February 27, 2014 Reference No. VAN-00217089

Village of Pemberton
7400 Prospect Road
Pemberton, BC V0N 2L1

Email: clamont@pemberton.ca

Attention: Caroline Lamont

Re: Pemberton Recreation Complex
Preliminary Geotechnical Review

Dear Ms. Lamont:

1.0 INTRODUCTION

As requested, **exp** Services Inc. (**exp**) has completed a geotechnical review of a property regarding the development of a proposed recreational complex in Pemberton, BC. Our review was completed in general conformance with a proposal submitted to the Village of Pemberton on January 9, 2014. The proposal was accepted by Caroline Lamont for the Village of Pemberton on January 22, 2014.

For the purposes of the geotechnical review the proposed development has been divided into Phase 1 and Phase 2 with the western portion of the subject property (Phase 1) being generally considered for buildings, parking areas, a soccer/football field and running track and the eastern portion (Phase 2) being generally considered for soccer and baseball fields as shown on the attached Site Plan (Figure 2).

The scope of services for this geotechnical review was limited to the provision of geotechnical engineering services only and did not include any provisions for environmental assessment.

2.0 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The subject site is located about 3km east of downtown Pemberton on the east side of Old Pemberton Farm Road as shown on the attached Key Plan (Figure 1). The roadway intersects Highway 99 about 600m south of the subject site. The proposed development site is irregular in shape with an approximate area of about 8.7 Ha. The site is bounded by Old Pemberton Farm Road to the west, a railway to the north, undeveloped land to the east and eastern portion of the south boundary, and a rock quarry on the western portion of the south boundary. Residential, commercial and school developments are proposed along the northwest, east and western portion of the south boundary respectively.

Historically, the Phase 1 area has been used as a rock quarry with crushing done on-site. The Phase 2 area has been undeveloped and remains in a generally native state.

The subject site is generally flat lying with elevations ranging from about 210m in the eastern portion to 212m geodetic in the western portion. A steeply inclined slope is located at the grade change near the Phase 1 eastern boundary. At the time of our review there were stockpiles of gravel placed in the centre of the Phase 1 portion of the property. Bedrock cut slopes were noted adjacent to the western portion of the south boundary along a bedrock knoll with a maximum elevation of about 245m geodetic, with residential development at the top. Stockpiles of blast rock were located near the toe of the cut slopes. The Phase 2 portion of the property is generally flat lying with minor undulations. North of the railway topography consists of south facing, moderately inclined bedrock controlled slope to an elevation of about 750m geodetic.

Localized ponding water was noted in the Phase 1 portion of the subject site with more prevalent ponding noted in the Phase 2 portion.

Vegetation within the subject site was restricted to the eastern portion of the site and consisted of areas of grass (eastern portion of Phase 1), assorted deciduous trees with trunk diameters up to about 75mm and localized evergreen trees with trunk diameters up to about 75mm. Within the Phase 2 area evergreen trees appeared to be restricted to localized areas where slight increases in grade were noted (i.e. the area near HA 14-05).

3.0 GEOTECHNICAL EXPLORATION

Geotechnical exploration completed for the Phase 1 area consisted of the excavation of twelve (12) test pits ranging in depth from about 0.3m to 4.1m, one (1) hand auger to a depth of about 2.3m and two (2) solid stem auger holes to depths of about 6.4m and 9.1m. Test pits and auger test holes were supervised, located, logged and sampled by **exp** personnel. Due to the unexpectedly not being able to encounter bedrock within the maximum reach of the test pits in the area of the proposed arena solid stem auger holes were drilled to determine depth to bedrock in the area and to assess soils below the depth achievable with test pits. Geotechnical exploration within Phase 2 consisted of five (5) hand augered test holes to depths ranging from about 0.4m to 3.0m. Hand augers were located, completed, logged and sampled by **exp** personnel. Hand Auger HA14-06 was limited to 0.4m depth due to the presence of thick ice. Samples obtained during geotechnical exploration were taken to our laboratory for further soil classification and moisture content analysis.

Test hole locations are shown on the attached Test Hole Location Plan (Figure 2). Detailed descriptions of soils encountered in the test holes are provided on the attached Test Hole logs with results of moisture content analysis.

4.0 SUBSURFACE CONDITIONS

Description of subsurface conditions within the subject site has been divided into Phase 1, primarily related to building, parking and a running track with a football/ soccer field, and Phase 2 primarily related to the construction of soccer fields and a baseball diamond.

4.1 Phase 1

In general, subsurface conditions within Phase 1 consisted of two distinct zones. The zones may be designated as the south zone and the north zone with the dividing line being located approximately 50m to 80m from the southern property line (see Figure 2). In the vicinity of the dividing line it appears underlying bedrock dips steeply to the north with associated increasing overburden soil thickness.

The southern zone (TP14-09 through TP14-12) appears to generally consist of sand and gravel or blasted boulders with a sand and gravel matrix fill, up to about 1m thick, overlying bedrock.

The northern zone (TP14-01 through TP14-08, AH14-01 and AH14-02) contained a surficial layer of compact silty sand/ sandy silt with some gravel, cobbles and boulders fill (ranging in thickness from about 1m to 2m). This fill layer was typically underlain by native compact sand with a thickness ranging from about 0.5m to 1.5m (Test holes AH14-01 and AH1-02 and TP14-08 in the area of the proposed Arena did not encounter the native sand layer). The native sand layer was underlain by soft to very soft organic silt overlying firm peat. In the area of the proposed Arena, where the sand layer was not encountered, organic silt was encountered in the Auger Holes but not the test pits, likely due to limited depth of excavation. TP14-05, TP14-06, AH14-01 and AH14-02 encountered the organic silt and did not encounter peat; however, it is possible the test pits were not deep enough to expose a peat layer underlying the organic silt. The auger holes encountered a firm silt layer with increasing sand content with increasing depth, underlain by sandy silt in AH14-01 and sand with wood fibers in AH14-02. Bedrock was encountered at 6.4m and 9.1 m in AH14-01 and AH14-02 respectively. Based on the two auger holes the bedrock surface has an apparent dip to the north of about 1H: 2V; however, this is based on very limited data and should be confirmed with further geotechnical exploration. Test pits TP14-02 through TP14-04 and auger hole AH14-02 encountered substantial wood remnants and/or fibers within both the organic silt layer (Test Pits) and in the base sand layer (Auger Hole) indicating the possibility of buried trees within the subgrade soils.

The hand auger within Phase 1 was located in the undeveloped area east of the existing gravel pit area and encountered a layer, about 1.5m thick, of soft to firm silt to organic silt overlying soft to firm organic silty peat about 0.5m thick underlain by soft to firm peat. The hand auger hole was terminated at about 2.3m depth on buried wood.

Groundwater was encountered at depths ranging from about 0.9m (TP14-07) to 2.3m (TP14-04). Variability in groundwater table levels within Phase 1 appeared to be relatively large over short distances (i.e. 1.1m over about 40m between TP14-04 and TP14-05), possibly due to variability in soil types and land use. It should be noted that groundwater levels typically vary seasonally and with changes in precipitation, land use and other factors. It is pointed out that intermittent, shallow, perched groundwater conditions can occur where relatively impervious soils are overlain by a permeable soil layer.

4.2 Phase 2

Based on the hand auger information, subsurface conditions within Phase 2 generally consisted of silt, of varying consistency, and soft peat layers. The surficial silt and peat layers were generally underlain by other silt and peat layers. A localized surficial stiff silt layer was also noted (HA14-05). No firm

bottom to the peat and silt was encountered in the hand auger holes to depths of about 3m. Soils were typically wet, with the exception of HA14-05 where stiff moist silt was encountered.

Groundwater was generally noted at surface with the exception of the area near HA14-05, which had slightly higher elevation than the adjacent grades and groundwater was not encountered in the hand auger hole (ended at a depth of 0.8m due to hard augering). It should be noted that groundwater levels typically vary seasonally and with changes in precipitation, land use and other factors. It is pointed out that intermittent shallow perched groundwater conditions can occur where relatively impervious soils are overlain by a permeable soil layer.

5.0 DISCUSSION AND RECOMMENDATIONS

As discussed above, subsurface soils in the southern portion of Phase 1 generally consisted of sand and gravel fill materials overlying bedrock. Subsurface soils in the northern portion of Phase 1 generally consisted of sand and gravel fill materials overlying silt, organic silt, peat and sand. Subsurface conditions within Phase 2 generally consisted of surficial soft peat or silt underlain with peat or silt. Localized surficial stiff silt zones were also encountered.

It is anticipated that buildings would be supported with raft foundations placed on structural fill placed on preloaded ground or on pile supported foundations in the northern portion of Phase 1 and on conventional strip and pad footings placed on structural fill placed on bedrock in the southern portion of Phase 1. Consideration could be given to moving the proposed arena such that the building envelope is within the southern portion of Phase (shallow bedrock). The shift of the building envelope would result in site preparations, seismic considerations etc. being similar to those described for the southern portion of Phase 1 below. Consideration could be given to moving the proposed arena to the southern portion of Phase 1 where the building could be supported on conventional strip and pad footings with site preparation, seismic considerations being as described for the southern portion of Phase 1.

The sections below provide geotechnical recommendations for site preparations for building foundations and playing fields, foundation design recommendations for buildings, seismic considerations, parking and drive aisles, backfill, slab-on-grade, sub-drainage, methane considerations and further geotechnical exploration to finalize building design.

5.1 Foundation Design

Foundation design for proposed buildings is anticipated to vary with the variations in subsurface conditions, particularly with respect to the presence of shallow bedrock. In the southern portion of Phase 1 bedrock was generally encountered at less than 1m depth from existing surface elevation, whereas depth to bedrock was up to 9.1m in the northern portion.

It is expected that proposed buildings founded in the southern portion of Phase 1 (pool) could be supported on bedrock or structural fill placed thereon. The following foundation values should be used for design of footings in the southern portion of Phases 1:

Foundation Material	Factored Ultimate Bearing Resistance	Allowable Bearing Pressure
Bedrock or structural fill placed thereon	375 kPa	250 kPa

The bearing capacities provided above are subject to the following conditions:

- Footings are setback a suitable distance from finished fill or cut slopes with locations approved by the geotechnical engineer;
- Strip and pad footings have minimum widths of 450mm and 600mm respectively;
- Footings are founded a minimum of 600mm below adjacent finished grade for confinement and frost protection purposes;
- Site preparations are completed as described in Section 5.2 "Site Preparation" and load bearing surfaces have been reviewed and approved by the geotechnical engineer.

To address potential ongoing post construction settlement, in the northern portion Phase 1, we recommend a raft or pile foundation. In addition to settlement from static loading, there is potential for seismically induced settlement and lateral spread following the design earthquake (see Section 5.3 "Seismic Considerations" below). A relatively thick layer of structural fill is recommended beneath building raft foundations due to the low bearing strength of the native soils and to provide uniformity of support to further moderate differential settlement. A raft foundation underlain by a substantial layer of structural fill will be more tolerant of differential settlement arising from potential liquefaction, which could occur during the design earthquake, as well as from the continued consolidation under dead plus live loads.

The following foundation values should for the foundation design of a raft foundation (Northern portion Phase 1):

Foundation Material	Maximum Average Contact Pressure	Maximum Localized Contact Pressure	Modulus of Subgrade Reaction
Min. 1m structural fill placed on loose to compact native sand or silty sand	40 kPa	60 kPa	25,000 kN/m^3

The values provided above are subject to the following conditions:

- The foundation is setback a suitable distance from finished fill or cut slopes with locations approved by the geotechnical engineer;

- Foundation is a minimum of 600mm below adjacent finished grade for frost protection purposes;

- Site preparations have been completed as described in Section 5.2 Site Preparation and load bearing surfaces have been reviewed by a geotechnical engineer;

- Settlement due to surcharge material (preload) has been determined to be sufficient by the geotechnical engineer prior to removal.

Pile foundations for proposed buildings located in the northern portion of Phase 1 would be end bearing on bedrock. Details regarding pile foundation design could be supplied as further geotechnical exploration is completed and building design advanced.

It is recommended that footing support not transition between structural fill and bedrock due to potential for significant differential settlement.

5.2 Site Preparation

Recommendations regarding site preparation for proposed buildings and playing fields will vary based on building foundation design and tolerance for ongoing maintenance for playing fields. A discussion of recommended site preparation is provided below.

5.2.1 Buildings and Parking/ Drive Areas

In the southern portion of Phase 1, site preparation should include removal of vegetation and loose fill materials to expose bedrock. Restoration or increases in grade should be achieved by the placement of structural fill consisting of well-graded 75mm minus pit run sand and gravel or 150mm minus shot rock with less than 5% fines passing the 75µm sieve. The structural fill should be placed in lifts with a maximum loose thickness of 300mm compacted to at least 95% Modified Proctor Maximum Dry Density (MPMDD). Structural fill placed below footings should extend a distance beyond the outside edge of footings at least equal to the thickness of the structural fill layer.

