APPENDIX A – GEOTECHNICAL ENGINEERING REPORTS

1. "GEOTECHNICAL EVALUATION - CBSA PORT OF ENTRY - PLEASANT CAMP, BC." PREPRAED BYTETRA-TECH EBA, DATED DECEMBER 9, 2014, FILE: W14103501-01.
2. "ROCK PIT DESIGN AND SITE BACKFILL RECOMMENDATIONS - CBSA PORT OF ENTRY - PLEASANT CAMP, BC." PREPARED BY TETRA_TECH EBA, DATED FEBRUARY 2, 2015, FILE W14103501-01.

TETRA TECH EBA

December 9, 2014

ISSUED FOR USE
FILE: W14103501-01
Via Email: julian.ho@pwgsc-tpsgc.ca

Public Works and Government Services Canada
Pacific Region
219 – 800 Burrard Street
Vancouver, BC V6Z 0B9

Attention: Julian Ho, P.Eng.

Subject: Geotechnical Evaluation
CBSA Port of Entry - Pleasant Camp, BC

1.0 INTRODUCTION

Public Works and Government Services Canada (PWGSC) has retained Stantec Architecture Ltd. (Stantec) of Whitehorse to provide engineering design services for proposed upgrades to the existing infrastructure at the Canada Border Services Agency (CBSA) Port of Entry at Pleasant Camp, BC. As such, through discussion with Stantec and PWGSC, Tetra Tech EBA Inc. (Tetra Tech EBA) was retained directly by PWGSC to complete a field drilling program and prepare a geotechnical report that will be used to provide geotechnical design information for the proposed works. Authorization to proceed was provided by Ms. Carolyn Arthur of PWGSC by way of an official letter of acceptance and contract, received by EBA on September 29, 2014.

1.1 Project Outline

As noted above, we understand that PWGSC plans to replace and/or upgrade the existing infrastructure at the CBSA Port of Entry at Pleasant Camp, BC. The proposed upgrades to the CBSA site are being undertaken subsequent to construction of new housing units at the site, which were built immediately adjacent to the current project site in 2010. Tetra Tech EBA provided geotechnical input for design and construction of the housing units in 2009.

At this time, we understand that the proposed upgrades will consist of:

- Demolition of many of the existing structures;
- Construction of a new CBSA building;
- Construction of a new site services building;
- Construction of new paved northbound road lanes and parking/pull through lanes serving the proposed new CBSA building.

A new water well is also included in the overall scope of upgrades at the site. Drilling of the well had been completed and flow testing was underway at the time of our site visit to complete the field drilling program. The site layout, including locations of existing and proposed new infrastructure, is shown in Figure 1, attached.

1.2 Project Location

The subject site is located at the CBSA border crossing between Canada and Alaska at about km 72 of the Haines Road at Pleasant Camp, BC. The project site can be found on NTS Mapsheet 114-P/8 at approximate UTM coordinates of 6,591,495 N and 422,535 E in Zone 8V.

2.0 PREVIOUS WORK AT THE SITE

2.1 CBSA Housing Project

As noted above, Tetra Tech EBA has completed a drilling program at the site and prepared a geotechnical report in 2009 for the recently constructed housing units located immediately south of the current project site.

For the 2009 CBSA housing project, four boreholes were drilled to about 5 m depth using an air rotary drill and Standard Penetration Test (SPT) sampling. The boreholes were logged in the field and recovered samples were returned to Tetra Tech EBA's Whitehorse laboratory for geotechnical index testing. The results of the drilling program were used to inform geotechnical design for the new housing units, which were built the following year in 2010.

Borehole logs and the results of geotechnical laboratory testing conducted on recovered samples are provided in Appendix B. Borehole locations are shown on Figure 1.

2.2 Historical Drilling Programs

Numerous other drilling programs have been completed at the site over a period of several years, predominantly in response to fuel spills that have occurred at the site in the past. Several reports prepared for PWGSC by SNC Lavalin Environment (SLE) of Burnaby, BC, were forwarded to Tetra Tech EBA by Stantec.

These reports contain borehole logs of holes drilled during previous drilling programs. Logs of boreholes drilled for a 2012 geotechnical drilling program included soil density information in the form of SPT N-values; however, the majority of SLE's work was related to environmental and hydrogeological assessments of the site and the resulting borehole logs do not include specific density information beyond rough estimates made by SLE's drilling inspector in the field. The logs do indicate soil stratigraphy and can be used to supplement the geotechnical information gathered through Tetra Tech EBA's current field program. Two cross-sections showing the soil profile at the site, one oriented parallel and the other oriented perpendicular to the Haines Road, were generated by SLE based on their cumulative work at the site, as shown on SLE Drawings 511502-5-Rev0 and 511502-6-Rev0.

The reports also include detailed descriptions of the local hydrogeological regime, including groundwater elevations recorded at the many monitoring wells that have been installed at the site. SLE produced a contour plot of the groundwater potentiometric elevations across the site based on groundwater levels measured in monitoring wells in late August, 2012 (SLE Drawing 131416-L03-Rev2). For monitoring wells screened in unconsolidated soil above the bedrock surface, the potentiometric elevation can be reasonably assumed to correspond to the groundwater table elevation at the site.

Locations of the historical SLE boreholes are shown on Drawing 131416-L03-Rev2, except for those drilled during SLE's 2012 geotechnical investigation, which are shown on Drawings 511502-4-Rev0 and 511502-5-Rev0.

SLE Drawings 511502-4-Rev0, 511502-5-Rev0, 511502-6-Rev0 and 131416-L03-Rev2 are attached for reference. Relevant borehole logs, including those from the 2012 geotechnical drilling program and selected other environmental boreholes, are attached in Appendix B.

3.0 SITE VISIT AND GEOTECHNICAL DRILLING PROGRAM

3.1 Geotechnical Drilling Program

Midnight Sun Drilling Inc. was retained by Tetra Tech EBA to carry out a geotechnical drilling program at the site. Four boreholes, BH01 through BH04, were advanced at various locations across the site using hollow stem augers and SPT sampling. In gravelly soil where sample recovery was poor using the standard 50 mm diameter split-spoon sampler, Large Diameter Penetration Testing (LPT) was conducted using a 75 mm outside diameter sampler in order to recover a sufficient volume of soil for geotechnical laboratory testing. One Dynamic Cone Penetration Test (DCPT) was also conducted at BH01 to obtain in situ soil density data in addition to the SPT/LPT blow counts. Borehole depths are summarized below on Table 1, and borehole locations are shown on Figure 1, attached.

Table 1: Summary of 2014 Borehole Depths

Borehole ID	Termination Depth (m)
BH01	9.6
BH02	6.1
BH03	3.0
BH04	6.7

As discussed in our proposal, the bedrock surface was targeted as the termination depth of each borehole. This target depth was achieved at three of the four borehole locations; however, BH04 was terminated above the bedrock surface due to the LPT sampler being lost down the hole after breaking off of the drilling rods during sampling. As such, it was not possible to drill any deeper with the broken steel sampler effectively blocking further advancement of the augers.

Prior to drilling, power and communications utility owners were contacted and locations of these buried services were marked on site. The location of private utilities including: water, sewer, storm lines and private power and communications lines between the various buildings, was determined based on field observations and drawings provided by Stantec. Because utility locations identified through drawings can be uncertain, borehole locations were selected in locations as far as possible from any noted buried lines.

During the drilling program, the soil profile was logged in the field by an experienced geotechnical engineer and representative disturbed samples were collected and returned to our Whitehorse laboratory for routine moisture content testing. Additional geotechnical index testing was carried out on selected samples.

The groundwater elevation at each borehole location was estimated during drilling, based on the degree of moisture observed in recovered samples and evidence of standing water on the drilling rods. The groundwater levels in a number of existing monitoring wells installed by SLE were also measured and recorded by Tetra Tech EBA while on site.

3.2 Existing Maintenance Building Foundation Inspection

As requested by Stantec and PWGSC, a brief inspection of the foundation conditions was conducted at the existing maintenance building, located at the north end of the site, where foundation cracking and settlement problems have been observed. We understand that Stantec may wish to construct the new site service building as an addition to the existing maintenance building. As such, Tetra Tech EBA conducted an inspection of the existing foundation conditions inside and around the outer perimeter of the building. Also, BH03 was advanced adjacent to the south edge of the maintenance building, providing an indication of the subsurface conditions at this location.

4.0 SITE CONDITIONS

4.1 Surface Conditions

The site is located on an approximately flat, level terrace lying against the lower east wall of a wide, U-shaped valley. Forested slopes are present on all sides, and Granite Creek flows from north to south along the base of the slope underlying the terrace, about 11 m below the site elevation.

The site itself is occupied by the existing Haines Road and CBSA Port of Entry, which comprises several one-storey buildings and associated infrastructure, such as fuel and water tanks. As shown on SLE Drawing 511502-6-Rev0, the ground surface is approximately level across the site (perpendicular to the Haines Road) and slopes downward at about 4% to the south (parallel to the Haines Road), in the direction of the Alaska border inspection station.

There are also existing CBSA housing units located to the south of the site, situated on a bench about 2 m lower in elevation than the immediate area surrounding the Port of Entry.

The area surrounding the Port of Entry and CBSA housing has been landscaped and cleared of natural vegetation. It is understood that a varying thickness of fill was placed over the original ground to level the site during construction of the original buildings. Areas not occupied by existing buildings or pavement has been planted with sod.

4.2 Soil Conditions

Based on Tetra Tech EBA's current geotechnical drilling program, the site appears to consist of generally loose to compact, gravelly sand overlying bedrock. A discontinuous layer of dense, till-like soil lies above the bedrock surface, and was encountered in two of the four boreholes drilled by Tetra Tech EBA. A summary of the soil profile at each of the boreholes is provided below on Table 2. For illustrative purposes, Table 2 shows the boreholes arranged in order from north to south.

Table 2: Summary of Soil Stratigraphy

Soil Type	Depth of Soil Layer (m)			
	BH03	BH02	BH01	BH04
Gravelly SAND	0 - 1.8	0 - 5.2	0 - 6.5	0 - 6.1
Till	-	5.2 - 6.1	6.5 - 9.6	6.1 - 6.7*
Bedrock	1.8 - 3.0	6.1	9.6	-
End of Borehole	3.0	6.1	9.6	6.7

*No till sample recovered, till surface interpreted based on drilling action and LPT driving resistance

The typical soil profile described above is in general agreement with conditions shown on SLE's cross sections (SLE Drawing 511502-6-Rev0), with the possible exception of more till-like soil encountered in Tetra Tech EBA's boreholes. SLE's cross sections also suggest that the bedrock surface dips to the south and the west with increasing distance away from the current project site.

SLE's borehole logs also indicate a zone of denser granular soil in the area of the Haines Road, likely due to compaction effort applied to the subgrade and fill placed during construction of the road, as well as the effect of vehicle traffic over the operating life of the road to date. For example, this effect was observed in SLE boreholes 09-17, AS-12, 04-5 and 08-6, which lie along Cross-Section C-C' and are attached in Appendix B for reference.

Tetra Tech EBA's borehole logs and results of laboratory testing are also provided in Appendix B. Please note that the attached logs contain detailed geotechnical information specific to each borehole location, and should be read in preference to the generalized descriptions provided above.

4.3 Groundwater Conditions

As noted above, SLE produced a contour plot of the potentiometric surface across the site based on depths to groundwater measured in monitoring wells in late August, 2012. These groundwater elevations are also shown on SLE's cross sections and indicate a groundwater table that is generally less than 2 m above the bedrock surface, reflecting relatively rapid drainage towards Granite Creek through the unconsolidated granular soils.

Several monitoring wells were re-measured by SLE in October 2012, during completion of their geotechnical drilling program. Groundwater elevations measured in October were consistently higher than those measured in August; groundwater elevations increased by less than about 1 m for monitoring wells located up-gradient (shallow bedrock) along the potentiometric surface but by about 1 to 3 m for monitoring wells located down-gradient (deeper bedrock).

Tetra Tech EBA also measured water levels in several monitoring wells during the drilling program in early November 2014. Water levels were again higher that those shown on SLE's contour plot from August 2012, and about 0.5 m higher than in October 2012 at MW04-1, which was the only location measured in both October 2012 and November 2014.

A summary of groundwater elevations observed in monitoring wells that were measured on at least two separate occasions is provided below on Table 3. For illustrative purposes, monitoring well locations are listed in order roughly according to the direction of groundwater flow, from up-gradient to down-gradient.

Table 3: Summary of Groundwater Table Elevations

Monitoring Well ID	Groundwater Table Elevation Above Sea Level (m)		
	August 29, 2012	**October 7, 2012**	**November 5, 2014**
MW09-5	270.07	-	271.14
AS-11	270.42	270.93	-
MWP4	270.05	270.94	-
MW08-2	268.11	-	270.19
MW03-11	Dry (<268.25)	270.53	-
MW04-5	267.87	269.71	-
MW08-7	268.03	-	270.74
MW08-6	267.73	-	270.51
MW04-1	Dry (<267.27)	268.39	268.87
MW04-2	267.43	-	268.45
MW08-5	267.06	-	268.84

Based on visual inspection of climate data collected by Environment Canada at the site over a period between 1981 and 2010, the period of greatest seasonal rainfall appears to occur during the late fall, in September and October. Beginning in November, temperatures are sufficiently low that most precipitation falls as snow. As such, the seasonal high groundwater table can be expected to occur in late October or early November, and therefore the groundwater levels observed by Tetra Tech EBA in November 2014 can reasonably be considered to represent the approximate maximum groundwater table elevation for the site. It is also possible that similarly high groundwater elevations would be observed at the site through the winter until about May due to occasional rain on snow events and eventual melting of the accumulated snowpack in the spring. For reference, the groundwater levels measured in August 2012 coincide with the end of the relatively dry summer season, and are likely approximately representative of the minimum groundwater table elevation at the site.

A chart showing climate normals at the site for the period between 1981 and 2010 and based on data collected by Environment Canada is shown in Figure 2.

4.4 Seismic Conditions

The site is located in a zone of significant seismic hazard, near the Yakutat Collision Zone, which is caused by convergence of the North American and Pacific tectonic plates, and approximately on top of the Chatham Strait Fault, which is the southern extension of the Denali Fault. The Denali Fault has historically produced earthquakes up to about M8 on the Moment Magnitude Scale in central Alaska, including the M7.9 Denali Earthquake in 2002. More recently, several smaller earthquakes have occurred within about 100 km of the site, including a M5.7 event on June 4, 2014 which was felt throughout the surrounding area, including Whitehorse, YT, about 200 km away.

Based on the 2010 edition of the National Building Code of Canada (NBCC 2010), seismic design of structures must consider earthquake events with a probability of exceedance of 2% in 50 years, which corresponds to a recurrence interval of 2,475 years. As such, based on NBCC 2010, seismic design at the site must consider a peak horizontal ground acceleration (PGA) of about 0.4 g for the design earthquake event.

A figure showing the NBCC 2010 seismic hazard for the site, including PGA and spectral accelerations, is attached for reference.

4.5 Existing Maintenance Building Foundations

As noted above, a brief inspection of the existing maintenance building foundations was conducted while on site. At the time of inspection, the floor slab was the only visible foundation element, and it was observed to consist of two long slabs, each forming about half of the building floor area. The paired slabs are oriented lengthwise along the building axis parallel to the Haines Road, and are separated by a piece of lumber installed between the two concrete elements, effectively forming a stress relief joint along the building centre.

Settlement of the floor slab was readily apparent, with up to about 150 mm of subsidence observed at the south end of the building, and several centimetres of differential settlement observed between the two half slabs inside the building. Widespread cracking was also observed in the southern portion of the western half slab, near the doorway entry to the building. Based on observations from the building exterior, it is likely that settlement and damage to the floor slab is concentrated in the southern end of the building, with less damage to the northern part of the slab. However, most of the interior floor area was occupied by equipment and material storage, and was therefore not visible for inspection.

In general, the cause of the observed foundation settlement is likely long term compression of loose, granular soil resulting from inadequate subgrade preparation during initial construction of the building foundations. For reference, loose sand was encountered from ground surface to about 1.8 m depth in BH03, which was drilled within a few metres of the south end of the maintenance building where the most severe settlement was observed.

The observed cracking is likely due to part of the western half slab being founded on dense, compacted fill associated with construction of the Haines Road immediately adjacent to the maintenance building, with the other half lying on loose material. This would result in large differential settlement which would cause cracking of the slab. The eastern half slab was likely constructed on uniformly loose soil, and as such has experienced more uniform settlement and less cracking.

It should be noted that no information is currently available describing the type of foundation system that is present below the visible floor slab. If available, record drawings and/ or reports prepared during the original building construction should be forwarded to Tetra Tech EBA for review.

5.0 ANALYSIS AND DISCUSSION

As discussed in our proposal, the main source of risk to developments at the subject site stems from the high regional seismic hazard. In particular, potential for seismically induced liquefaction in saturated, granular soil and/or seismically induced slope failures are considered to be the most likely hazards at the site. As such, Tetra Tech EBA has conducted liquefaction and slope stability assessments for the proposed developments at the site, which are described in the following sections.

5.1 Assessment of Liquefaction Potential

5.1.1 Simplified Method and Key Input Parameters

Tetra Tech EBA has completed an assessment of liquefaction potential at the site according to the Simplified Method of Idriss and Boulanger (2008), which is based on the work of Seed and Idriss (1971), and using available borehole logs with included SPT data. Geotechnical drilling programs with SPT N-values available include Tetra Tech EBA's 2014 program and SLE's 2012 program. As noted above, the majority of SLE's historical drilling programs at the site have been completed for environmental purposes, with SPTs not conducted and/or N-values not published on the borehole logs, and therefore are not directly useful for liquefaction assessment.

Seismically induced liquefaction typically occurs in loose, saturated granular soils that are subjected to strong seismic shaking, where the pore space between loose soil particles contracts, resulting in elevated pore water pressure and effectively resulting in a quicksand-like condition. Liquefaction is typically accompanied by a rapid and drastic loss in soil shear strength, which can result in slope failures and potentially a large amount of lateral displacement and/or vertical settlement.

Key input parameters used in the Simplified Method of liquefaction assessment are summarized below:

- **Seismic Loading:** A PGA of 0.4g was selected based on the NBCC 2010 design ground motions for the event with a probability of exceedance of 2% in 50 years. A design earthquake magnitude of 7.5 was used, which is a reasonable estimate for strong earthquakes generated from nearby seismic sources. This also corresponds to the reference magnitude considered in the Simplified Method of liquefaction assessment. Therefore, use of a design magnitude of 7.5 precludes the requirement for a Magnitude Scaling Factor in the analysis;
- **Groundwater Table Elevation:** Because liquefaction will only occur in soils which are at or near 100% saturation, it is critical to have a reasonable estimate of the groundwater table elevation across the site. Groundwater table elevations at each borehole location were estimated based on SLE's contour plot of potentiometric elevations (SLE Drawing 131416-L03-Rev2) and adjusted to reflect an estimated worst-case,

high groundwater condition based on groundwater levels measured in monitoring wells during Tetra Tech EBA's drilling program, on November 5, 2014; and

- **In situ Soil Density (SPT N-Value):** The SPT N-value has been widely used in geotechnical engineering to provide an estimate of in situ soil density, which is directly correlated to liquefaction resistance. For use in our liquefaction assessment, field N-values were corrected to normalized $(N_1)_{60\text{-cs}}$ values in accordance with Idriss and Boulanger (2008). A SPT drop hammer efficiency of 80% was assumed, based on typical efficiency ratings of 80 to 100% for SPT hammers provided by MARL, the drill manufacturer. Field N-values obtained from LPT testing were reduced by an additional factor of 0.65 to correct for the larger sampler diameter, based on the method proposed by Daniel et al. (2003).

5.1.2 Results of Liquefaction Assessment

The results of our liquefaction assessment suggest that widespread, discontinuous zones of potentially liquefiable soil are present in the northern part of the site, as indicated in Figure 1. Liquefiable zones were generally identified within the zone of saturated soil lying immediately above the bedrock (or till surface) and below the groundwater table where field SPT N-values are lower than about 15. The depth and distribution of identified liquefiable zones are summarized below on Table 4.

Table 4: Distribution of Potentially Liquefiable Soils

Borehole ID	Liquefiable Zones Identified?	Depth of Liquefiable Zones
BH01	Yes	5.2 - 6.5 m
BH02	Yes	4.6 - 5.2 m
BH03	Yes	1.0 - 1.8 m
BH04	No	-
DH12-01 (SLE)	Yes	3.0 - 3.5 m
DH12-02 (SLE)	No	-
DH12-03 (SLE)	Yes	1.5 - 2.1 m
DH12-04 (SLE)	No	-
DH12-05 (SLE)	Yes	3.0 - 3.3 m
DH12-06 (SLE)*	Yes*	16.8 - 17.2 m*
DH12-07 (SLE)	No	-
DH12-08 (SLE)	No	-
DH12-09 (SLE)	No	-

*SPT used to identify liquefiable zone at SLE DH12-06 likely conducted in weathered bedrock and/or slough at the bottom of the borehole, and therefore is likely not liquefiable. Actual bedrock depth in this area is likely about 10 m, based on SLE cross sections and Tetra Tech EBA BH01.

It is important to note that the zones of potentially liquefiable soil listed on the table above may not be exhaustive, either in terms of extent across the site or depth within a given borehole. This may be particularly true in the case of SLE's 2012 boreholes, where the depth interval between SPTs was typically about 3 m. SPTs and/or DCPTs were carried out at intervals of 1.5 m or less in Tetra Tech EBA's 2014 boreholes in order to obtain a higher resolution of soil density data, as discussed in our proposal.

Furthermore, the zone of relatively dense soil indicated on SLE logs of boreholes drilled in the area of the Haines Road was not considered to be liquefiable. However, because SPT blow counts are generally not included on

SLE's logs, this designation is based on qualitative descriptions of soil density provided along with the soil descriptions.

In general, and as noted above, potentially liquefiable zones were primarily identified in the northern portion of the site where the depth to bedrock, and consequently the groundwater table above the bedrock, is relatively shallow. In the southern portion of the site, the bedrock surface and groundwater table is deeper, and the saturated soil at depth appears to be sufficiently dense to resist liquefaction.

5.1.3 Potential Impacts to Site Infrastructure

As discussed above, liquefaction is associated with a rapid and severe reduction in soil shear strength. As such, for sites with potentially liquefiable soils that are located near slopes, an assessment of slope stability should be conducted. This is discussed in detail in Section 5.2, below.

Other common sources of damage to buildings or other infrastructure includes lateral displacement and vertical, post-liquefaction reconsolidation settlement. Based on the methods described by Idriss and Boulanger (2008), horizontal displacements of up to about 0.9 m and vertical, post-liquefaction reconsolidation settlement up to about 100 mm may be expected above liquefied soils at depth.

It should be noted that horizontal displacements are estimated for level ground, and that larger displacements may be observed adjacent to slopes, for instance the small slope that lies between the Port of Entry and the CBSA housing units. Conversely, where liquefied soil zones form discontinuous lenses that are constrained on all sides, horizontal displacements will be minimal.

Also, depending on the density of soils lying above the groundwater table, some degree of settlement due to compaction of loose, granular soil should be expected in addition to liquefaction induced reconsolidation settlement. In the worst case, a conservative upper bound for post-seismic, vertical settlement can be estimated by applying a 3% vertical strain to the entire thickness of unconsolidated, granular soil lying above the till/ bedrock surface. This would result in estimated worst-case settlements of about 50 mm at BH03 in the north (1.8 m of unconsolidated soil) to about 200 mm at BH01 in the south (6.5 m of unconsolidated soil).

5.2 Slope Stability Assessment

Slope stability at the site under various loading conditions was checked using Slope/W computer software, commercially available from Geo-Slope International. Description and results of the slope stability modeling is provided below.

5.2.1 Slope Model Geometry and Soil Properties

A two-dimensional slope model was constructed based on Cross-Section C-C', as shown on SLE Drawing 511502-6-Rev0. This cross-section intersects the site near the proposed new CBSA building approximately in the east-west direction and provides a ground elevation profile across the site, including the approximately 11 m high slope falling to Granite Creek in the west, as well as the estimated bedrock surface elevation at depth. As such, the SLE cross-section forms the basis for the model geometry used by Tetra Tech EBA as a "base case" for slope stability modeling. For the purposes of this analysis, we have assumed that final site grades will be approximately unchanged from existing elevations.

Similarly, the groundwater table elevation in the slope model was selected to approximate a worst-case, high groundwater elevation, as discussed above in Section 4.3.

Two additional slope models were also considered to examine the effect of varying depth to bedrock/groundwater across the site; the first considered a bedrock and groundwater table elevation that was lowered by 2 m elevation to approximate the soil profile and deeper bedrock in the southern portion of the site, in the area of BH01, and the second considered bedrock and groundwater elevations 2 m higher than the base case, in order to approximate the shallow bedrock at the north end of the site, in the area of BH03.

As described above in Section 4.2, the soil profile at the site generally consists of unconsolidated, granular soil over bedrock, with a discontinuous layer of till-like soil lying above the bedrock surface. As such, the soil profile in the slope was modeled as an extensive, uniform deposit of loose to compact, gravelly sand, with a zone of compact to dense, gravelly sand located below the width of the Haines Road, as discussed in Section 4.2. For the lowered bedrock case, this denser zone was truncated at the depth of the groundwater table, with loose to compact, gravelly sand below. These two soil types were modeled using a Mohr-Coulomb strength model, with typical properties assigned based on relative density, which was estimated from corrected SPT N-values obtained during drilling.

For loading scenarios considering post-seismic loading, the strength of liquefied soil was modeled using a residual shear strength to overburden pressure ratio, per Idriss and Boulanger (2008). The extent of liquefied soil was estimated based on the results of our liquefaction assessment, which suggests that liquefiable zones are present beneath the site on the east side of the Haines Road.

Bedrock was modeled as an impenetrable, infinitely strong material.

A summary of soil units and properties used in our slope stability analyses is provided below on Table 5.

Table 5: Summary of Soil Units and Properties Used in Slope/W Analyses

Soil Unit Name	Slope/W Strength Model	Unit Weight, γ (kN/m^3)	Effective Cohesion, c' (kPa)	Angle of Internal Friction, φ (degrees)	Liquefied Residual Shear Strength Ratio, S_r/σ'_{vo}
Loose to Compact, gravelly SAND	Mohr-Coulomb	18	0	32	-
Compact to Dense, gravelly SAND	Mohr-Coulomb	19	0	36	-
Liquefied Soil	S=f(overburden)	18	-	-	0.1
Bedrock	Bedrock (Impenetrable)	-	-	-	-

5.2.2 Loading Cases

A variety of different loading cases were considered for each of the model geometries used in our analysis, as summarized below. Results are presented below in Section 5.3.4 and in Appendix C.

- **Static Case:** Static loading was considered as a "base case" scenario. No liquefaction or seismic loading was considered in this model. Because the building layout and design loads have not yet been established, a nominal surcharge load of 10 kPa was applied to the entire ground surface in the area of the CBSA Port of Entry to approximately represent the future building loads and/or minor increases in site grades due to placement of fill during construction. A typical traffic live load of 16 kPa was applied to the width of the existing Haines Road;

- **Pseudo-Static (Seismic) Case**: A static, horizontal inertial force of 0.2g was applied to the model to approximate the effect of seismic shaking. The applied inertial force of 0.2g represents 50% of the PGA under the design (2% in 50 years) earthquake event, as recommended by Hynes-Griffin and Franklin (1984). In this loading scenario, the live traffic surcharge applied to the Haines Road was removed; however, the 10 kPa surcharge across the remainder of the site was left in place, as it is intended to represent a permanent dead load. No vertical seismic force was applied;

- **Post-Seismic (Liquefied) Case:** Liquefied soil properties were assigned to the loose gravelly sand below the CBSA Port of Entry in the region where liquefiable soils were identified, as discussed above in Section 5.1.2. In this case, both the seismic inertial loading and traffic surcharge were removed. As in the pseudo-static case, the 10 kPa surcharge representing building loads was left in place;

- **Worst Case (Seismic + Liquefaction):** For completeness, a model including both the seismic force of 0.2g and liquefied soil properties was run as a “worst-case” scenario. This model can be considered to be conservative in nature, as the onset of liquefaction generally occurs after the strongest shaking has passed during an earthquake event; and

- **Yield Acceleration:** The seismic force was varied to achieve a factor of safety equal to 1.0. The seismic coefficient (in g) corresponding to a factor of safety of 1.0 is referred to as the “yield acceleration”, and is used to estimate seismic slope displacements, as discussed below in Section 5.2.3.

Each loading case was initially run with the slip surface entry zone extending to the crest of the slope adjacent to the western edge of the Haines Road. However, early results suggested that the lowest Factor of Safety (FS) would be obtained in each case for the slip surface located nearest to the crest of the slope adjacent to the west side of the Haines Road. As such, each model was re-run with the slip surface entry point constrained to the eastern edge of the Haines Road in order to better assess the impact of potential slope displacement on the full width of the existing road and the proposed new CBSA buildings. In this case, the slip surface entry point again tended to be located as near as possible to the slope crest. This trend, along with visual inspection of non-critical slip surfaces assessed in Slope/W, suggests that the FS will tend to increase with distance into the site away from the slope crest.

For reference, the FS is essentially a ratio of stabilizing to destabilizing forces, where FS of less than 1 implies slope failure and/ or excessively large displacement. Conversely, FS greater than 1 suggests a stable slope; however, larger minimum values (typically 1.3 to 1.5) are often targeted in design to account for uncertainty in the analysis.

5.2.3 Seismic Slope Displacement

Seismic slope displacements under inertial loading were estimated based on the method proposed by Bray and Travasarou (2007), wherein permanent seismic slope displacements are estimated based on the slope yield coefficient, calculated using Slope/W software as described in Section 5.2.2, and the input ground motion, including the design horizontal ground acceleration from NBCC 2010 (0.4g) and an estimated earthquake magnitude of 7.5.

Bray and Travasarou’s equations include provision for use of frequency-dependant, spectral acceleration if the fundamental period of the slope under consideration is known. However, determination of the fundamental period of a slope requires that the soil shear wave velocity be measured, and such data is not available in Tetra Tech EBA’s or SLE’s records. Therefore, because the resulting calculated slope displacement for the approximately

10 m high slope would be extremely sensitive to relatively small variations in shear wave velocity, the slope was assumed to behave as a rigid block and the PGA, essentially representing the spectral acceleration for a fundamental period of zero seconds, was used in the analysis.

Estimated slope displacements are presented below in Section 5.2.4.

5.2.4 Results

Screenshots showing results of slope stability modeling using Slope/W software are provided in Appendix C, and summarized in Table 6 below.

Table 6: Results of Slope/W Slope Stability Modeling

Loading Condition	Relative Bedrock Elevation	Slip Surface Location	Factor of Safety
Static	High Bedrock (+2 m)	Crest of Slope	1.20
		Edge of CBSA Site	1.55
	Base Case (SLE Section C-C')	Crest of Slope	1.25
		Edge of CBSA Site	1.60
	Low Bedrock (-2 m)	Crest of Slope	1.36
		Edge of CBSA Site	1.66
Pseudo-Static (Seismic)	High Bedrock (+2 m)	Crest of Slope	0.76
		Edge of CBSA Site	0.90
	Base Case (SLE Section C-C')	Crest of Slope	0.78
		Edge of CBSA Site	0.95
	Low Bedrock (-2 m)	Crest of Slope	0.85
		Edge of CBSA Site	1.02
Post-Seismic (Liquefied)	High Bedrock (+2 m)	Crest of Slope	1.20
		Edge of CBSA Site	1.57
	Base Case (SLE Section C-C')	Crest of Slope	1.25
		Edge of CBSA Site	1.64
	Low Bedrock (-2 m)	Crest of Slope	1.36
		Edge of CBSA Site	1.72
Worst Case (Seismic + Liquefaction)	High Bedrock (+2 m)	Crest of Slope	0.76
		Edge of CBSA Site	0.90
	Base Case (SLE Section C-C')	Crest of Slope	0.78
		Edge of CBSA Site	0.95
	Low Bedrock (-2 m)	Crest of Slope	0.85
		Edge of CBSA Site	1.02

The Slope/W results suggest that the site is generally stable under static conditions, with FS greater than 1.2 for slip surfaces at the slope crest, and FS greater than 1.5 for slip surfaces impacting the Haines Road up to the western edge of the project site. For reference, a minimum FS of 1.5 is considered to be acceptable for static loading conditions, implying that slope stability is acceptable for the Port of Entry but marginal at the western shoulder of the Haines Road.

Under post-seismic, liquefied conditions, the FS was practically indentical to the static loading case. This is due to the modeled extent of liquefiable soils, which was interpreted to be limited to the northern half of the site and to the east of the Haines Road, as described in Section 5.1.2. The liquefied zone was sufficiently confined by the zone of denser soil beneath the Haines Road that it did not impact the stability in the slope model.

A lower FS was achieved for cases considering pseudo-static loading; the FS ranged from about 0.75 to 0.85 for slip surfaces at the slope crest, and from about 0.9 to 1.0 for slip surfaces impacting the Haines Road and western edge of the project site. For reference, a minimum FS of 1.1 is commonly recommended to limit slope displacement to tolerable amounts under seismic loading. As such, the results of the Slope/W modeling suggest that failures on the slope face and potential for large ground displacements impacting the Haines Road and the Port of Entry are likely under the design earthquake.

The results of the worst-case scenario, which considered both a horizontal seismic force and liquefied soil, again suggested that liquefaction will not have a significant impact on slope stability; practically identical FS were achieved between the worst case and the pseudo-static loading conditions.

As discussed above, the potential slope displacements under seismic loading were estimated using the method of Bray and Travasarou (2007). As such, the yield acceleration and estimated median, 16th percentile (median minus one standard deviation), and 84th percentile (median plus one standard deviation) slope displacements are presented below on Table 7.

Table 7: Summary of Estimated Seismic Slope Displacement

Relative Bedrock Elevation	Slip Surface Location	Yield Acceleration, k_y (g)	16th Percentile Displacement, D_{16} (mm)	Median Slope Displacement, D (mm)	84th Percentile Displacement, D_{84} (mm)
High (+2 m)	Slope Crest	0.070	168	324	627
	Edge of CBSA Site	0.155	39	75	145
Base Case (SLE Section C-C')	Slope Crest	0.085	122	236	456
	Edge of CBSA Site	0.180	28	54	105
Low (-2 m)	Slope Crest	0.120	65	126	243
	Edge of CBSA Site	0.210	20	38	74

The results presented on Table 7 are generally consistent with the results of the slope stability modeling, with lower FSs corresponding to a lower yield acceleration and consequently larger estimated slope displacements. Large median displacements, in excess of 100 mm, are estimated at the crest of the slope and smaller median displacements, less than 80 mm, are estimated at the edge of the project site. 84th percentile displacements up to about 600 mm are estimated at the slope crest, but are limited to less than 150 mm within the project site.

5.3 Discussion

Based on our analysis, it is considered likely that zones of soil at the site will liquefy following the design earthquake. However, based on the available information, the extent of potentially liquefiable soils is considered to be limited to the east side of the Haines Road. As a result, liquefaction does not have a significant impact on slope stability, and impacts to the site as a result of liquefaction will likely be limited to some vertical settlement, as discussed in Section 5.1.3. Based on the results of slope stability modeling and because the zones of potentially liquefiable soil appear to be constrained by surrounding denser soils, lateral displacements will likely be minimal.

