSIN, B.C.

THURBER

DWG. NO.
17-308-681-1