In the northern portion of Phase 1, load supporting areas, parking areas, walkways and other hard landscape features site preparation should include removal of vegetation and deleterious materials to expose silty sand, gravel fill or compact sand.

If a raft foundation system, is to be used to support proposed buildings in this area preloading of the building envelope is recommended. Settlement monitoring of the preload should consist of placement of settlement gauges near the crest of each corner of the preload surcharge and within the centre of the preload surcharge. Final settlement gauge placement should be reviewed and approved by the geotechnical engineer. Monitoring of the settlement gauges should be conducted prior to placement of surcharge, immediately after placement of surcharge or after each lift as appropriate, once a week for the first month and every two weeks for the next two months and monthly thereafter. The preload height would be determined after proposed dead and live loading for the building is finalized. The surcharge crest should extend beyond the building envelope at least 2m with slopes no steeper than 2H: 1V.

For a raft foundation system the raft foundation should be founded on a relatively thick layer of structural fill. The recommended minimum thickness of the structural fill layer is 1.0m relative to the bottom of the slab.

Density testing of sand and gravel structural fill should be conducted to confirm recommended compaction has been achieved with confirmation of shot rock structural fill compaction being conducted by visual methods by the geotechnical engineer.

For pile supported foundations site preparation should include removal of vegetation and levelling and compaction of existing fill materials to provide a stable base for pile driving equipment. It should be noted that if buildings are pile supported, the surrounding areas may experience ongoing settlement relative to the building.

5.2.2 Playing Fields

The playing fields are generally located within Phase 2 and the northern portion of Phase 1. Subsurface conditions range from soft silt and peat at surface underlain by soft to firm silt and soft peat to firm silt at surface. It is assumed that some fill will be required to be placed on the areas considered for playing fields due to high (near surface) groundwater levels. Due to the highly variable nature of subsurface soils and their compressibility, differential settlement across the playing surfaces should be anticipated. Preloading of the playing surfaces would help mitigate the differential settlement; however, some long term differential settlement will still likely occur. The decision to preload should be based on economics of preloading versus performance issues and ongoing maintenance costs of releveling playing fields. Monitoring of preload will provide an estimate of differential settlement to expect over the long term.

Site preparation should include removal of vegetation and mowing of grass in peat areas leaving the sod untouched. Fill material to increase or restore grade should consist of pit run sand and gravel with less than 5% fines content to allow for suitable compaction. Fill material should be placed in lifts with a maximum loose thickness of 300mm, compacted with several passes of a ride-on type vibratory steel drum roller.

As final design elevations, playing field layout and general maintenance strategy is advanced; further geotechnical recommendations could be provided.

5.3 Seismic Considerations

The British Columbia Building Code (BCBC 2012) provides guidelines and parameters for seismic design. The design earthquake corresponds to a 2% probability of exceedance in 50 years, which is equivalent to a 1 in 2475 year return period. The Natural Resources Canada website provides site specific interpolated seismic hazard values and indicates a peak horizontal firm ground acceleration of 0.280g corresponds to the 1 in 2475 year earthquake event for the Pemberton area. The inferred earthquake magnitude for the design earthquake is 7.0.

Results of the geotechnical exploration indicates bedrock overlain with granular fill on the southern portion of Phase 1 and interbedded sand, peat, organic silt and silt in the northern portion. Based on this information, liquefaction of the subsurface soils in the southern portion of Phase 1 is not expected.

However, the design earthquake motion would be altered or amplified as the motion propagates though the loose, or soft soils at sites where the firm ground is deeper, such as the northern portion of Phase 1. To account for the amplification factor in this type of ground BCBC 2012 recommends the use of the Foundation Factor Fa and Fv for short and long period respectively. The site classification for the northern portion of Phase 1 from Seismic Response Table 4.1.8.4.A from BCBC 2012 is considered to be Site Class F. Assessment of liquefaction potential, lateral spread and seismically induced settlement for the northern portion of Phase 1 would require further geotechnical exploration (see Section 5.10 "Further Geotechnical Exploration").

5.4 Parking Lot and Drive Areas

Parking lot and drive areas in the northern portion of Phase 1 should be preloaded to mitigate future differential settlement issues (see Section 5.2 "Site Preparation").

The structural fill used for the buildings should be suitable for use as structural fill for grade increases below base and sub-base gravels. Sub-base and base gravels should conform to the gradation tables provided in the most recent MMCD (Tables 2.9 and 2.10 respectively). Sieve analysis of sub-base and base course fills should be completed to confirm compliance with MMCD.

Sub-base and base course should be compacted to at least 95% Modified Proctor maximum dry density with density testing conducted to confirm adequate compaction has been achieved.

5.5 Backfill

Backfill for perimeter areas or for support of exterior sidewalks, patios, etc. should consist of well-graded pit run sand and gravel with less than 5% fines content. The backfill should be placed in lifts with a maximum loose thickness of 300mm compacted to a minimum 95% MPMDD. Placed structural fill should be density tested to confirm recommended density has been achieved.

5.6 Slab-on-Grade

Slab-on-grade should be supported on suitably prepared subgrades as described in Section 5.2 "Site Preparation". A 100mm thick layer of 19mm clear crushed gravel should be placed beneath concrete slabs to provide a bedding and drainage layer for potential seepage zones. The clear crushed gravel layer should have an outlet to the perimeter drains (if required, see Section 5.9 "Sub-Drainage") via weep holes through the foundation walls of the building. A layer of 6 mil poly vapour barrier should be placed over the clear crushed gravel to protect it from concrete contamination and to limit dampness of the slab from capillary moisture which could damage floor coverings.

5.9 Sub-Drainage

A perimeter drain should be installed for buildings where the floor slab is less than 150mm above adjacent finished grade. The perimeter drain should consist of 150mm diameter perforated PVC pipe surrounded by at least 150mm of 19mm clear crushed gravel separated from the remaining backfill by a layer of birds eye gravel. The perimeter drains should be installed no deeper than the underside of the adjacent footing base. The perimeter drain should be connected to a pumped sump or suitable gravity outlet. Roof drainage should be in a separate drainage system.

5.10 Methane Potential

It is considered likely that methane gas will be generated by organic soils and peat in the northern portion of Phase1. In order to prevent build-up of methane, appropriate ventilation and mitigation of the building should be designed.

5.11 Further Geotechnical Exploration

In order to finalize geotechnical recommendations for the proposed development, further geotechnical exploration would be required, particularly with respect to seismic considerations.

Recommended additional geotechnical exploration would include the following tasks:

- Seismic Cone Penetrometer Tests (SCPT's) for building to be located in the northern portion of Phase 1;
- Additional auger test holes (in conjunction with SCPT's) to delineate depth to bedrock and confirm transition from bedrock to soft soil foundation regimes;
- Possibly further test pits within Phase 2 to further delineate surficial soil types; however, this item may be accomplished during construction after better access has been constructed.

5 CLOSURE

Exp has prepared this report based on the referenced information and our understanding of the project as described in this report. If the development plans change or if subsurface conditions are noted to differ from those described, **exp** should be notified and the recommendations provided regarding the geotechnical aspects of this project reviewed and, if deemed appropriate, modified.

This report was prepared for the exclusive use of our client and their designated consultants or agents and may not be used by other parties without the written consent of **exp** Services Inc. The attached "Interpretation & Use of Study and Report" forms an integral part of this report and must be included with any copies of this report.

Sincerely,

exp Services Inc.

PROFESSIONAL ENGINEER OF BRITISH COLUMBIA E. G. SYKES 28/14

Evan Sykes, P.Eng.
Senior Engineer

Reviewed by:

Ben Weiss, P.Eng.
Senior Engineer

Enclosure: Interpretation & Use of Study and Report
Key Plan (Figure 1)
Testhole Location Plan (Figure 2)
Test Hole Logs (TP14-01 through TP 14-10; AH14-01 & AH14-02; HA 14-01 through HA 14-06)

ES/es

exp RE 2014 02 27 Geotechnical Review Proposed Recreation Complex, Pemberton, BC

INTERPRETATION & USE OF STUDY AND REPORT

1. STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering consulting practices in this area. No other warranty, expressed or implied, is made. Engineering studies and reports do not include environmental consulting unless specifically stated in the engineering report.

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 THE REPORT

The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose 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 are only valid to the extent that 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.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming 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. WE WILL CONSENT TO ANY REASONABLE REQUEST BY THE CLIENT TO APPROVE THE USE OF THIS REPORT BY OTHER PARTIES AS "APPROVED USERS". The contents of the Report remain our copyright property and we authorise only the Client and Approved Users to make copies of the Report only in such quantities as are reasonably necessary for the use of the Report by those parties. The Client and Approved Users may not give, lend, sell or otherwise make the Report, or any portion thereof, available to any party without our written permission. Any use which a third party makes of the Report, or any portion of the Report, are the sole responsibility of such third parties. We accept no responsibility for damages suffered by any third party resulting from unauthorised use of the Report.

5. INTERPRETATION OF THE REPORT

a. Nature and Exactness of Descriptions: Classification and identification of soils, rocks, geological units, contaminant materials, building envelopment assessments, and engineering estimates 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 and even comprehensive sampling and testing programs, implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations, or building envelope descriptions, utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarising 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 all persons making use of such documents or records should be aware of, and accept, this risk. 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 persons providing information.

c. To avoid misunderstandings, **exp** Services Inc. (**exp**) should be retained to work with the other design professionals to explain relevant engineering findings and to review their plans, drawings, and specifications relative to engineering issues pertaining to consulting services provided by **exp**. Further, **exp** should be retained to provide field reviews during the construction, consistent with building codes guidelines and generally accepted practices. Where applicable, the field services recommended for the project are the minimum necessary to ascertain that the Contractor's work is being carried out in general conformity with **exp**'s recommendations. Any reduction from the level of services normally recommended will result in **exp** providing qualified opinions regarding adequacy of the work.

6.0 ALTERNATE REPORT FORMAT

When **exp** submits both electronic file and hard copies of reports, drawings and other documents and deliverables (**exp**'s instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by **exp** shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancy, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by **exp** shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of **exp**'s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except **exp**. The Client warrants that **exp**'s instruments of professional service will be used only and exactly as submitted by **exp**.

The Client recognizes and agrees that electronic files submitted by **exp** have been prepared and submitted using specific software and hardware systems. **Exp** makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

275 – 3001 Wayburne Drive
Burnaby, BC V5G 4W3 Canada
T: 604.874.1245 • www.exp.com

Memorandum

Date:	February 26, 2016	**From:**	Evan Sykes, P.Eng.
To:	Pemberton Sports Field	**Project No.:**	VAN-00231683
Prepared By:	Evan Sykes, P.Eng.		
Project Name:	Pemberton Sports Field		
Subject:	Addendum Geotechnical Review dated February 24, 2016 Rev 1		
Distribution:	[redacted]		

As requested, **exp** Services Inc. (**exp**) is providing additional information regarding the proposed development of a parking/ sports field in the area of Pemberton Farm Road, Pemberton, BC. This addendum should be read in conjunction with the **exp** report titled "Geotechnical Review – Proposed Parking Lot/ Sports Field Rev 2, Pemberton Farm Road, Pemberton, BC", dated February 24, 2016. The purpose of this addendum is to clarify requirements for mowing of vegetation, structural fill and compaction. Each of these items is discussed below.

1. The referenced report recommends mowing of the vegetation within the proposed development area. This includes larger shrubs and small trees. As indicted in the report roots should be left in place so as not to disturb the sod mat. In addition, it is not considered necessary to remove the mulch left by the mowing process.

2. Prior to using the proposed structural fill material, granular soils dredged from a nearby creek, the material should be sampled and a grain size analysis completed. The structural fill material should have a fines content passing the 0.075mm sieve of less than 5%;

3. The placed and compacted structural fill should be tested to confirm that at least 95% Modified Proctor Maximum Dry Density (MPMDD) value has been achieved in the upper 300mm and 90% MPMDD in the fills below. Density testing for the upper 300mm should be completed with a spacing of not more than 30m and 60m for the lower fills.

If there are any questions regarding this addendum please call the undersigned.

ISO 9001:2008 REGISTERED
OQM | Organizational Quality Management Program

Sincerely,

exp Services Inc.

February 26, 2016

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
E. G. SYKES

Evan Sykes, P.Eng.
Senior Engineer

Reviewed by:

Matthew Yip, P.Eng.
Senior Engineer

ES/es

FIELD MEMO

65189

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☐ KAMLOOPS OFFICE
Unit 100B, 1425 Pearson Place
Kamloops, B.C., Canada V1S 1J9
Phone: 250 372-5321 Fax: 250 372-1678

CLIENT: [redacted]

ATTENTION: [redacted]

CC:

ATTENTION:

PROJECT NO.: VAN-00231683-A0

DATE: March 8, 2016

FROM: Evan Sykes, P.Eng.