Further to the slope stability modeling, estimated 84th percentile (median plus one standard deviation) slope displacements impacting the site are less than 150 mm, which is the upper threshold for acceptable slope displacements recommended by the Task Force for Seismic Slope Stability (2010) in British Columbia to prevent building collapse.

Furthermore, slope displacements become smaller with increasing distance from the slope crest, meaning that the estimated displacement at the edge of the site represents an upper bound estimate for slope displacement impacting the CBSA site. This suggests that infrastructure located to the east of the Haines Road is unlikely to be catastrophically impacted under the design earthquake event. However, it is likely that the Haines Road adjacent to the slope crest will undergo large slope displacements, and will likely require significant remediation or reconstruction to safely carry vehicle traffic.

We understand that the Port of Entry is required to be a post-disaster site that will remain functional immediately following the design earthquake. As such, recommendations to minimize potential seismic impacts to new structures at the site are provided below in Section 6. However, as noted above, it is likely that the existing Haines Road will not be safe for vehicle traffic immediately following the design seismic event. Therefore, it is recommended that the new northbound roadway/ vehicle inspection lanes be designed to carry two-way traffic following a large earthquake. Based on the preliminary site layout provided by Stantec, the new paved lanes will be located well away from the slope crest, and are therefore likely to remain relatively undamaged and operable during the design earthquake.

It is also important to note that the FS against slope failure and/ or the magnitude of seismic slope displacement can be very sensitive to the severity of the input ground motion and the extent of liquefiable soil. While the design ground motions are explicitly stipulated by NBCC 2010, the extent of liquefaction has been estimated based on limited data obtained from geotechnical drilling programs conducted by Tetra Tech EBA and SLE. In particular, the interpreted zone of relatively dense soil lying below the width of the Haines Road is based on qualitative descriptions of soil density provided on SLE’s borehole logs. If these descriptions are inaccurate, it is possible that the zone of liquefaction may extend beneath the Haines Road, and possibly daylight at the slope face above Granite Creek. This would likely result in slope failure and/ or large slope displacements extending further back from the slope crest than anticipated, which would cause greater than estimated damage to the site.

If desired, additional drilling could be completed in the area of the Haines Road and the slope crest to confirm the qualitative descriptions provided on SLE’s logs and better delineate the extent of potentially liquefiable soil. Tetra Tech EBA would be pleased to provide a proposal to complete this work, if required.

6.0 RECOMMENDATIONS

6.1 Shallow Building Foundations

Based on the ground conditions and significant seismic hazard at the site, we recommend that all new structures be founded on structural slabs-on-grade with thickened spread and strip footing foundations. The monolithic slab will help to prevent differential movements within the overlying structure and will improve building performance compared to a structure on isolated spread/ strip footings in the event of seismic activity affecting the site. Furthermore, subexcavation and recompaction of the loose, granular soil near ground surface will further contribute to minimizing damage to structures due to seismic events. As such, geotechnical recommendations for site preparation and the design and construction of thickened structural slabs-on-grade at the site are provided in the following sections.

6.1.1 Site Preparation

Site preparation for construction of shallow building foundations should be completed in accordance with the following recommendations:

- The existing surficial cover (asphalt, grass) and loose soil should be subexcavated to a depth of 1.0 m below the underside elevation of the new footings, plus an additional 1.0 m on all sides;
- Based on the results of our field drilling program, it is anticipated that the subgrade exposed at the base of the subexcavation will consist of loose to compact, gravelly sand. Upon completion of the subexcavation, we recommend that the exposed subgrade be inspected by a qualified geotechnical engineer in order to confirm the encountered subgrade conditions and to provide additional recommendations, if required;
- Prior to backfilling the subexcavation, the exposed granular subgrade should be heavily recompacted to densify the loose subgrade and provide a stable bearing surface on which to place and compact backfill material. Further to the item above, if the subgrade is found to be soft and/ or wet, or if unanticipated ground conditions are encountered, additional measures may be recommended that may include, but not necessarily be limited to, additional subexcavation or placement of geotextile filter fabric to cover the subgrade;
- The subexcavation should be backfilled with non-frost-susceptible pit run gravel, placed in maximum 200 mm lifts, moisture conditioned and compacted to minimum 98% Standard Proctor Maximum Dry Density (SPMDD). The recommended gradation for pit run gravel is provided on Table 8;
- As an alternative to imported pit run gravel, the subexcavated gravelly sand may be suitable for use as backfill, provided that any unsuitable materials (i.e., cobbles and boulders greater than 150 mm diameter, fine-grained or organic soil, saturated materials) are removed, and pending inspection and approval by a qualified geotechnical engineer;
- A minimum 100 mm thick bearing layer of 20 mm crushed basecourse (CBC) gravel should be placed immediately below the underside of the slab-on-grade and all slab thickenings. The CBC should be moisture conditioned and compacted to minimum 98% SPMDD in order to provide a smooth, level bearing surface on which to cast the concrete foundation elements. The recommended gradation for 20 mm CBC is provided on Table 8;

Table 8: Recommended Gradation for Granular Fill Materials

Pit Run Gravel		20 mm Crushed Base Course	
Particle Size (mm)	**% Passing (by weight)**	**Particle Size (mm)**	**% Passing (by weight)**
80	100	-	-
25	55 – 100	20	100
12.5	42 – 84	12.5	64 – 100
5.00	26 – 65	5.00	36 – 72
1.25	11 – 47	1.25	12 – 42
0.315	3 – 30	0.315	4 – 22
0.080	0 – 8	0.080	3 – 6

6.1.2 Foundation Design and Construction

6.1.2.1 Limit States Design

The 2010 edition of the National Building Code of Canada (NBCC 2010) stipulates that foundation design must be carried out using Limit State Design (LSD) methods. Under LSD, a minimum of two loading cases must be considered by geotechnical and structural designers; the Ultimate Limit State (ULS) and the Serviceability Limit State (SLS). The ULS and SLS bearing resistances are calculated differently. The ULS bearing resistance is the maximum pressure that the soil can withstand without suffering bearing failure. The SLS bearing pressure is the maximum allowable pressure required to limit settlement to a tolerable amount. Both the ULS and SLS bearing resistances are highly dependant on soil properties, footing size and shape, and burial depth.

Additionaly, under LSD, resistance factors are applied to the calculated (unfactored) resistances to determine the maximum allowable factored design load. Geotechnical resistance factors for design of shallow foundations against vertical bearing failure (ULS) and horizontal displacement (sliding under lateral loading) are provided below on Table 9, per Table 6.1 of the *Canadian Highway Bridge Design Code* (CAN/CSA-S6-06). Per CAN/CSA-S6-06, SLS resistances should consider unfactored loads, and therefore no resistance factor is required.

Table 9: Geotechnical Resistance Factors – Shallow Foundations

Item	Resistance Factor
Vertical Bearing Resistance (ULS)	0.5
Horizontal Resistance (Sliding)	0.8

6.1.2.2 Foundation Recommendations

As noted above, structural slabs-on-grade with thickened spread and strip footings are recommended for new building foundations at the site. As such, design and construction of new building foundations at the site should be undertaken in accordance with the following recommendations:

- Spread and strip footings refer to thickened areas within the structural slab-on-grade that are designed to provide the required bearing resistance under building loads. For the purposes of geotechnical design, Tetra Tech EBA has assumed a footing thickness of 0.2 m and a minimum depth of cover of 0.3 m from finished grade to the underside of footing;

- Unfactored bearing resistances are provided based on minimum footing dimensions of 0.4 m for strip footings and 1.0 m for spread (square) footings. If significantly different footing sizes are preferred for this project, or if higher bearing resistance is required to support the design building loads, Tetra Tech EBA should be notified to review and adjust the calculated bearing resistances, as necessary;

- Unfactored ULS bearing resistances of 425 and 265 kPa should be used for spread and strip footings, respectively;

- Unfactored SLS bearing resistances of 660 and 720 kPa should be used for spread and strip footings, respectively. SLS bearing resistances are calculated based on an allowable elastic settlement of 25 mm, which is generally sufficient to limit total and differential settlement to tolerable levels for typical building projects;

- Based on the granular soil encountered in the geotechnical drilling program, significant long-term consolidation/ compaction settlement is not anticipated, provided that site preparation is completed in accordance with the recommendations provided above in Section 6.1.1;
- Concrete foundation elements should be cast onto a clean, compacted, granular bearing surface. It is important that no loose and/ or disturbed material be allowed to remain on the bearing surface. As discussed above in Section 6.1.1, foundation bearing surfaces should consist of 20 mm CBC gravel, moisture conditioned and compacted to minimum 98% SPMDD;
- The working area should be protected from the inflow of surface water at all times. Concrete foundation elements should not be cast onto saturated or seasonally frozen soil;
- Based on the silt content of the subgrade soils, they are considered to be marginally frost-susceptible. However, because the site is well drained and the depth to the local groundwater table appears to be below the maximum depth of seasonal frost penetration, installation of perimeter insulation is not required to protect building foundations from frost action;
- The ground elevation at finished grade around the building perimeter should be at least 0.3 m above the surrounding grade to maintain positive drainage away from the building foundations. Ponding and/ or infiltration of water adjacent to the building should be prevented, as this could have detrimental effects on the performance of the building foundations. Runoff from the roof should be directed onto splash pads and away from the building. This particularly important in the late fall, just prior to seasonal freeze-up; and
- It is recommended that concrete placed during foundation construction be designed in accordance with CSA A23.1 requirements for F-2 exposure class concrete (30 MPa with 4-7% air entrainment). Any exterior concrete, such as sidewalks or aprons, should be designed in accordance with CSA requirements for C-2 exposure class concrete (32 MPa with 5-8% air entrainment).

6.2 Seismic Site Class

NBCC 2010 requires that a seismic site class be established for seismic design of proposed structures, based on the average properties of the soil profile at the site. Based on the results of our drilling program, the average soil properties at the CBSA site at Pleasant Camp are consistent with Site Class D, as shown on NBCC 2010 Table 4.1.8.4A.

Per NBCC 2010 Tables 4.1.8.4B and 4.1.8.4C, for large earthquake ground motions such as those considered at the site, Site Class D implies that there will be little to no amplification of the “firm-ground/ Site Class C” design motions provided in the attached NBCC 2010 seismic hazard calculation. As such, no amplification of the design PGA was applied to ground motions considered in liquefaction or slope analyses.

It should be noted that NBCC 2010 Table 4.1.8.4A indicates that Site Class F should be assigned to sites with any thickness of liquefiable soils, such as the subject site. Under Site Class F, NBCC 2010 stipulates that a site-specific seismic response analysis be completed. A site-specific seismic response analysis is intended to assess the (de)amplification of seismic waves as they propagate through the rock/ soil profile at a given site. However, NBCC 2010 also includes a provision that buildings with a fundamental period of vibration of less than 0.5 s do not require site-specific response analysis, and can be designed based on the Site Class assigned assuming that no liquefiable soils are present.

Based on the anticipated height of the proposed buildings at the site, it is likely that all of the proposed new structures will have a fundamental period of less than 0.5 s. This should be confirmed as soon as possible, and Tetra Tech EBA should be retained to complete a site-specific response analysis if any of the proposed structures are expected have a fundamental period greater than 0.5 s.

6.3 Pavement Design

Based on the results of our drilling program and available traffic information, Tetra Tech EBA has completed a pavement design for the proposed new paved roadways.

6.3.1 Design Method and Input Parameters

Pavement design was completed in accordance with 1993 American Association of State Highway and Transportation Officials (AASHTO) flexible pavement design procedures. The following input parameters were used for pavement design:

- **Traffic:** Traffic parameters were based on traffic counts of northbound vehicles collected by YG between 1994 and 2011 at Pleasant Camp. Traffic input parameters used for pavement design included Average Daily Traffic (ADT) of 128 vehicles per day, including 13% commercial (truck) traffic and an annual growth rate of 2%. These parameters indicate a total traffic loading of 110,000 Equivalent Single Axle Loads (ESAL) over an assumed 20 year design life.

- **Subgrade Characteristics:** Based on boreholes drilled at the site, the subgrade is assumed to consist of gravelly sand with an assumed resilient modulus of 35 MPa for the compacted subgrade. In general, subgrade preparation should be undertaken similar to that recommended for the CBSA building foundations, and it is recommended that the exposed subgrade be inspected by a qualified geotechnical engineer prior to backfilling/ pavement construction.

- **Material Characteristics:** Structural and drainage coefficients used in pavement design are summarized on Table 10 below. As shown on the table, the gradation for 20 mm CBC is provided on Table 8 in Section 6.1.1 above. Similarly, as shown on Table 8, pit run gravel is considered acceptable for use as Select Granular Sub-Base (SGSB) material. A 16 mm, Class 1 Medium Mix asphalt is recommended, per Section 502 of the *British Columbia Ministry of Transportation's 2012 Standard Specifications for Highway Construction*. Based on the cold climate at the site, an asphalt cement with properties to prevent low temperature thermal cracking most likely does not exist. Therefore, a Group A 200/300 binder is recommended (equivalent to PG52-34).

Table 10: Material Characteristics Used For Pavement Design

Material Description	Structural Layer Coefficient	Drainage Coefficient
Asphalt Concrete Pavement (AP)	0.4	1.0
20 mm Crushed Basecourse (CBC)	0.14	1.0
Select Granular Sub-Base (SGSB)	0.10	1.0

- **AASHTO Pavement Design Parameters:** Other parameters used to complete pavement design are summarized below on Table 11:

Table 11: AASHTO Pavement Design Parameters

Criteria	Value
Reliability	85%
Initial Serviceability Index (P_i)	4.2
Terminal Serviceability Index (P_t)	2.5
Serviceability Loss (PSI)	1.7
Overall Standard Deviation (S_o)	0.45

6.3.2 Recommended Pavement Structure

Three recommended pavement structures are provided below for new pavement constructed at the site, including options using asphalt pavement or Bituminous Surface Treatment (BST).

Table 12: Recommended Pavement Structure - Option 1

Material Type	Layer Thickness (mm)
AP	75
20 mm CBC	150
80 mm Pit Run (SGSB)	200

Table 13: Recommended Pavement Structure - Option 2

Material Type	Layer Thickness (mm)
AP	75
20 mm CBC	300
80 mm Pit Run (SGSB)	-

Table 14: Recommended Pavement Structure - Option 3

Material Type	Layer Thickness (mm)
BST Surfacing	-
20 mm CBC	150
80 mm Pit Run (SGSB)	550

6.4 Existing Maintentance Building Foundations

6.4.1 Floor Slab Remediation Options

Depending on anticipated usage requirements over the remainder of the design life of the existing building, the following rehabilitation options are considered feasible at the site, and are arranged in order of estimated cost from highest to lowest:

- **Demolition and Reconstruction:** If an as-new facility with a level floor is desired, demolition of the existing building and replacement with a new structure is recommended;
- **Foundation Jacking:** Other options may be feasible to raise and level the cracked slab back to approximately it's original elevation. Such options include injection of high density, expanding foam or compaction grouting beneath the building foundations;
- **Interior Slab Leveling:** Based on the magnitude of settlement observed in the floor slab, and the relatively shallow depth to bedrock in the area, it is likely that little to no additional settlement will occur under the weight of the building. As such, the floor slab could be re-leveled through placement of grout or concrete over the interior slab surface; or
- **Leave Building As-Is:** If the building is acceptable for intended use in it's existing state, no action is required. As noted above, little to no additional settlement is expected over the remainder of the building's design life.

6.4.2 Location of New Site Services Building

Based on discussion with Stantec, we understand that PWGSC wishes to construct the proposed new site services building as an addition to the existing maintenance building. However, based on our observations of the damage to the existing building floor slab and the loose granular soil encountered in BH03, drilled adjacent to the existing building, structural connection between the old and new buildings is not recommended.

Alternatively, we understand that the site services building could be located close to the existing building, potentially with a covered walkway connecting the two structures. This option is preferable to construction of an addition to the existing maintenance building, provided that no part of the new building or walkway will be structurally connected to the existing building. Site preparation for the site services building should be undertaken in accordance with the recommendations provided in Section 6.1.1. However, because the configuration of the existing building foundations below the floor slab is now known, it will be important to take care not to undermine the existing foundations during site preparation for the new building. In general, the subexcavation within 1 m of the existing building should not extend below the underside elevation of any existing footings.

7.0 CONSTRUCTION TESTING AND MONITORING

All foundation design recommendations presented are site-specific and based on the assumption that an adequate level of construction monitoring during foundation excavation and installation will be provided, and that all construction will be carried out by a suitably qualified, experienced contractor. An adequate level of construction monitoring also ensures the recommendations based on geotechnical data obtained at borehole locations are applicable to the entire building site. Appropriate Quality Assurance and Quality Control (QA/QC) testing should be undertaken during construction to confirm that construction is completed in accordance with the recommendations provided in this report.

Furthermore, it is recommended that EBA be given the opportunity to review the details of the final design related to the geotechnical aspects of the building foundation, prior to construction. Past experience has shown that this action may prevent inconsistencies, poor performance, and/or increased costs that may lead to disputes.

8.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Public Works and Government Services Canada and their agents. Tetra Tech EBA Inc. (Tetra Tech EBA) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Public Works and Government Services Canada, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in the signed contract and to Tetra Tech EBA's General Conditions, which are provided in Appendix A of this report.

9.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech EBA Inc.

A. W. WALLACE # 35255
9 Dec 2014

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Attachments: Figures (7)
Appendix A: Tetra Tech EBA's General Conditions – Geotechnical
Appendix B: Borehole Logs and Geotechnical Laboratory Testing Results
Appendix C: Results of Slope/W Slope Stability Modeling

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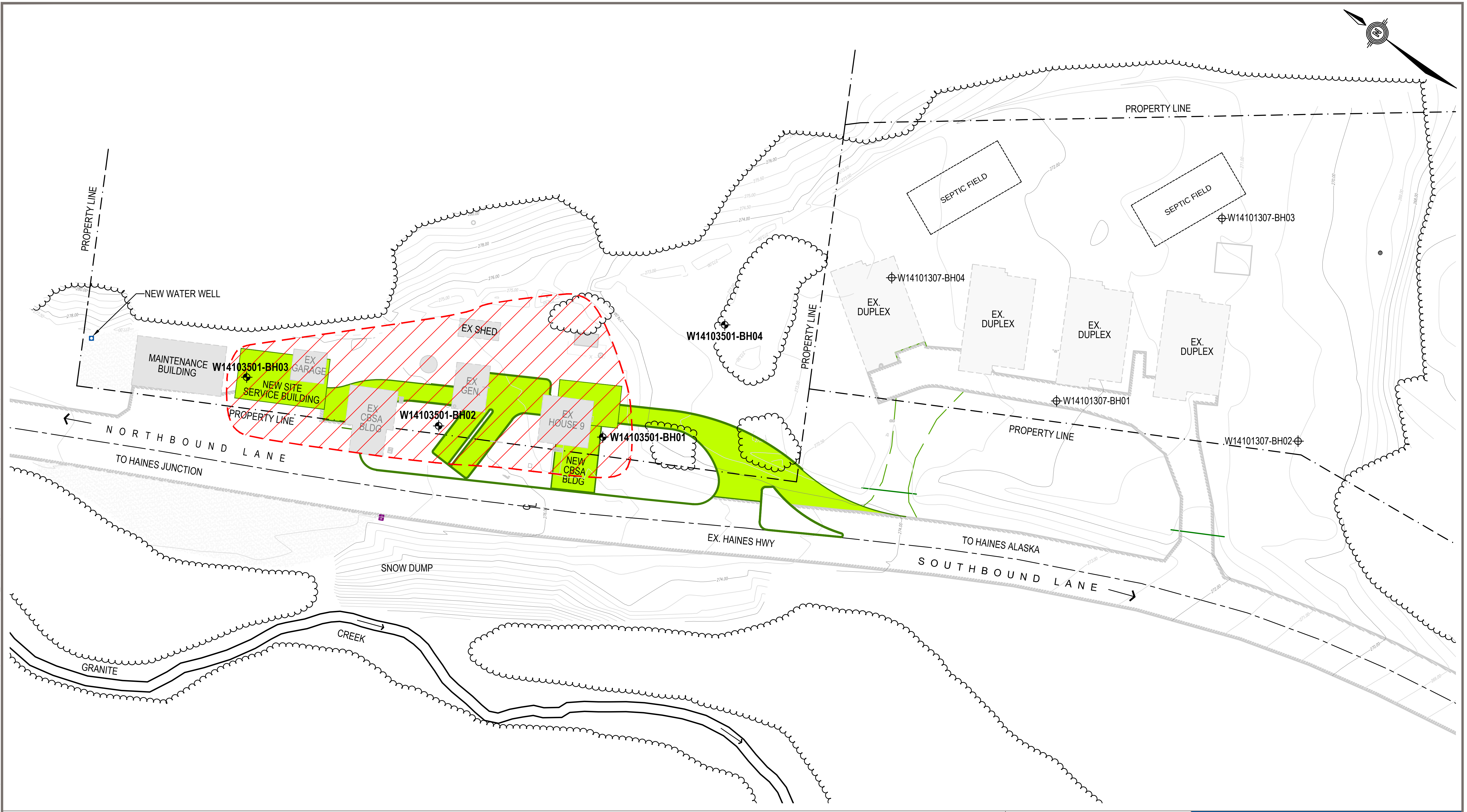
FIGURES



LEGEND

⊕ - 2009 BOREHOLE LOCATION

◆ - 2014 BOREHOLE LOCATION

▨ - ZONE OF POTENTIALLY LIQUEFIABLE SOIL

🟩 - PROPOSED NEW SITE LAYOUT

0 25m

Scale: 1:750 @ 11"x17"

CLIENT

Public Works and
Government Services
Canada

TETRA TECH EBA

NEW CBSA BUILDING GEOTECHNICAL EVALUATION
PLEASANT CAMP, BRITISH COLUMBIA

SITE PLAN SHOWING BOREHOLE LOCATIONS

PROJECT NO.	DWN	CKD	REV
W14103501-01	CB	AW	0

OFFICE	DATE
EBA-WHSE	November 28, 2014

Figure 1

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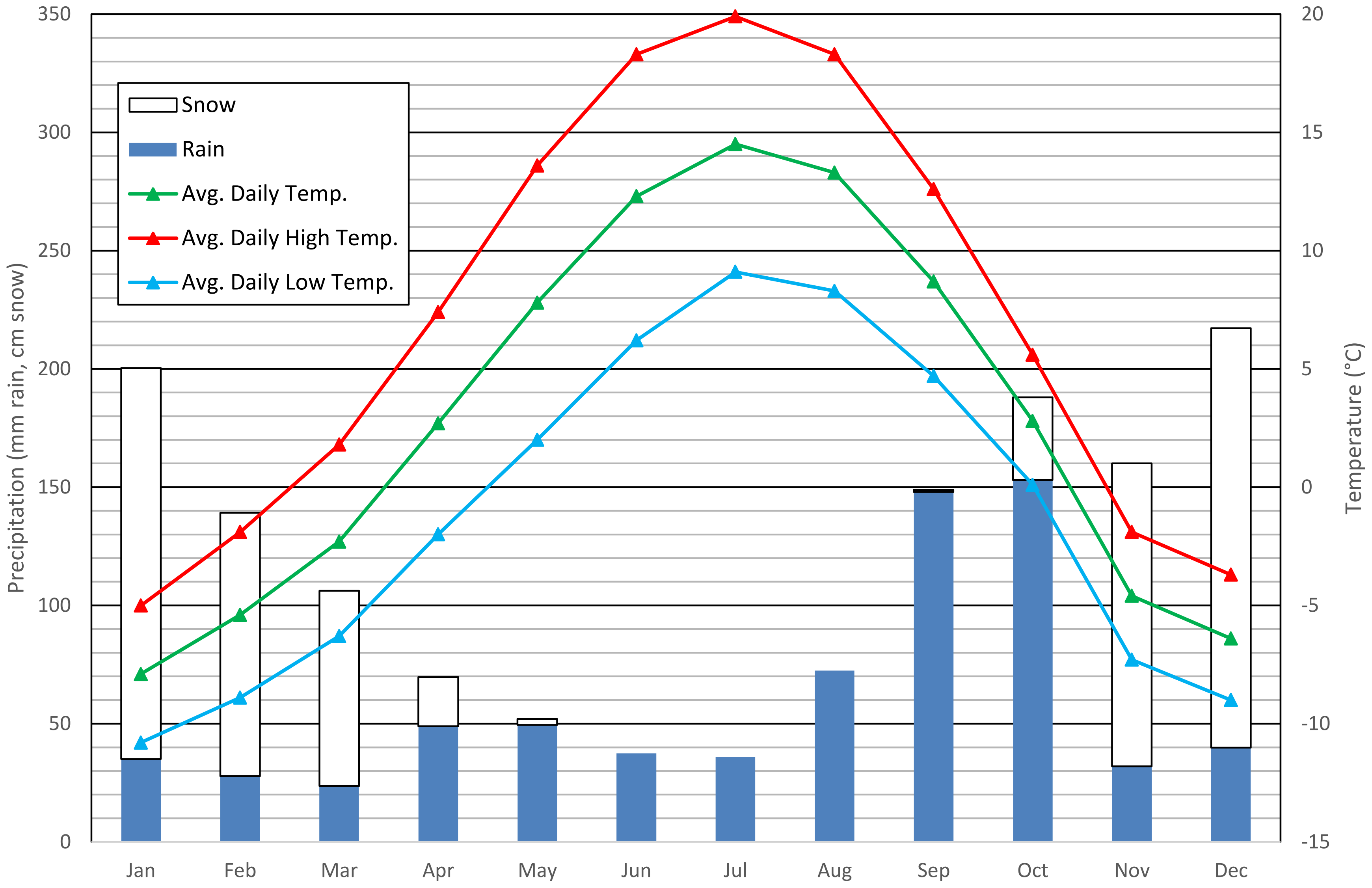
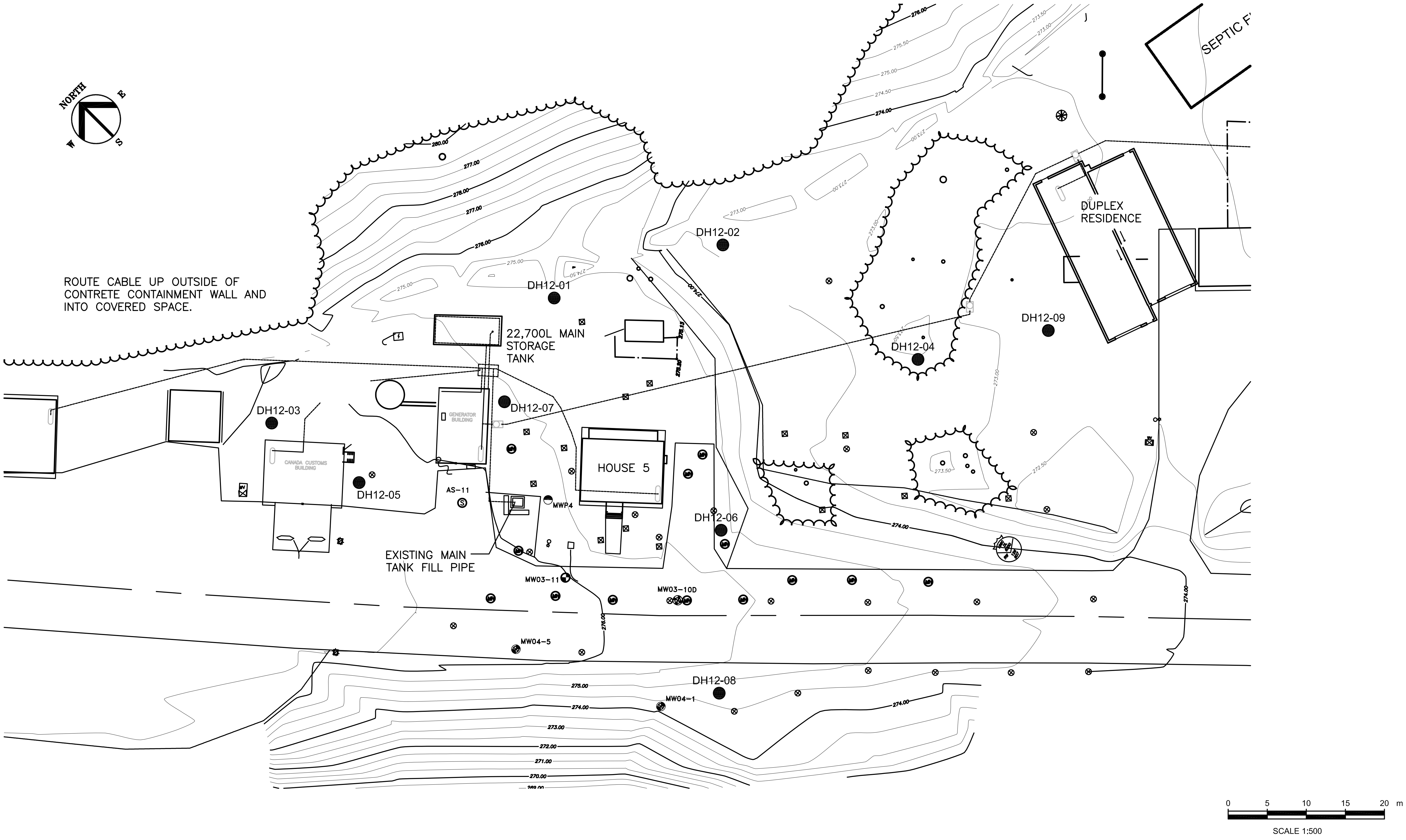
FIGURE 2
Climate Normals 1981 to 2010
CBSA Port of Entry - Pleasant Camp, BC





LEGEND

- ● BOREHOLE
- MONITORING WELL
- ELECTRICAL BOX
- TRAFFIC LIGHT
- STREET LIGHT
- OVERHANG SIGN
- MANHOLE
- ☒ AERATOR
- ○ TREE DIAMETER (VARIES IN SIZE)
- ○ TRAVERSE HUB
- WATER VALVE
- ⊗ OBSERVATION MONITORING WELL WATER
- ◇ WELL
- ◉ SEPTIC PIPE
- SATELLITE DISH
- ▭ MARKER FOR U/G HIGH VOLTAGE CABLE
- TREELINE

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED PRIOR TO INTRUSIVE WORK. NOT ALL UTILITIES MAY BE SHOWN.
3. DISTANCES ARE IN METRES (m).
4. CONTOURS ARE IN 0.50 m INTERVALS.
5. ELEVATIONS ARE IN METRES ABOVE SEA LEVEL (masl).

REFERENCE DRAWINGS

41–130–100	–	MORROW ENGINEERING LTD. SITE PLAN
DWG. NO.	DATE	DESCRIPTION

REVISIONS

0	–	–	–	–
REV.	DATE	DESCRIPTION	BY	CHK

SNC•LAVALIN
Environment

CLIENT NAME:
PUBLIC WORKS &
GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, B.C.

TITLE:
SITE PLAN WITH
BOREHOLE LOCATIONS

DWN BY: PCB/CW	SCALE: AS SHOWN	DATE: 2013 03 26	DWG No: REV.: 0
CHK'D: NS	PLOT: 20130718.1129	CADFILE:511502–61–1	511502-4

PATH: P:\SLE\01 – BRITISH COLUMBIA\JCS#131416–E011 CBSA PLEASANT CAMP REMEDIAL EXCAVATION\DRAFTING\DRAFTING\511502–61–1.DWG

LEGEND

● ⓢ ⓥ MONITORING WELLS

● BOREHOLE

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED PRIOR TO INTRUSIVE WORK. NOT ALL UTILITIES MAY BE SHOWN.
3. DRAWING FOR CONSTRUCTION – CONCEPTUAL DESIGN PLANNING PURPOSES ONLY.
3. DISTANCES ARE IN METRES (m).
4. CONTOURS ARE IN 0.50 m INTERVALS.
5. ELEVATIONS ARE IN METRES ABOVE SEA LEVEL (masl).

REFERENCE DRAWINGS

41–130–100	–	MORROW ENGINEERING LTD. SITE PLAN
DWG. NO.	DATE	DESCRIPTION

REVISIONS

0	–	–	–	–
REV.	DATE	DESCRIPTION	BY	CHK

SNC•LAVALIN
Environment

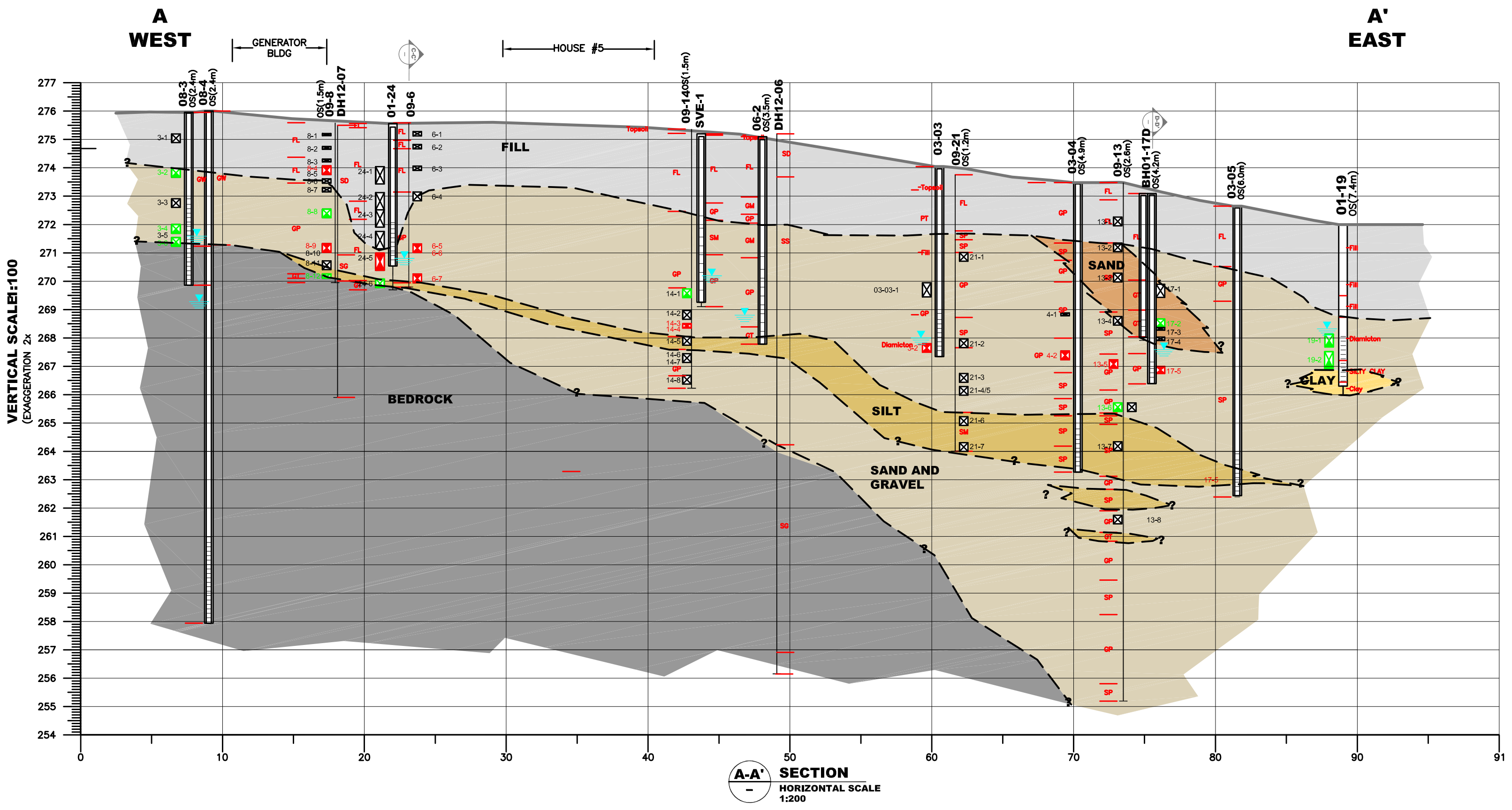
CLIENT NAME:
PUBLIC WORKS &
GOVERNMENT SERVICES CANADA

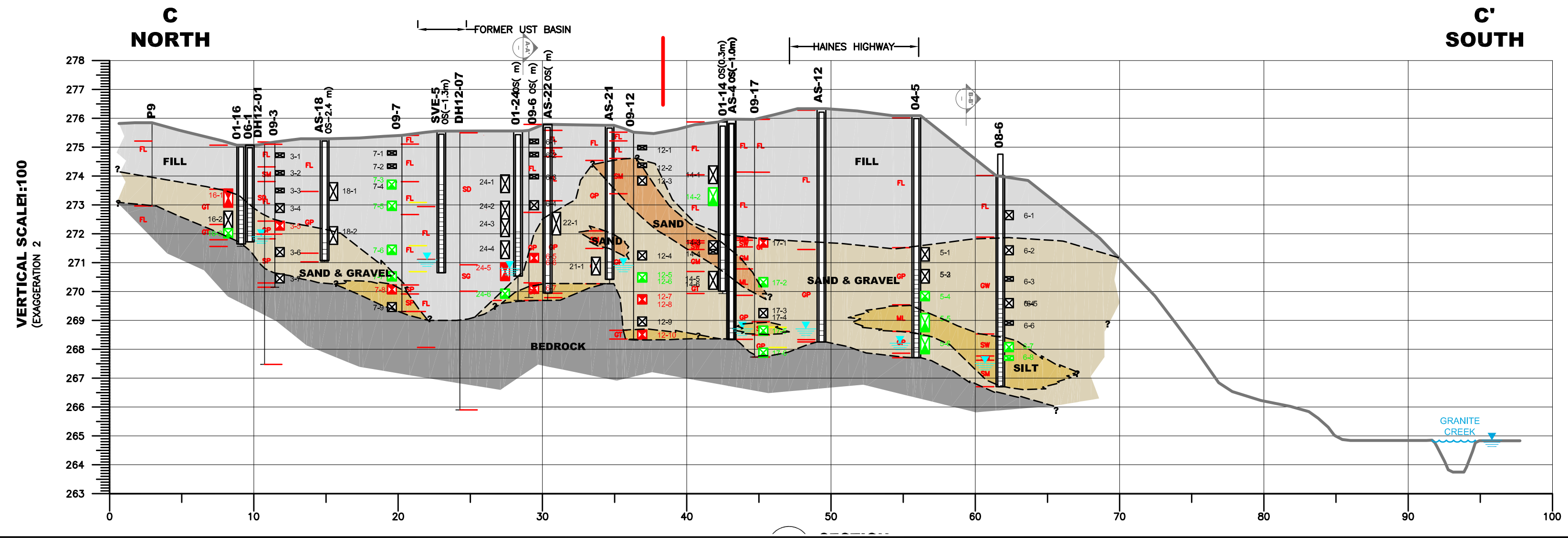
PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, B.C.

TITLE:
BOREHOLES AND MONITORING WELL WITH CONTOUR AND SECTION LINES

DWN BY: PCB/CW	SCALE: AS SHOWN	DATE: 2013 03 26	DWG No: REV.: 0
CHK'D: NS	PLOT: 20130718.1140	CADFILE:511502–61–2	511502-5

PATH: P:\SLE\01 – BRITISH COLUMBIA\JCS#131416–E011 CBSA PLEASANT CAMP REMEDIAL EXCAVATION\DRAFTING\DRAFTING\511502–61–2.DWG

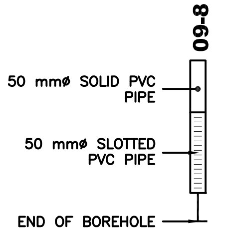




LEGEND

▨	SAND, & GRAVEL (FILL)
▨	SAND, & GRAVEL
▨	SAND, SILTY TO SOME SILT
▨	SILT & SAND TILL
▨	CLAY
▨	BEDROCK
— — — — —	INFERRED STRATIGRAPHIC BOUNDARY
▽	GROUNDWATER ELEVATION
☒	SAMPLE (NOT ANALYZED)
☒	CONCENTRATION(S) LESS THAN THE APPLICABLE CSR OR CCME STANDARDS
☒	CONCENTRATION(S) GREATER THAN THE APPLICABLE CSR OR CCME STANDARDS

NOTES



REFERENCE DRAWINGS

	–	
DWG. NO.	DATE	DESCRIPTION

REVISIONS

0	–	–	–	–
REV.	DATE	DESCRIPTION	BY	CHK

SNC•LAVALIN
Environment

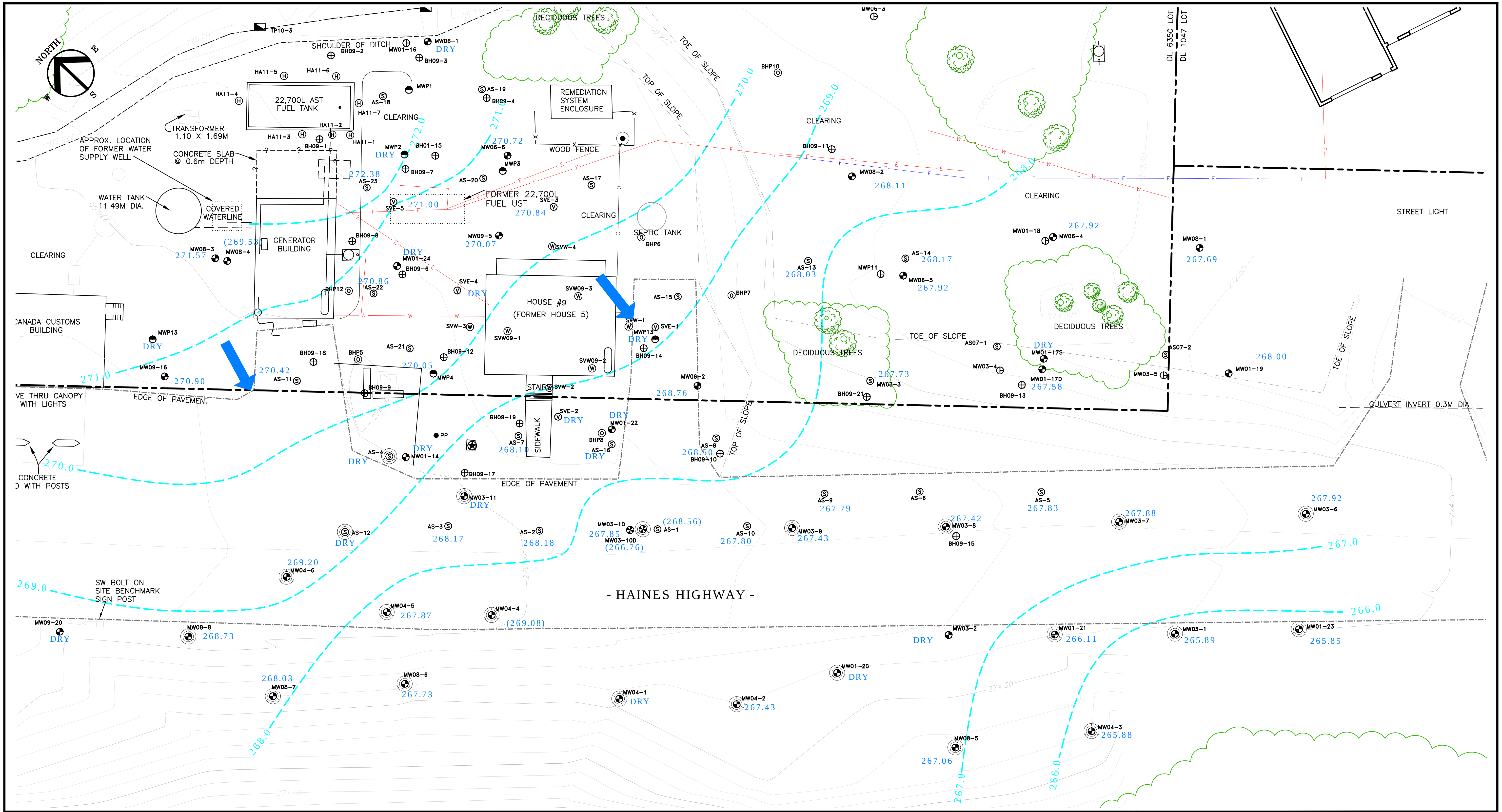
CLIENT NAME:
PUBLIC WORKS &
GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, B.C.

TITLE:
GEOLOGICAL CROSS-SECTION A-A' AND C-C'

DWN BY: PCB/CW	SCALE: AS SHOWN	DATE: 2013 03 26	DWG No: REV.: 0
CHK'D: NS	PLOT: 20130718.1142	CADFILE:511502–62–1	511502-6

PATH: P:\SLE\01 – BRITISH COLUMBIA\JCS#131416–E011 CBSA PLEASANT CAMP REMEDIAL EXCAVATION\DRAFTING\DRAFTING\511502–62–1.DWG



LEGEND

0 5 10 15 METRES

▬ ▬ ▬	LOT BOUNDARY
········	FORMER STRUCTURES
——F——	FUEL LINE
— — —	AS/SVE SYSTEM PIPING
——	TOPOGRAPHIC MAJOR CONTOUR (2m)
——	TOPOGRAPHIC MINOR CONTOUR (0.5m)
⌒⌒⌒	FOREST

Ⓞ	BOREHOLE (OTHER)
◒	MONITORING WELL (OTHER)
◕	MONITORING WELL (SLE)
⊕	BOREHOLE (SLE)
Ⓢ	AIR SPARGE WELL (SLE)
Ⓥ	SOIL VAPOUR EXTRACTION WELL (SLE)
Ⓦ	SOIL VAPOUR WELL
⦶	DESTROYED MONITORING WELL

— — —	INFERRED POTENTIOMETRIC CONTOUR
267.43	POTENTIOMETRIC ELEVATION (m) 2012–08–29
(269.08)	POTENTIOMETRIC ELEVATION NOT USED IN CONTOURING
⬅	ESTIMATED GROUNDWATER FLOW DIRECTION

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
	NOV. 2005	YUKON ENGINEERING SERVICES

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
3	2013–03–13	ISSUE AS FINAL	JEC	TL
2	2013–01–23	ISSUED TO CLIENT	AJK	PAC
1	2012–03–31	ISSUED TO CLIENT	AJK	DWB
0	2011–03–31	ISSUED TO CLIENT	AJK	PAC

SNC·LAVALIN Environment

CLIENT NAME:
PUBLIC WORKS &
GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, BC

TITLE:
POTENTIOMETRIC ELEVATIONS &
INFERRED CONTOURS (AUGUST 29, 2012)

DWN BY: KGP	SCALE: 1:300	DATE: 2010–03–05	DWG No: REV.: 2
CHK'D: DWB	PLOT: 20130312.1218	CADFILE: 131416R33	131416-L03

PATH: P:\CURRENT PROJECTS\PUBLIC WORKS AND GOV'T SERVICES CANADA\131416\GEOMATICS\CAD\131416R33.DWG

2010 National Building Code Seismic Hazard Calculation

INFORMATION: Eastern Canada English (613) 995-5548 français (613) 995-0600 Facsimile (613) 992-8836
Western Canada English (250) 363-6500 Facsimile (250) 363-6565

Requested by: Adam Wallace, Tetra Tech EBA Inc.

November 20, 2014

Site Coordinates: 59.4548 North 136.3664 West

User File Reference: CBSA Port of Entry - Pleasant Camp, BC

National Building Code ground motions:
2% probability of exceedance in 50 years (0.000404 per annum)

Sa(0.2)	Sa(0.5)	Sa(1.0)	Sa(2.0)	PGA (g)
0.895	**0.589**	**0.322**	**0.174**	**0.393**

Notes. Spectral and peak hazard values are determined for firm ground (NBCC 2010 soil class C - average shear wave velocity 360-750 m/s). Median (50th percentile) values are given in units of g. 5% damped spectral acceleration (Sa(T), where T is the period in seconds) and peak ground acceleration (PGA) values are tabulated. Only 2 significant figures are to be used. ***These values have been interpolated from a 10 km spaced grid of points. Depending on the gradient of the nearby points, values at this location calculated directly from the hazard program may vary. More than 95 percent of interpolated values are within 2 percent of the calculated values.***

Ground motions for other probabilities:

Probability of exceedance per annum	0.010	0.0021	0.001
Probability of exceedance in 50 years	40%	10%	5%
Sa(0.2)	0.282	0.524	0.678
Sa(0.5)	0.168	0.324	0.429
Sa(1.0)	0.084	0.167	0.229
Sa(2.0)	0.046	0.091	0.123
PGA	0.140	0.243	0.306

References

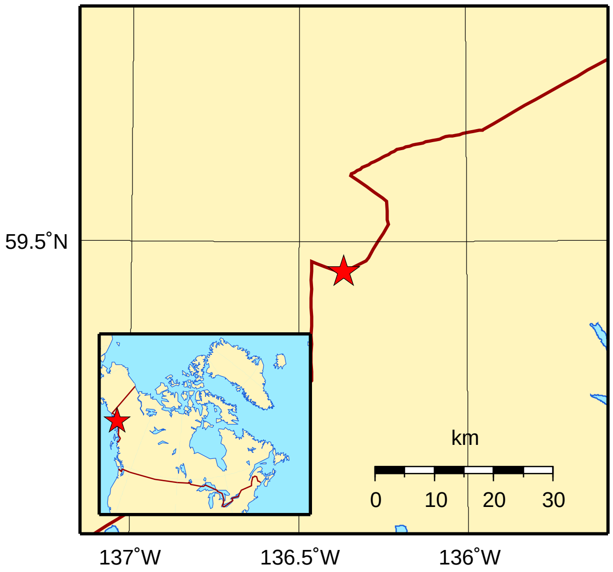
National Building Code of Canada 2010 NRCC no. 53301; sections 4.1.8, 9.20.1.2, 9.23.10.2, 9.31.6.2, and 6.2.1.3
Appendix C: Climatic Information for Building Design in Canada - table in Appendix C starting on page C-11 of Division B, volume 2

User's Guide - NBC 2010, Structural Commentaries NRCC no. 53543 (in preparation)
Commentary J: Design for Seismic Effects

Geological Survey of Canada Open File xxxx
Fourth generation seismic hazard maps of Canada: Maps and grid values to be used with the 2010 National Building Code of Canada (in preparation)

See the websites *www.EarthquakesCanada.ca* and *www.nationalcodes.ca* for more information

Aussi disponible en français



APPENDIX A

TETRA TECH EBA'S GENERAL CONDITIONS

GENERAL CONDITIONS

GEOTECHNICAL REPORT

This report incorporates and is subject to these "General Conditions".

1.0 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of Tetra Tech EBA's Client. Tetra Tech EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than Tetra Tech EBA's Client unless otherwise authorized in writing by Tetra Tech EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of Tetra Tech EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 ALTERNATE REPORT FORMAT

Where Tetra Tech EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed Tetra Tech EBA's instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by Tetra Tech EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of Tetra Tech EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except Tetra Tech EBA. Tetra Tech EBA's instruments of professional service will be used only and exactly as submitted by Tetra Tech EBA.

Electronic files submitted by Tetra Tech EBA have been prepared and submitted using specific software and hardware systems. Tetra Tech EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

3.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, Tetra Tech EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

4.0 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. Tetra Tech EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

5.0 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

6.0 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. Tetra Tech EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

7.0 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

8.0 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

9.0 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

10.0 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

11.0 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

12.0 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

13.0 SAMPLES

Tetra Tech EBA will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

14.0 INFORMATION PROVIDED TO TETRA TECH EBA BY OTHERS

During the performance of the work and the preparation of the report, Tetra Tech EBA may rely on information provided by persons other than the Client. While Tetra Tech EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, Tetra Tech EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

APPENDIX B

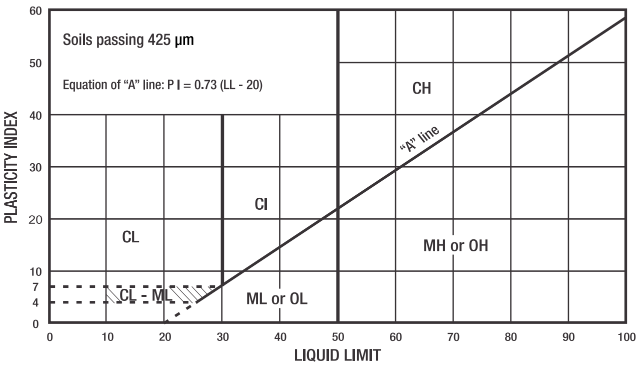
BOREHOLE LOGS AND GEOTECHNICAL LABORATORY RESULTS

MODIFIED UNIFIED SOIL CLASSIFICATION

MAJOR DIVISION			GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA		
COARSE-GRAINED SOILS More than 50% retained on 75 µm sieve*	GRAVELS 50% or more of coarse fraction retained on 4.75 mm sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Classification on basis of percentage of fines Less than 5% Pass 75 mµsieve GW, GP, SW, SP More than 12% Pass 75 mµsieve GM, GC, SM, SC 5% to 12% Pass 75 µm sieve Borderline Classification requiring use of dual symbols	$C_U = D_{60} / D_{10}$ Greater than 4 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines		Not meeting both criteria for GW	
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures		Atterberg limits plot below "A" line or plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-clay mixtures		Atterberg limits plot above "A" line or plasticity index greater than 7	
	SANDS More than 50% of coarse fraction passes 4.75 mm sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines		$C_U = D_{60}/D_{10}$ Greater than 6 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
			SP	Poorly graded sands and gravelly sands, little or no fines		Not meeting both criteria for SW	
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures		Atterberg limits plot below "A" line or plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures		Atterberg limits plot above "A" line or plasticity index greater than 7	
FINE-GRAINED SOILS (by behavior) 50% or more passes 75 µm sieve*	SILTS	Liquid limit <50	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands of slight plasticity			
		Liquid limit >50	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts			
	CLAYS Above "A" line on plasticity chart negligible organic content	Liquid limit <30	CL	Inorganic clays of low plasticity, gravelly clays, sandy clays, silty clays, lean clays			
		Liquid limit 30-50	CI	Inorganic clays of medium plasticity, silty clays			
		Liquid limit >50	CH	Inorganic clays of high plasticity, fat clays			
	ORGANIC SILTS AND CLAYS	Liquid limit <50	OL	Organic silts and organic silty clays of low plasticity			
		Liquid limit >50	OH	Organic clays of medium to high plasticity			
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils			

For classification of fine-grained soils and fine fraction of coarse-grained soils.

PLASTICITY CHART



*Based on the material passing the 75 mm sieve
Reference: ASTM Designation D2487, for identification procedure see D2488. USC as modified by PFRA

SOIL COMPONENTS				
FRACTION	SIEVE SIZE		DEFINING RANGES OF PERCENTAGE BY MASS OF MINOR COMPONENTS	
	PASSING	RETAINED	PERCENTAGE	DESCRIPTOR
GRAVEL				
coarse	75 mm	19 mm	>35 %	"and"
fine	19 mm	4.75 mm	21 to 35 %	"y-adjective"
SAND				
coarse	4.75 mm	2.00 mm	10 to 20 %	"some"
medium	2.00 mm	425 µm		
fine	425 µm	75 µm	>0 to 10 %	"trace"
SILT (non plastic) or CLAY (plastic)	75 µm		as above but by behavior	

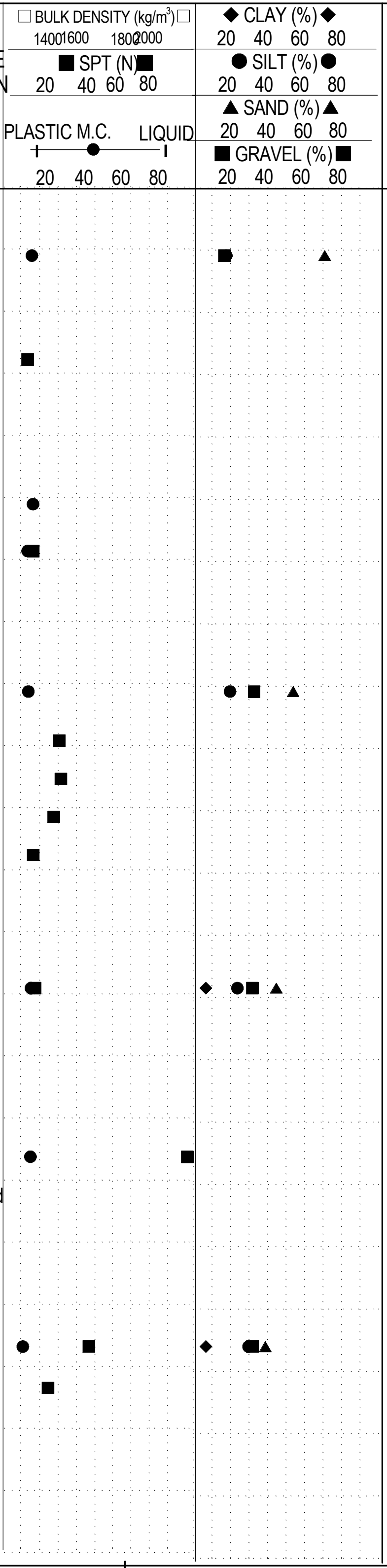
OVERSIZE MATERIAL	
Rounded or subrounded	
COBBLES	75 mm to 300 mm
BOULDERS	> 300 mm
Not rounded	
ROCK FRAGMENTS	>75 mm
ROCKS	> 0.76 cubic metre in volume

Geotechnical Evaluation	CLIENT: Public Works and Govt. Services Canada	PROJECT NO. - BOREHOLE NO.
CBSA Port of Entry	DRILL: Midnight Sun Drilling Inc. - MARL M4CT	W14103501 - BH01
Pleasant Camp, BC	METHOD: Hollow Stem Auger/SPT	ELEVATION: 275.25 m

SAMPLE TYPE ▩ DISTURBED ◺ NO RECOVERY ☒ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE ▩ BENTONITE ⁘ PEA GRAVEL ▥ SLOUGH ⁘ GROUT ▨ DRILL CUTTINGS ⁘ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	GROUND ICE DESCRIPTION AND COMMENTS	Elevation (m)
0	125 mm asphalt over SAND and GRAVEL (Fill) - trace of silt, well graded, gravel subround, to 20 mm diameter, damp, brown.				Solid stem augers to 5.6 m	275.0
	100 mm brown topsoil over SAND - gravelly, some silt, trace of organics, gravel subangular, to 25 mm diameter, moist, loose, brown.	▩	SA01			
1						274.0
		◺	SA02	9	SPT conducted at 1.05 m	
2						273.0
		▩	SA03			
	- compact below 2.6 m	☒	SA04	12	SPT conducted at 2.6 m	
3						272.0
4		▩	SA05			271.0
	Poor recovery, no samples collected. Probable wet, sandy, fine gravel, inferred based on drilling action and traces of soil returned on solid stem augers.			26 27 23 12	Dynamic Cone Penetration Test (DCPT) conducted from 4.3 to 5.5 m	
5						270.0
6		☒	SA06	13	LPT conducted at 6.1 m	269.0
	SAND (Till-like) - gravelly, silty, gravel subround with occasional angular fragments (broken in sampler), to 60 mm diameter, wet, dense, grey and brown mottled.					
7						268.0
	- dense to very dense, moist, grey below 7.6 m	☒	SA08	95/150mm	SPT (no recovery) and LPT conducted at 7.6 m	
8						267.0
9						266.0
		☒	SA09	42/100mm	LPT conducted at 9.1 m	
			SA10	20/25mm	SPT conducted at 9.6 m	
	END of BOREHOLE at 9.6 m (Auger refusal on probable bedrock). Samples collected by SPT or LPT as indicated above. Field LPT blow counts have been corrected to equivalent SPT N-Values.					
10						265.0
11						



TETRA TECH EBA

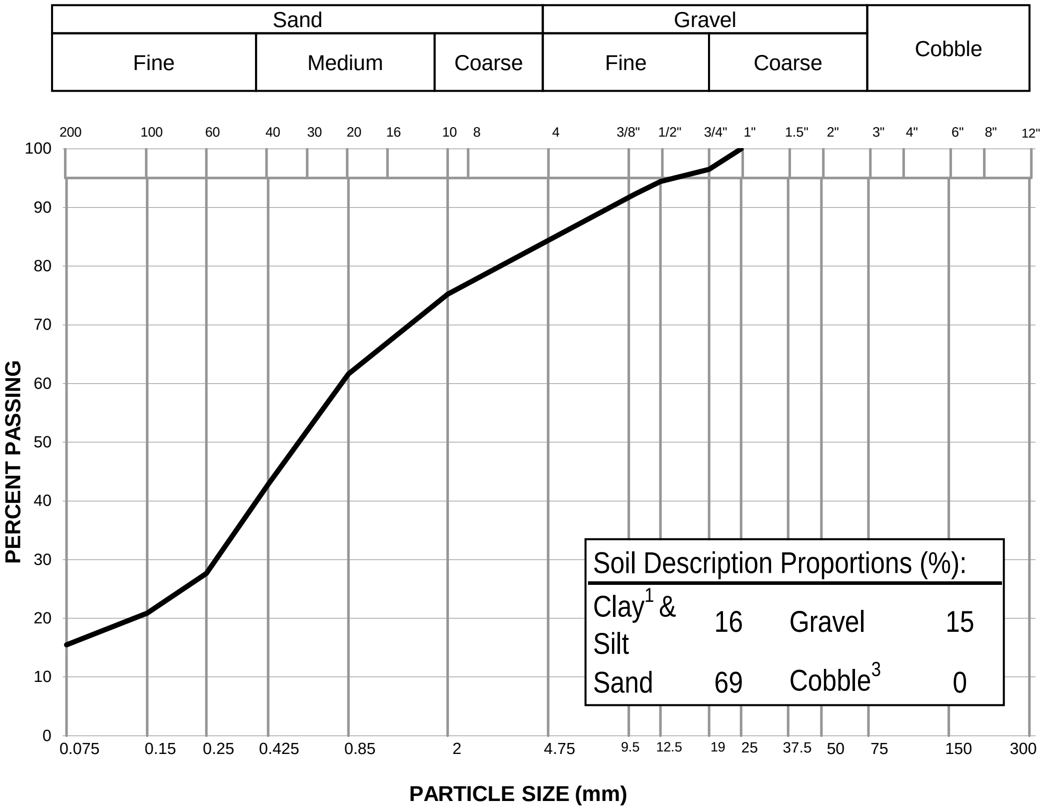
LOGGED BY: AWW	COMPLETION DEPTH: 9.6m
REVIEWED BY: JRT	COMPLETE: 11/5/2014
DRAWING NO: See Figure 1	Page 1 of 1

PARTICLE SIZE ANALYSIS REPORT

ASTM D422, C136 & C117

Project:	CBSA Port of Entry - Geotech. Eval.	Sample No.:	SA01
Project No.:	W14103501-01	Material Type:	
Site:	Pleasant Camp, BC	Sample Loc.:	BH01
Client:	PWGSC	Sample Depth:	0.45 m
Client Rep.:	Julian Ho, P.Eng.	Sampling Method:	Grab
Date Tested:	November 24, 2014 By: AMT	Date sampled:	November 5, 2014
Soil Description[2]:	SAND - some silt, some gravel	Sampled By:	AWW
		USC Classification:	SM Cu: #N/A
Moisture Content:	11.3%		Cc: #N/A

Particle Size (mm)	Percent Passing
300	
200	
150	
100	
75	
50	
38	
25	100
19	96
12.5	94
10	92
5	85
2	75
0.85	62
0.425	43
0.25	28
0.15	21
0.075	15.5



Soil Description Proportions (%):			
Clay[1] & Silt	16	Gravel	15
Sand	69	Cobble[3]	0

Notes:

[1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual

[2] The description is visually based & subject to EBA description protocols

[3] If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification: ______

Remarks: ______

Reviewed By: ______ P.Eng.

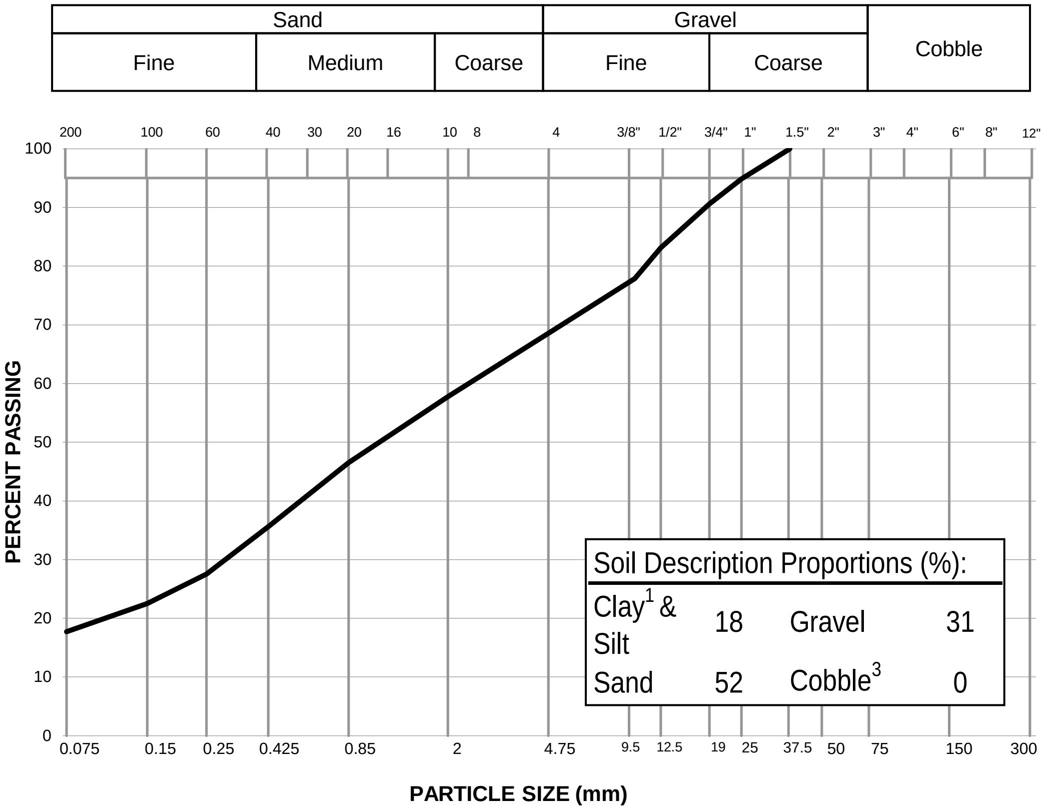
TETRA TECH

PARTICLE SIZE ANALYSIS REPORT

ASTM D422, C136 & C117

Project:	CBSA Port of Entry - Geotech. Eval.	Sample No.:	SA05
Project No.:	W14103501-01	Material Type:	
Site:	Pleasant Camp, BC	Sample Loc.:	BH01
Client:	PWGSC	Sample Depth:	3.96 m
Client Rep.:	Julian Ho, P.Eng.	Sampling Method:	Grab
Date Tested:	November 24, 2014 By: AMT	Date sampled:	November 5, 2014
Soil Description[2]:	SAND - gravelly, some silt	Sampled By:	AWW
		USC Classification:	SM Cu: #N/A
Moisture Content:	9.4%		Cc: #N/A

Particle Size (mm)	Percent Passing
300	
200	
150	
100	
75	
50	
38	100
25	95
19	91
12.5	83
10	78
5	69
2	58
0.85	47
0.425	36
0.25	28
0.15	23
0.075	17.7



Soil Description Proportions (%):

Clay[1] & Silt	18	Gravel	31
Sand	52	Cobble[3]	0

Notes: [1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual

[2] The description is visually based & subject to EBA description protocols

[3] If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification: ____________________

Remarks: ____________________

Reviewed By: ____________________ P.Eng.

TETRA TECH

PARTICLE SIZE ANALYSIS REPORT

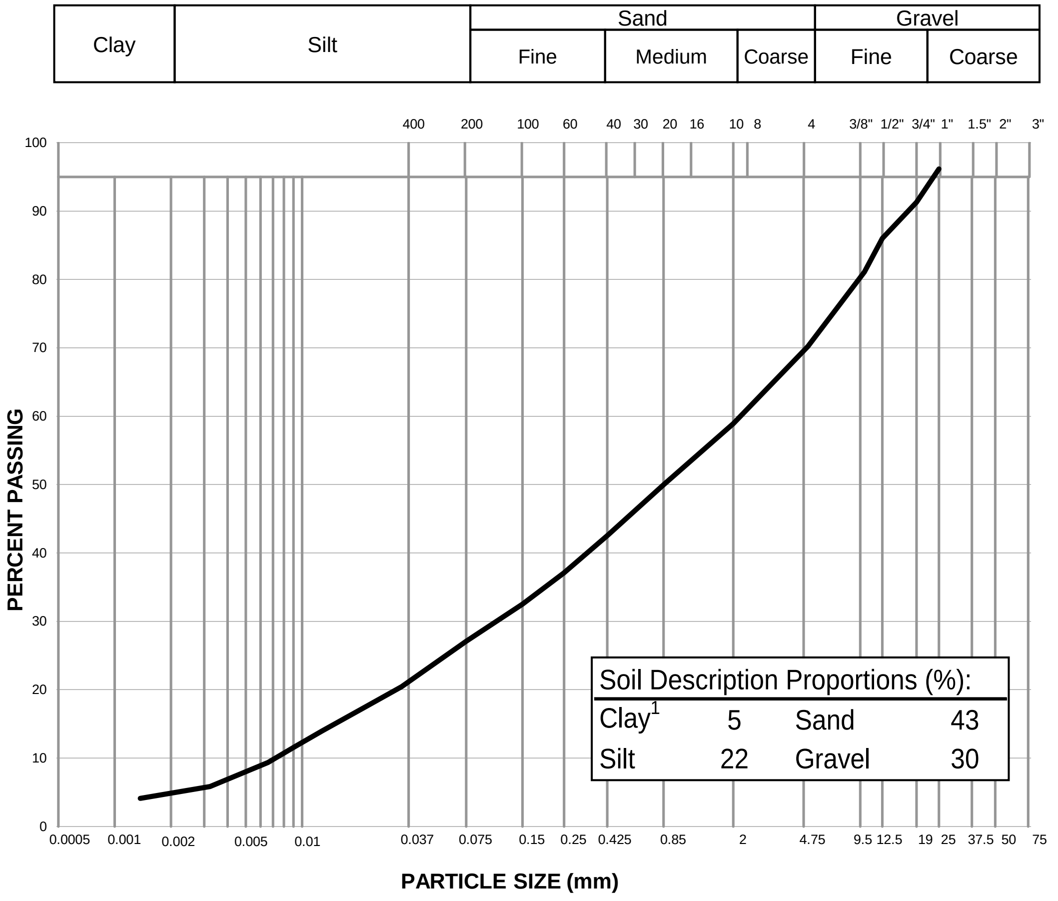
ASTM D422, C136 & C117

Project: CBSA Port of Entry - Geotech. Eval.
Project No.: W14103501-01
Site: Pleasant Camp, BC
Client: PWGSC
Client Rep.: Julian Ho, P.Eng.
Date Tested: November 20, 2014 By: AMT
Soil Description[2]: SAND - gravelly, silty, trace clay

Sample No.: SA06
Material Type:
Sample Loc.: BH01
Sample Depth: 20 feet
Sampling Method: LPT
Date sampled: November 5, 2014
Sampled By: AWW
USC Classification: SM Cu: 313.0
Cc: 0.8

Moisture Content: 10.8%

Particle Size (mm)	Percent Passing
75	
50	
38	
25	96
19	91
12.5	86
10	81
5	70
2	59
0.85	50
0.425	43
0.25	37
0.15	33
0.075	27.1
0.0340	20.4
0.0218	17.5
0.0128	14.0
0.0092	11.7
0.0066	9.3
0.0032	5.8
0.0014	4.1



Soil Description Proportions (%):

Clay[1]	5	Sand	43
Silt	22	Gravel	30

Notes: [1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual
[2] The description is visually based & subject to EBA description protocols

Specification:

Remarks:

Reviewed By: P.Eng.