SERVICE PROVIDED: Site Review

LOCATION: Proposed Sports field, Old Pemberton Farm Rd, Pemberton, BC

OBSERVATIONS:

In accordance with agreed site Review requirements, exp Services Inc (exp) completed a field review of placement of structural fill required to increase grade to design elevations. Grass throughout the site had been mowed trees removed with trunk ground down to surface level ~~and~~ and geogrid placed on original ground surface with at least 300mm overlap. Sand and gravel was being placed over the geogrid and track packed in a single lift. Following placement the structural fill should be compacted with a heavy ride-on type roller to achieve 95% Modified Proctor density. Density testing at surface and at depth as recommended in previous memoranda should be completed.

"MEMO SHALL NOT BE CONSTRUED AS AUTHORIZATION FOR EXTRA PAYMENT. ALL CLAIMS FOR EXTRA PAYMENT REQUIRE THE APPROVAL OF THE CONTRACT ADMINISTRATOR."

exp Services Inc. Per

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA E. G. SYKES

March 8, 2016

Signature

NOTE: PRELIMINARY INFORMATION ONLY – SUBJECT TO CONFIRMATION

Distribution: White – Client Canary – Field Pink – File Golden Rod - Book

February 24, 2016 Reference No. VAN-00231683-A0

[redacted]

[redacted]

Attention: [redacted]

Re: Geotechnical Review – Proposed Parking Lot/Sports Field Rev 1
Pemberton Farm Road, Pemberton, BC

[redacted]

1.0 INTRODUCTION

As requested, **exp** Services Inc. (**exp**) has completed a geotechnical review with respect to the development of a sports field to be located on an undeveloped parcel of land located near the north end of Pemberton Farm Road, Pemberton, BC. This review was completed in general conformance with an **exp** proposal submitted to [redacted] on February 17, 2016 and accepted by the Client on the same date.

This review is based on the following information:

- Site reconnaissance by **exp** personnel completed in 2014;
- Test pits, auger holes and hand augers completed within and adjacent to the proposed sports field completed by **exp**;
- Review of proposed location of the sports field as provide by the Client; and,
- Discussions with the Client with respect to development plans.

The scope of services for this geotechnical review was limited to the provision of geotechnical engineering only and did not include any provision for environmental assessment.

2.0 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The subject site is located about 3 km east of downtown Pemberton about 150m east of Old Pemberton Farm Road. The subject site is accessed via Highway 99 which intersects Old Pemberton Farm Road about 600m south of the subject site. The proposed development site is roughly triangular in shape with an approximate area of about 1.5 Ha. The site is surrounded by undeveloped land with a gravel-surfaced parking area immediately east of the site. The area to the southeast of the site has been used as a rock quarry with crushing operations on-site.

The site is generally flat lying with elevations ranging from about 206m to 207m geodetic, generally increasing from east to west. Localized water ponding has been noted within the subject site, particularly west of the quarry area.

Vegetation within the subject area was restricted to the eastern portion of the site and generally consisted of grass, assorted deciduous trees with trunk diameters up to about 100mm and localized evergreen trees with trunk diameters up to about 125mm.

We understand that the proposed development of the subject area consists of constructing a gravel-surfaced parking area for the Pemberton Music Festival in the near term, followed by construction of a sports field in the long term. We understand that the gravel parking to be located in the subject area is to be temporary and tolerant of significant potential settlement and could be regarded as required. The sports field would be developed as a permanent feature with considerably less settlement tolerance.

3.0 GEOTECHNICAL EXPLORATION

A previously completed geotechnical exploration consisted of twelve (12) test pits ranging in depth from about 0.3m to 4.1m, two (2) solid stem auger holes to depths of about 6.4m and 9.1m, and six (6) hand augers ranging in depth from about 0.4m to 3.0m. All test holes were located, logged and sampled by **exp** personnel with samples being returned to **exp**'s laboratory for further visual classification and moisture content analysis as deemed appropriate.

Test hole locations are shown on the attached Testhole Location Plan (Figure 2). Detailed descriptions of soils encountered in the test holes are provided on the attached Test Hole Logs with results of moisture content analysis.

4.0 SUBSURFACE CONDITIONS

In general, subsurface conditions within the subject area appeared to consist of relatively shallow bedrock in the southwestern portion of the site with increasing soil thickness to the north. It appeared the bedrock dipped steeply and the thickness of the soil overburden increases rapidly to the north. The southwestern zone (TP14-12) appeared to consist of sand and gravel or blasted boulders with a sand and gravel matrix up to about 1m thick underlain by bedrock.

The northern portion (TP14-02 and TP14-03) appeared to consist of a surficial layer of compact silty sand/ sandy silt with some gravel, cobbles and boulders fill with a thickness of about 1.3m to 2.0m. The fill layer was underlain by layers of peat and organic silt with interbeds of compact sand up to about 0.8m thick. A hand auger (HA14-01) located in the southeastern portion of the subject area encountered silt to organic silt and peat to depths of about 2.3m.

Based on the geotechnical exploration, groundwater levels appeared to vary considerably across the subject area, from a depth of about 1.2m to 1.8m in the north portion (TP14-02 and TP14-03, respectively), to 0.4m in the southeast area (HA14-0), and 1.2m in the southwestern area (TP14-12). It should be noted that groundwater levels typically vary seasonally and with changes in precipitation, land use and other factors. Intermittent, shallow, perched groundwater conditions can occur where relatively impervious soils are overlain by a permeable layer.

5.0 DISCUSSION AND RECOMMENDATIONS

Recommendations for site preparation for temporary parking lot and a permanent sports field are provided below.

5.1 Parking Lot

Site preparations for temporary parking lot should consist of mowing of grass in peat areas leaving the sod untouched. Trees and other shrubbery should be removed; however, the roots should be left in place so as to not disturb the adjacent sod. A layer of biaxial geogrid panels, such as Nilex BX 1200, or approved equivalent should be placed over the sod mat prior to placement of structural fill or surface gravels. In areas requiring grade increases, structural fill consisting of pit run sand and gravel should be placed with a maximum loose thickness of 900mm, compacted with several passes of a static ride-on type steel drum roller. We understand that material from nearby river dredging would be available for grading purposes. Previous experience with this material indicates it is generally low in fines content and would be suitable. In general, in areas where no previous fill has been placed the structural fill layer should be at least 900mm thick.

In order to provide a drivable surface a layer of base gravels (19mm minus crushed gravel) placed over the parking area may be prudent. The parking surface should be reviewed prior to the festival to confirm an adequate drivable surface is present.

5.2 Sports Field

Due to the permanent nature of the proposed sports field and relative low tolerance to settlement, it is recommended that the area be preloaded prior to construction of the field. Due to the highly variable and often compressible nature of the subsurface soils throughout the proposed sports field area, differential settlement across the playing surface should be anticipated. Preloading of the playing surface would help mitigate the differential settlement; however, some long-term differential settlement will still likely occur. Monitoring of the preload will provide an estimate of differential settlement to expect over the long-term.

Preload should be placed on prepared subgrade as described in the Section 5.1 above. In order to reduce the amount of preload removal and subsequent restoration of grade, structural fill for the sports field should be placed to an elevation above the design subgrade elevation such that anticipated settlement caused by the preload surcharge is less than the height of the structural fill above final design subgrade elevation (i.e., following preload removal, the structural fill is still present at design subgrade elevation). Settlement of about 1m should be anticipated; however, the thickness of the compressible soils is not known and will significantly affect the amount of settlement.

It is recommended that preloads at least 2m thick be placed over the sports field. The preload slopes should be inclined no steeper than 1.5H: 1V (Horizontal:Vertical) with the crest of the slopes extending at least 2m beyond the settlement sensitive areas. Settlement gauges should be installed in a grid pattern with a spacing of about 10m. The settlement gauges should be placed directly on the ground surface prior to placement of preload. Elevations of the preload surveyed prior to placement of any preload and immediately following placement of preload. The settlement gauges should be surveyed weekly following placement of preload for six (6) weeks and monthly after that. A plan of settlement gauge locations, toe and crest of preload slopes and all survey data collected should be forwarded to

the Geotechnical Engineer for review and analysis. Settlement tolerances over the long-term should be forwarded to the Geotechnical Engineer to allow for determination of timing for preload removal.

6.0 CLOSURE

Exp has prepared this report based on the referenced information and our understanding of the project as described in this report. If the development plans should change or subsurface conditions are noted to differ from those described in this report, **exp** should be notified in a timely manner and the recommendations provided regarding the geotechnical aspects of the project reviewed and, if deemed appropriate, modified.

This report was prepared for the exclusive use of **exp**'s client, [redacted] and their designated consultants or agents and may not be used by other parties without the written consent of **exp** Services Inc. The attached "Interpretation & Use of Study and Report" forms an integral part of this report and must be included with any copies of this report.

Sincerely,

exp Services Inc.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA E. G. SYKES February 24, 2016

Evan Sykes, P.Eng.
Senior Engineer

Reviewed by:

Matthew Yip, P.Eng.
Senior Engineer

Enclosures: Interpretation & Use of Study and Report
Key Plan (Figure 1)
Testhole Location Plan (Figure 2)
Testhole Logs (HA14-01, TP14-02, TP14-03, TP14-12)

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INTERPRETATION & USE OF STUDY AND REPORT

1. STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering consulting practices in this area. No other warranty, expressed or implied, is made. Engineering studies and reports do not include environmental consulting unless specifically stated in the engineering report.

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 THE REPORT

The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose 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 are only valid to the extent that 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.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming 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. WE WILL CONSENT TO ANY REASONABLE REQUEST BY THE CLIENT TO APPROVE THE USE OF THIS REPORT BY OTHER PARTIES AS "APPROVED USERS". The contents of the Report remain our copyright property and we authorise only the Client and Approved Users to make copies of the Report only in such quantities as are reasonably necessary for the use of the Report by those parties. The Client and Approved Users may not give, lend, sell or otherwise make the Report, or any portion thereof, available to any party without our written permission. Any use which a third party makes of the Report, or any portion of the Report, are the sole responsibility of such third parties. We accept no responsibility for damages suffered by any third party resulting from unauthorised use of the Report.

5. INTERPRETATION OF THE REPORT

a. Nature and Exactness of Descriptions: Classification and identification of soils, rocks, geological units, contaminant materials, building envelopment assessments, and engineering estimates 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 and even comprehensive sampling and testing programs, implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations, or building envelope descriptions, utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarising 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 all persons making use of such documents or records should be aware of, and accept, this risk. 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 persons providing information.

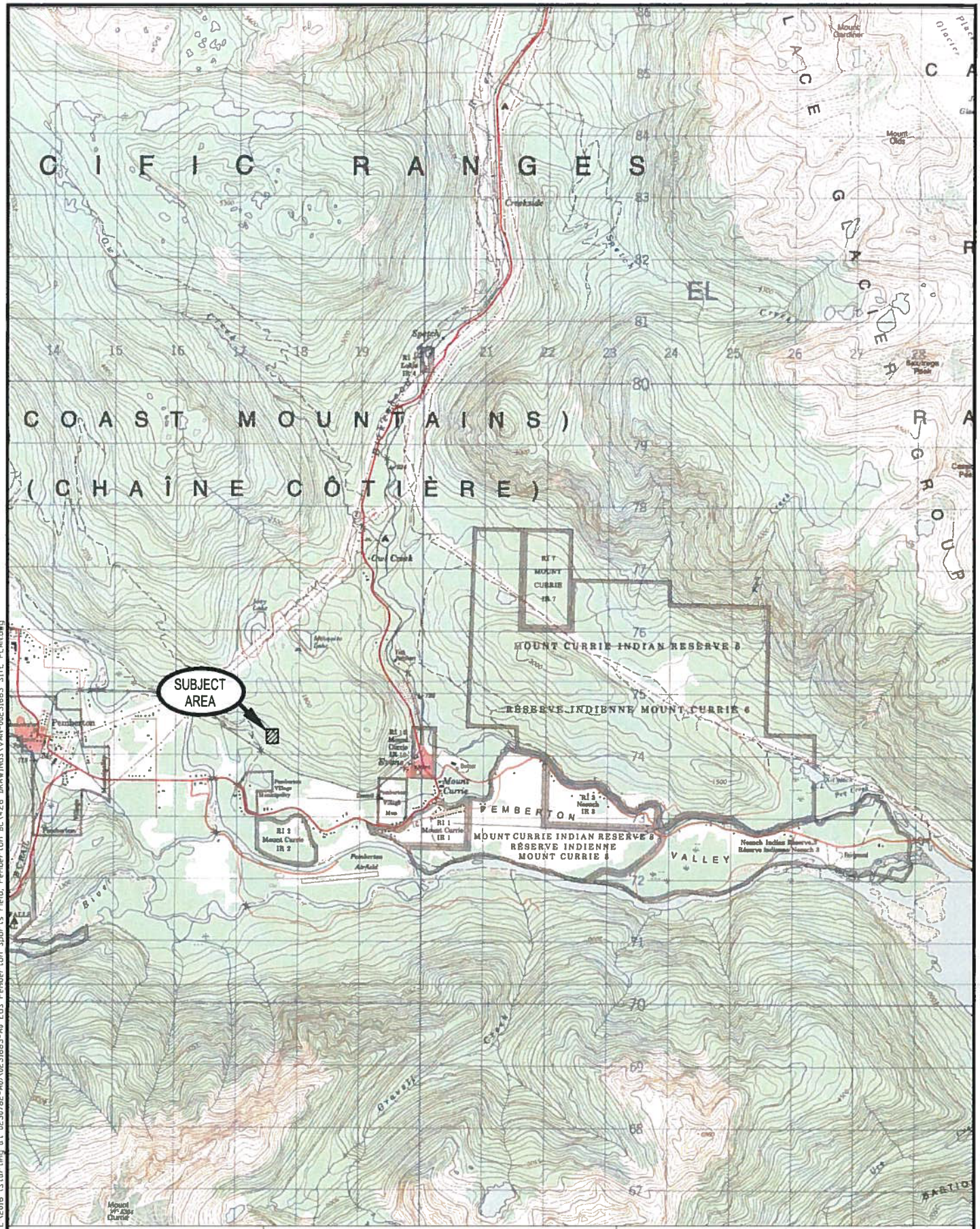
c. To avoid misunderstandings, **exp** Services Inc. (**exp**) should be retained to work with the other design professionals to explain relevant engineering findings and to review their plans, drawings, and specifications relative to engineering issues pertaining to consulting services provided by **exp**. Further, **exp** should be retained to provide field reviews during the construction, consistent with building codes guidelines and generally accepted practices. Where applicable, the field services recommended for the project are the minimum necessary to ascertain that the Contractor's work is being carried out in general conformity with **exp**'s recommendations. Any reduction from the level of services normally recommended will result in **exp** providing qualified opinions regarding adequacy of the work.