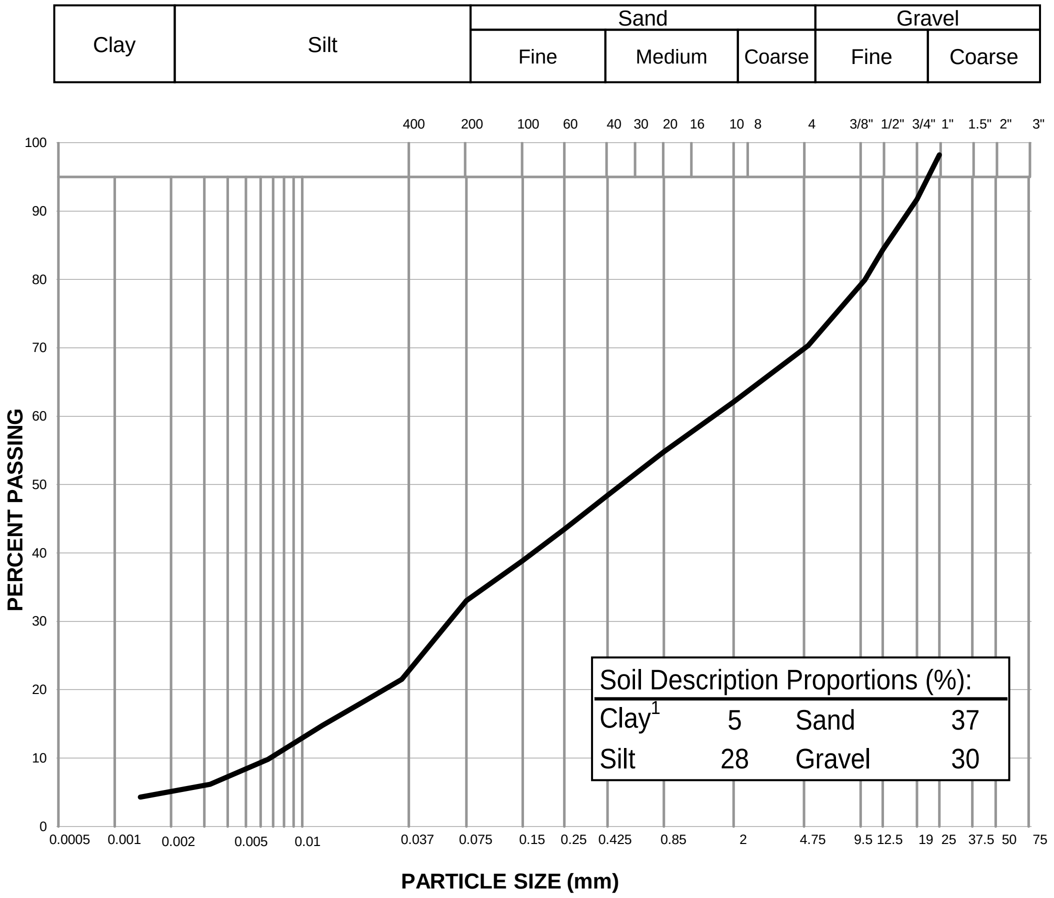
TETRA TECH

PARTICLE SIZE ANALYSIS REPORT

ASTM D422, C136 & C117

Project:	CBSA Port of Entry - Geotech. Eval.	Sample No.:	SA09
Project No.:	W14103501-01	Material Type:	
Site:	Pleasant Camp, BC	Sample Loc.:	BH01
Client:	PWGSC	Sample Depth:	9.14 m
Client Rep.:	Julian Ho, P.Eng.	Sampling Method:	LPT
Date Tested:	November 20, 2014 By: AMT	Date sampled:	November 5, 2014
Soil Description[2]:	SAND - gravelly, silty, trace clay	Sampled By:	AWW
		USC Classification:	SM Cu: 248.1
Moisture Content:	6.4%		Cc: 0.4

Particle Size (mm)	Percent Passing
75	
50	
38	
25	98
19	92
12.5	84
10	80
5	70
2	62
0.85	55
0.425	48
0.25	43
0.15	39
0.075	33.0
0.0340	21.5
0.0218	18.4
0.0128	14.8
0.0092	12.3
0.0066	9.8
0.0032	6.1
0.0014	4.3



Soil Description Proportions (%):

Clay[1]	5	Sand	37
Silt	28	Gravel	30

Notes: [1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual

[2] The description is visually based & subject to EBA description protocols

Specification: __________

Remarks: __________

Reviewed By: __________ P.Eng.

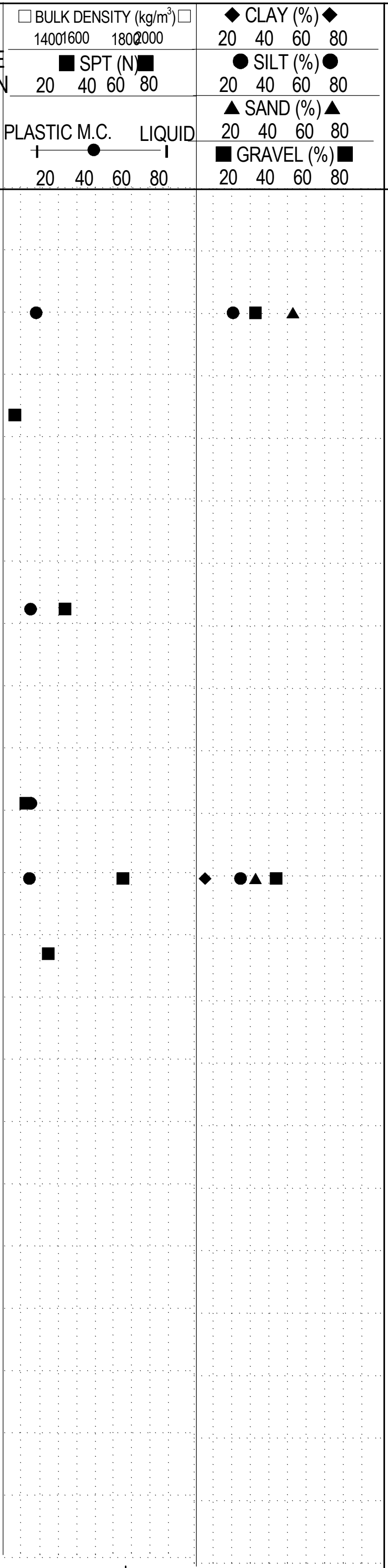
TETRA TECH

Geotechnical Evaluation	CLIENT: Public Works and Govt. Services Canada	PROJECT NO. - BOREHOLE NO.
CBSA Port of Entry	DRILL: Midnight Sun Drilling Inc. - MARL M4CT	W14103501 - BH02
Pleasant Camp, BC	METHOD: Hollow Stem Auger/SPT	ELEVATION: 276.25 m

SAMPLE TYPE ▨ DISTURBED ◺ NO RECOVERY ☒ SPT ☰ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE ▨ BENTONITE ⁘ PEA GRAVEL ▥ SLOUGH ⁖ GROUT ▧ DRILL CUTTINGS ⁙ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	GROUND ICE DESCRIPTION AND COMMENTS	Elevation (m)
0	Grass over ORGANIC SILT (Topsoil). SAND - gravelly, some silt, trace of organics, gravel subround, to 75 mm diameter, moist, very loose, brown.				Solid stem augers to 1.5 m	276.0
1		▨	SA01			275.0
2		◺	SA02	2	SPT conducted at 1.5 m	274.0
3	- zone of compact, silty SAND with some gravel at 3 m - grey-brown below 3 m	☒	SA03	29	SPT conducted at 3.1 m	273.0
4	- loose below 3.7 m					272.0
5		☒	SA04	8	SPT conducted at 4.6 m	271.0
	GRAVEL (Till-like) - sandy, silty, trace of clay, gravel subangular with occasional angular fragments (broken in sampler), to 65 mm diameter, moist, dense to very dense, grey.	☒	SA05	60/225mm	LPT conducted at 5.3 m	
6	END of BOREHOLE at 6.1 m (Auger refusal on probable bedrock). Samples collected by SPT or LPT as indicated above. Field LPT blow counts have been corrected to equivalent SPT N-Values.		SA06	20/25mm	SPT conducted at 6.1 m	270.0
7						269.0
8						268.0
9						267.0
10						266.0
11						



TETRA TECH EBA

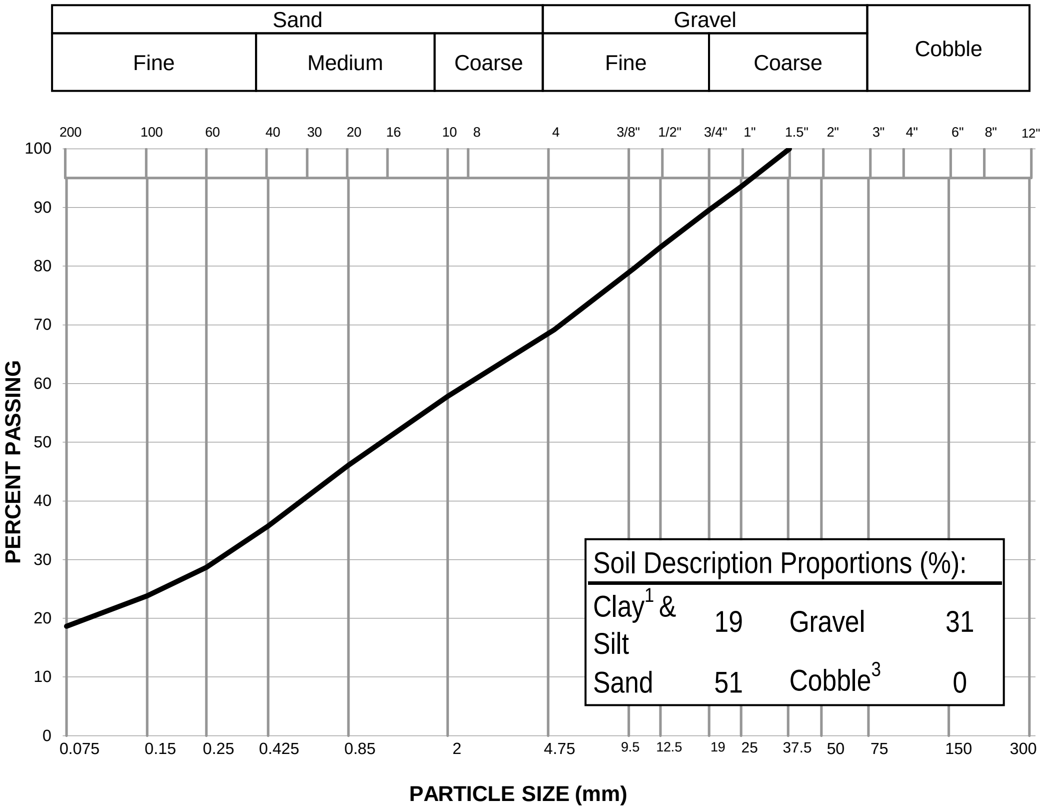
LOGGED BY: AWW	COMPLETION DEPTH: 6.1m
REVIEWED BY: JRT	COMPLETE: 11/6/2014
DRAWING NO: See Figure 1	Page 1 of 1

PARTICLE SIZE ANALYSIS REPORT

ASTM D422, C136 & C117

Project:	CBSA Port of Entry - Geotech. Eval.		Sample No.:	SA01
Project No.:	W14103501-01		Material Type:	
Site:	Pleasant Camp, BC		Sample Loc.:	BH02
Client:	PWGSC		Sample Depth:	0.91 m
Client Rep.:	Julian Ho, P.Eng.		Sampling Method:	Grab
Date Tested:	November 25, 2014	By: AMT	Date sampled:	November 5, 2014
Soil Description[2]:	SAND - gravelly, some silt		Sampled By:	AWW
			USC Classification:	SM Cu: #N/A
Moisture Content:	13.5%			Cc: #N/A

Particle Size (mm)	Percent Passing
300	
200	
150	
100	
75	
50	
38	100
25	94
19	90
12.5	83
10	80
5	69
2	58
0.85	46
0.425	36
0.25	29
0.15	24
0.075	18.7



Soil Description Proportions (%):

Clay[1] & Silt	19	Gravel	31
Sand	51	Cobble[3]	0

Notes:

[1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual

[2] The description is visually based & subject to EBA description protocols

[3] If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification:

Remarks:

Reviewed By: P.Eng.

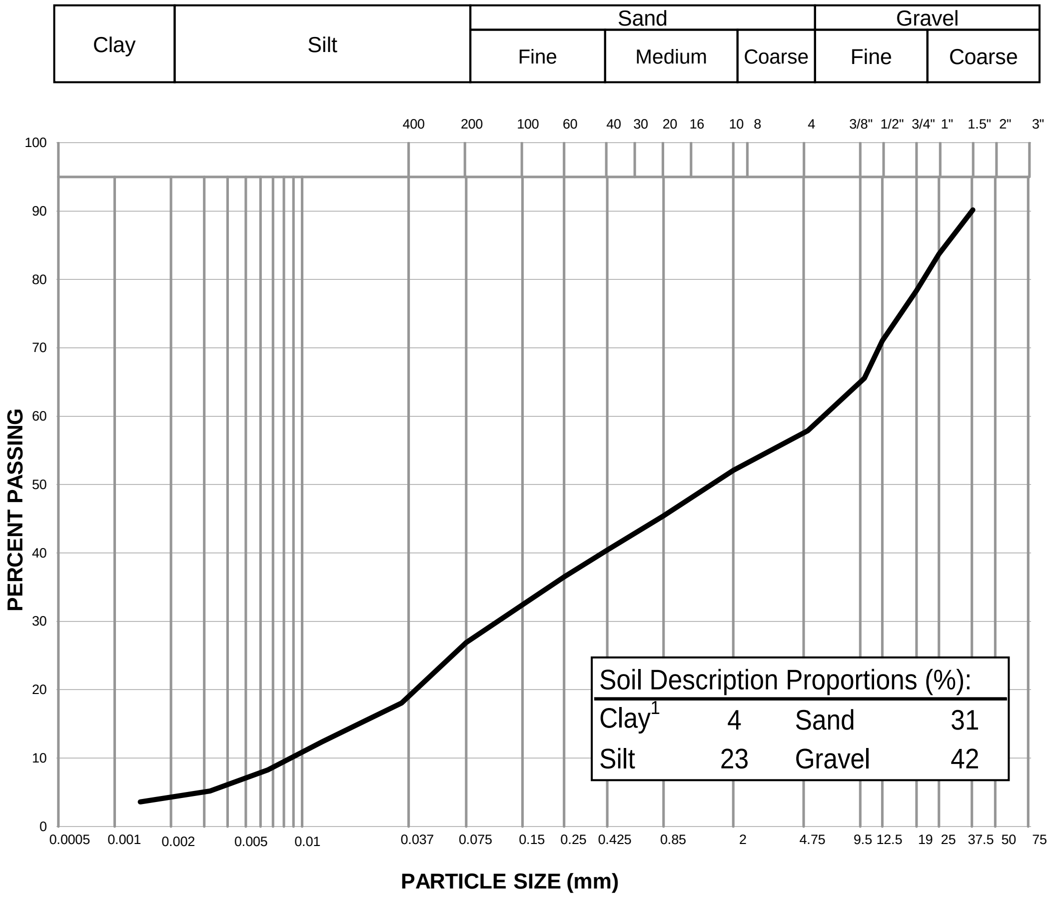
TETRA TECH

PARTICLE SIZE ANALYSIS REPORT

ASTM D422, C136 & C117

Project:	NCBSA Port of Entry - Geotech. Eval.	Sample No.:	SA05
Project No.:	W14103501-01	Material Type:	
Site:	Pleasant Camp, BC	Sample Loc.:	BH02
Client:	PWGSC	Sample Depth:	5.33 m
Client Rep.:	Julian Ho, P.Eng.	Sampling Method:	LPT
Date Tested:	November 20, 2014 By: AMT	Date sampled:	November 5, 2014
Soil Description[2]:	GRAVEL - sandy, silty, trace clay	Sampled By:	AWW
		USC Classification:	GM Cu: 727.1
Moisture Content:	9.9%		Cc: 0.2

Particle Size (mm)	Percent Passing
75	
50	
38	90
25	84
19	78
12.5	71
10	66
5	58
2	52
0.85	45
0.425	40
0.25	36
0.15	32
0.075	26.9
0.0340	18.1
0.0218	15.5
0.0128	12.4
0.0092	10.3
0.0066	8.3
0.0032	5.2
0.0014	3.6



Soil Description Proportions (%):

Clay[1]	4	Sand	31
Silt	23	Gravel	42

Notes: [1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual

[2] The description is visually based & subject to EBA description protocols

Specification: ____________________

Remarks: ____________________

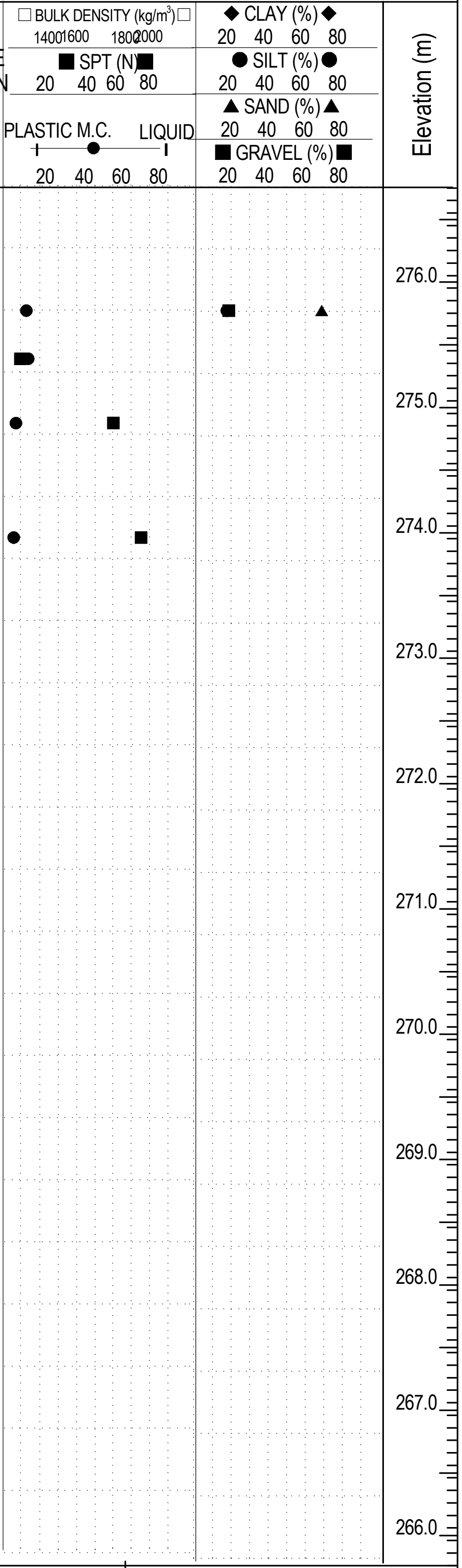
Reviewed By: ____________________ P.Eng.

TETRA TECH

Geotechnical Evaluation	CLIENT: Public Works and Govt. Services Canada	PROJECT NO. - BOREHOLE NO.
CBSA Port of Entry	DRILL: Midnight Sun Drilling Inc. - MARL M4CT	W14103501 - BH03
Pleasant Camp, BC	METHOD: Hollow Stem Auger/SPT	ELEVATION: 276.75 m

SAMPLE TYPE	■ DISTURBED	◿ NO RECOVERY	☒ SPT	☰ A-CASING	▥ SHELBY TUBE	▮ CORE
BACKFILL TYPE	■ BENTONITE	⁘ PEA GRAVEL	▥ SLOUGH	⁖ GROUT	▧ DRILL CUTTINGS	⁘ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	GROUND ICE DESCRIPTION AND COMMENTS
0	Grass over SAND (Topsoil) - gravelly, silty, some organics, moist, brown.				Solid stem augers to 1.5 m
	SAND - some silt and gravel, gravel subround to aubangular, to 50 mm diameter, moist, loose, grey-brown.				
1		■	SA01		
	-trace of fine gravel, occasional silty lumps below 1.1 m	☒	SA02	5	SPT conducted at 1.1 m
2	BEDROCK - dark grey to black, argillite or similar meta-shale, matches description of bedrock encountered at nearby water well.	☒	SA03	55	SPT conducted at 1.7 m
		☒	SA04	70/225mm	SPT conducted at 2.6 m
3	END of BOREHOLE at 3.0 m (Target Depth). Samples collected by SPT or LPT as indicated above. Field LPT blow counts have been corrected to equivalent SPT N-Values.				
4					
5					
6					
7					
8					
9					
10					
11					



TETRA TECH EBA

LOGGED BY: AWW	COMPLETION DEPTH: 3m
REVIEWED BY: JRT	COMPLETE: 11/6/2014
DRAWING NO: See Figure 1	Page 1 of 1

PARTICLE SIZE ANALYSIS REPORT

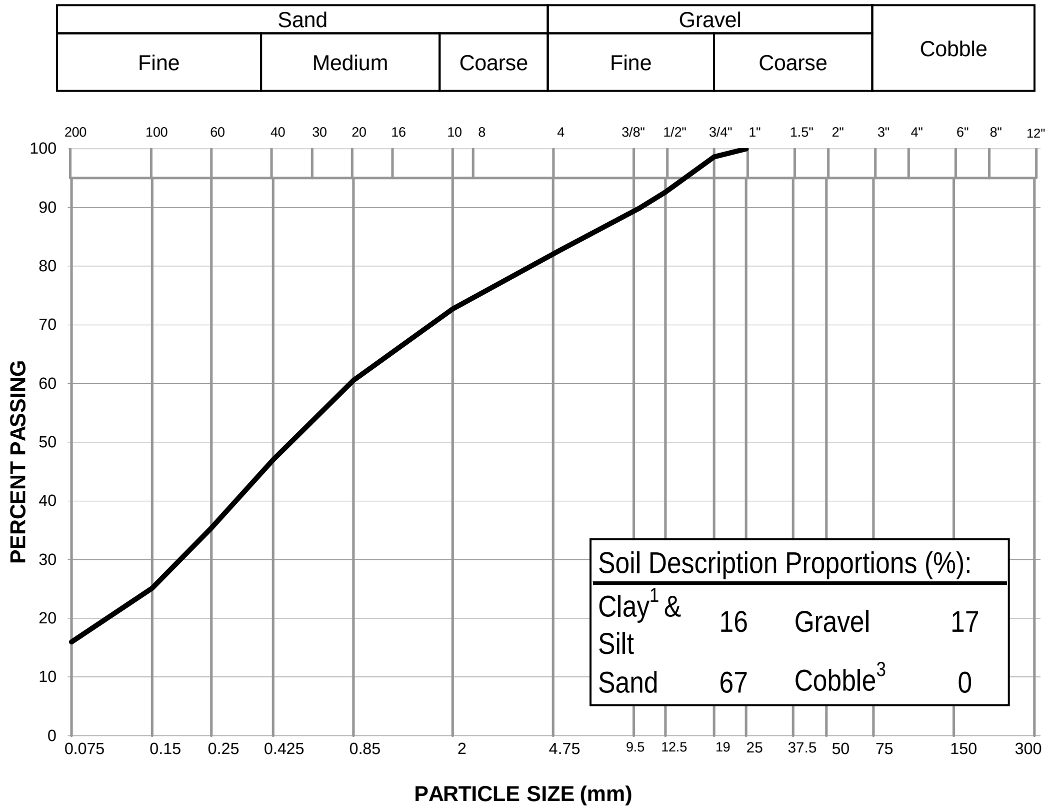
ASTM D422, C136 & C117

Project: CBSA Port of Entry - Geotech. Eval.
Project No.: W14103501-01
Site: Pleasant Camp, BC
Client: PWGSC
Client Rep.: Julian Ho, P.Eng.
Date Tested: November 25, 2014 By: AMT
Soil Description[2]: SAND - some gravel, some silt

Sample No.: SA01
Material Type:
Sample Loc.: BH03
Sample Depth: 0.91 m
Sampling Method: Grab
Date sampled: November 6, 2014
Sampled By: AWW
USC Classification: SM Cu: #N/A

Moisture Content: 8.3% Cc: #N/A

Particle Size (mm)	Percent Passing
300	
200	
150	
100	
75	
50	
38	
25	100
19	99
12.5	93
10	90
5	83
2	73
0.85	61
0.425	47
0.25	35
0.15	25
0.075	16.0



Soil Description Proportions (%):

Clay[1] & Silt	16	Gravel	17
Sand	67	Cobble[3]	0

Notes: [1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual
[2] The description is visually based & subject to EBA description protocols
[3] If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification:

Remarks:

Reviewed By: P.Eng.

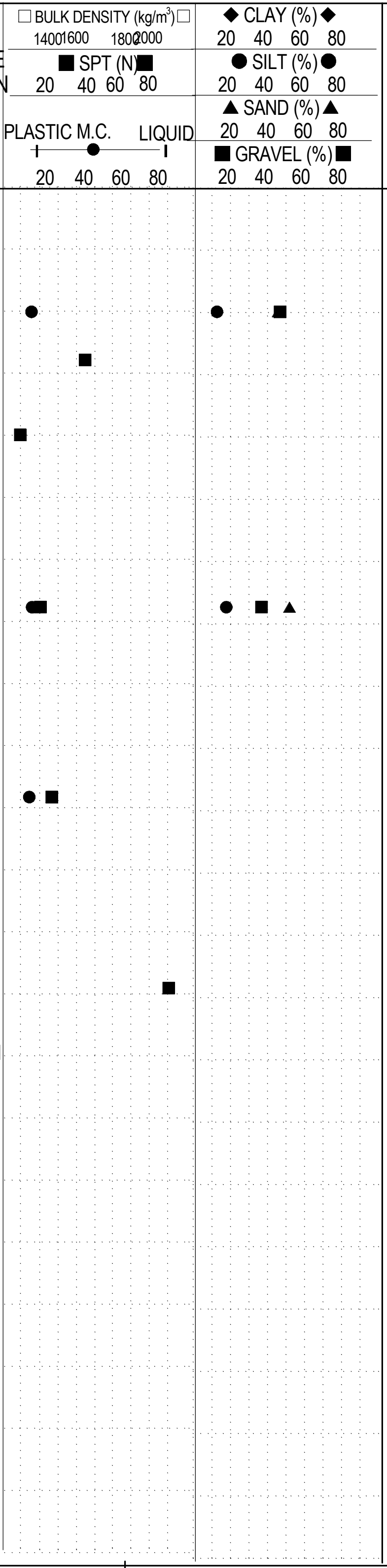
TETRA TECH

Geotechnical Evaluation	CLIENT: Public Works and Govt. Services Canada	PROJECT NO. - BOREHOLE NO.
CBSA Port of Entry	DRILL: Midnight Sun Drilling Inc. - MARL M4CT	W14103501 - BH04
Pleasant Camp, BC	METHOD: Hollow Stem Auger/SPT	ELEVATION: 273 m

SAMPLE TYPE ■ DISTURBED ⧄ NO RECOVERY ☒ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE ■ BENTONITE ⁘ PEA GRAVEL ▥ SLOUGH ⁘ GROUT ▧ DRILL CUTTINGS ⁘ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	GROUND ICE DESCRIPTION AND COMMENTS	Elevation (m)
0	Grass over SAND and GRAVEL - some silt and organics (wood fragments and roots), frequent cobbles and/or boulders, gravel subround, to 75 mm diameter, moist, loose to compact, brown. -trace to no organics, grey-brown below 0.6 m				Solid stem augers to 1.5 m	273.0
1		■	SA01			272.0
		⧄	SA02	40	SPT conducted at 1.1 m	
2		⧄	SA03	5	SPT conducted at 1.7 m	271.0
3	-compact below 3.0 m					270.0
		☒	SA04	16	LPT conducted at 3.1 m	
4						269.0
		☒	SA05	22	SPT conducted at 4.6 m	
5						268.0
6						267.0
	Possible till surface, inferred based on drilling action and penetration resistance.	⧄	SA06	85	LPT conducted at 6.1 m, sampler lost down hole during retrieval	
7	END of BOREHOLE at 6.7 m (Hole abandoned due to split spoon sampler lost at bottom of hole). Samples collected by SPT or LPT as indicated above. Field LPT blow counts have been corrected to equivalent SPT N-Values.					266.0
8						265.0
9						264.0
10						263.0
11						262.0



TETRA TECH EBA

LOGGED BY: AWW	COMPLETION DEPTH: 6.7m
REVIEWED BY: JRT	COMPLETE: 11/6/2014
DRAWING NO: See Figure 1	Page 1 of 1

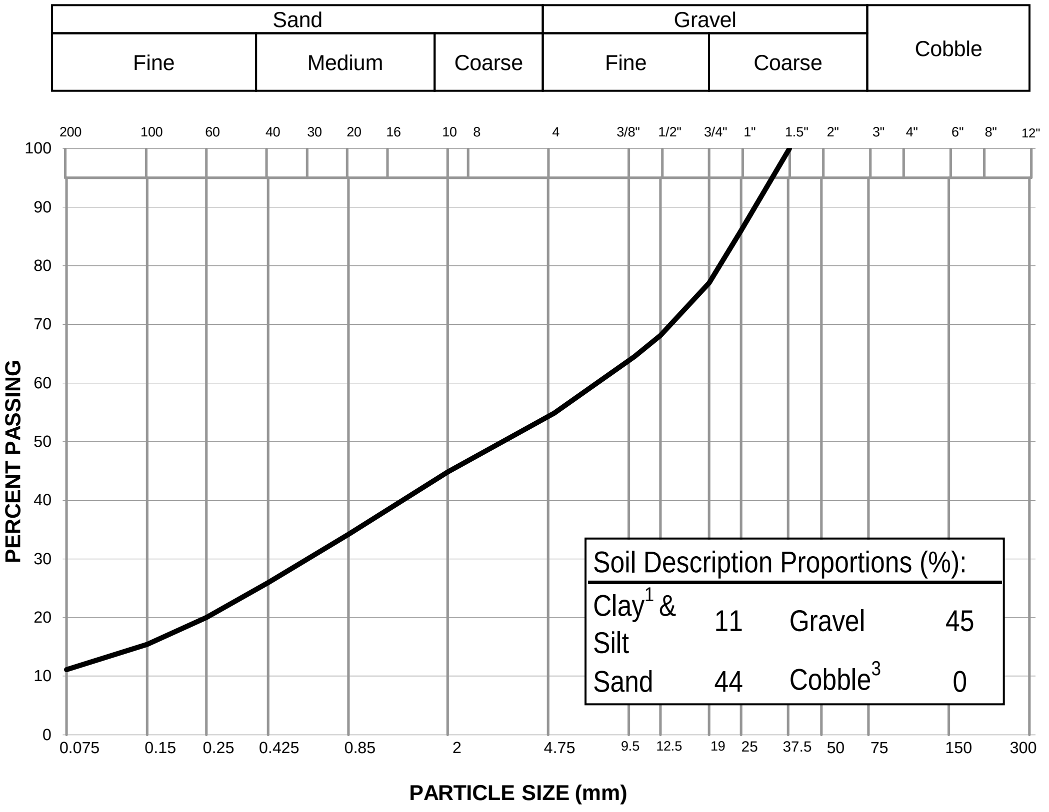
WHITEHORSE W14103501-01.GPJ EBA.GDT 12/8/14

PARTICLE SIZE ANALYSIS REPORT

ASTM D422, C136 & C117

Project:	CBSA Port of Entry - Geotech. Eval.	Sample No.:	SA01
Project No.:	W14103501-01	Material Type:	
Site:	Pleasant Camp, BC	Sample Loc.:	BH04
Client:	PWGSC	Sample Depth:	0.91 m
Client Rep.:	Julian Ho, P.Eng.	Sampling Method:	Grab
Date Tested:	November 25, 2014 By: AMT	Date sampled:	November 6, 2014
Soil Description[2]:	GRAVEL and SAND - some silt	Sampled By:	AWW
		USC Classification:	GM Cu: #N/A
Moisture Content:	11.1%		Cc: #N/A

Particle Size (mm)	Percent Passing
300	
200	
150	
100	
75	
50	
38	100
25	86
19	77
12.5	68
10	65
5	55
2	45
0.85	34
0.425	26
0.25	20
0.15	15
0.075	11.1



Soil Description Proportions (%):

Clay[1] & Silt	11	Gravel	45
Sand	44	Cobble[3]	0

Notes:
[1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual
[2] The description is visually based & subject to EBA description protocols
[3] If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification:

Remarks:

Reviewed By: ____________________ P.Eng.

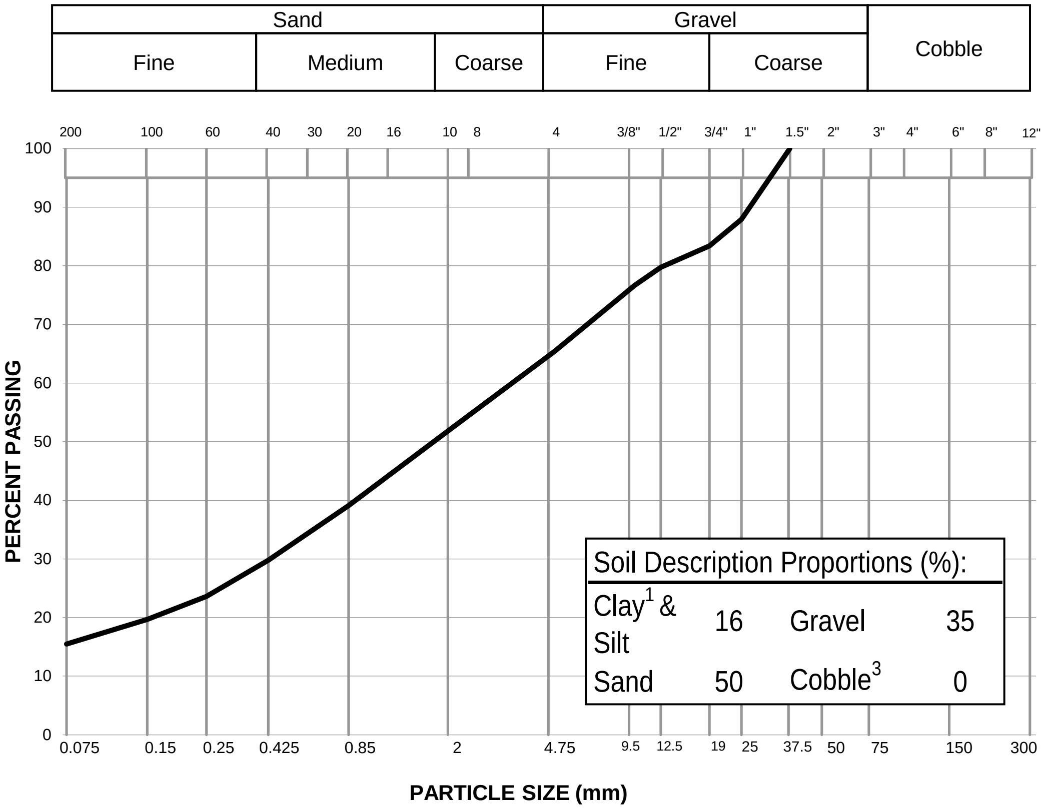
TETRA TECH

PARTICLE SIZE ANALYSIS REPORT

ASTM D422, C136 & C117

Project:	CBSA Port of Entry - Geotech. Eval.	Sample No.:	SA04
Project No.:	W14103501-01	Material Type:	
Site:	Pleasant Camp, BC	Sample Loc.:	BH04
Client:	PWGSC	Sample Depth:	3.05 m
Client Rep.:	Julian Ho, P.Eng.	Sampling Method:	LPT
Date Tested:	November 25, 2014 By: AMT	Date sampled:	November 6, 2014
Soil Description[2]:	SAND - gravelly, some silt	Sampled By:	AWW
		USC Classification:	SM Cu: #N/A
Moisture Content:	11.4%		Cc: #N/A

Particle Size (mm)	Percent Passing
300	
200	
150	
100	
75	
50	
38	100
25	88
19	83
12.5	80
10	77
5	65
2	52
0.85	39
0.425	30
0.25	24
0.15	20
0.075	15.5



Soil Description Proportions (%):

Clay[1] & Silt	16	Gravel	35
Sand	50	Cobble[3]	0

Notes:
[1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual
[2] The description is visually based & subject to EBA description protocols
[3] If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification: ____________________

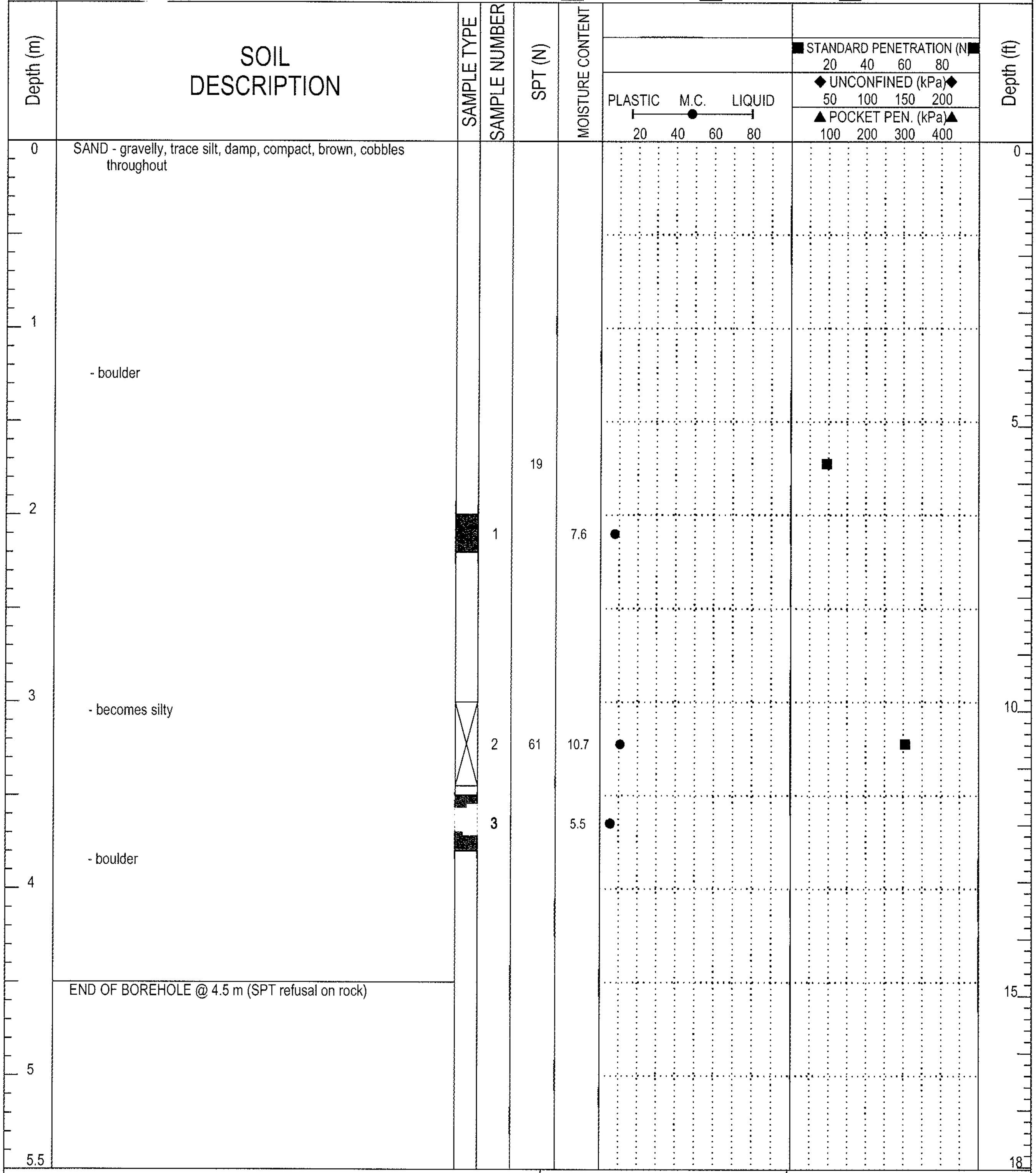
Remarks: ____________________

Reviewed By: ____________________ P.Eng.

TETRA TECH

CBSA Geotechnical Evaluation	CLIENT: SNC Lavalin Environmental Inc.	PROJECT NO. - BOREHOLE NO.
Pleasant Camp, BC	DRILL: M5T Tracked Air-rotary	W14101307 BH01
	6591400N; 422648E; Zone 8	

SAMPLE TYPE	⬚ DISTURBED	◫ NO RECOVERY	☒ SPT	▤ A-CASING	▥ SHELBY TUBE	▮ CORE
BACKFILL TYPE	⬚ BENTONITE	⁘ PEA GRAVEL	▥ SLOUGH	⁘ GROUT	▧ DRILL CUTTINGS	⁘ SAND



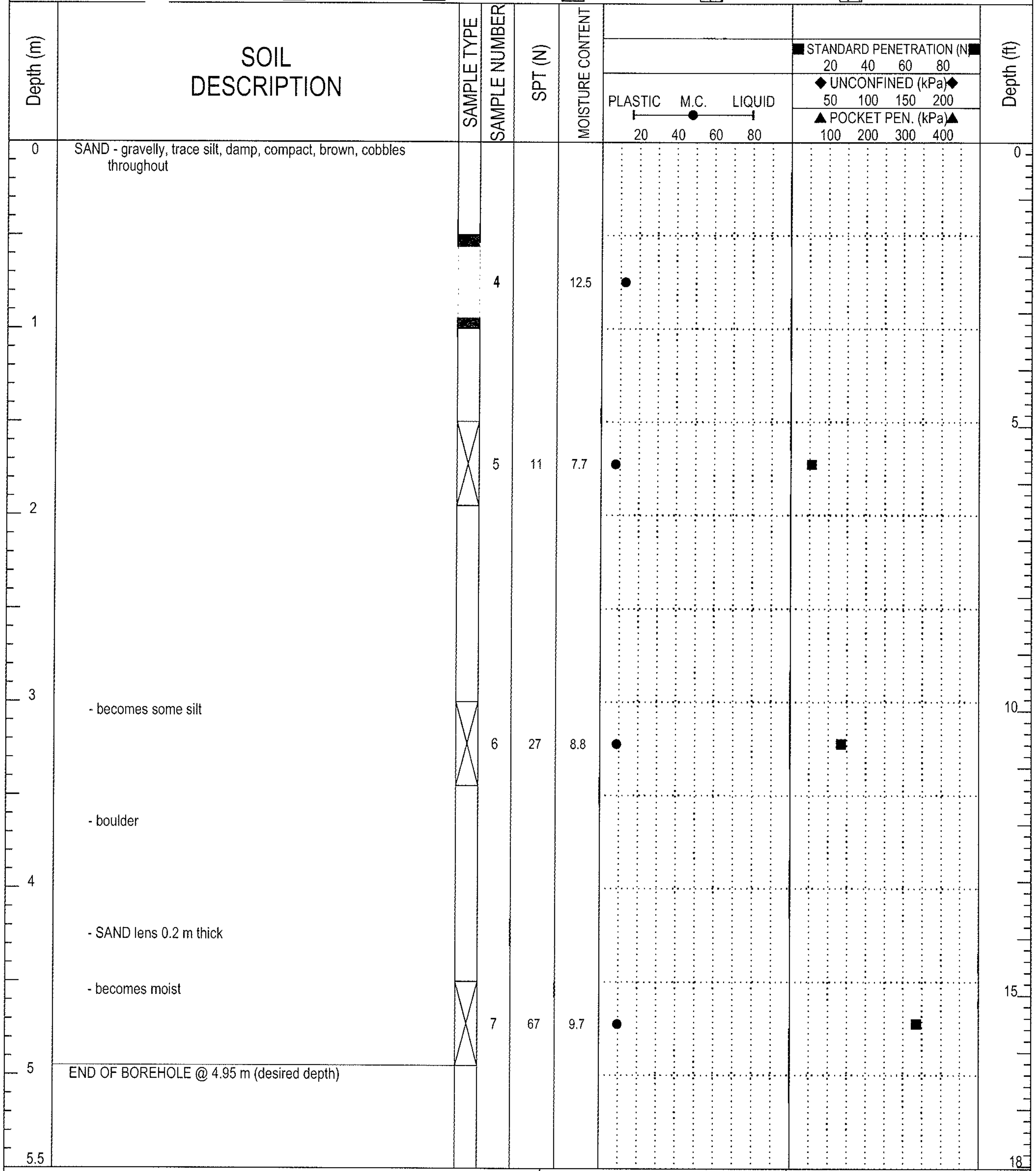
SOIL DESCRIPTION	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT
SAND - gravelly, trace silt, damp, compact, brown, cobbles throughout			
- boulder			
		19	
	1		7.6
- becomes silty			
	2	61	10.7
	3		5.5
- boulder			
END OF BOREHOLE @ 4.5 m (SPT refusal on rock)			

eba EBA Engineering Consultants Ltd.	LOGGED BY: JTP	COMPLETION DEPTH: 4.5m
	REVIEWED BY: CPC	COMPLETE: 8/26/2009
	DRAWING NO:	Page 1 of 1

CBSA Geotechnical Evaluation	CLIENT: SNC Lavalin Environmental Inc.	PROJECT NO. - BOREHOLE NO.
Pleasant Camp, BC	DRILL: M5T Tracked Air-rotary	W14101307 BH02
	6591362N; 422668E; Zone 8	

SAMPLE TYPE: DISTURBED ▨ NO RECOVERY ☒ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE: BENTONITE ▨ PEA GRAVEL ▥ SLOUGH ▨ GROUT ▧ DRILL CUTTINGS ▨ SAND



SAND - gravelly, trace silt, damp, compact, brown, cobbles throughout

- becomes some silt

- boulder

- SAND lens 0.2 m thick

- becomes moist

END OF BOREHOLE @ 4.95 m (desired depth)

SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT
4		12.5
5	11	7.7
6	27	8.8
7	67	9.7

EBA Engineering Consultants Ltd.

LOGGED BY: JTP	COMPLETION DEPTH: 4.95m
REVIEWED BY: CPC	COMPLETE: 8/26/2009
DRAWING NO:	Page 1 of 1

PARTICLE SIZE ANALYSIS TEST REPORT

ASTM D422 & C136

Project:	CBSA Housing Project Geotech Eval	Client:	SNC Lavalin Environmental Inc.
Project No.:	W14101307	Client Rep.:	Mr. Dave Bridger
Site:	Pleasant Camp, BC		

Material Type:

Sample No.: SA04

Sample Loc.: BH02

Sample Depth: 0.5 - 1.0 m

Sampling Method: Grab

Date sampled: 26-Aug-2009 By: JTP

Date Tested: 31-Aug-2009 By: IM

Soil Description[2]: SAND - gravelly, trace silt

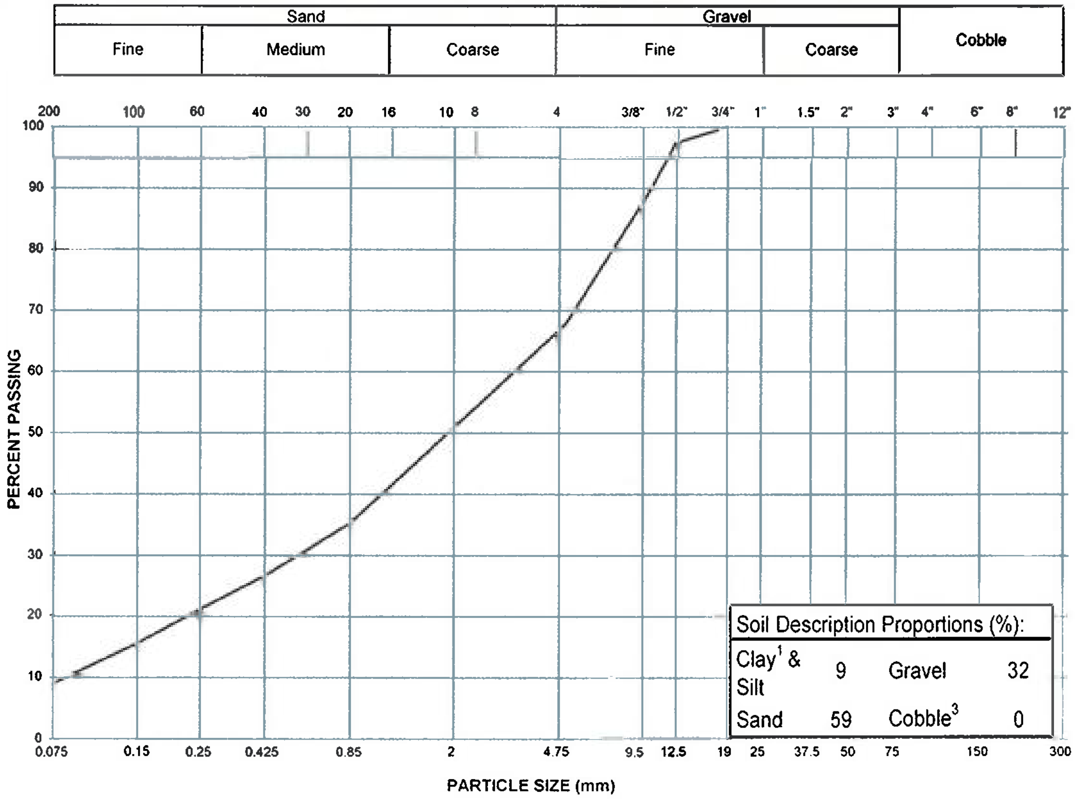
USC Classification:

Cu: 41.6

Cc: 1.1

Moisture Content: 12.5

Particle Size (mm)	Percent Passing
300	
200	
150	
100	
75	
50	
38	
25	
19	100
12.5	98
10	89
5	68
2	51
0.85	35
0.425	27
0.25	21
0.15	16
0.075	9



Soil Description Proportions (%):

Clay[1] & Silt	9	Gravel	32
Sand	59	Cobble[3]	0

Notes:

[1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual

[2] The description is visually based & subject to EBA description protocols

[3] If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification: __________

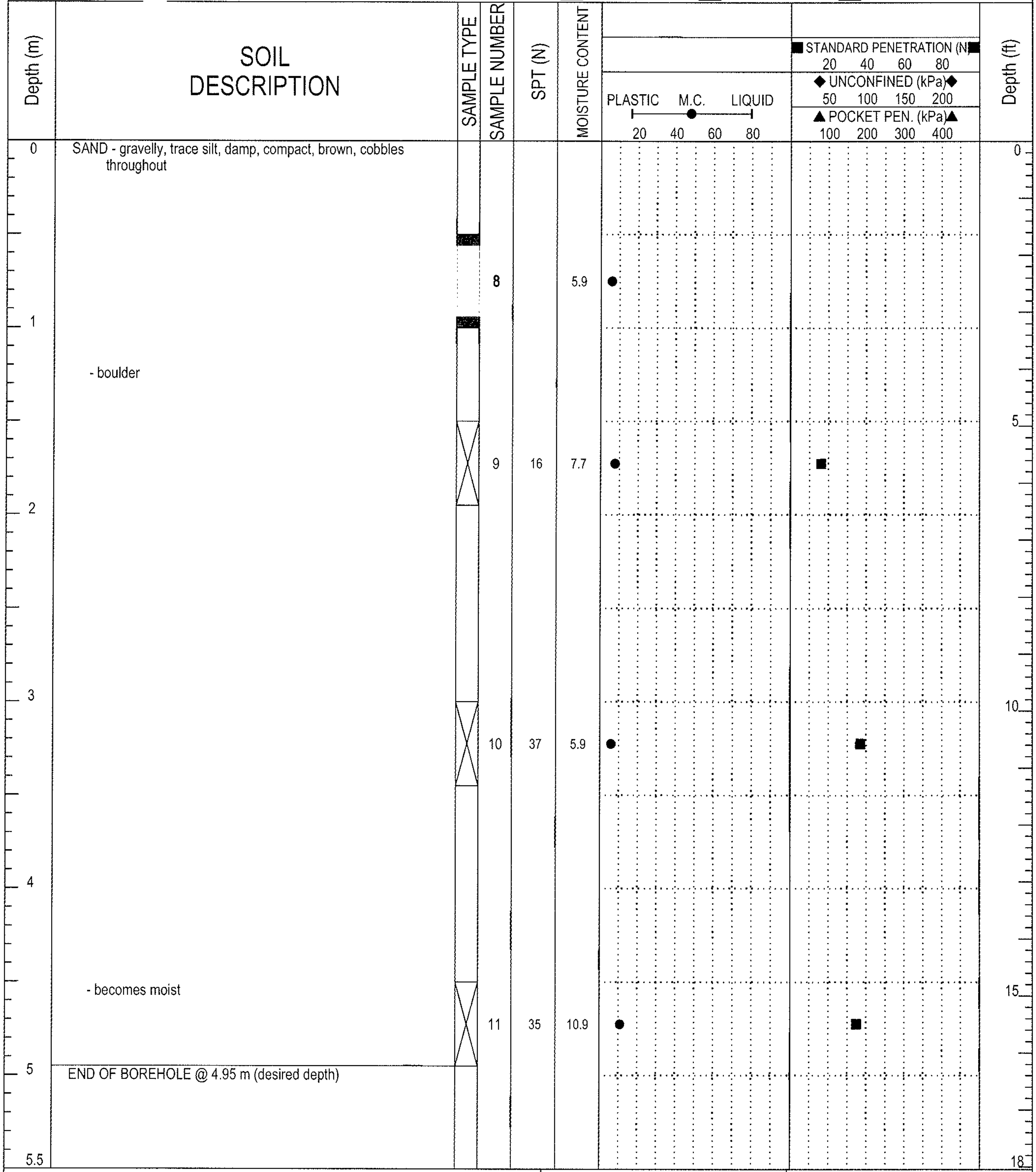
Remarks: __________

Reviewed By: Jus Pjj

CBSA Geotechnical Evaluation	CLIENT: SNC Lavalin Environmental Inc.	PROJECT NO. - BOREHOLE NO.
Pleasant Camp, BC	DRILL: M5T Tracked Air-rotary	W14101307 BH03
	6591408N; 422682E; Zone 8	

SAMPLE TYPE: DISTURBED ▨ NO RECOVERY ☒ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE: BENTONITE ▨ PEA GRAVEL ▥ SLOUGH ▨ GROUT ▨ DRILL CUTTINGS ▨ SAND



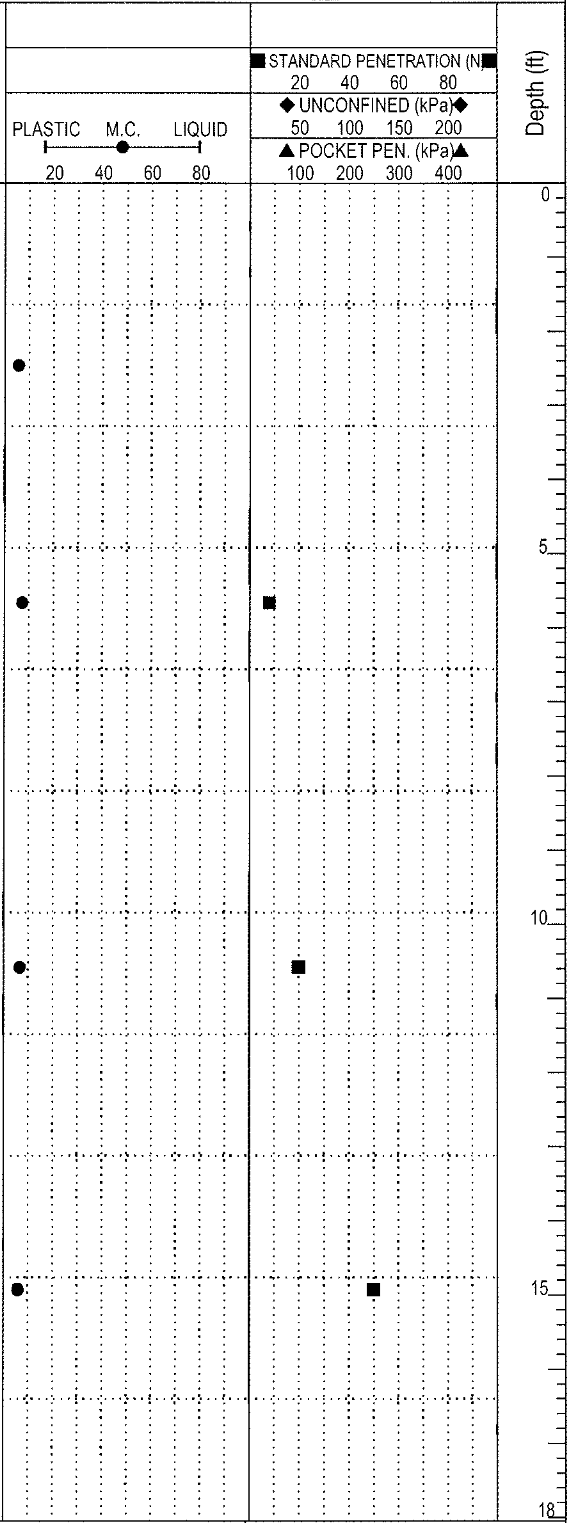
SOIL DESCRIPTION	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT
SAND - gravelly, trace silt, damp, compact, brown, cobbles throughout			
	8		5.9
- boulder			
	9	16	7.7
	10	37	5.9
- becomes moist			
	11	35	10.9
END OF BOREHOLE @ 4.95 m (desired depth)			

EBA Engineering Consultants Ltd.	LOGGED BY: JTP	COMPLETION DEPTH: 4.95m
	REVIEWED BY: CPC	COMPLETE: 8/26/2009
	DRAWING NO:	Page 1 of 1

CBSA Geotechnical Evaluation	CLIENT: SNC Lavalin Environmental Inc.	PROJECT NO. - BOREHOLE NO.
Pleasant Camp, BC	DRILL: M5T Tracked Air-rotary	W14101307 BH04
	6591442N; 422643E; Zone 8	

SAMPLE TYPE	☐ DISTURBED	▨ NO RECOVERY	☒ SPT	☰ A-CASING	▥ SHELBY TUBE	▮ CORE
BACKFILL TYPE	☐ BENTONITE	⁘ PEA GRAVEL	▥ SLOUGH	⁘ GROUT	▧ DRILL CUTTINGS	⁘ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT
0	SAND - gravelly, trace silt, damp, compact, brown, cobbles throughout				
			12		5.6
		☒	13	8	7.3
3	- becomes some silt				
		☒	14	20	6.5
	- SILT lens 0.2 m thick				
	- boulder				
				50	5.9
	END OF BOREHOLE @ 4.6 m (SPT refusal on rock)				



Depth (m): 0, 1, 2, 3, 4, 5, 5.5

EBA Engineering Consultants Ltd.	LOGGED BY: JTP	COMPLETION DEPTH: 4.6m
	REVIEWED BY: CPC	COMPLETE: 8/26/2009
	DRAWING NO:	Page 1 of 1

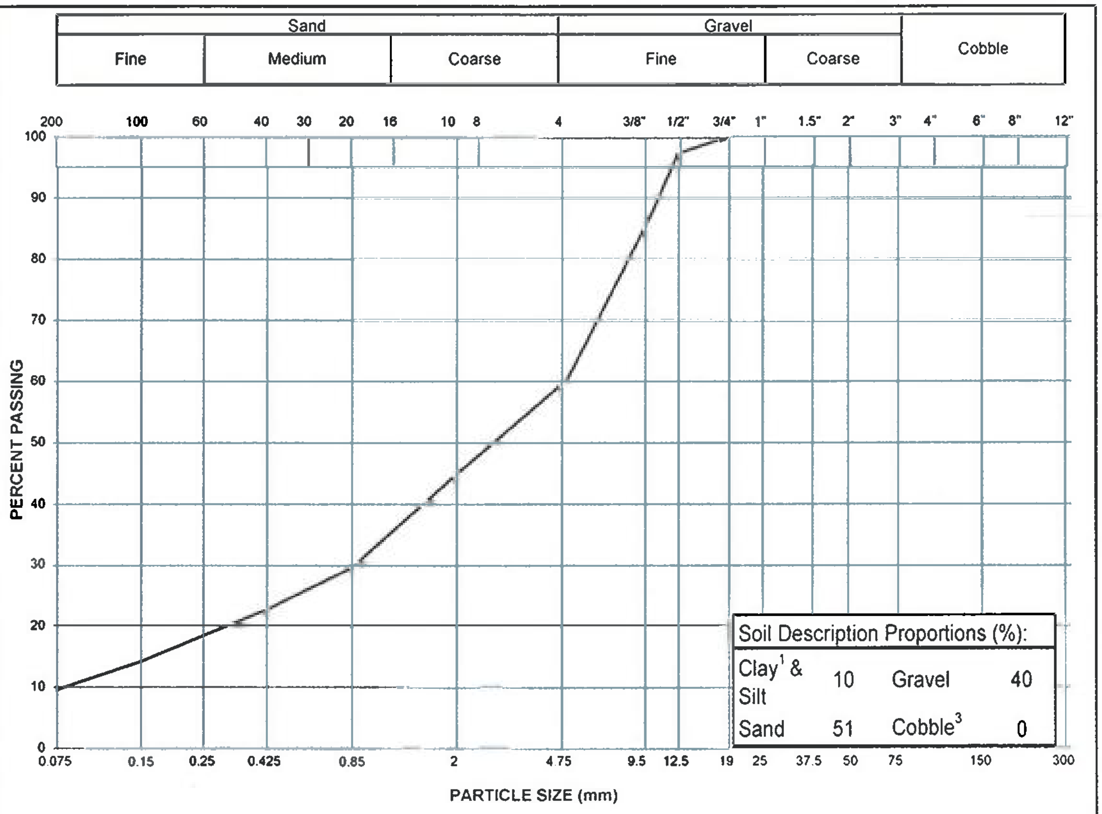
PARTICLE SIZE ANALYSIS TEST REPORT

ASTM D422 & C136

Project:	CBSA Housing Project Geotech Eval	Client:	SNC Lavalin Environmental Inc.
Project No.:	W14101307	Client Rep.:	Mr. Dave Bridger
Site:	Pleasant Camp, BC		

Material Type:		Date Tested:	31-Aug-2009	By:	IM
Sample No.:	SA12	Soil Description²:	SAND AND GRAVEL - trace silt		
Sample Loc.:	BH04				
Sample Depth:	0.5 - 1.0 m	USC Classification:		Cu:	60.2
Sampling Method:	Grab			Cc:	1.9
Date sampled:	26-Aug-2009 By: JTP	Moisture Content:	5.6		

Particle Size (mm)	Percent Passing
300	
200	
150	
100	
75	
50	
38	
25	
19	100
12.5	97
10	87
5	60
2	45
0.85	29
0.425	23
0.25	18
0.15	14
0.075	10



Soil Description Proportions (%):			
Clay¹ & Silt	10	Gravel	40
Sand	51	Cobble³	0

Notes:

[1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual

[2] The description is visually based & subject to EBA description protocols

[3] If cobbles are present, sampling procedure may not meet ASTM C702 & D75

Specification: ______________________

Remarks: ______________________

Reviewed By: ______________________

EBA Engineering
Consultants Ltd.

SNC·LAVALIN
Morrow Environmental

Client :
Public Works and Gov't Services Canada

Location :
Pleasant Camp, BC

Borehole No. : 04-5

(Page 1 of 1)

Drilling Contractor: Geotech Drilling Services Ltd
Drilling Method : Odex
Borehole Dia. (m) : 0.10
Pipe/Slotted Pipe Dia. (m): 0.05, 0.05

Date Monitored : 2005 07 06
Ground Surf Elev. (m) : 300.242
Top of Casing Elev. (m) : 300.139

Project Number : 130846
Borehole Logged By : RDS
Date Drilled : 2004 10 15
Log Typed By : JS

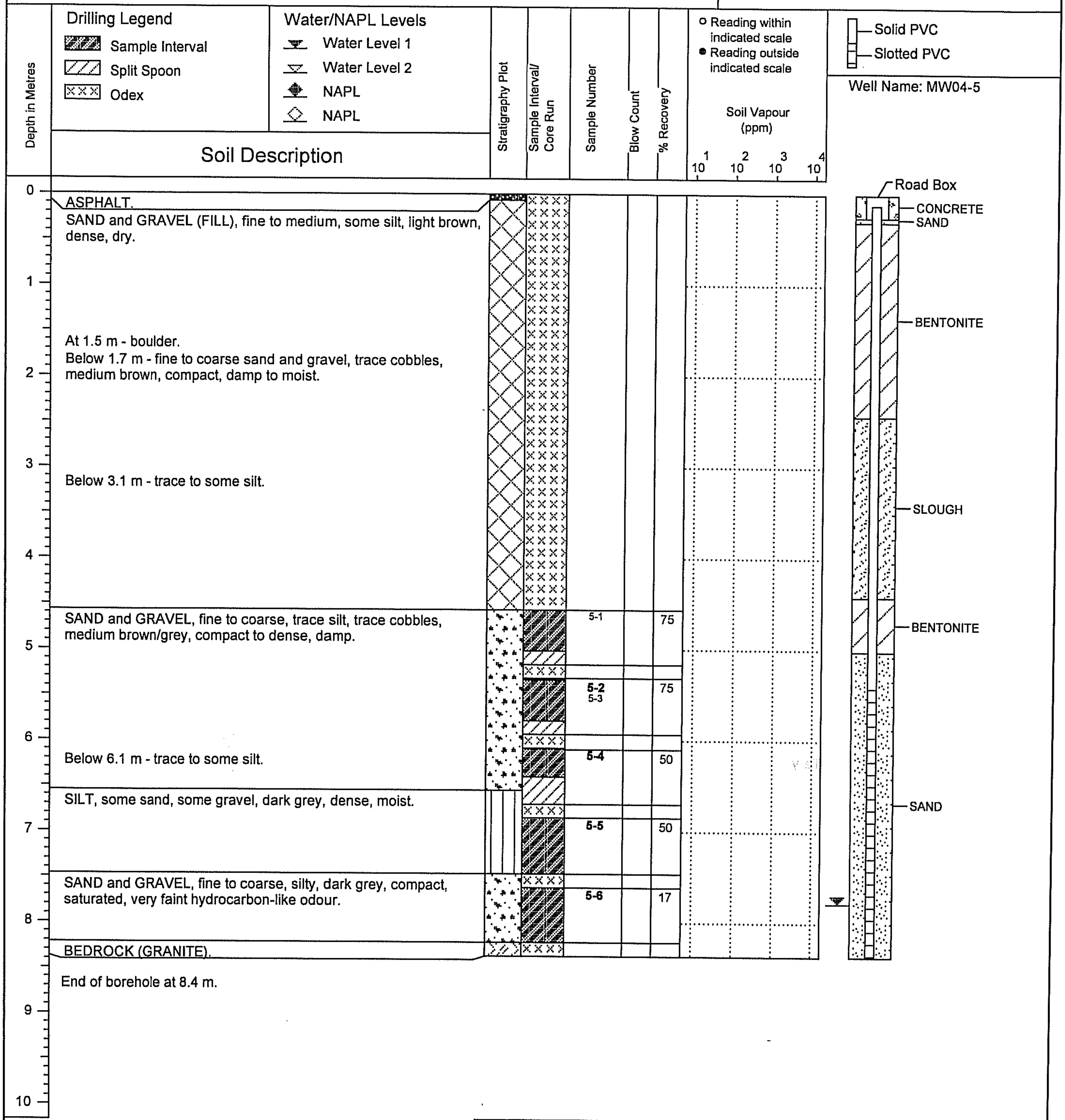
Drilling Legend
- ▨ Sample Interval
- ▧ Split Spoon
- ☒ Odex

Water/NAPL Levels
- ▽ Water Level 1
- ▽ Water Level 2
- ◆ NAPL
- ◇ NAPL

- ○ Reading within indicated scale
- ● Reading outside indicated scale

- Solid PVC
- Slotted PVC

Well Name: MW04-5



Soil Description

ASPHALT.

SAND and GRAVEL (FILL), fine to medium, some silt, light brown, dense, dry.

At 1.5 m - boulder.
Below 1.7 m - fine to coarse sand and gravel, trace cobbles, medium brown, compact, damp to moist.

Below 3.1 m - trace to some silt.

SAND and GRAVEL, fine to coarse, trace silt, trace cobbles, medium brown/grey, compact to dense, damp.

Below 6.1 m - trace to some silt.

SILT, some sand, some gravel, dark grey, dense, moist.

SAND and GRAVEL, fine to coarse, silty, dark grey, compact, saturated, very faint hydrocarbon-like odour.

BEDROCK (GRANITE).

End of borehole at 8.4 m.

Sample Number	Blow Count	% Recovery
5-1		75
5-2 5-3		75
5-4		50
5-5		50
5-6		17

Notes:
Bolded sample denotes sample analyzed.
Sample 5-3 is a blind field duplicate of sample 5-2.

DRAFT

SNC·LAVALIN Environment

Client :
Public Works and Gov't Services Canada

Location :
Pleasant Camp, BC

Borehole No. : 08-6

(Page 1 of 1)

Drilling Contractor: Geotech Drilling Services Ltd.
Drilling Method : Air Rotary
Borehole Dia. (m) : 0.10
Pipe/Slotted Pipe Dia. (m): 0.05, 0.05

Date Monitored : 2008 09 30
Ground Surf Elev. (m) : 298.17
Top of Casing Elev. (m) : 298.91

Project Number : 131416
Borehole Logged By : TDD
Date Drilled : 2008 09 27
Log Typed By : SGP

Drilling Legend
- ▨ Sample Interval
- ▨ Split Spoon
- ▨ Air Rotary

Water/NAPL Levels
- ▽ Water Level 1
- ▽ Water Level 2
- ◆ NAPL
- ◇ NAPL

○ Reading within indicated scale
● Reading outside indicated scale

Well Name: 08-6

Depth in Metres

Soil Description

0 – SAND (FILL), fine to coarse grained, gravelly, trace to some cobbles, trace silt, brown, loose, damp.