6.0 ALTERNATE REPORT FORMAT

When **exp** submits both electronic file and hard copies of reports, drawings and other documents and deliverables (**exp**'s instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by **exp** shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancy, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by **exp** shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of **exp**'s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except **exp**. The Client warrants that **exp**'s instruments of professional service will be used only and exactly as submitted by **exp**.

The Client recognizes and agrees that electronic files submitted by **exp** have been prepared and submitted using specific software and hardware systems. **Exp** makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.



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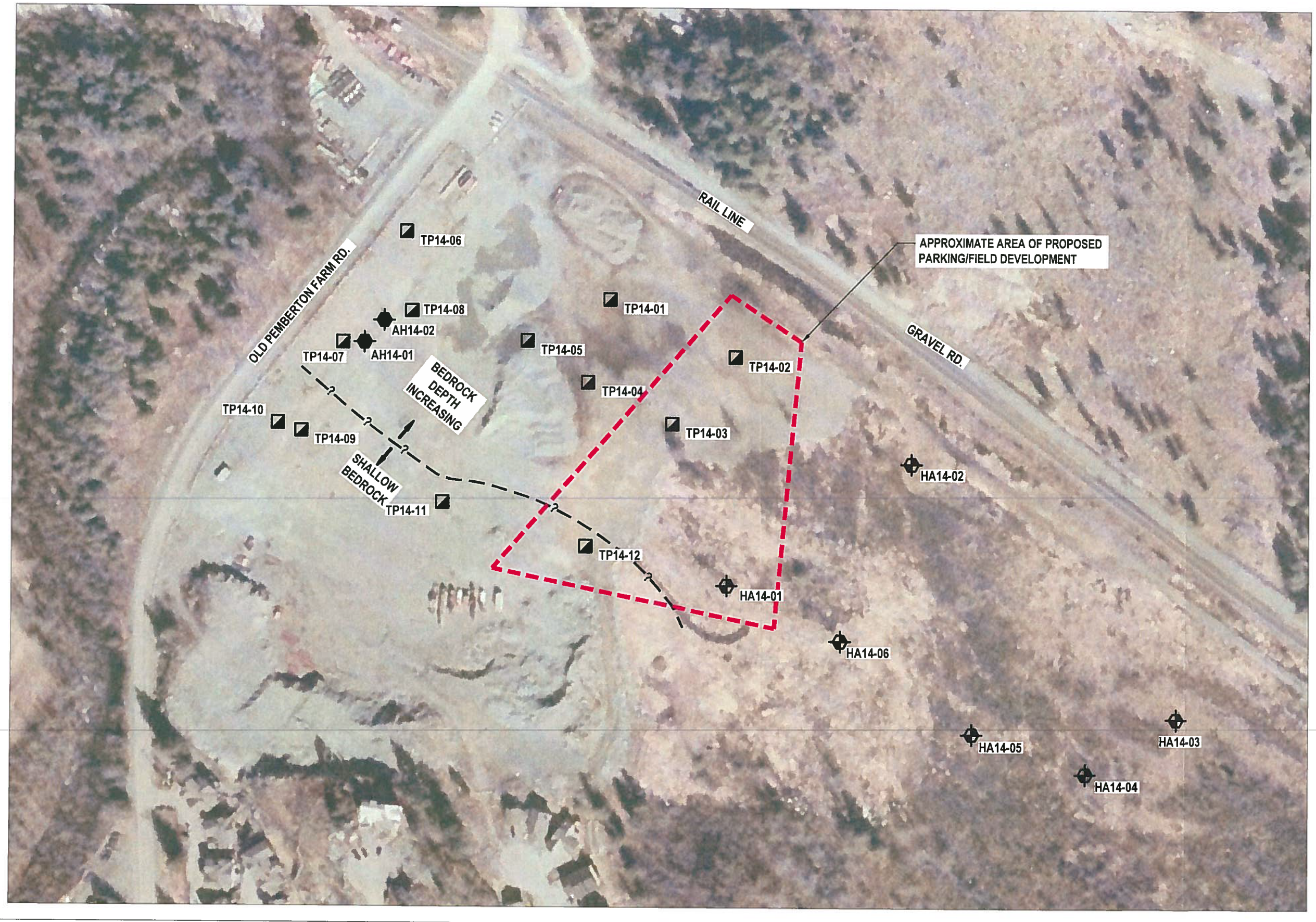
exp.

CLIENT [redacted]

PROJECT
PARKING/FIELD DEVELOPMENT
OLD PEMBERTON FARM ROAD, PEMBERTON, B.C.

TITLE:
KEY PLAN
NTS MAP 92J07

PROJECT NO.	DFTR.	DSGN.	CHK.	DATE	SCALE	DWG NO.
VAN-00231683-AO	PDL		EGS	2016-02-23	N.T.S.	FIGURE 1



N

LEGEND

- TEST PIT
- AUGERHOLE
- HAND AUGER

REFERENCE DRAWING FROM CROSLAND DOAK LANDSCAPE ARCHITECTURE + BUILDING DESIGN DATED 2012-04-24

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exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	MG/PDL
DSGN.	DS
CHK.	EGS

REVISIONS

No.	DESCRIPTION	DATE

CLIENT [redacted]

PROJECT
PARKING/FIELD DEVELOPMENT
OLD PEMBERTON FARM ROAD, PEMBERTON, B.C.

PROJECT NO.
VAN-00231683-A0

TITLE
TESTHOLE LOCATION PLAN

DATE	SCALE:	DWG NO.
2016-02-23	1:2000	FIGURE 2

Feb 23, 2016 - 9:18am L:\2016 (Starting at 0230782-A0)\0231683-A0 EGS Pemberton Sports Field, Pemberton BC\4-26 DRAWINGS\VAN-00231683 SITE PLAN.dwg

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF HAND AUGER : HA14-01

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
DRILLING DATE 2/3/14
DRILLING CONTRACTOR exp Services Inc.
DRILLING METHOD Hand Auger
LOGGED BY DGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
HAND AUGER LOCATION N: 5574009 E: 517379
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** 0.4m visible free water
▼ **AFTER DRILLING** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
		SILT to ORGANIC SILT, some sand, some rootlets, some organics, brownish grey with rust inclusions, moist to wet, (soft to firm) slight plastic ▽							
1		-becomes sandier with depth		S17	GB				54
		ORGANIC SILTY PEAT, fibrous, brown, wet, (soft to firm)	1.4						
2		PEAT, fibrous, blackish brown, wet, (soft to firm)	2.0	S18	GB				296

Refusal at 2.3m.

NOTES: Refusal on wood

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF TEST PIT : TP14-02

CLIENT Village of Pemberton
PROJECT NAME Pemberton Recreational Facility
PROJECT NUMBER VAN-00217089-A0
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
EXCAVATION DATE 2/3/14
TEST PIT LOCATION N: 5574125 E: 517383
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
ELEVATION
EXCAVATION METHOD Excavator
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** 1.3m seepage
LOGGED BY DGS **CHECKED BY** EGS ▽ **AFTER EXCAVATION** —

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ 20 40 60 80 / DYNAMIC CONE BLOWS/0.3m 20 40 60 80	FINES CONTENT (%) 20 40 60 80 / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL 20 40 60 80
		SILTY SAND, some gravel to gravelly, some cobbles and boulders, some roots and rootlets, moist, brown, (compact) (FILL)		S4	GB				10
		-frozen from ground surface to 0.3m							
1		SILTY SAND & GRAVEL, pieces of plastic, grey, wet, (compact) well-graded (FILL)	0.9	S5	GB				9
		PEAT, fibrous, brown, wet, (firm) (FILL?)	1.3						
2		SAND, trace silt, grey, wet, (compact) fine grained	1.5						
		ORGANIC SILT, some peat to peaty, some clay, trace sand, abundant wood remnants, grey with black inclusions, (soft to very soft) plastic	2.1						
3		-becomes more wood than silt							
		PEAT, fibrous, brown, moist to wet, (firm)	3.2	S6	GB				27.3

Bottom of test pit at 3.5m.

(Continued Next Page)

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RECORD OF TEST PIT : TP14-02

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

PHOTOS

Figure TP14-02.1

Figure TP14-02.2

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

exp Services Inc.
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Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF TEST PIT : TP14-03

CLIENT Village of Pemberton
PROJECT NAME Pemberton Recreational Facility
PROJECT NUMBER VAN-00217089-A0
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
EXCAVATION DATE 2/3/14
TEST PIT LOCATION N: 5574091 E: 517351
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
ELEVATION
EXCAVATION METHOD Excavator
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** 1.8m seepage
LOGGED BY DGS **CHECKED BY** EGS
▽ **AFTER EXCAVATION** —

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
1		SILTY SAND & GRAVEL, some cobbles and boulders, some woodwaste, moist, brownish grey, (compact) (FILL) -frozen from ground surface to 0.3m							
2		▽							
		SAND, trace silt, grey, wet, (compact) fine grained	2.0						
3		ORGANIC SILT, some peat to peaty, some clay, trace sand, abundant wood remnants, grey with black inclusions, (soft to very soft) plastic	2.8						
		PEAT, fibrous, brown, moist to wet, (firm)	3.7						

Bottom of test pit at 3.8m.

(Continued Next Page)

exp Services Inc.
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Burnaby, B.C. V5G 4W3
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RECORD OF TEST PIT : TP14-03

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

PHOTOS

Figure TP14-03.1
-

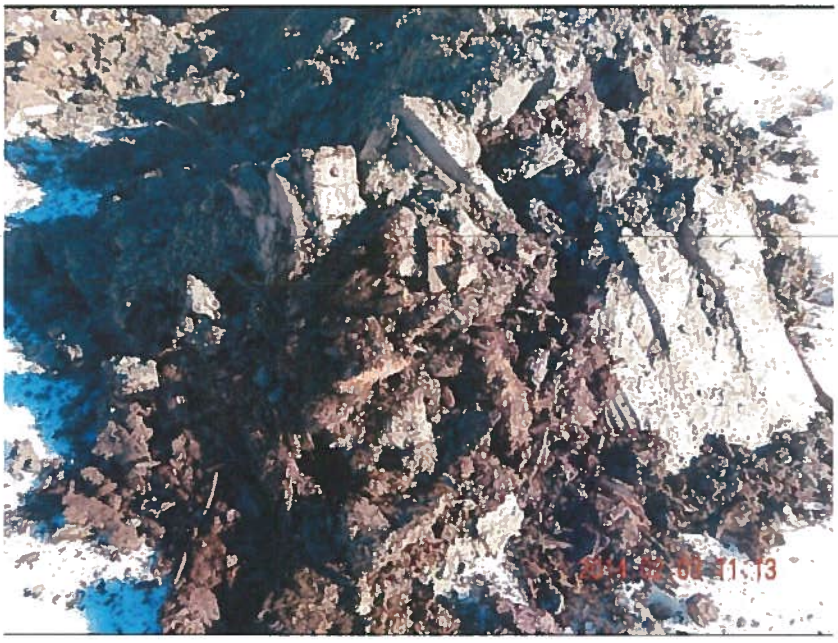

Figure TP14-03.2
-

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF TEST PIT : TP14-12

CLIENT Village of Pemberton
PROJECT NAME Pemberton Recreational Facility
PROJECT NUMBER VAN-00217089-A0
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
EXCAVATION DATE 2/3/14
TEST PIT LOCATION N: 5574029 E: 517307
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
ELEVATION
EXCAVATION METHOD Excavator
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** —
LOGGED BY DGS **CHECKED BY** EGS
▽ **AFTER EXCAVATION** 1.2m abundant water flow

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
		SILTY SAND & GRAVEL, some cobbles and boulders, moist, brownish grey, (compact) (FILL)							
1		BEDROCK, fractured, orange and grey, (hard) ▽	0.8						

Refusal at 1.5m.