Between 1.7 m - 2.1 m - some gravel, cobbley.

SAND and GRAVEL, fine to coarse grained sand, some silt to trace silt, trace cobbles, brown, medium dense, damp.

At 3.3 m - boulder.

At 4.0 m - boulder.

Below 4.9 m - silty.

SAND, fine grained, some silt to silty, trace gravel, grey, medium dense, moist.

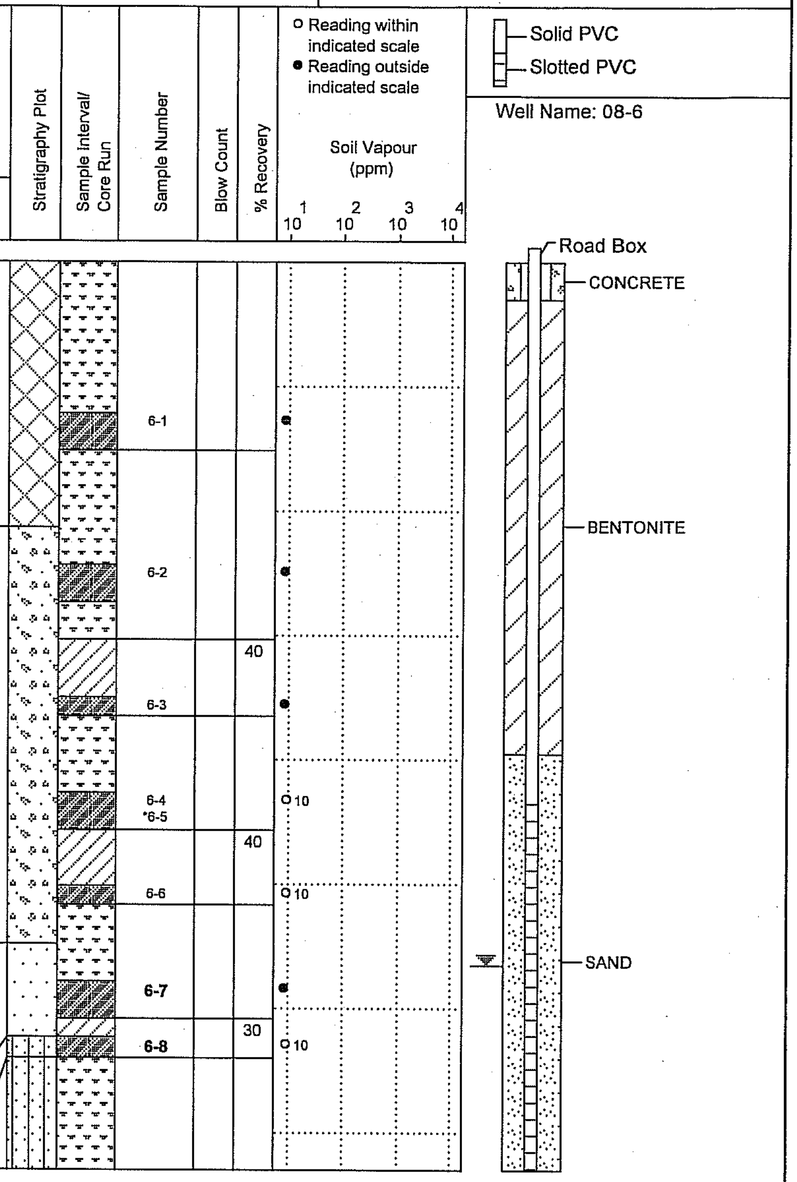
Below 6.3 m - wet.

SAND and GRAVEL, fine to coarse grained, silty, trace cobbles, dense, wet.

SAND (TILL-LIKE), fine to medium grained, some gravel to gravelly, some silt, grey, very dense, damp.

End of borehole at 7.3 m.

0
1
2
3
4
5
6
7
8
9
10



Notes:
Bolded sample denotes sample analyzed.
*6-5 denotes blind field duplicate of 6-4.

Print Date: 2010 02 12 QA1: MAG 2009 04 06

DRAFT

SNC•LAVALIN Environment

Client :
Public Works and Gov't Services Canada

Location :
Pleasant Camp, BC

Borehole No. : 09-17

(Page 1 of 1)

Drilling Contractor: Geotech Drilling Services Ltd.
Drilling Method : Odex
Borehole Dia. (m) : 0.10

Ground Surf Elev. (m) : 300.164

Project Number : 131416
Borehole Logged By : TD
Date Drilled : 2009 08 28
Log Typed By : TLW

Drilling Legend
▨ Sample Interval
☒ Odex

Water/NAPL Levels
▽ Water Level 1
▽ Water Level 2
◆ NAPL
◇ NAPL

○ Reading within indicated scale
● Reading outside indicated scale

Soil Description

Depth in Metres

SAND and GRAVEL (FILL), medium grained, some silt, brown, medium dense, damp.

SAND and GRAVEL, medium to fine grained, some silt, trace cobbles, dark brown, loose to medium dense, damp.

Below 4.9 - dense to medium dense.

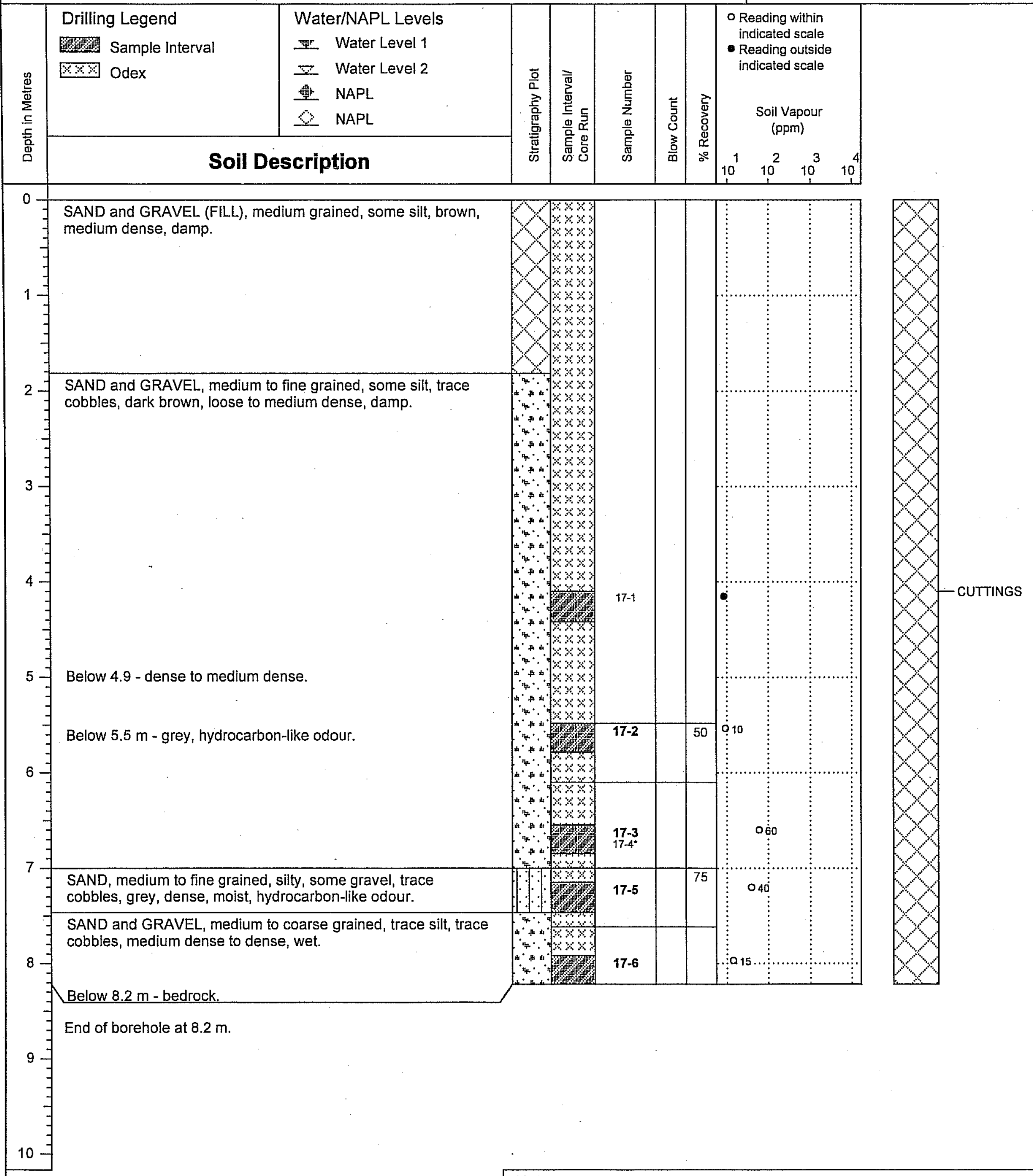
Below 5.5 m - grey, hydrocarbon-like odour.

SAND, medium to fine grained, silty, some gravel, trace cobbles, grey, dense, moist, hydrocarbon-like odour.

SAND and GRAVEL, medium to coarse grained, trace silt, trace cobbles, medium dense to dense, wet.

Below 8.2 m - bedrock.

End of borehole at 8.2 m.



Notes:
Bolded sample denotes sample analyzed.
*Sample 17-4 is a blind field duplicate of sample 17-3.

Print Date: 2010 02 12 QA1: PS 2009 10 29 QA2: TD 2010 02 10

SNC•LAVALIN
Morrow Environmental

Client :
Public Works and Gov't Services Canada

Location :
Pleasant Camp, BC

Borehole No. : AS-12

(Page 1 of 1)

Drilling Contractor: Geotech Drilling Services Ltd
Drilling Method : Odex
Borehole Dia. (m) : 0.10
Pipe/Slotted Pipe Dia. (m): 0.05, 0.05

Date Monitored : 2005 07 06
Ground Surf Elev. (m) : 300.485
Top of Casing Elev. (m) : 300.365

Project Number : 130846
Borehole Logged By : RDS
Date Drilled : 2005 09 09
Log Typed By : LL

Drilling Legend
☒ Odex

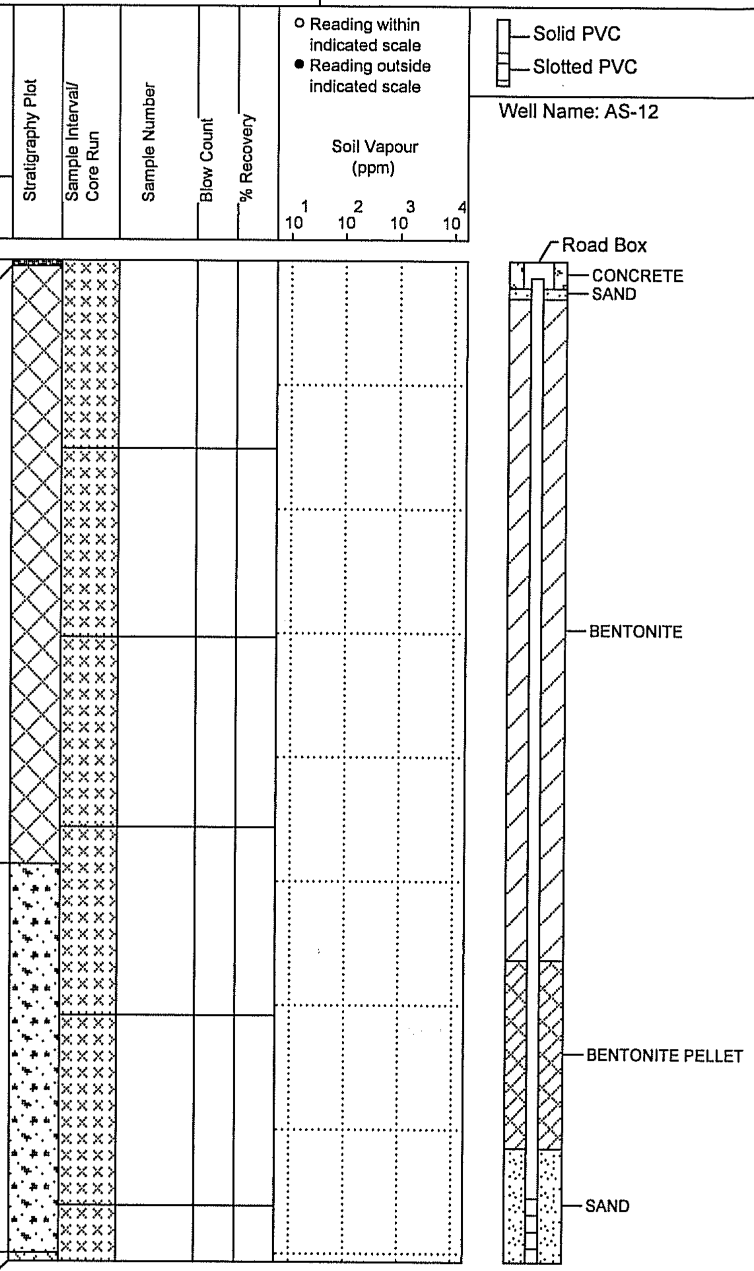
Water/NAPL Levels
▼ Water Level 1
▽ Water Level 2
◆ NAPL
◇ NAPL

○ Reading within indicated scale
● Reading outside indicated scale

Solid PVC
Slotted PVC

Well Name: AS-12

Depth in Metres	Soil Description
0	ASPHALT.
	SAND and GRAVEL (FILL), medium to fine grained, some silt, trace cobbles, light to medium brown, dense to compact, dry to damp, trace wood pieces.
5	SAND and GRAVEL, fine to coarse, trace silt, trace cobbles, medium brown-grey, dense, damp. Below 5.5 m - trace to some silt, damp to moist. Below 6.4 m - dark grey, moist, faint hydrocarbon-like odour. Between 6.4 m and 7.6 m - increasing hydrocarbon-like odour with depth. At 7.9 m - moist to wet.
8	BEDROCK.
	End of borehole at 8.1 m.

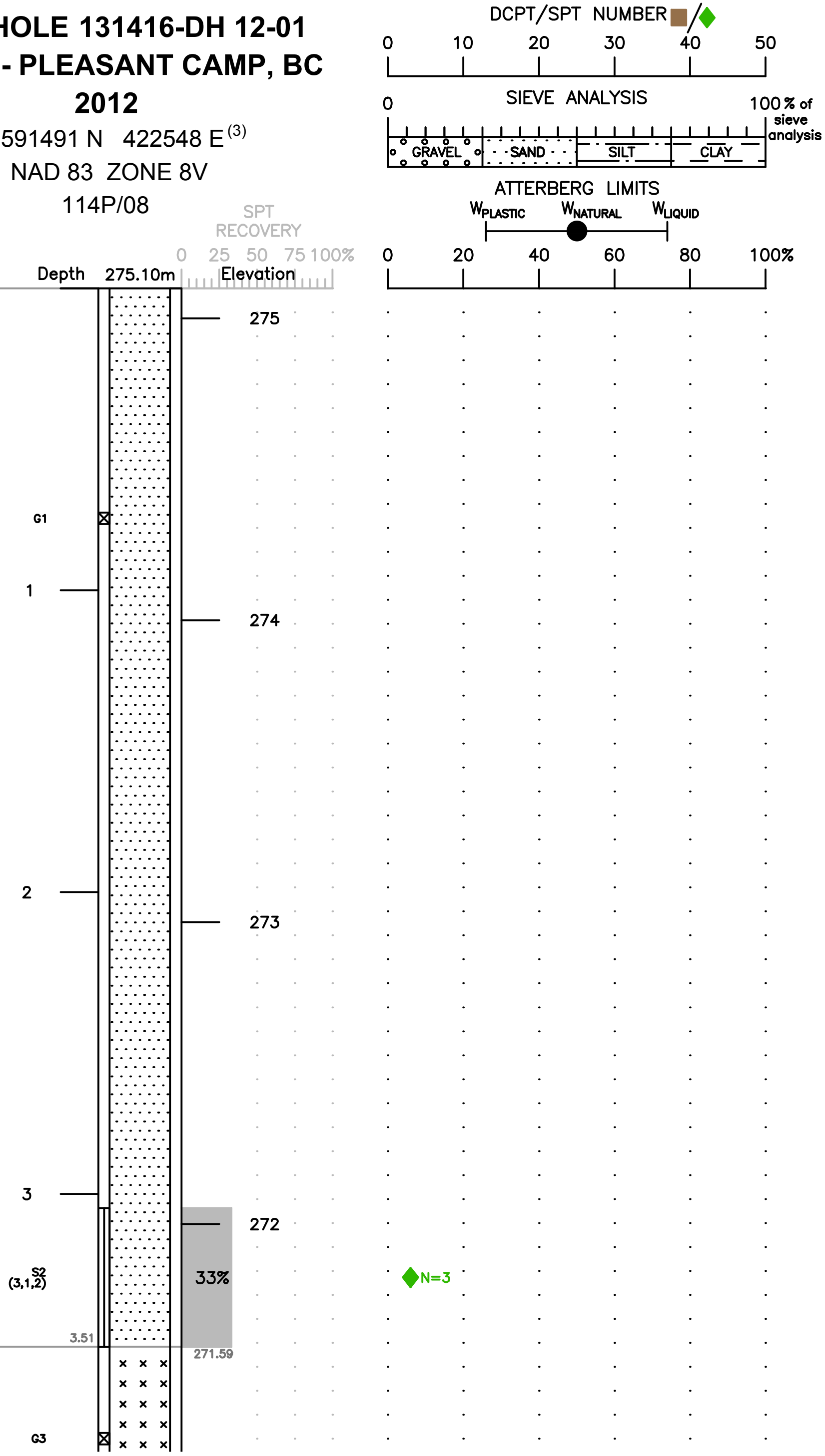


Notes:
Bolded sample denotes sample analyzed.
Remediation well: soil samples not collected. Soils logged via air return - split spoon samples taken for soil confirmation purposes only.

Print Date: 2008 07 21, Date Approved: 2006 10 31

BOREHOLE 131416-DH 12-01
PWGSC - PLEASANT CAMP, BC
2012

6591491 N 422548 E (3)
NAD 83 ZONE 8V
114P/08



SAND: silty, fine to medium grained, cohesion (silt), moist, brown.
- at 0.2 m: non-cohesive, damp
- at 3.0 m: very loose, coarse grained, some gravel

BEDROCK: light grey, dry, hard and slow drilling, dusty

NOTES:
1. Dynamic Cone Penetration / Standard Penetration Tests (SPT) conducted with 63.5 kg (140 lb) automatic trip hammer falling 762 mm (30 inches).
2. (#,#) dentes DCPT / (#,#,#) denotes SPT blows per 152 mm (6.0 inches).
3. Coordinates are handheld GPS. Accuracy for this unit is +/− 15 m.
4. Elevations are in meters above sea level (masl) and interpolated from contours (+/− 0.50 m).
5. Depths are in meters (m).

LIMITATION

This drill log is a summary of the conditions estimated by the field personnel at the specific location at the time of drilling. The conditions and properties described above will vary between locations and may vary with time.

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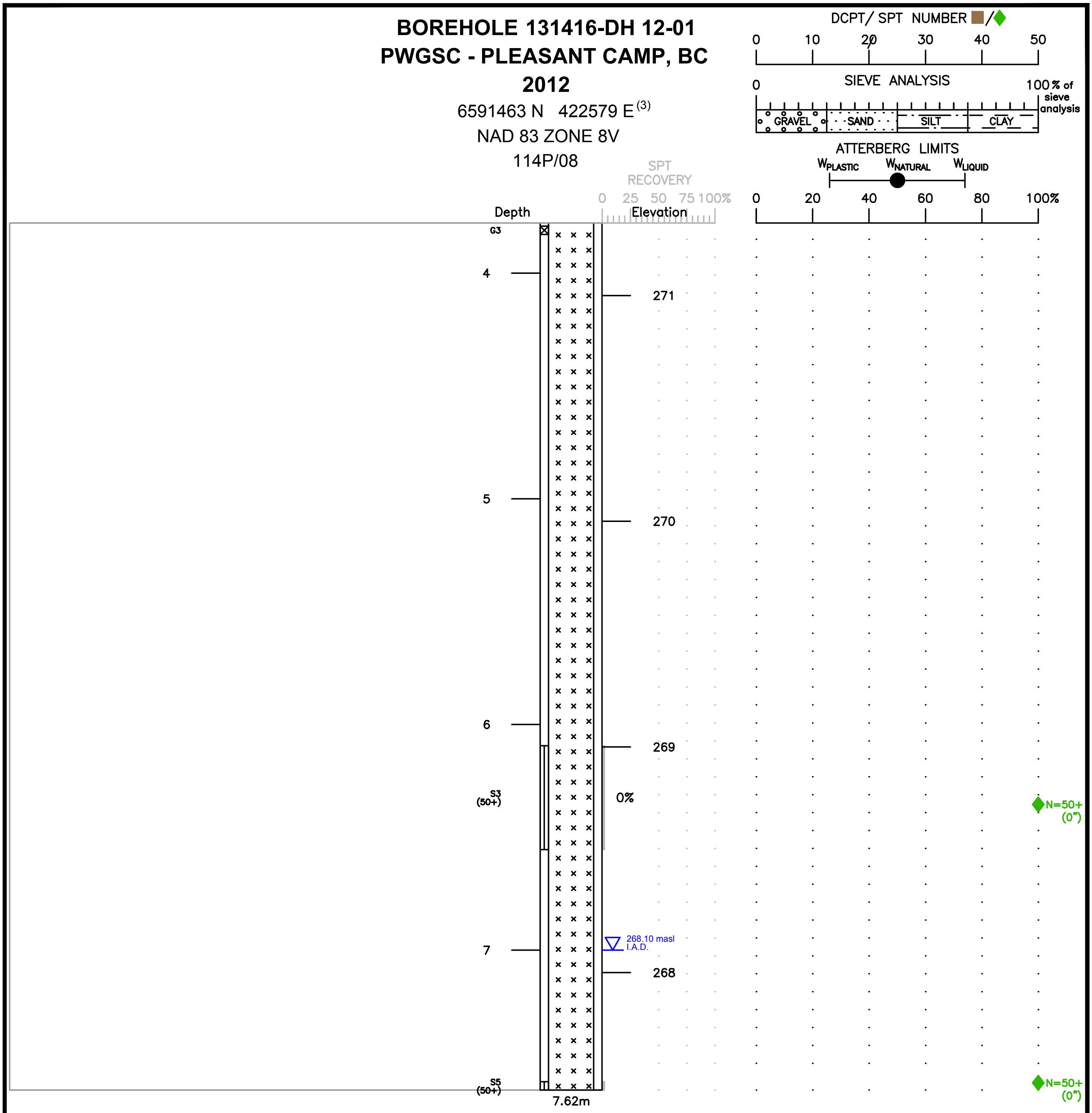
SUPERVISOR	D. GAMAL / N. SAFI	**CONTRACTOR**	GEOTECH DRILLING SERVICES LTD.	**APPROVED BY**	
LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416
DATE DRILLED	05–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE** 1:25	**DATE** 06–NOV–12

ACADDWG:\\P:\SLE\01 – British Columbia\JCS#131416–E011 CBSA Pleasant Camp Remedial Excavation\Drafting\Borehole\BH–131416–01.dwg

BOREHOLE 131416-DH 12-01
PWGSC - PLEASANT CAMP, BC
2012

6591463 N 422579 E (3)
NAD 83 ZONE 8V
114P/08



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LIMITATION

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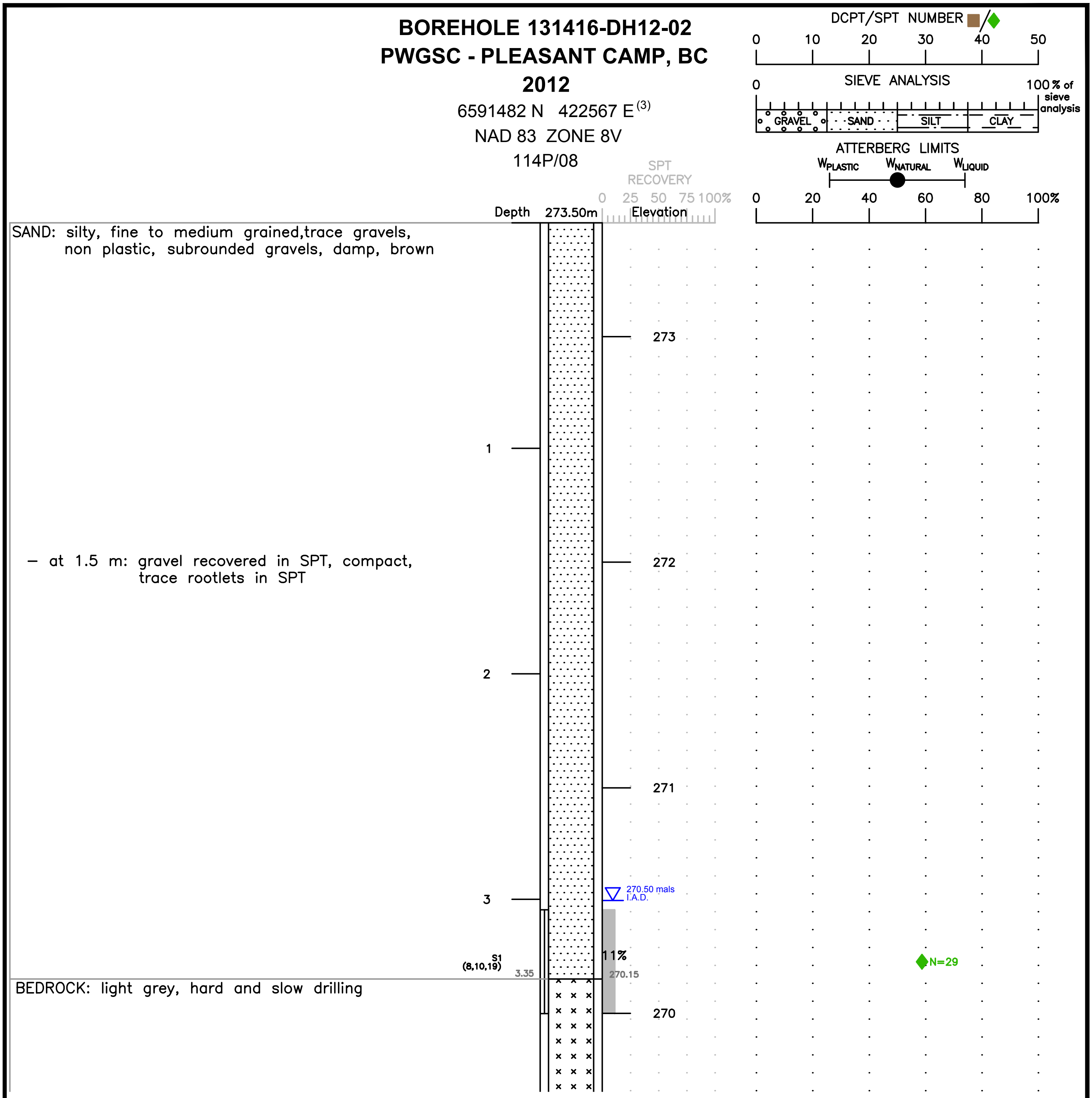
LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU		
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416		
DATE DRILLED	07–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE**	1:25	**DATE**	06–NOV–12

ACADDWG:\\P:\SLE\01 – British Columbia\JCS#131416–E011 CBSA Pleasant Camp Remedial Excavation\Drafting\Borehole\BH–131416–01.dwg

BOREHOLE 131416-DH12-02
PWGSC - PLEASANT CAMP, BC
2012

6591482 N 422567 E (3)
NAD 83 ZONE 8V
114P/08



SAND: silty, fine to medium grained,trace gravels, non plastic, subrounded gravels, damp, brown

– at 1.5 m: gravel recovered in SPT, compact, trace rootlets in SPT

BEDROCK: light grey, hard and slow drilling

NOTES:
1. Dynamic Cone Penetration / Standard Penetration Tests (SPT) conducted with 63.5 kg (140 lb) automatic trip hammer falling 762 mm (30 inches).
2. (#,#) denotes DCPT / (#,#,#) denotes SPT blows per 152 mm (6.0 inches).
3. Coordinates are handheld GPS. Accuracy for this unit is +/– 15 m.
4. Elevations are in meters above sea level (masl) and interpolated from contours (+/– 0.50 m).
5. Depths are in meters (m).

LIMITATION

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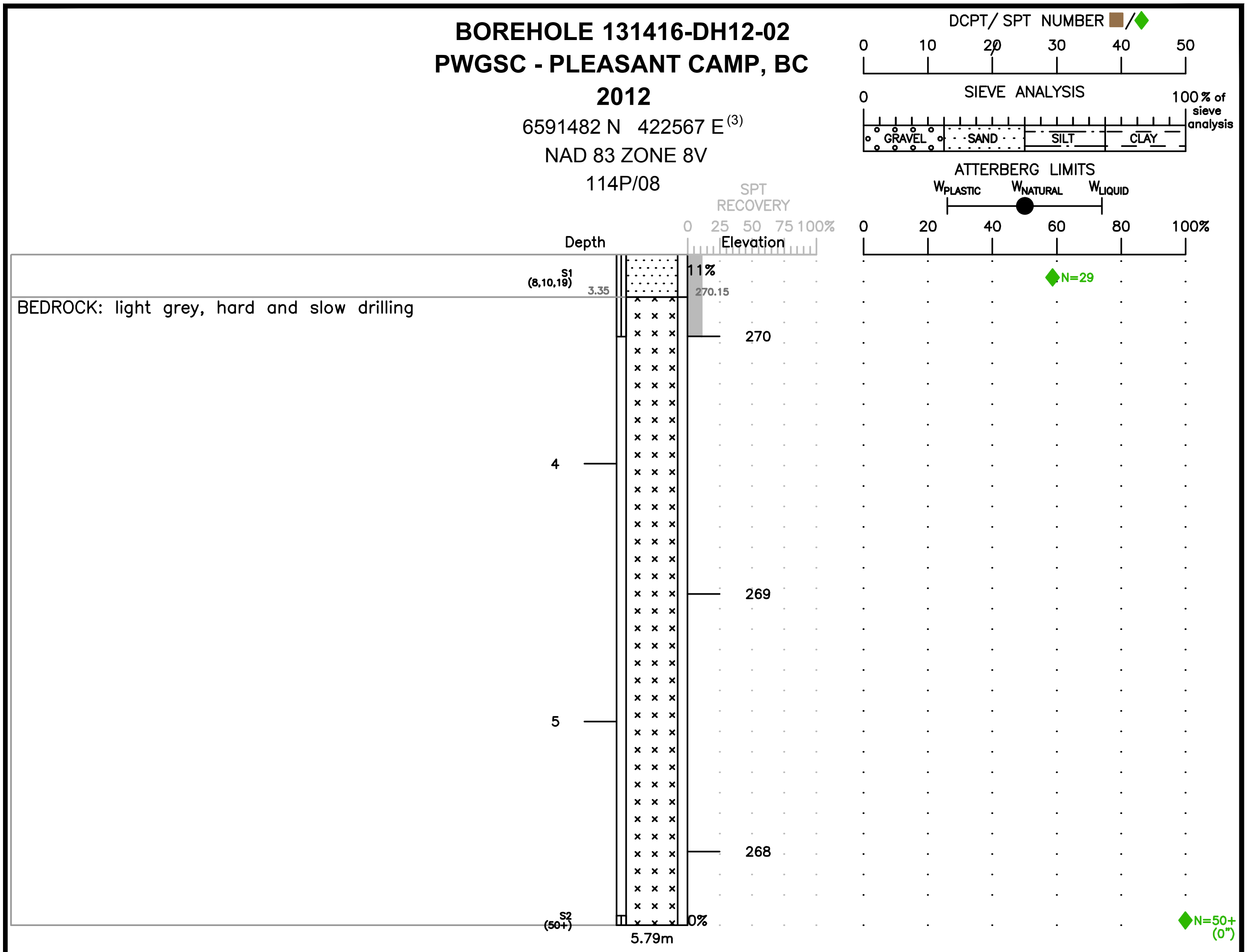
SUPERVISOR	D. GAMAL / N. SAFI	**CONTRACTOR**	GEOTECH DRILLING SERVICES LTD.	**APPROVED BY**	
LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416
DATE DRILLED	07–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE** 1:25	**DATE** 06–NOV–12

ACADDWG:\\P:\SLE\01 – British Columbia\JCS#131416–E011 CBSA Pleasant Camp Remedial Excavation\Drafting\Borehole\BH–131416–02.dwg

BOREHOLE 131416-DH12-02
PWGSC - PLEASANT CAMP, BC
2012

6591482 N 422567 E (3)
NAD 83 ZONE 8V
114P/08



NOTES:
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4. Elevations are in meters above sea level (masl) and interpolated from contours (+/− 0.50 m).
5. Depths are in meters (m).

PAGE 2 OF 2

LIMITATION

This drill log is a summary of the conditions estimated by the field personnel at the specific location at the time of drilling. The conditions and properties described above will vary between locations and may vary with time.

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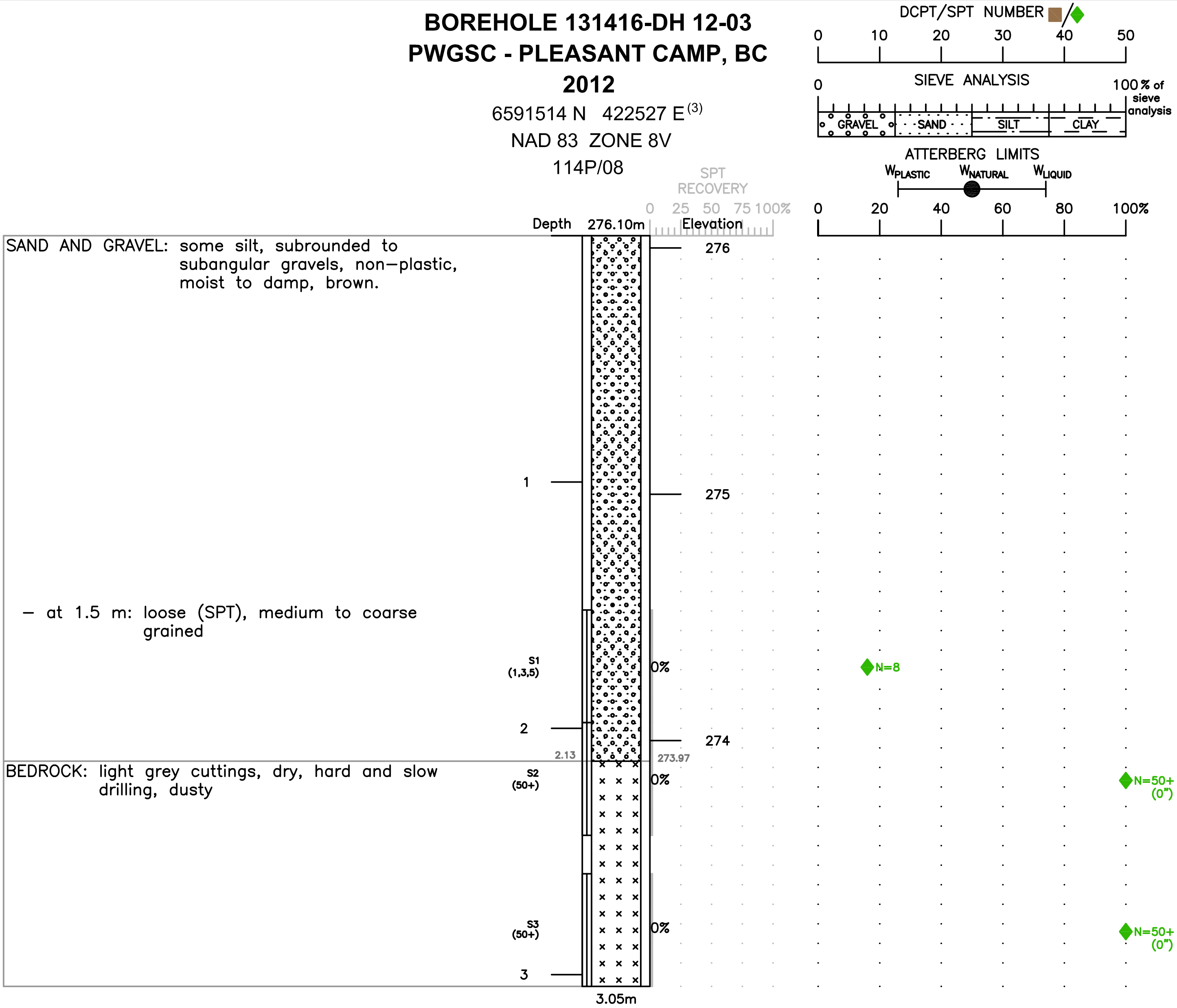
LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416
DATE DRILLED	07–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE** 1:25	**DATE** 06–NOV–12

ACADDWG:\\P:\SLE\01 – British Columbia\JCS#131416–E011 CBSA Pleasant Camp Remedial Excavation\Drafting\Borehole\BH–131416–02.dwg

BOREHOLE 131416-DH 12-03
PWGSC - PLEASANT CAMP, BC
2012

6591514 N 422527 E[3]
NAD 83 ZONE 8V
114P/08



SAND AND GRAVEL: some silt, subrounded to subangular gravels, non–plastic, moist to damp, brown.

– at 1.5 m: loose (SPT), medium to coarse grained

BEDROCK: light grey cuttings, dry, hard and slow drilling, dusty

NOTES:
1. Dynamic Cone Penetration / Standard Penetration Tests (SPT) conducted with 63.5 kg (140 lb) automatic trip hammer falling 762 mm (30 inches).
2. (#,#) denotes DCPT / (#,#,#) denotes SPT blows per 152 mm (6.0 inches).
3. Coordinates are handheld GPS. Accuracy for this unit is +/– 15 m.
4. Elevations are in meters above sea level (masl) and interpolated from contours (+/– 0.50 m).
5. Depths are in meters (m).

LIMITATION

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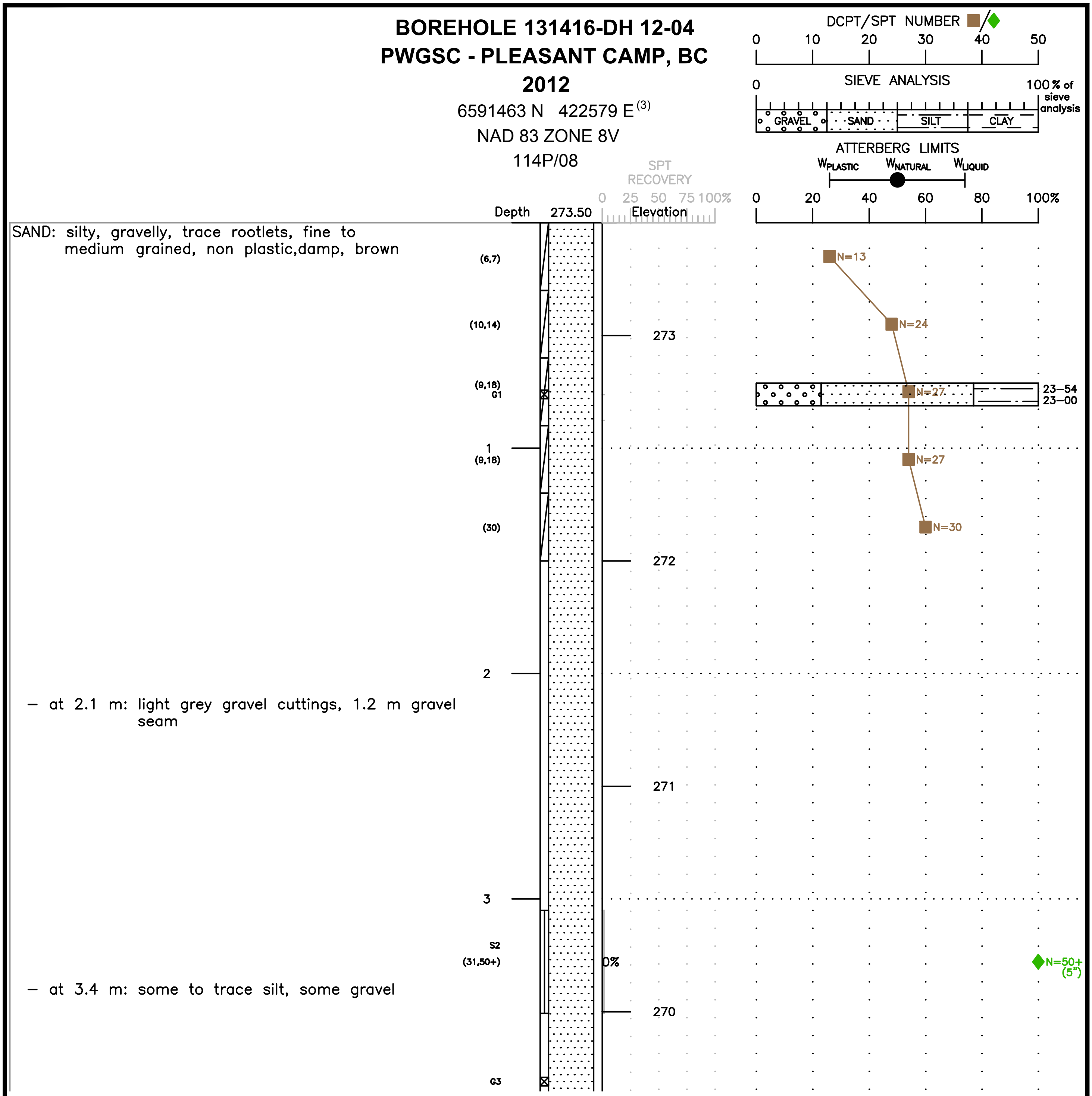
SUPERVISOR	D. GAMAL / N. SAFI	**CONTRACTOR**	GEOTECH DRILLING SERVICES LTD.	**APPROVED BY**			
LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU		
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416		
DATE DRILLED	05–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE**	1:25	**DATE**	06–NOV–12

ACADDWG:\\P:\SLE\01 – British Columbia\JCS#131416–E011 CBSA Pleasant Camp Remedial Excavation\Drafting\Borehole\BH–131416–03.dwg

BOREHOLE 131416-DH 12-04
PWGSC - PLEASANT CAMP, BC
2012

6591463 N   422579 E (3)
NAD 83 ZONE 8V
114P/08



SAND: silty, gravelly, trace rootlets, fine to medium grained, non plastic, damp, brown

– at 2.1 m: light grey gravel cuttings, 1.2 m gravel seam

– at 3.4 m: some to trace silt, some gravel

NOTES:
1. Dynamic Cone Penetration / Standard Penetration Tests (SPT) conducted with 63.5 kg (140 lb) automatic trip hammer falling 762 mm (30 inches).
2. (#,#) denotes DCPT / (#,#,#) denotes SPT blows per 152 mm (6.0 inches).
3. Coordinates are handheld GPS. Accuracy for this unit is +/– 15 m.
4. Elevations are in meters above sea level (masl) and interpolated from contours (+/– 0.50 m).
5. Depths are in meters (m).

LIMITATION

This drill log is a summary of the conditions estimated by the field personnel at the specific location at the time of drilling. The conditions and properties described above will vary between locations and may vary with time.

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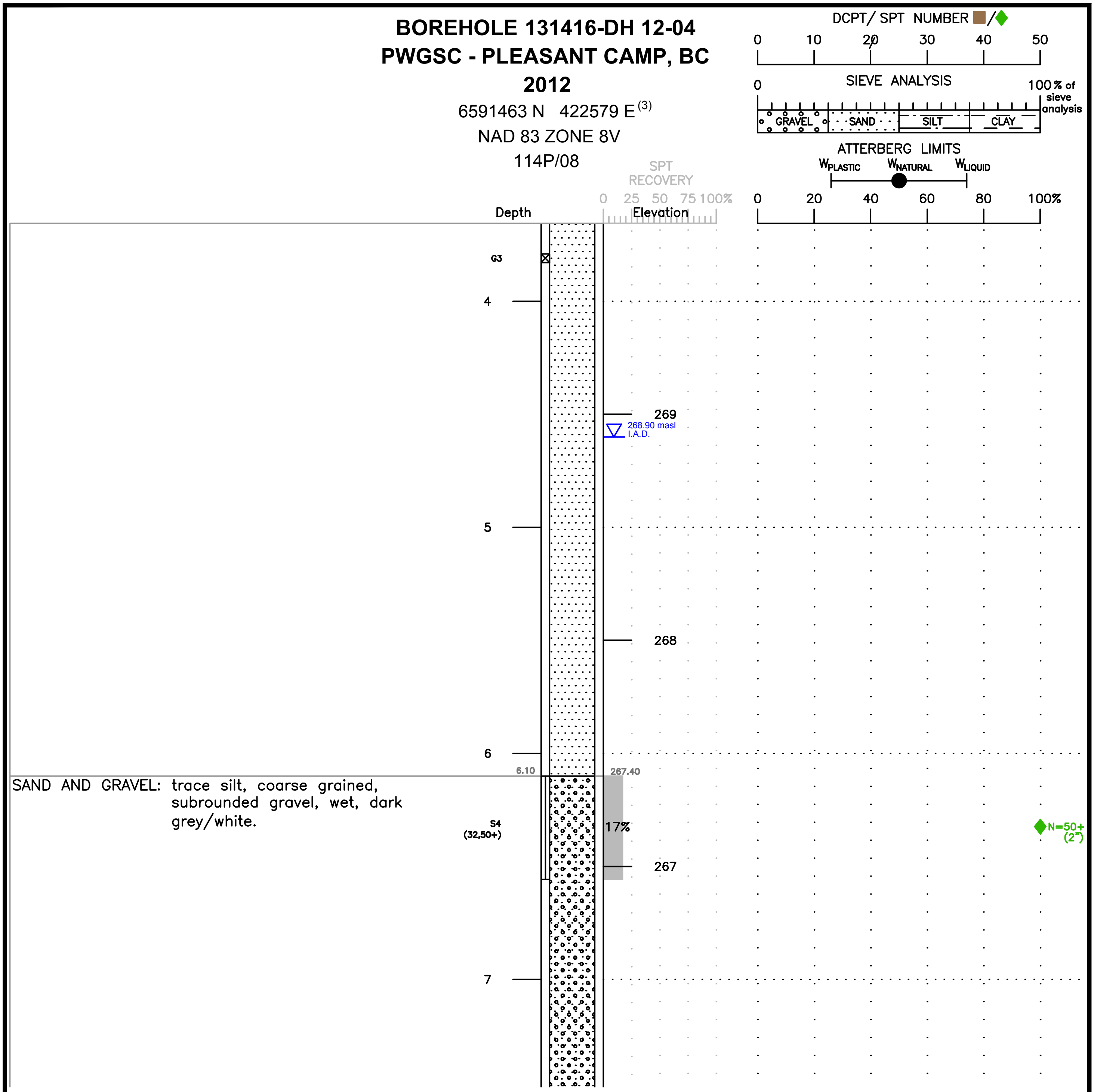
Member of the SNC-LAVALIN Group

SUPERVISOR	D. GAMAL / N. SAFI	**CONTRACTOR**	GEOTECH DRILLING SERVICES LTD.	**APPROVED BY**			
LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU		
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416		
DATE DRILLED	07–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE**	1:25	**DATE**	14–NOV–12

BOREHOLE 131416-DH 12-04
PWGSC - PLEASANT CAMP, BC
2012

6591463 N   422579 E$^{(3)}$
NAD 83 ZONE 8V
114P/08



SAND AND GRAVEL: trace silt, coarse grained, subrounded gravel, wet, dark grey/white.

NOTES: 1. Dynamic Cone Penetration / Standard Penetration Tests (SPT) conducted with 63.5 kg (140 lb) automatic trip hammer falling 762 mm (30 inches).
2. (#,#) denotes DCPT / (#,#,#) denotes SPT blows per 152 mm (6.0 inches).
3. Coordinates are handheld GPS. Accuracy for this unit is +/− 15 m.
4. Elevations are in meters above sea level (masl) and interpolated from contours (+/− 0.50 m).
5. Depths are in meters (m).

LIMITATION

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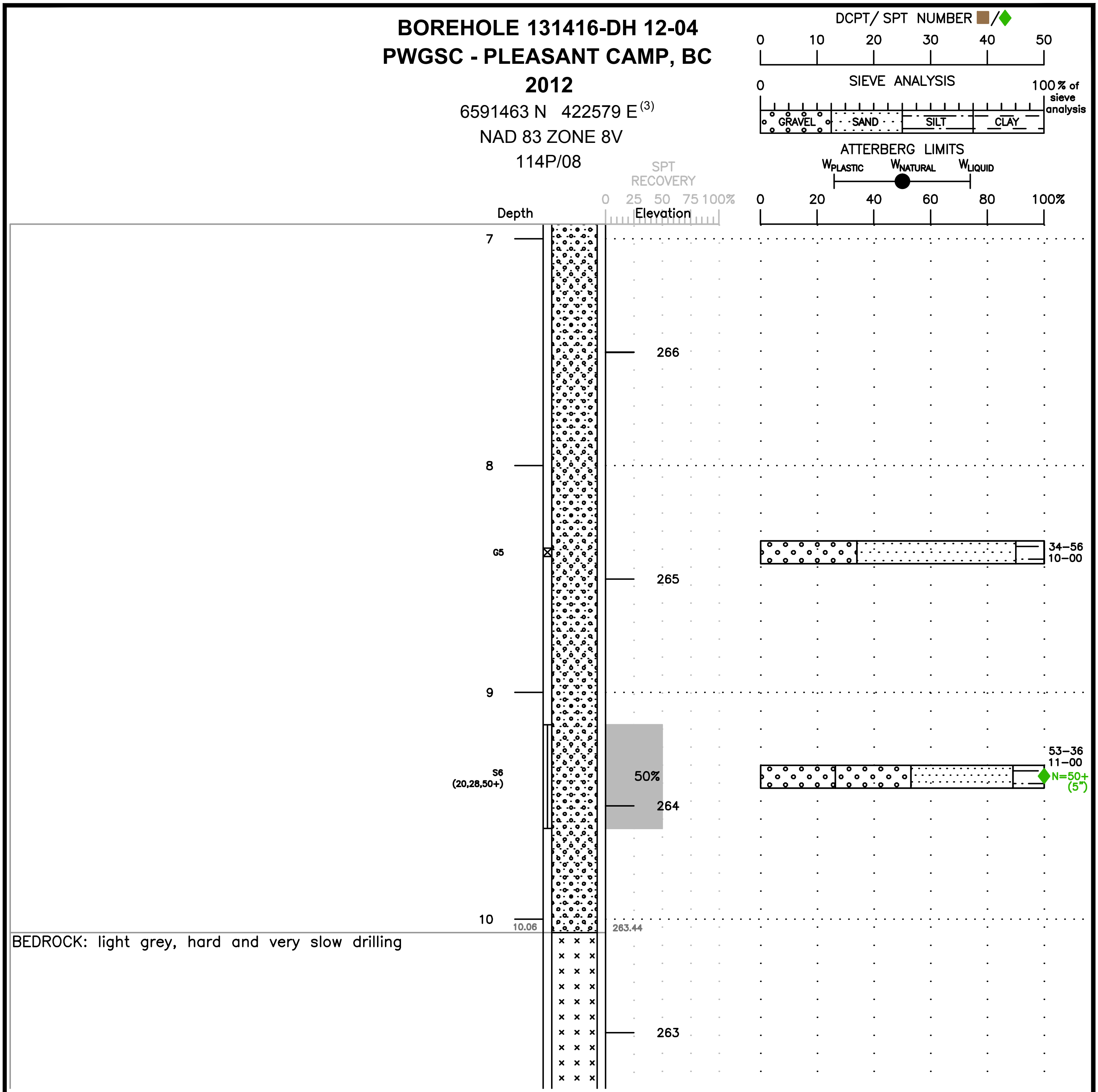
SUPERVISOR	D. GAMAL / N. SAFI	**CONTRACTOR**	GEOTECH DRILLING SERVICES LTD.	**APPROVED BY**	
LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416
DATE DRILLED	07–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE** 1:25	**DATE** 14–NOV–12

ACADDWG:\\P:\SLE\01 – British Columbia\JCS#131416–E011 CBSA Pleasant Camp Remedial Excavation\Drafting\Borehole\BH–131416–04.dwg

BOREHOLE 131416-DH 12-04
PWGSC - PLEASANT CAMP, BC
2012

6591463 N 422579 E$^{(3)}$
NAD 83 ZONE 8V
114P/08



BEDROCK: light grey, hard and very slow drilling

NOTES:
1. Dynamic Cone Penetration / Standard Penetration Tests (SPT) conducted with 63.5 kg (140 lb) automatic trip hammer falling 762 mm (30 inches).
2. (#,#) denotes DCPT / (#,#,#) denotes SPT blows per 152 mm (6.0 inches).
3. Coordinates are handheld GPS. Accuracy for this unit is +/– 15 m.
4. Elevations are in meters above sea level (masl) and interpolated from contours (+/– 0.50 m).
5. Depths are in meters (m).

LIMITATION

This drill log is a summary of the conditions estimated by the field personnel at the specific location at the time of drilling. The conditions and properties described above will vary between locations and may vary with time.

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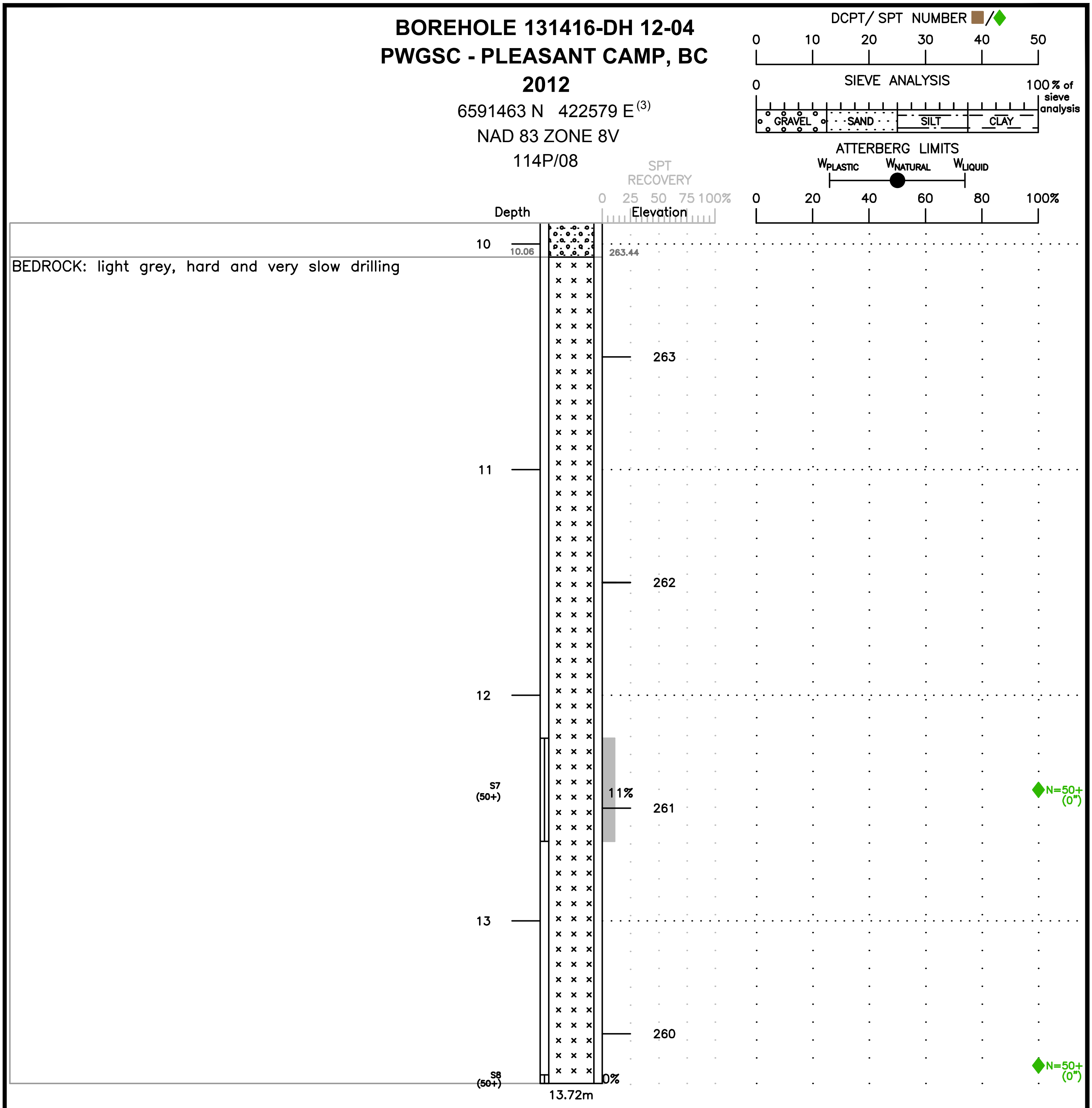
LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU		
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416		
DATE DRILLED	07–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE**	1:25	**DATE**	14–NOV–12

ACADDWG:\\P:\SLE\01 – British Columbia\JCS#131416–E011 CBSA Pleasant Camp Remedial Excavation\Drafting\Borehole\BH–131416–04.dwg

BOREHOLE 131416-DH 12-04
PWGSC - PLEASANT CAMP, BC
2012

6591463 N 422579 E (3)
NAD 83 ZONE 8V
114P/08



BEDROCK: light grey, hard and very slow drilling

NOTES:
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2. (#,#) denotes DCPT / (#,#,#) denotes SPT blows per 152 mm (6.0 inches).
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LOGGED BY	N. SAFI	OPERATOR	T. HESSE	DRAWN BY	C. WU		
GEOLOGY BY	N/A	DRILL RIG TYPE	DR212	PROJECT No.	131416		
DATE DRILLED	07–OCT–12	ABANDONMENT	CUTTINGS AND BENTONITE SEAL	SCALE	1:25	DATE	14–NOV–12

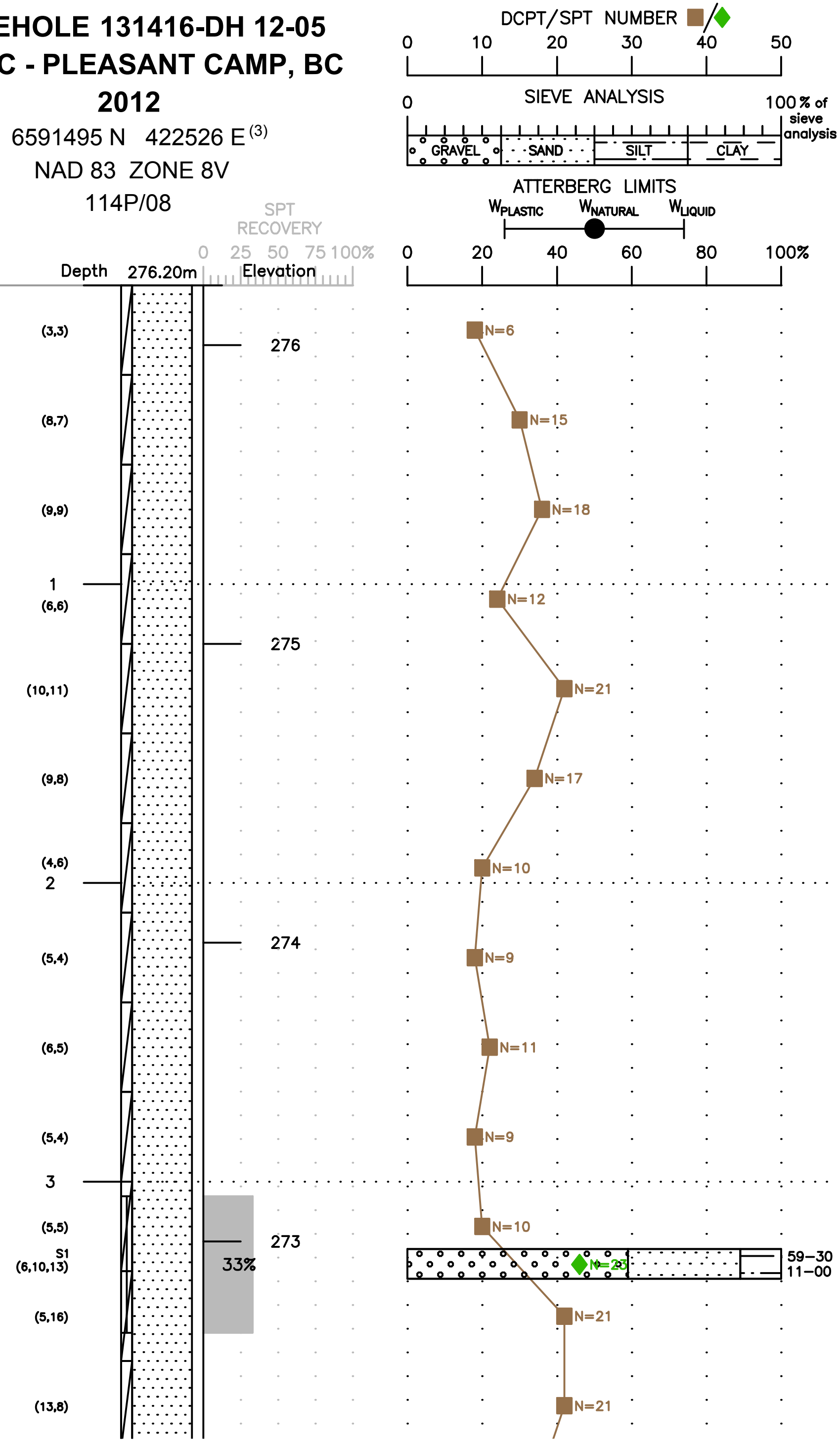
ACADDWG:\\P:\SLE\01 – British Columbia\JCS#131416–E011 CBSA Pleasant Camp Remedial Excavation\Drafting\Borehole\BH–131416–04.dwg

BOREHOLE 131416-DH 12-05
PWGSC - PLEASANT CAMP, BC
2012

6591495 N 422526 E (3)
NAD 83 ZONE 8V
114P/08

SAND: some gravel, some to trace silt, non plastic, medium to coarse grained, subangular gravels, damp, brown.

- at 3.0 m: compact (SPT), gravelly, trace silt, coarse–grained, some oxidations stains, wet at end of SPT



NOTES:
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PAGE 1 OF 2

LIMITATION

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LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU		
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416		
DATE DRILLED	05–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE**	1:25	**DATE**	14–NOV–12

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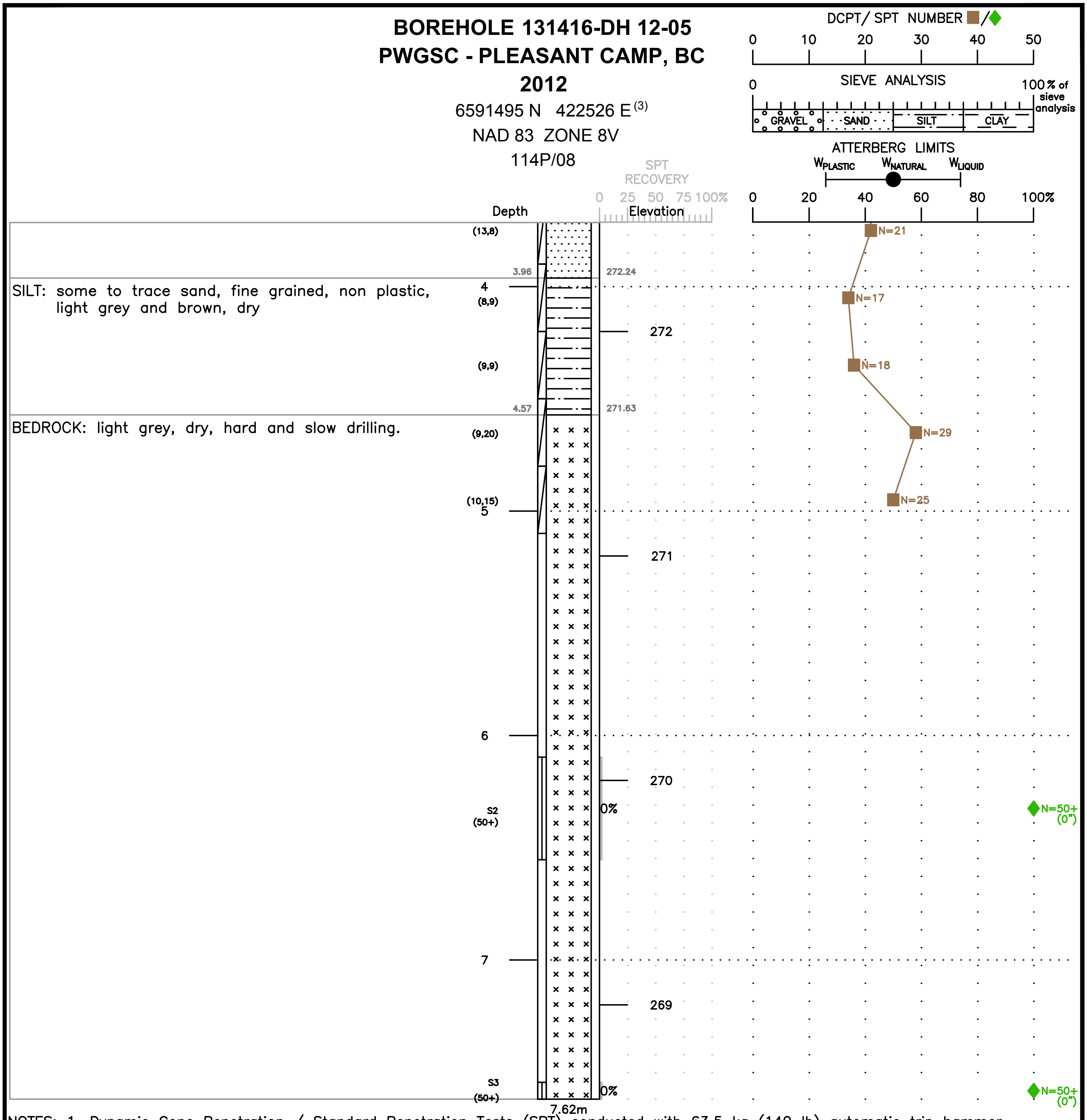
BOREHOLE 131416-DH 12-05
PWGSC - PLEASANT CAMP, BC
2012

6591495 N 422526 E (3)
NAD 83 ZONE 8V
114P/08



SILT: some to trace sand, fine grained, non plastic, light grey and brown, dry

BEDROCK: light grey, dry, hard and slow drilling.

NOTES:
1. Dynamic Cone Penetration / Standard Penetration Tests (SPT) conducted with 63.5 kg (140 lb) automatic trip hammer falling 762 mm (30 inches).
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LIMITATION

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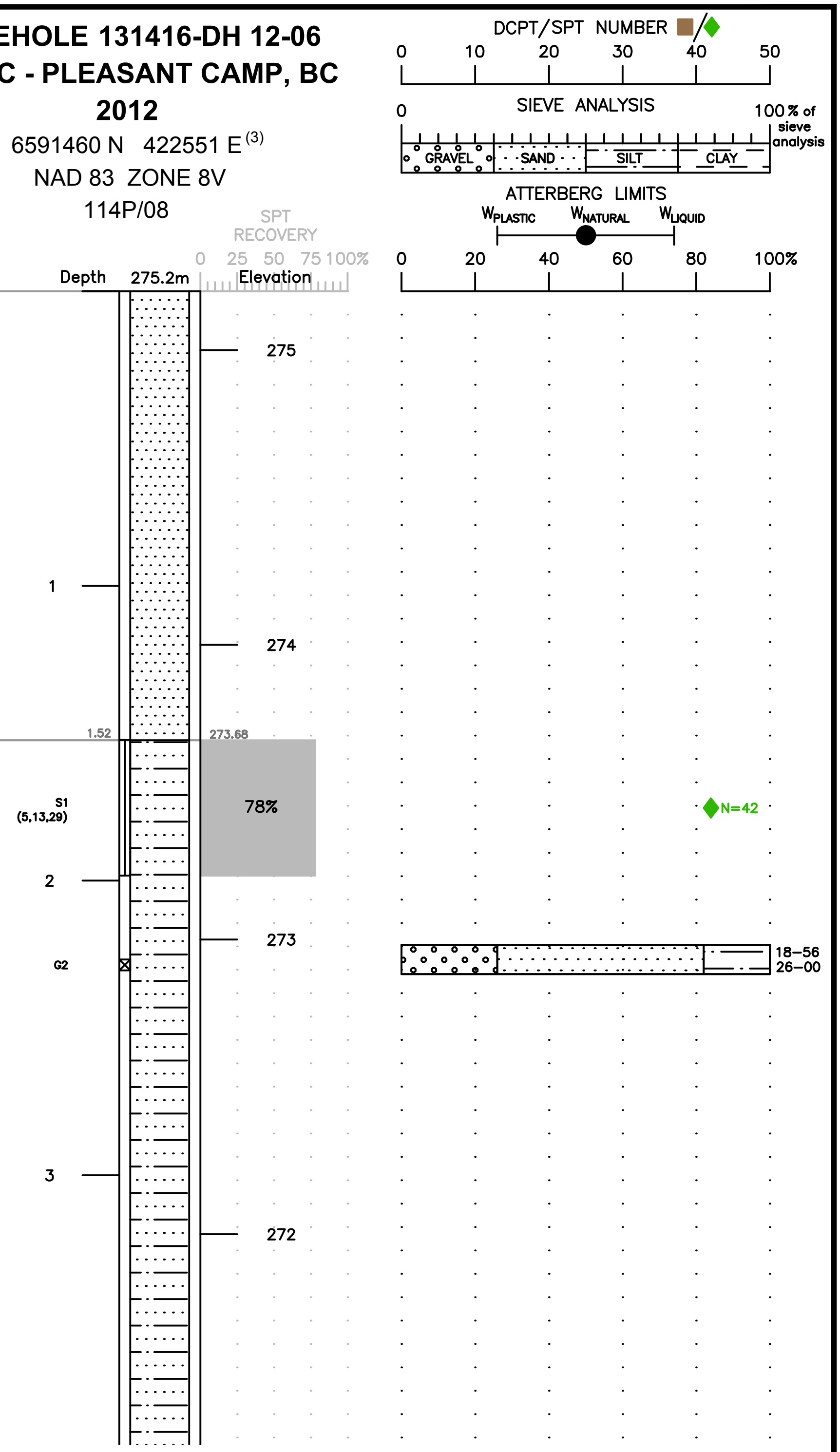
LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416
DATE DRILLED	05-OCT-12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE** 1:25	**DATE** 14-NOV-12

BOREHOLE 131416-DH 12-06
PWGSC - PLEASANT CAMP, BC
2012

6591460 N 422551 E $^{(3)}$
NAD 83 ZONE 8V
114P/08



SAND: silty, trace gravel, fine to medium grained, moist to wet, brown.