(Continued Next Page)

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Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF TEST PIT : TP14-12

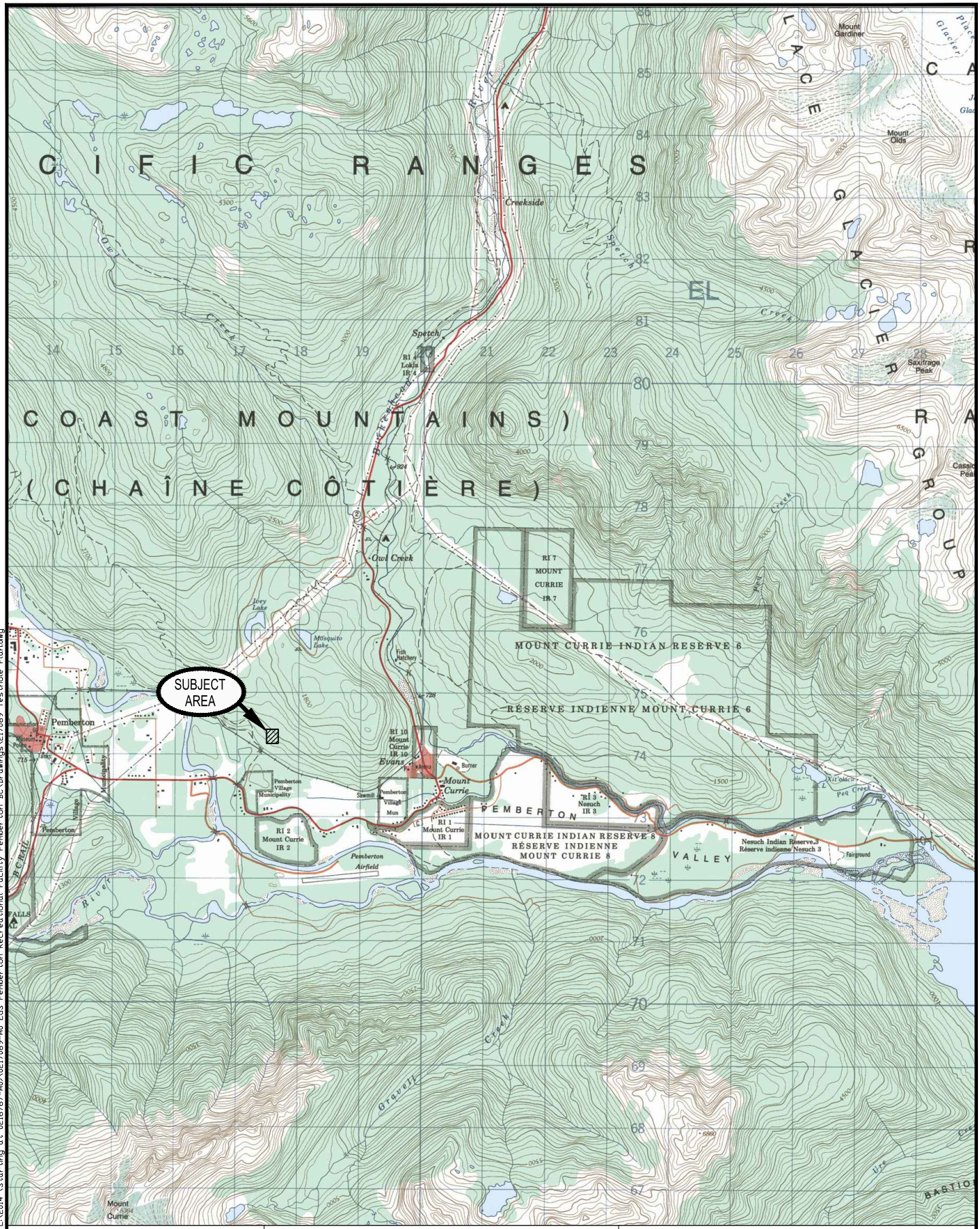
CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

PHOTOS

Figure TP14-12.1
-

Figure TP14-12.2
-

EXP GEO W/P: *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14



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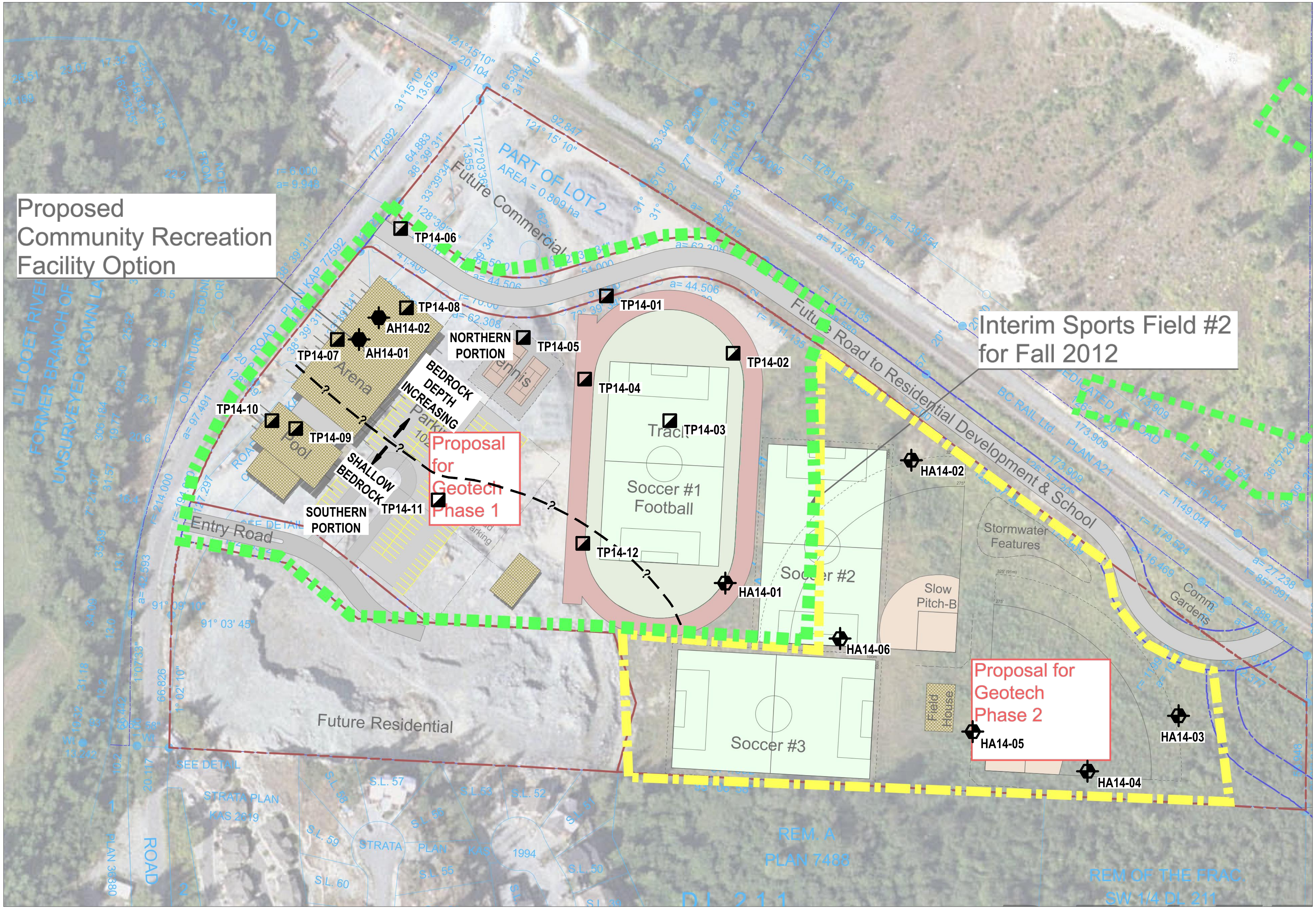
exp.	CLIENT: VILLAGE OF PEMBERTON				TITLE: KEY PLAN NTS MAP 92J07	
	PROJECT: PEMBERTON RECREATIONAL FACILITY OLD PEMBERTON FARM ROAD, PEMBERTON, B.C.					
	PROJECT NO.: VAN-00217089-AO	DFTR.: PDL	DSGN.:	CHK.: EGS	DATE: 2014-02-24	SCALE: N.T.S.	DWG NO.: FIGURE 1



Proposed
Community Recreation
Facility Option
Interim Sports Field #2
for Fall 2012
PART OF LOT 2
AREA = 0.809 ha
Future Commercial
Future Road to Residential Development & School
TP14-06
TP14-08
AH14-02
AH14-01
TP14-07
NORTHERN
PORTION
TP14-05
TP14-01
TP14-02
TP14-04
TP14-03
TP14-10
TP14-09
BEDROCK
DEPTH
INCREASING
SHALLOW
BEDROCK
TP14-11
SOUTHERN
PORTION
Proposal
for
Geotech
Phase 1
TP14-12
HA14-01
HA14-02
HA14-06
HA14-03
HA14-04
HA14-05
Proposal for
Geotech
Phase 2
Arena
Pool
Tennis
Track
Soccer #1
Football
Soccer #2
Soccer #3
Slow
Pitch-B
Field
House
Stormwater
Features
Comm.
Gardens
Entry Road
Future Residential
BC RAIL Ltd.
LILLOOET RIVER
FORMER BRANCH OF
UNSURVEYED CROWN LA
REM. A
PLAN 7488
REM OF THE FRAC.
SW 1/4 DL 211
D.L. 211
STRATA PLAN
KAS 2019
ROAD

LEGEND

- TEST PIT
- AUGERHOLE
- HAND AUGER

REFERENCE DRAWING FROM CROSLAND DOAK LANDSCAPE ARCHITECTURE + BUILDING DESIGN DATED 2012-04-24

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Feb 26, 2014 - 4:07pm

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Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	MG
DSGN.	DS
CHK.	EGS

REVISIONS

No.	DESCRIPTION	DATE

CLIENT: VILLAGE OF PEMBERTON

PROJECT: PEMBERTON RECREATIONAL FACILITY
OLD PEMBERTON FARM ROAD, PEMBERTON, B.C.

PROJECT NO. VAN-00217089-A0

TITLE: TESTHOLE LOCATION PLAN

DATE	SCALE:	DWG NO.
2014-02-14	1:2000	FIGURE 2

275 – 3001 Wayburne Drive
Burnaby, BC V5G 4W3 Canada
T: 604.874.1245 • www.exp.com

Memorandum

Date:	July 28, 2016	**From:**	Evan Sykes, P.Eng.
To:	Sports Field, Old Pemberton Farm Road, Pemberton, BC	**Project No.:**	VAN-00231638-A0
Prepared By:	Evan Sykes, P.Eng.		
Project Name:	Sports Field		
Subject:	Preload Recommendations Rev 1		
Distribution:	[redacted]		

As requested, **exp** Services Inc. (**exp**) has completed a preload plan for a proposed sports field to be, located at the north end of Old Pemberton farm Road, Pemberton, BC. Existing site conditions generally consist of structural fill, up to about 1.5m thick, overlying peat up to about 2.5m in thickness. Preload has been recommended for the site in order to mitigate long term post construction differential settlement of the proposed sports field. A preload thickness of about 2m is recommended with the preload extending horizontally at least 2m beyond the prosed sports field edges with preload slopes being no steeper than 1.5H: 1V (Horizontal: Vertical). Anticipated settlement of the preload area is about 1m.

A sketch of the preload area is provide on the attached Location Plan (Figure 1); however, it should be noted that the extent of prepared area and location of the sports field are for illustration and preliminary volume calculation purposes only and are not based on survey or design. Figure also shows locations of settlement gauges to be installed and surveyed prior to placement of preload. The preload slopes and setbacks from proposed field edge are shown on the attached Figure 2.

Volume calculations for the preload quantities indicate a total volume of about 17,500 cu.m. will be required for the preload. This volume is based on the preload being placed on the existing prepared surface and the surface is at design grades.

ISO 9001:2008 REGISTERED
OQM | Organizational Quality Management Program

Sincerely,

exp Services Inc.

Evan Sykes, P.Eng.
Senior Engineer

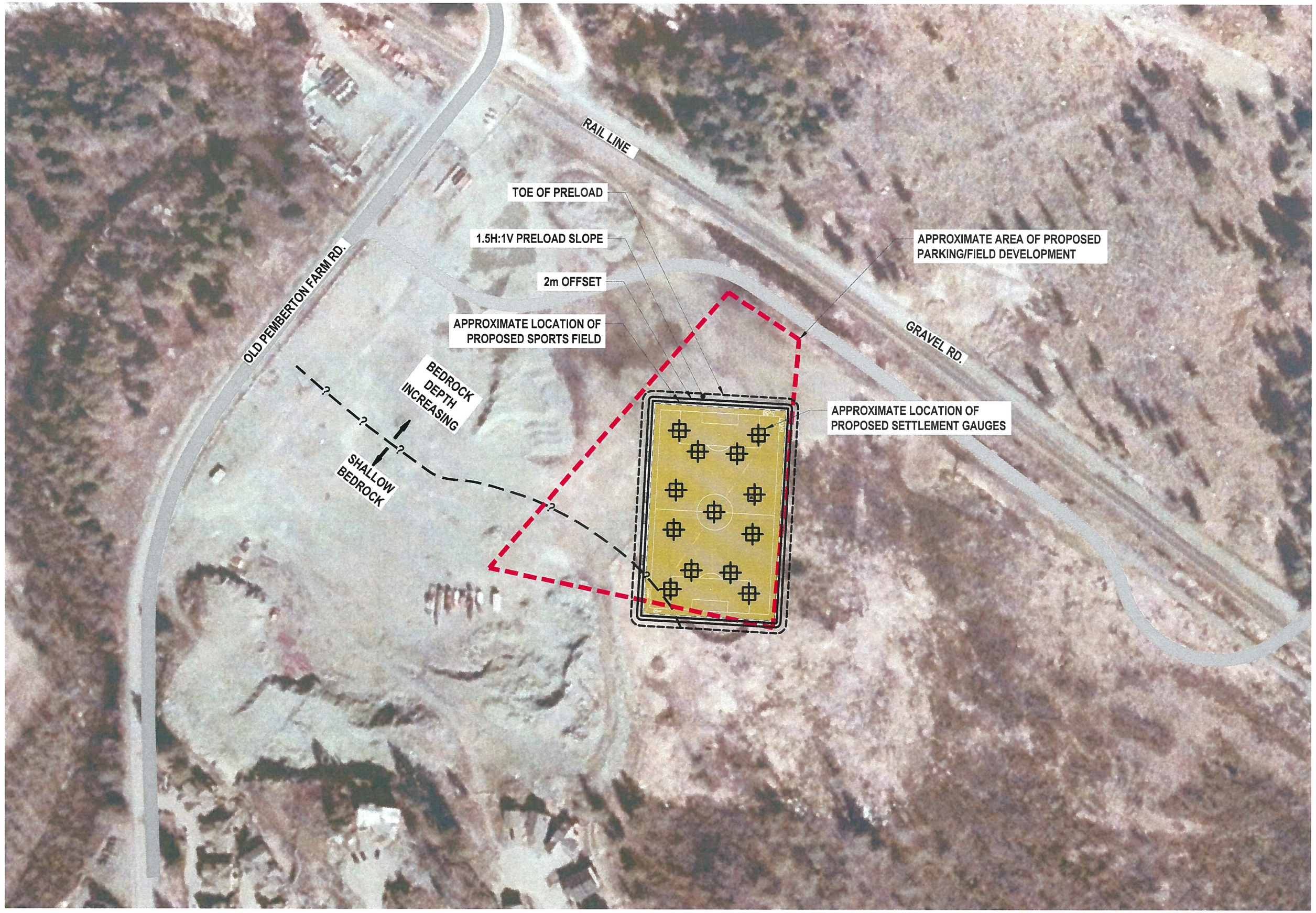
Reviewed by:

Matthew Yip, P.Eng.
Senior Engineer

Enclosure: Location Plan (Figure 1)
Preload Section (Figure 2)

ES/es

Exp ME 2016 07 28 Preload Recommendations



N

LEGEND

- TEST PIT
- AUGERHOLE
- HAND AUGER

REFERENCE DRAWING FROM CROSLAND DOAK LANDSCAPE ARCHITECTURE + BUILDING DESIGN DATED 2012-04-24

0 1:2000 100

exp Services Inc.
275–3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
Telephone: 604–874–1245
Fax: 604–874–2358
exp.com

DFTR.	DSGN.	CHK.
MG/PDL	DS	EGS

REVISIONS		
No.	DESCRIPTION	DATE

CLIENT [redacted]

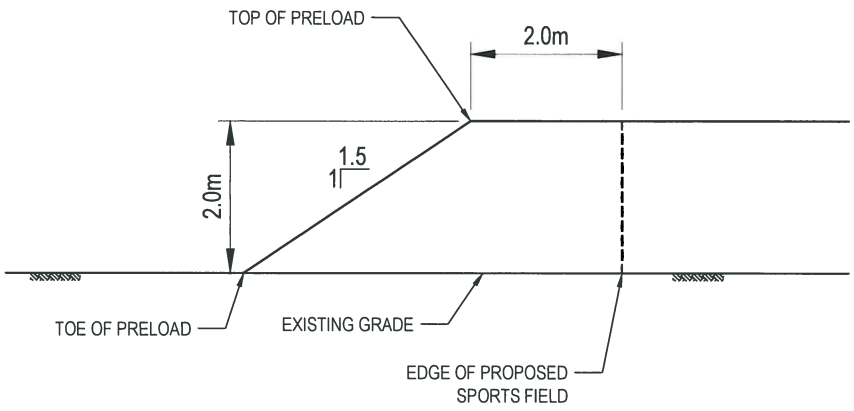
PROJECT
FIELD DEVELOPMENT
OLD PEMBERTON FARM ROAD, PEMBERTON, B.C.

PROJECT NO.
VAN-00231683-A0

TITLE:
LOCATION PLAN
PRELOAD AND SETTLEMENT GAUGES

DATE	SCALE:	DWG NO.
2016-02-23	1:2000	FIGURE 1

Jul 28, 2016 - 12:02pm L:\2016 (Starting at 0230782--A0)\00231683-A0 EGS Pemberton Sports Field, Pemberton BC\4-26 DRAWINGS\VAN-00231683 SITE PLAN VER 2.dwg



Wednesday, July 27, 2016 3:43:58 PM
L:\2016 Starting at 0230782-A0\0231683-A0 EGS Penberton Sports Field, Penberton BC\4.26 DRAWINGS\VAN-00231683 SITE PLAN VER 2.dwg

exp.

CLIENT [redacted]

PROJECT
FIELD DEVELOPMENT
OLD PEMBERTON FARM ROAD, PEMBERTON, B.C.

TITLE:
PRELOAD SECTION

PROJECT NO.	DFTR.	DSGN.	CHK.	DATE	SCALE:	DWG NO.
VAN-00231683-AO	PDL		EGS	2016-07-27	1:100	FIGURE 2

Metro Testing Laboratories Ltd.
1278 Stonemount Place
Squamish, BC, V8B 0R7

FIELD DENSITY REPORT

PROJECT NO. W 1637
CLIENT [redacted]
C.C.

TO [redacted]

PROJECT PEMBERTON SPORTS FIELD
SOILS:OTHERS.

PEMBERTON FARM ROAD
PEMBERTON

REPORT NO. 1 NO. OF DENSITIES 5 TESTED BY CD DATE TESTED 2016.Apr.22

CONTRACTOR [redacted]
AREA PEMBERTON SPORTS FIELD
CONSTRUCTION TYPE GENERAL SITE BACKFILL

TIME TESTED 09:30

DENSITY NUMBER	LOCATION	LAB REFERENCE AND MATERIAL TYPE	MOISTURE		OVERSIZE MATERIAL	DRY DENSITY		COMPACTION %
			FIELD	OPTIMUM		FIELD	LAB	
1	NE CORNER	Proctor 1	4.0	8.5	27.0	1910	1990	96
2	SE CORNER	Proctor 1	3.9	8.5	27.0	1927	1990	97
3	SW CORNER	Proctor 1	3.8	8.5	27.0	1951	1990	98
4	SE CORNER	Proctor 1	4.4	8.5	27.0	1917	1990	96
5	CENTER	Proctor 1	4.0	8.5	27.0	1922	1990	97

FIELD METHOD Nuclear ASTM D6938
LABORATORY METHOD Modified Proctor ASTM D1557
ROCK CORRECTION METHOD ASTM D4718 Proctor Density Correction
OVERSIZE SCREEN SIZE Passing 3/4" - 19mm

SPECIFIED COMPACTION 95
LOW DENSITIES INDICATED WITH *

COMMENTS

Metro Testing Laboratories Ltd. PER. [signature]

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of test results is provided only on written request.

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MOISTURE - DENSITY RELATIONSHIP REPORT

PROJECT NO. W 1637
CLIENT [redacted]
C.C.

TO [redacted]

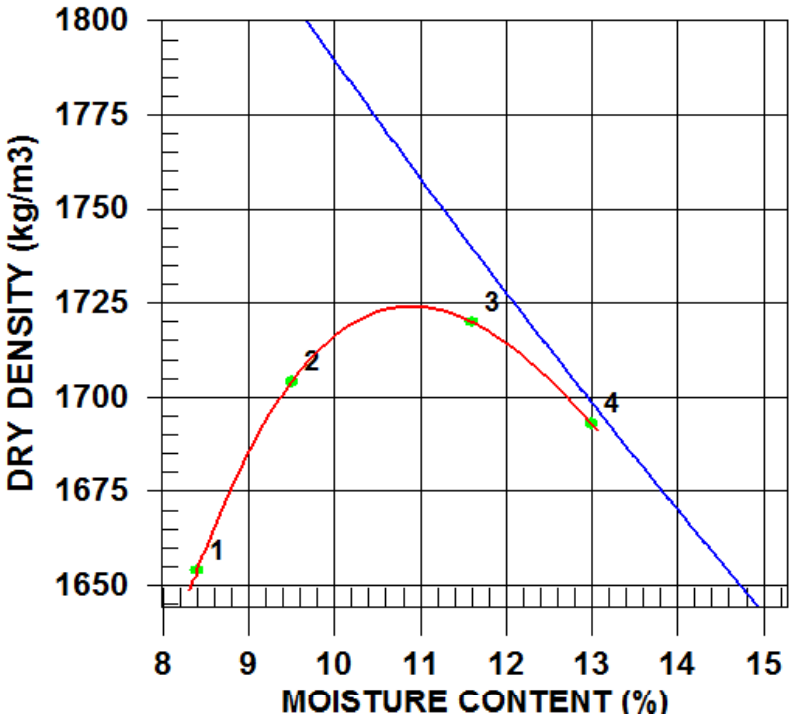
PROJECT PEMBERTON SPORTS FIELD
SOILS:OTHERS.
PEMBERTON FARM ROAD
PEMBERTON

CONTRACTOR [redacted]

PROCTOR NO. 1 NO. OF TRIALS 4 DATE RECEIVED 2016.Mar.07 DATE SAMPLED 2016.Mar.05

INSITU MOISTURE 6.5 %
SAMPLED BY SS
TESTED BY
SUPPLIER DREDGE MATERIAL
SOURCE LILLOET RIVER
MATERIAL IDENTIFICATION
MAJOR COMPONENT
SIZE
DESCRIPTION GRAVELLY SAND
ROCK TYPE

COMPACTION STANDARD Modified Proctor, ASTM D1557
COMPACTION PROCEDURE C: 152.4mm Mold, Passing 19mm
RAMMER TYPE Manual
PREPARATION Moist
OVERSIZE CORRECTION METHOD ASTM 4718
RETAINED 19mm SCREEN 27.0 %
OVERSIZE SPECIFIC GRAVITY 2.14



TRIAL NUMBER	WET DENSITY (kg/m3)	DRY DENSITY (kg/m3)	MOISTURE CONTENT (%)
1	1793	1654	8.4
2	1866	1704	9.5
3	1920	1720	11.6
4	1913	1693	13.0

ZERO AIR VOIDS CURVE FOR ESTIMATED SPECIFIC GRAVITY OF 2.18	MAXIMUM DRY DENSITY (kg/m3)	OPTIMUM MOISTURE CONTENT (%)
CALCULATED	1720	11.0
OVERSIZE CORRECTED	1820	8.5

COMMENTS
MATERIAL SAMPLED FROM ON-SITE STOCKPILE

Metro Testing Laboratories Ltd.
PER. [signature]

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Squamish, BC, V8B 0R7

SIEVE ANALYSIS REPORT
8 16 30 50 SERIES

PROJECT NO. W 1637
CLIENT [redacted]
C.C.

TO [redacted]

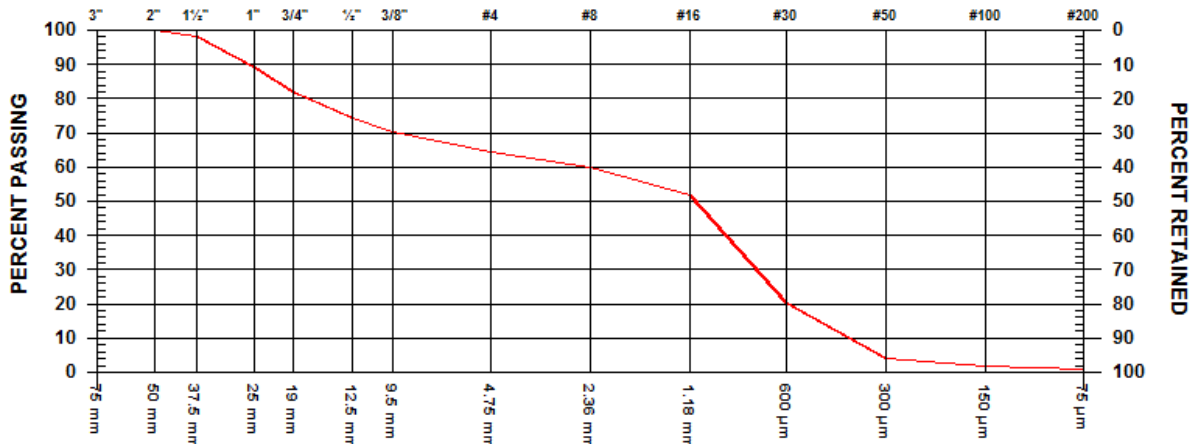
PROJECT PEMBERTON SPORTS FIELD
SOILS:OTHERS.
PEMBERTON FARM ROAD
PEMBERTON

CONTRACTOR [redacted]

SIEVE TEST NO. 1 DATE RECEIVED 2016.Mar.07 DATE TESTED 2016.Mar.07 DATE SAMPLED 2016.Mar.05

SUPPLIER DREDGED MATERIAL
SOURCE LILLOOET RIVER
SPECIFICATION
MATERIAL TYPE GRAVELLY SAND

SAMPLED BY SS
TESTED BY CD
TEST METHOD WASHED



GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
3"	75 mm		
2"	50 mm	100.0	
1 1/2"	37.5 mm	98.3	
1"	25 mm	89.1	
3/4"	19 mm	82.1	
1/2"	12.5 mm	74.3	
3/8"	9.5 mm	70.2	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
No. 4	4.75 mm	64.3	
No. 8	2.36 mm	60.0	
No. 16	1.18 mm	51.9	
No. 30	600 µm	20.3	
No. 50	300 µm	4.2	
No. 100	150 µm	1.6	
No. 200	75 µm	0.7	

COMMENTS
MATRIAL SAMPLED FROM ON-SITE STOCKPILE

Metro Testing Laboratories Ltd. PER. [signature]
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Squamish, BC, V8B 0R7

SIEVE ANALYSIS REPORT
8 16 30 50 SERIES

PROJECT NO. W 1637
CLIENT [redacted]
C.C.

TO [redacted]

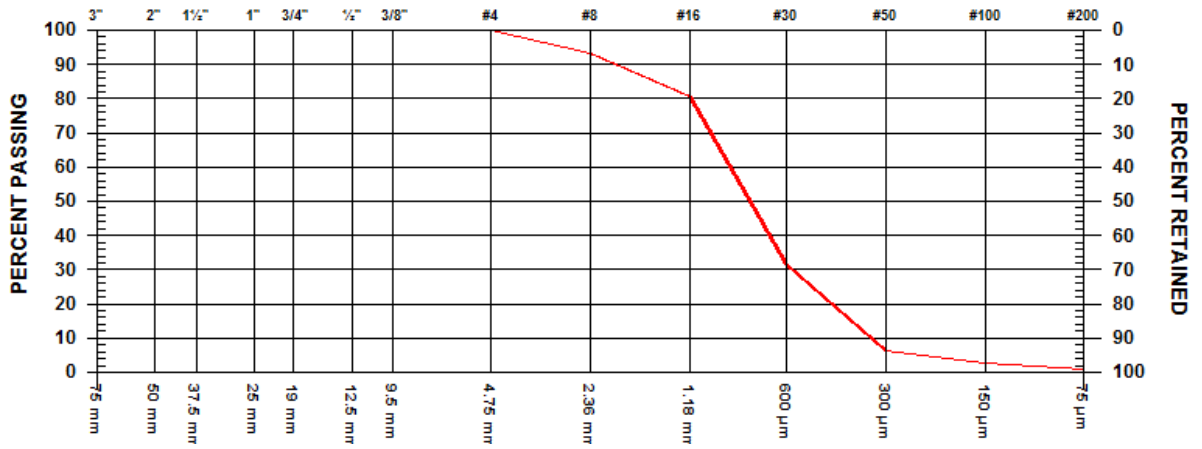
PROJECT PEMBERTON SPORTS FIELD
SOILS:OTHERS.
PEMBERTON FARM ROAD
PEMBERTON

CONTRACTOR [redacted]

SIEVE TEST NO. 2 DATE RECEIVED 2016.Mar.07 DATE TESTED 2016.Mar.07 DATE SAMPLED 2016.Mar.05

SUPPLIER DREDGED MATERIAL
SOURCE LILLOOET RIVER
SPECIFICATION
MATERIAL TYPE GRAVELLY SAND

SAMPLED BY SS
TESTED BY CD
TEST METHOD WASHED



GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
3"	75 mm		
2"	50 mm		
1 1/2"	37.5 mm		
1"	25 mm		
3/4"	19 mm		
1/2"	12.5 mm		
3/8"	9.5 mm		

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
No. 4	4.75 mm	100.0	
No. 8	2.36 mm	93.3	
No. 16	1.18 mm	80.7	
No. 30	600 µm	31.6	
No. 50	300 µm	6.5	
No. 100	150 µm	2.5	
No. 200	75 µm	1.1	

COMMENTS
THIS MATERIAL REPRESENTS THE SIEVE ANALYSIS RESULTS FOR ONLY THE MATERIAL

PASSING THE 4.75mm DIAMETER SCREEN, TAKEN FROM TEST NO. 1 OF THE LILLOET

Metro Testing Laboratories Ltd. PER. [signature]

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Report System Software Registered to: Metro Testing (Whistler) Ltd., Whistler

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF AUGERHOLE : AH14-01

CLIENT Village of Pemberton
PROJECT NAME Pemberton Recreational Facility
PROJECT NUMBER VAN-00217089-A0
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
DRILLING DATE 2/7/14
AUGERHOLE LOCATION N: 5574143 E: 517204
DRILLING CONTRACTOR Sea to Sky Drilling Ltd.
ELEVATION
DRILLING METHOD Solid Stem Auger
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** ---
LOGGED BY MAK **CHECKED BY** EGS
▼ **AFTER DRILLING** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL
		GRAVEL, some sand to sandy, trace silt, grey, moist, (compact to dense), medium to coarse sand, fine sub-angular gravel, (FILL)		S01	GB				
		SILT, some clay, trace sand, rootlets, brown, moist to damp, (firm)	0.8						
1		SANDY SILT TO SILTY SAND, trace fine gravel, trace rootlets, grey, moist, (compact), fine sand	0.9	S02	GB				24
				S03	GB				35
		-No gravel -becomes wet							
2		▼		S04	GB				38
				S05	GB				42
		ORGANIC SILT, trace to some peat, mottled grey and black, moist to wet, (soft)	2.4	S06	GB				82
3		SILT, some wood fibers, trace to some sand, trace peat, pockets and seams of clayey silt, mottled brown and grey, wet, (firm) -Sand content increases with depth	2.7	S07	GB				77
				S08	GB				56
4									
		-becomes some sand		S09	GB				52
				S10	GB				43
5									

(Continued Next Page)

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

exp Services Inc.
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Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF AUGERHOLE : AH14-01

CLIENT Village of Pemberton
PROJECT NAME Pemberton Recreational Facility
PROJECT NUMBER VAN-00217089-A0
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
		SILT, some wood fibers, trace to some sand, trace peat, pockets and seams of clayey silt, mottled brown and grey, wet, (firm) *(continued)* -becomes SILT and SAND		S11	GB				37
6		SANDY SILT, trace peat, mottled brown and grey, wet, (firm)	5.5	S12	GB				42

Refusal at 6.4m.

NOTES: Refusal on bedrock

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF AUGERHOLE : AH14-02

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
DRILLING DATE 2/7/14
DRILLING CONTRACTOR Sea to Sky Drilling Ltd.
DRILLING METHOD Solid Stem Auger
LOGGED BY MAK **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
AUGERHOLE LOCATION N: 5574132 E: 517194
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** ---
▼ **AFTER DRILLING** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
		GRAVEL, some sand to sandy, trace silt, grey, moist, (compact to dense), medium to coarse sand, fine sub-angular gravel, (FILL)							
1		SILT, some clay, trace to some sand, trace sand, rootlets, brown, moist to damp, (firm)	0.6						
2		-Becomes trace peat -becomes wet ▼							
3		ORGANIC SILT, trace to some peat, mottled grey and black, moist to wet, (soft)	2.3						
4		SILT, trace to some sand, trace peat, rust pockets, grey, wet, (firm)	3.2						
5		SAND AND ORGANIC WOOD FIBERS, some silt to silty, grey, wet,(compact), medium to fine sand	4.5	S13					57 ●

(Continued Next Page)

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF AUGERHOLE : AH14-02

CLIENT Village of Pemberton
PROJECT NAME Pemberton Recreational Facility
PROJECT NUMBER VAN-00217089-A0
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) / PLASTIC & LIQUID LIMIT MOISTURE CONTENT (PL MC LL; 20 40 60 80)
		SAND AND ORGANIC WOOD FIBERS, some silt to silty, grey, wet,(compact), medium to fine sand *(continued)*		S14					
		- Occasional Wood Chips layers		S15					48
6				S16					
7				S17					44
8				S18					
9			9.1	S19					
		Refusal at 9.1m.							

NOTES: Refusal on bedrock

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF HAND AUGER : HA14-01

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
DRILLING DATE 2/3/14
DRILLING CONTRACTOR exp Services Inc.
DRILLING METHOD Hand Auger
LOGGED BY DGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
HAND AUGER LOCATION N: 5574009 E: 517379
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** 0.4m visible free water
▼ **AFTER DRILLING** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
1		SILT to ORGANIC SILT, some sand, some rootlets, some organics, brownish grey with rust inclusions, moist to wet, (soft to firm) slight plastic ▽							
		-becomes sandier with depth		S17	GB				54
2		ORGANIC SILTY PEAT, fibrous, brown, wet, (soft to firm)	1.4						
		PEAT, fibrous, blackish brown, wet, (soft to firm)	2.0	S18	GB				256

Refusal at 2.3m.

NOTES: Refusal on wood

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF HAND AUGER : HA14-02

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
DRILLING DATE 2/5/14
DRILLING CONTRACTOR exp Services Inc.
DRILLING METHOD Hand Auger
LOGGED BY EGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
HAND AUGER LOCATION N: 5574071 E: 517473
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** ---
▼ **AFTER DRILLING** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
1		SILT, light brown, wet, (soft)							
2		PEAT, fibrous, blackish brown, wet, (soft to firm)	1.5						
3									

Bottom of hole at 3.0m.

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF HAND AUGER : HA14-03

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
DRILLING DATE 2/5/14
DRILLING CONTRACTOR exp Services Inc.
DRILLING METHOD Hand Auger
LOGGED BY EGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
HAND AUGER LOCATION N: 5573942 E: 517608
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** ---
▼ **AFTER DRILLING** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
		ORGANIC SILTY PEAT, fibrous, dark brown, wet, (soft)							
		SILT, light brown, wet, (soft to firm)	0.1						
1									
2									
		PEAT, fibrous, blackish brown, wet, (soft to firm)	2.4						
3									

Bottom of hole at 3.0m.

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF HAND AUGER : HA14-04

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
DRILLING DATE 2/5/14
DRILLING CONTRACTOR exp Services Inc.
DRILLING METHOD Hand Auger
LOGGED BY EGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
HAND AUGER LOCATION N: 5573914 E: 517562
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** ---
▼ **AFTER DRILLING** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
		PEAT, fibrous, dark brown, wet, (soft to firm)							
1									
2									
		SILT, light brown, wet, (firm)	2.7						

Bottom of hole at 2.9m.

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

exp Services Inc.
275-3001 Wayburne Drive
Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF HAND AUGER : HA14-05

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
DRILLING DATE 2/5/14
DRILLING CONTRACTOR exp Services Inc.
DRILLING METHOD Hand Auger
LOGGED BY EGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
HAND AUGER LOCATION N: 5573934 E: 517504
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** ---
▼ **AFTER DRILLING** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
0.5		SILT, mottled brown and grey, moist, (stiff)							
		Bottom of hole at 0.8m.							

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

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Telephone: 604.422.2152

RECORD OF HAND AUGER : HA14-06

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
DRILLING DATE 2/5/14
DRILLING CONTRACTOR exp Services Inc.
DRILLING METHOD Hand Auger
LOGGED BY EGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
HAND AUGER LOCATION N: 5573981 E: 517437
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF DRILLING** ---
▼ **AFTER DRILLING** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
0.1		PEAT, blackish brown, frozen							
0.2									
0.3									
0.4									

Refusal at 0.4m.

NOTES: Refusal due to ice

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

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RECORD OF TEST PIT : TP14-01

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
EXCAVATION DATE 2/3/14
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EXCAVATION METHOD Excavator
LOGGED BY DGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
TEST PIT LOCATION N: 5574154 E: 517319
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** 1.2m seepage
▼ **AFTER EXCAVATION** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL
1		SILTY SAND to SANDY SILT, some gravel, some cobbles and boulders, wood pieces, brownish grey, (compact) (FILL) -frozen from ground surface to 0.3m						20 40 60 80	20 40 60 80
2		SAND, trace silt, grey, wet, (compact) fine grained	1.2	S1	GB				28
		ORGANIC SILT, some peat to peaty, some clay, trace sand, grey with black inclusions, (soft to very soft) plastic	2.0	S2	GB				281
3		PEAT, fibrous, brown, moist to wet, (firm)	2.5						
4				S3	GB				256

Bottom of test pit at 4.1m.

(Continued Next Page)

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

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RECORD OF TEST PIT : TP14-01

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

PHOTOS

Figure TP14-01.1
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Figure TP14-01.2
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exp Services Inc.
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Telephone: 604.422.2152

RECORD OF TEST PIT : TP14-02

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
EXCAVATION DATE 2/3/14
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EXCAVATION METHOD Excavator
LOGGED BY DGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
TEST PIT LOCATION N: 5574125 E: 517383
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** 1.3m seepage
▼ **AFTER EXCAVATION** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL
		SILTY SAND, some gravel to gravelly, some cobbles and boulders, some roots and rootlets, moist, brown, (compact) (FILL)		S4	GB				10
		-frozen from ground surface to 0.3m							
1		SILTY SAND & GRAVEL, pieces of plastic, grey, wet, (compact) well-graded (FILL)	0.9	S5	GB				9
		PEAT, fibrous, brown, wet, (firm) (FILL?)	1.3						
2		SAND, trace silt, grey, wet, (compact) fine grained	1.5						
		ORGANIC SILT, some peat to peaty, some clay, trace sand, abundant wood remnants, grey with black inclusions, (soft to very soft) plastic	2.1						
3		-becomes more wood than silt							
		PEAT, fibrous, brown, moist to wet, (firm)	3.2	S6	GB				273

Bottom of test pit at 3.5m.

(Continued Next Page)

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RECORD OF TEST PIT : TP14-02

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

PHOTOS

Figure TP14-02.1
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Figure TP14-02.2
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RECORD OF TEST PIT : TP14-03

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
EXCAVATION DATE 2/3/14
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EXCAVATION METHOD Excavator
LOGGED BY DGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
TEST PIT LOCATION N: 5574091 E: 517351
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** 1.8m seepage
▼ **AFTER EXCAVATION** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m 20 40 60 80	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL 20 40 60 80
1		SILTY SAND & GRAVEL, some cobbles and boulders, some woodwaste, moist, brownish grey, (compact) (FILL)							
		-frozen from ground surface to 0.3m							
2		SAND, trace silt, grey, wet, (compact) fine grained	2.0						
3		ORGANIC SILT, some peat to peaty, some clay, trace sand, abundant wood remnants, grey with black inclusions, (soft to very soft) plastic	2.8						
		PEAT, fibrous, brown, moist to wet, (firm)	3.7						

Bottom of test pit at 3.8m.

(Continued Next Page)

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RECORD OF TEST PIT : TP14-03

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

PHOTOS

Figure TP14-03.1
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Figure TP14-03.2
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RECORD OF TEST PIT : TP14-04

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
EXCAVATION DATE 2/3/14
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EXCAVATION METHOD Excavator
LOGGED BY DGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
TEST PIT LOCATION N: 5574112 E: 517308
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** 2.3m seepage
▼ **AFTER EXCAVATION** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
		SILTY SAND & GRAVEL, some cobbles and boulders, moist, brownish grey, (compact) (FILL) -frozen from ground surface to 0.3m							
1		SAND, trace silt, grey, wet, (compact) fine grained	0.6						
2		ORGANIC SILT, some peat to peaty, some clay, trace sand, abundant wood remnants, grey with black inclusions, (soft to very soft) plastic ▽	2.0						
3		PEAT, fibrous, brown, moist to wet, (firm)	2.8						

Bottom of test pit at 3.0m.

(Continued Next Page)

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RECORD OF TEST PIT : TP14-04

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

PHOTOS

Figure TP14-04.1
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Figure TP14-04.2
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RECORD OF TEST PIT : TP14-05

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
EXCAVATION DATE 2/3/14
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EXCAVATION METHOD Excavator
LOGGED BY DGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
TEST PIT LOCATION N: 5574133 E: 517277
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** 1.2m seepage
▼ **AFTER EXCAVATION** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL
		GRAVEL, 25mm crush (FILL)						20 40 60 80	20 40 60 80
		-frozen from ground surface to 0.3m							
1		SILTY SAND & GRAVEL, some cobbles and boulders, pieces of cut wood, moist, brownish grey, (compact) (FILL) ▽	1.0						
2		SAND, trace silt, grey, wet, (compact) fine grained	1.8	S7	GB				44
3		ORGANIC SILT, some sand, layers of peat, grey with brown inclusions, (soft to very soft)	2.4	S8	GB				49

Bottom of test pit at 3.5m.

(Continued Next Page)

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RECORD OF TEST PIT : TP14-05

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

PHOTOS

Figure TP14-05.1
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Figure TP14-05.2
-

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RECORD OF TEST PIT : TP14-06

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
EXCAVATION DATE 2/3/14
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EXCAVATION METHOD Excavator
LOGGED BY DGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
TEST PIT LOCATION N: 5574188 E: 517215
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** 1.4m inferred
▼ **AFTER EXCAVATION** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL
		SILTY SAND & GRAVEL, some cobbles and boulders, moist, brownish grey, (compact) (FILL) -frozen from ground surface to 0.3m						20 40 60 80	20 40 60 80
1		SILTY SAND, trace roots, grey, moist, (compact) fine grained	0.9	S9	GB				35
		▽ SAND, trace silt, grey with rust stains, wet, (loose to compact) medium grained	1.4						
2				S10	GB				
		SILTY SAND, grey, wet, (loose to compact) fine grained -grades to ORGANIC SILT, some sand by 2.6m	2.4						
3		ORGANIC SILTY PEAT, fibrous, brown, wet, (firm)	2.8	S11	GB				194

Bottom of test pit at 3.4m.

(Continued Next Page)

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

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RECORD OF TEST PIT : TP14-06

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

PHOTOS

Figure TP14-06.1
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Figure TP14-06.2
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RECORD OF TEST PIT : TP14-07

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
EXCAVATION DATE 2/3/14
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EXCAVATION METHOD Excavator
LOGGED BY DGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
TEST PIT LOCATION N: 5574132 E: 517183
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** 0.9m inferred
▼ **AFTER EXCAVATION** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL
		SILTY SAND & GRAVEL, some cobbles and boulders, moist, brownish grey, (compact) (FILL) -frozen from ground surface to 0.3m						20 40 60 80	20 40 60 80
1		SAND, trace silt, grey, wet, (compact) fine grained	0.9						
2		ORGANIC SILT, some sand, layers of peat, grey with brown inclusions, (soft to very soft)	2.0	S12	GB				31
3		SILTY SAND, grey, wet, (loose to compact) fine to medium grained	2.6	S13	GB				42
4		SANDY SILT, seams of black peat, light brownish grey, moist, (stiff)	3.6	S14	GB				41

Bottom of test pit at 4.0m.

(Continued Next Page)

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

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RECORD OF TEST PIT : TP14-07

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

PHOTOS

Figure TP14-07.1
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Figure TP14-07.2
-

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RECORD OF TEST PIT : TP14-08

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
EXCAVATION DATE 2/3/14
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EXCAVATION METHOD Excavator
LOGGED BY DGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
TEST PIT LOCATION N: 5574148 E: 517218
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** ---
▼ **AFTER EXCAVATION** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
		SILTY SAND & GRAVEL, some cobbles and boulders, moist, brownish grey, (compact) (FILL)							
1		SILTY SAND, layers of sand, layers of silt, grey with rust stains, wet, (loose to compact) fine grained	0.9	S15	GB				35
2		-layers of peat remnants		S16	GB				45

Bottom of test pit at 2.4m.

NOTES: Due to surface frost, machine was unable to dig a big enough hole to go deeper than 2.4m

(Continued Next Page)

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RECORD OF TEST PIT : TP14-08

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

PHOTOS

Figure TP14-08.1
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Figure TP14-08.2
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RECORD OF TEST PIT : TP14-09

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
EXCAVATION DATE 2/3/14
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EXCAVATION METHOD Excavator
LOGGED BY DGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
TEST PIT LOCATION N: 5574087 E: 5171162
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** ---
▼ **AFTER EXCAVATION** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
0.1 0.2 0.3		SAND & GRAVEL, blast rock, brownish grey, frozen, (BEDROCK?)							

Refusal at 0.3m.

NOTES: Machine was unable to dig past 0.3m possibly due to frost.
May potentially be bedrock.

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

(Continued Next Page)

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RECORD OF TEST PIT : TP14-09

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

PHOTOS

Figure TP14-09.1
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EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

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RECORD OF TEST PIT : TP14-10

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
EXCAVATION DATE 2/3/14
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EXCAVATION METHOD Excavator
LOGGED BY DGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
TEST PIT LOCATION N: 5574091 E: 517150
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** ---
▼ **AFTER EXCAVATION** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
0.1 0.2 0.3		SAND & GRAVEL, blast rock, brownish grey, frozen, (BEDROCK?)							

Refusal at 0.3m.

NOTES: Machine was unable to dig past 0.3m possibly due to frost.
May potentially be bedrock.

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

(Continued Next Page)

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RECORD OF TEST PIT : TP14-10

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

PHOTOS

Figure TP14-10.1
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EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

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RECORD OF TEST PIT : TP14-11

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
EXCAVATION DATE 2/3/14
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EXCAVATION METHOD Excavator
LOGGED BY DGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
TEST PIT LOCATION N: 5574051 E: 517234
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** 1.6m visible free water
▼ **AFTER EXCAVATION** ---

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL
		BOULDERS, some sand, some gravel, light brownish grey, (loose to compact)						20 40 60 80	20 40 60 80
1		-abundant voids between boulders from surface to final depth; voids generally filled with sand and gravel.							

Refusal at 1.2m.

▽

EXP GEO W/P.P. *PHOTOS* 0217089-A0.GPJ EXP STD.GDT 2/25/14

(Continued Next Page)

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RECORD OF TEST PIT : TP14-11

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC

PHOTOS

Figure TP14-11.1
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Figure TP14-11.2
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exp Services Inc.
275-3001 Wayburne Drive
Burnaby, B.C. V5G 4W3
Telephone: 604.422.2152

RECORD OF TEST PIT : TP14-12

CLIENT Village of Pemberton
PROJECT NUMBER VAN-00217089-A0
EXCAVATION DATE 2/3/14
EXCAVATION CONTRACTOR Coastal Mountain Excavations Ltd.
EXCAVATION METHOD Excavator
LOGGED BY DGS **CHECKED BY** EGS

PROJECT NAME Pemberton Recreational Facility
PROJECT LOCATION Old Pemberton Farm Road, Pemberton, BC
TEST PIT LOCATION N: 5574029 E: 517307
ELEVATION
GROUND WATER LEVELS: ▽ **AT TIME OF EXCAVATION** ---
▼ **AFTER EXCAVATION** 1.2m abundant water flow

DEPTH (m)	STRATA	SOIL DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES POCKET PEN. (kPa)	SPT N VALUE BLOWS/0.3m ▲ / DYNAMIC CONE BLOWS/0.3m (20 40 60 80)	FINES CONTENT (%) □ / PLASTIC & LIQUID LIMIT MOISTURE CONTENT PL MC LL (20 40 60 80)
		SILTY SAND & GRAVEL, some cobbles and boulders, moist, brownish grey, (compact) (FILL)							
1		BEDROCK, fractured, orange and grey, (hard) ▼	0.8						

Refusal at 1.5m.

(Continued Next Page)

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PHOTOS

Figure TP14-12.1
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Figure TP14-12.2
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