SAND AND SILT: fine grained, some gravels, subrounded gravels, moist to wet, brown, dense last 150 mm of SPT on a piece of rock/ gravel

NOTES:
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LIMITATION

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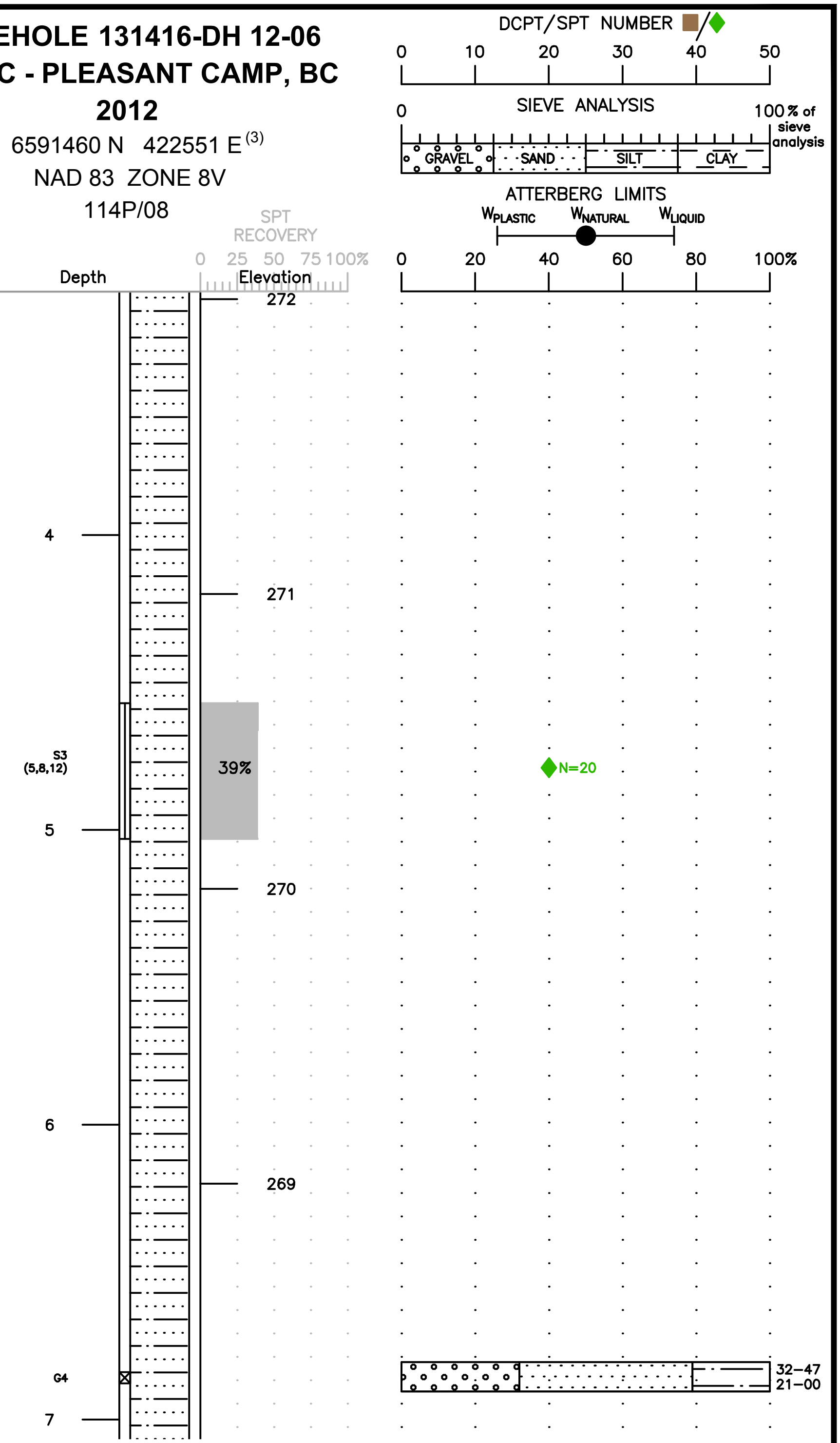
LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416
DATE DRILLED	06–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE** 1:25	**DATE** 14–NOV–12

BOREHOLE 131416-DH 12-06
PWGSC - PLEASANT CAMP, BC
2012

6591460 N 422551 E (3)
NAD 83 ZONE 8V
114P/08



– at 4.6 m: compact, SPT end consists of coarse gravels, light grey and white

– at 6.1 m: silt sand, dark grey in color, low plastic silt, wet

NOTES:
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PAGE 2 OF 6

LIMITATION

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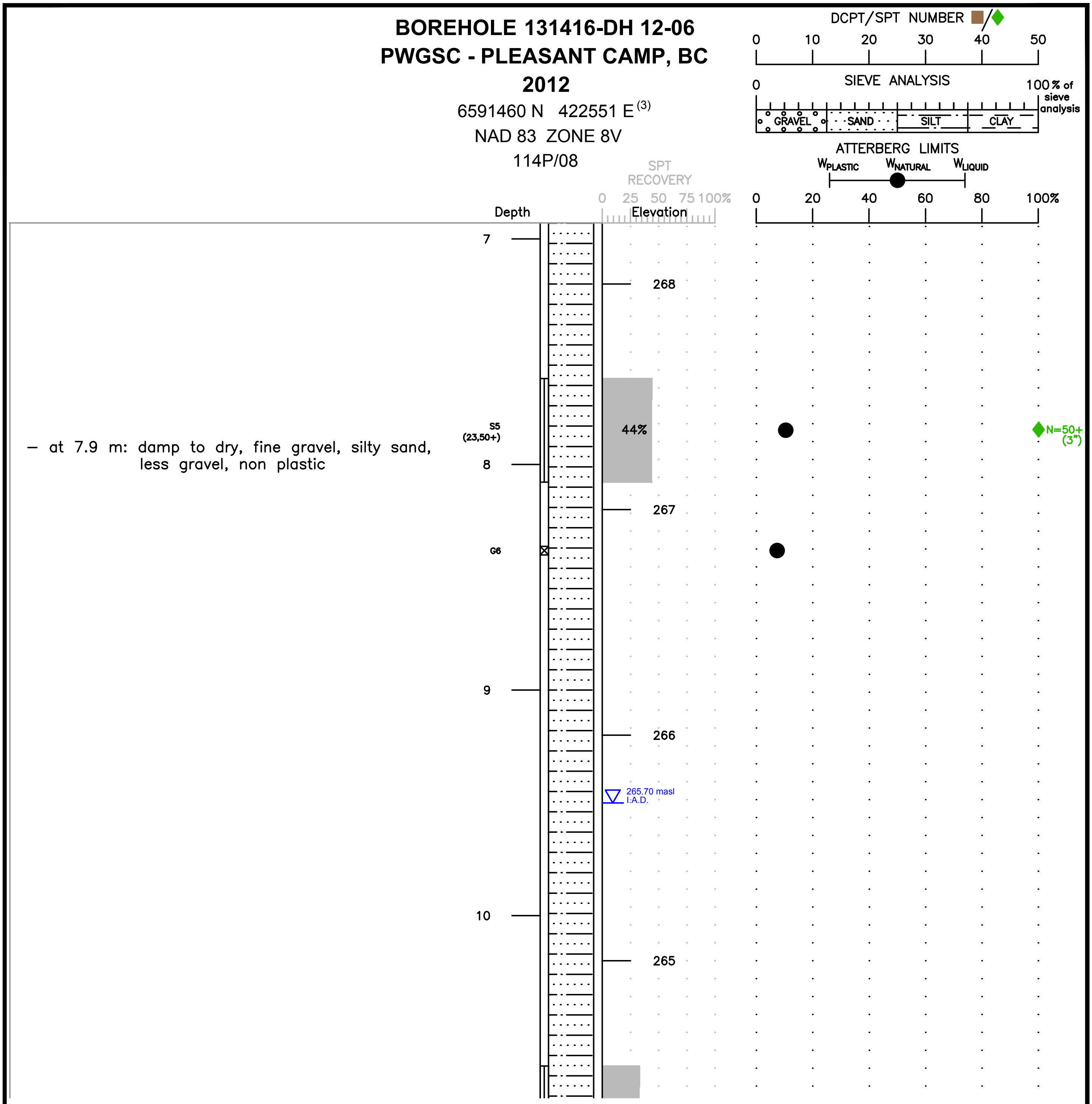
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416
DATE DRILLED	06–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE** 1:25	**DATE** 14–NOV–12

ACADDWG:\\P:\SLE\01 – British Columbia\JCS#131416–E011 CBSA Pleasant Camp Remedial Excavation\Drafting\Borehole\BH–131416–06.dwg

BOREHOLE 131416-DH 12-06
PWGSC - PLEASANT CAMP, BC
2012

6591460 N 422551 E[3]
NAD 83 ZONE 8V
114P/08



– at 7.9 m: damp to dry, fine gravel, silty sand, less gravel, non plastic

NOTES:
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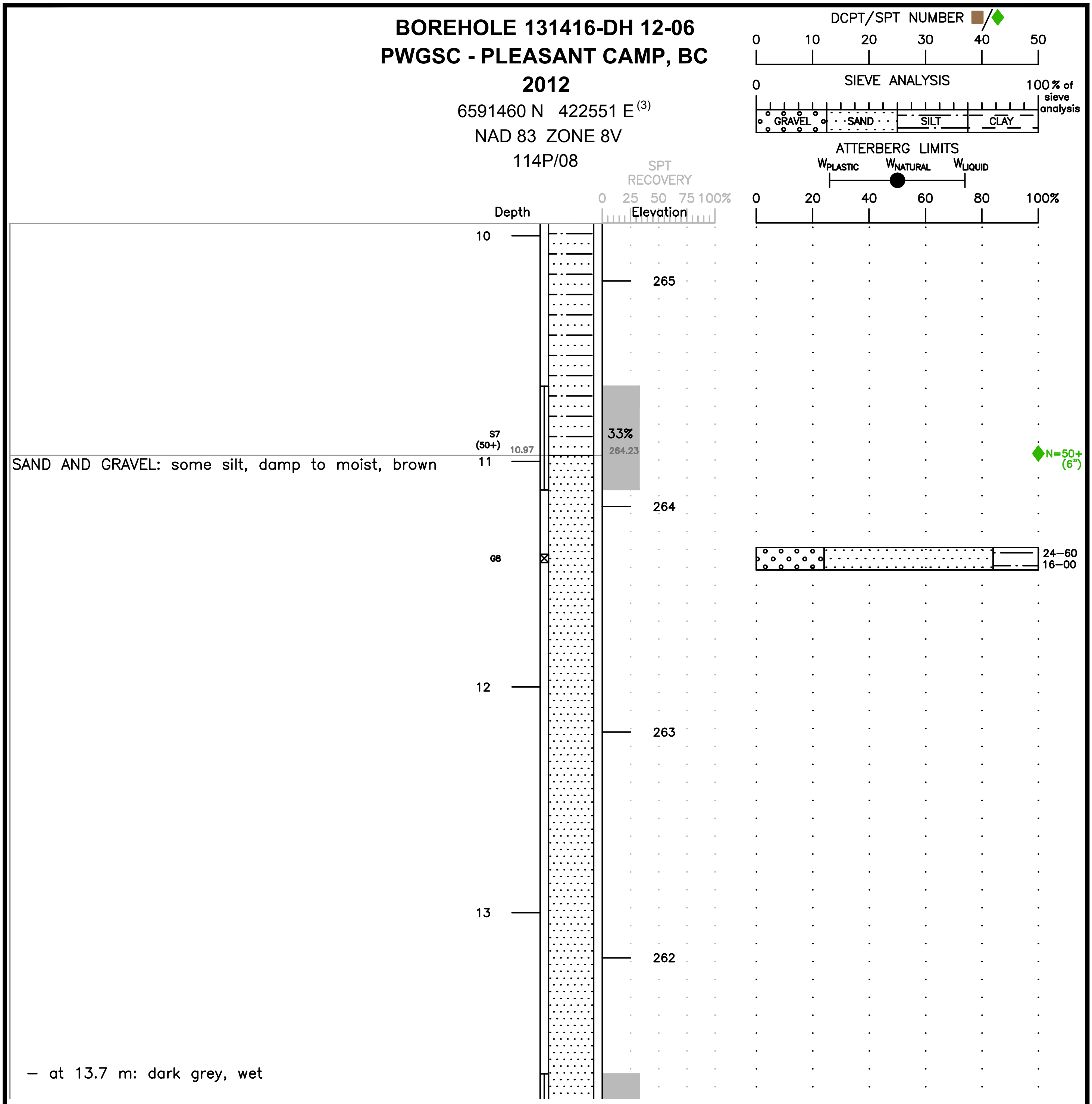
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416
DATE DRILLED	06–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE** 1:25	**DATE** 14–NOV–12

ACADDWG:\\P:\SLE\01 – British Columbia\JCS#131416–E011 CBSA Pleasant Camp Remedial Excavation\Drafting\Borehole\BH–131416–06.dwg

BOREHOLE 131416-DH 12-06
PWGSC - PLEASANT CAMP, BC
2012

6591460 N 422551 E$^{(3)}$
NAD 83 ZONE 8V
114P/08



SAND AND GRAVEL: some silt, damp to moist, brown

– at 13.7 m: dark grey, wet

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PAGE 4 OF 6

LIMITATION

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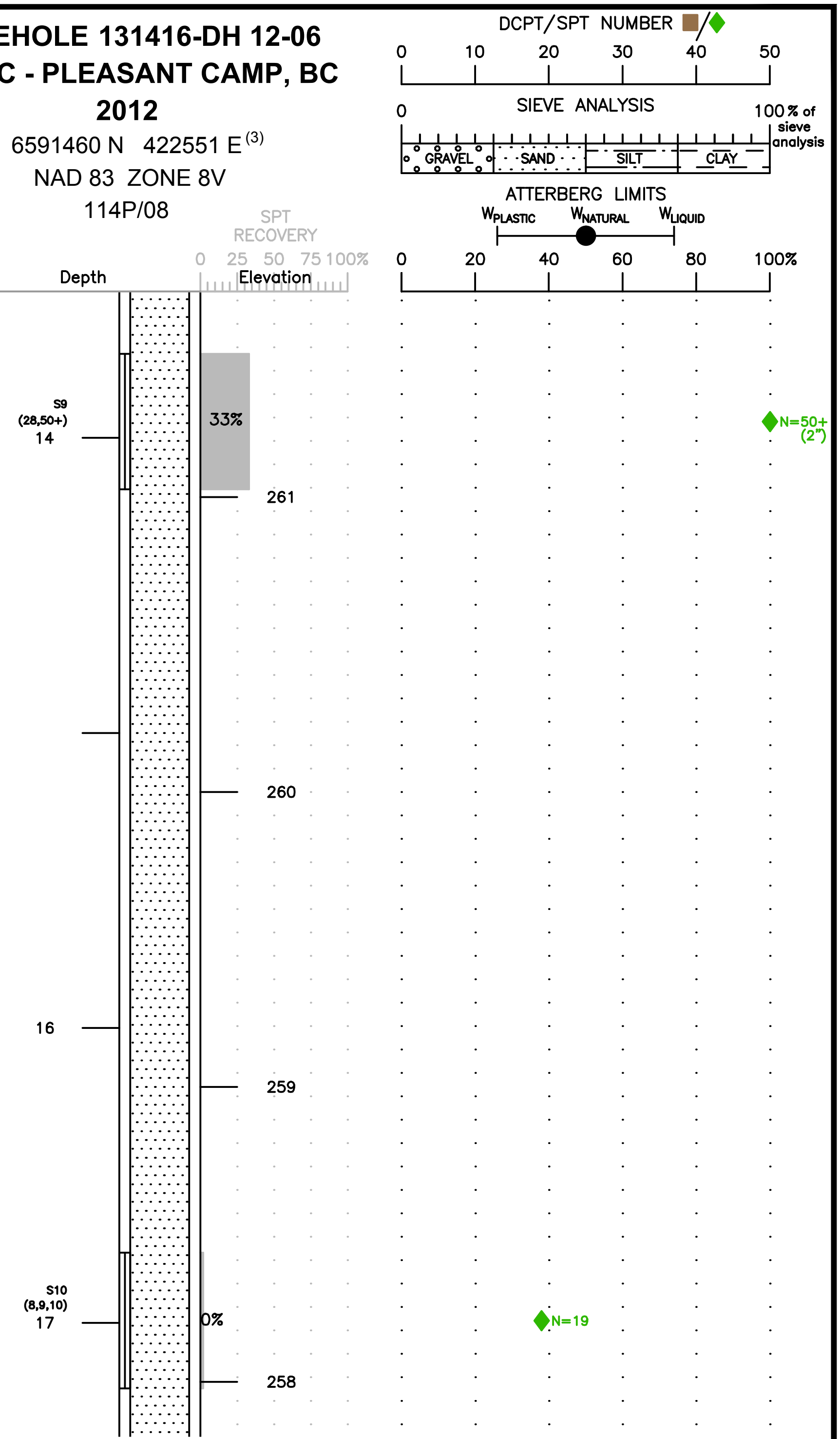
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416
DATE DRILLED	14–NOV–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE** 1:25	**DATE** 06–NOV–12

ACADDWG:\\P:\SLE\01 – British Columbia\JCS#131416–E011 CBSA Pleasant Camp Remedial Excavation\Drafting\Borehole\BH–131416–06.dwg

BOREHOLE 131416-DH 12-06
PWGSC - PLEASANT CAMP, BC
2012

6591460 N 422551 E (3)
NAD 83 ZONE 8V
114P/08



- at 13.7 m: dark grey, wet

- at 15.2 m: white gravels, coarse to medium grained sand, moist

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GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416
DATE DRILLED	06–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE** 1:25	**DATE** 14–NOV–12

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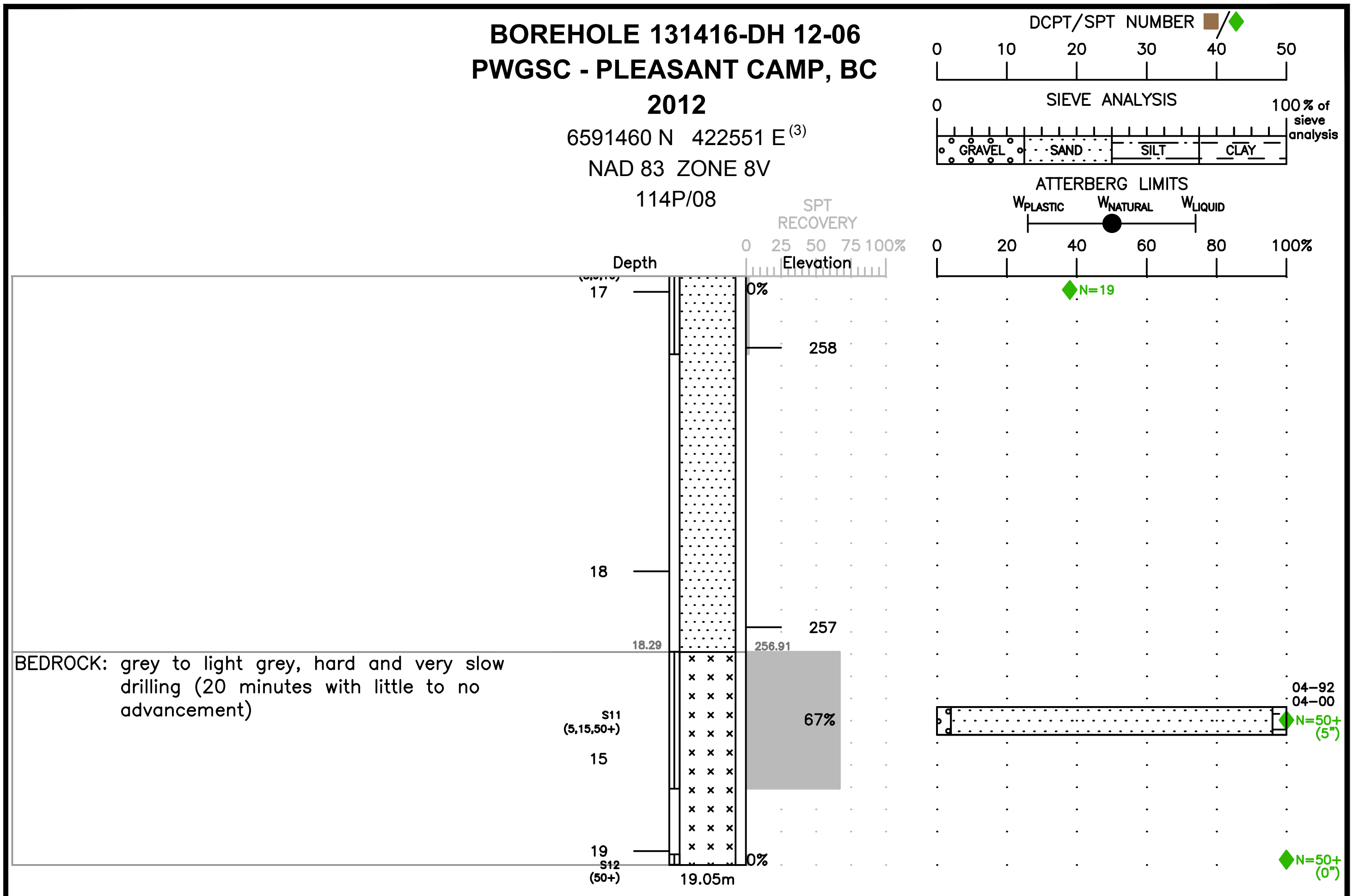
BOREHOLE 131416-DH 12-06
PWGSC - PLEASANT CAMP, BC
2012

6591460 N 422551 E (3)
NAD 83 ZONE 8V
114P/08



BEDROCK: grey to light grey, hard and very slow drilling (20 minutes with little to no advancement)

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PAGE 6 OF 6

LIMITATION

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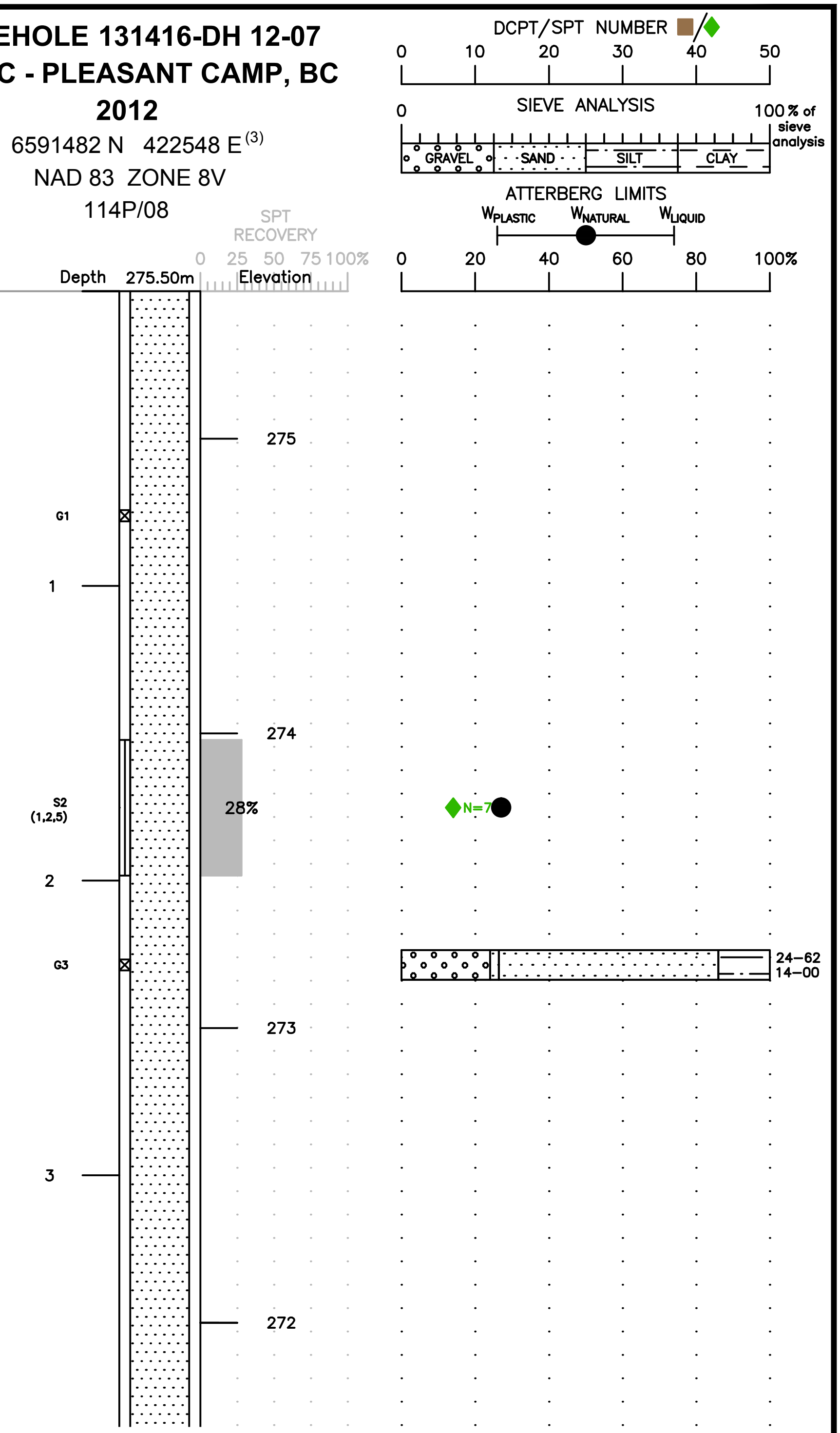
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416		
DATE DRILLED	06–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE**	1:25	**DATE**	14–NOV–12

ACADDWG:\\P:\SLE\01 – British Columbia\JCS#131416–E011 CBSA Pleasant Camp Remedial Excavation\Drafting\Borehole\BH–131416–06.dwg

BOREHOLE 131416-DH 12-07
PWGSC - PLEASANT CAMP, BC
2012

6591482 N 422548 E $^{(3)}$
NAD 83 ZONE 8V
114P/08



SAND: gravelly, some silt, medium to coarse grained, wet (drillers used water), brown (imported fill?)

- at 1.5 to 2.0 m: loose (SPT), silty clayey, wet

- at 2.7 m: light grey, some white gravel, no silt to trace silt

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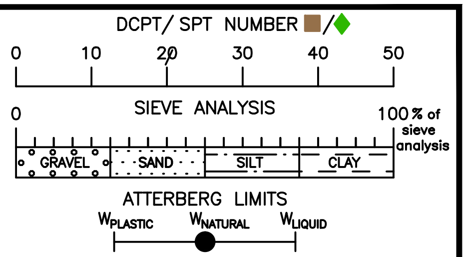
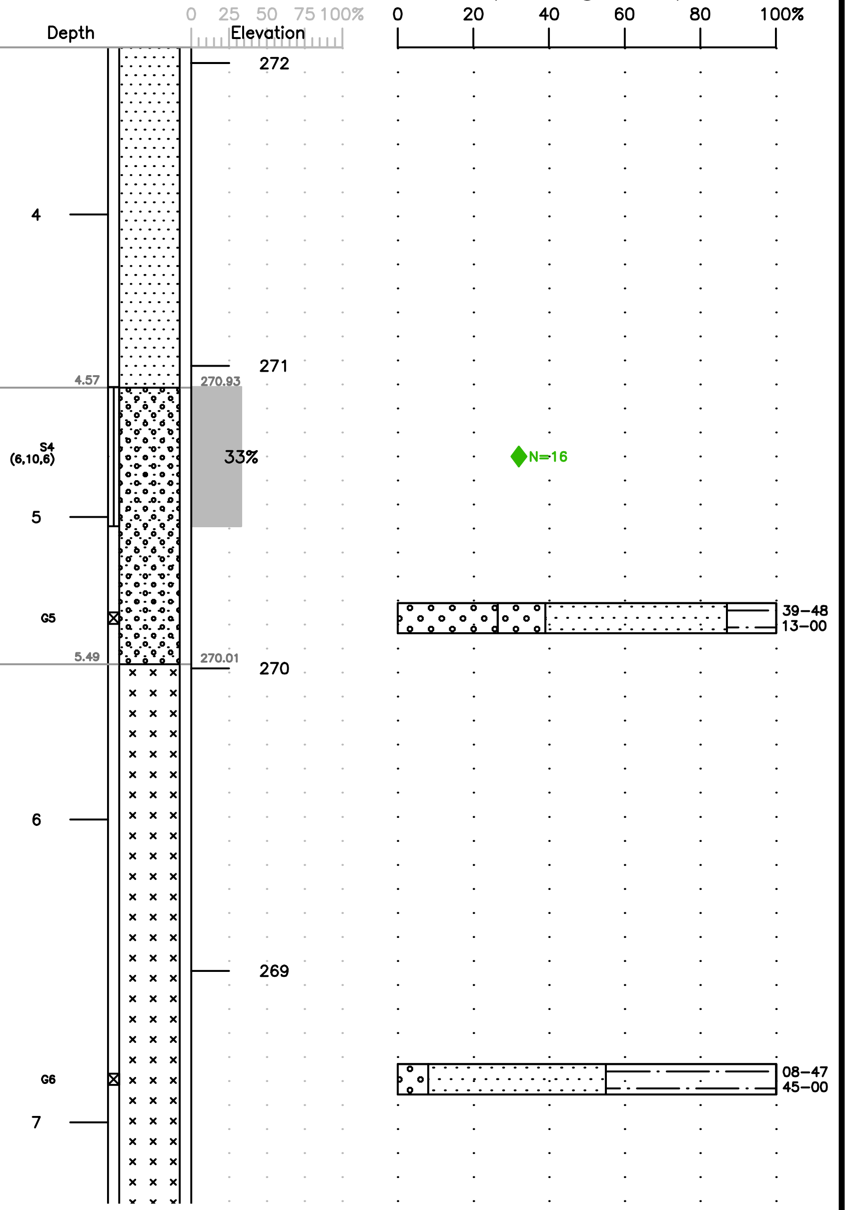
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416
DATE DRILLED	07–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE** 1:25	**DATE** 14–NOV–12

BOREHOLE 131416-DH 12-07
PWGSC - PLEASANT CAMP, BC
2012

6591482 N 422548 E$^{(3)}$
NAD 83 ZONE 8V
114P/08





SAND AND GRAVEL: coarse grained sand, subangular to subrounded gravel, non plastic, compact (SPT), brown to dark grey, wet

BEDROCK: light grey, hard and slow drilling, sandy silt, damp

NOTES:
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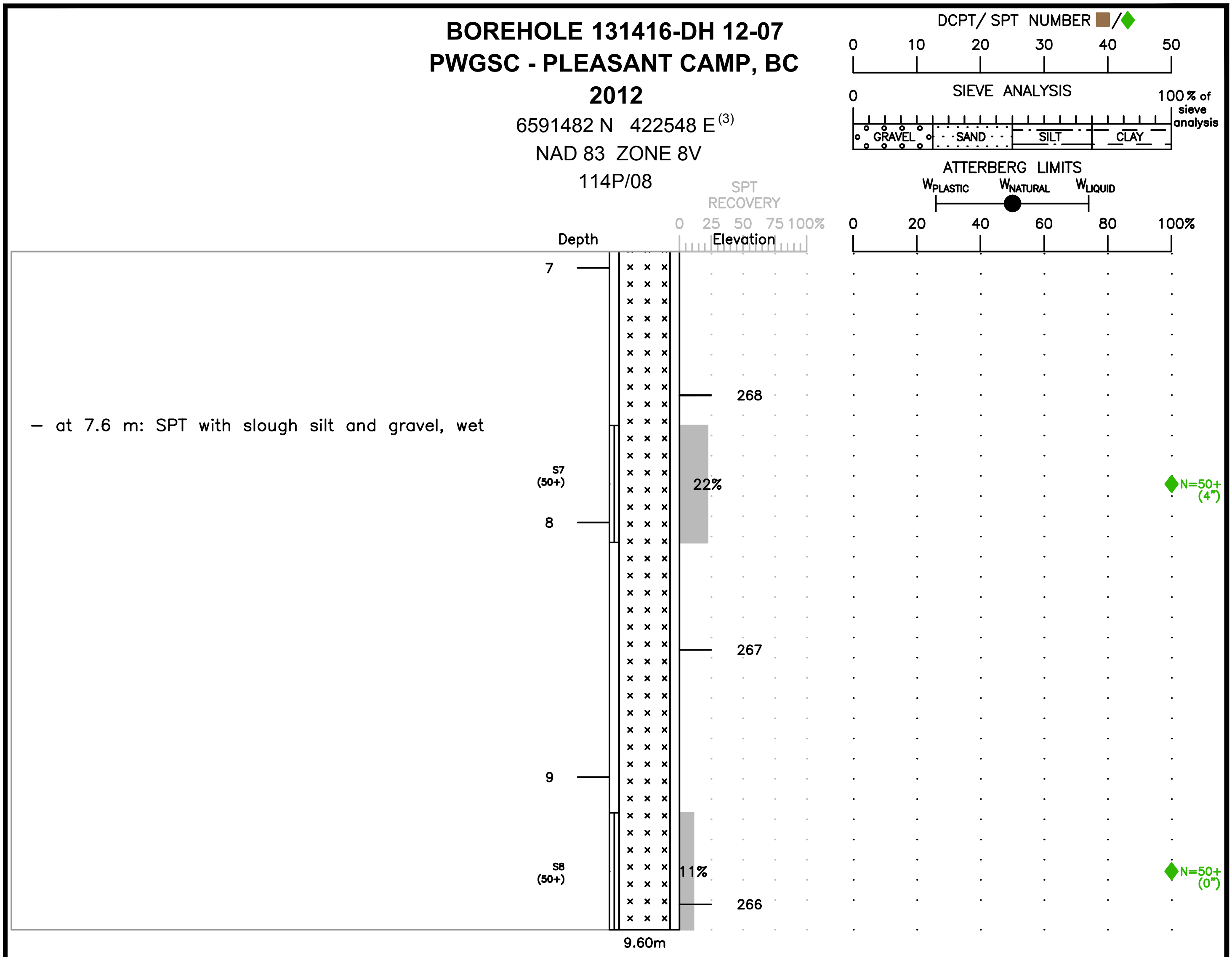
ACADDWG:\\P:\SLE\01 – British Columbia\JCS#131416–E011 CBSA Pleasant Camp Remedial Excavation\Drafting\Borehole\BH–131416–07.dwg

BOREHOLE 131416-DH 12-07
PWGSC - PLEASANT CAMP, BC
2012

6591482 N 422548 E (3)
NAD 83 ZONE 8V
114P/08



– at 7.6 m: SPT with slough silt and gravel, wet

NOTES:
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2. (#,#) denotes DCPT / (#,#,#) denotes SPT blows per 152 mm (6.0 inches).
3. Coordinates are handheld GPS. Accuracy for this unit is +/– 15 m.
4. Elevations are in meters above sea level (masl) and interpolated from contours (+/– 0.50 m).
5. Depths are in meters (m).

LIMITATION

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LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU		
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416		
DATE DRILLED	07–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE**	1:25	**DATE**	14–NOV–12

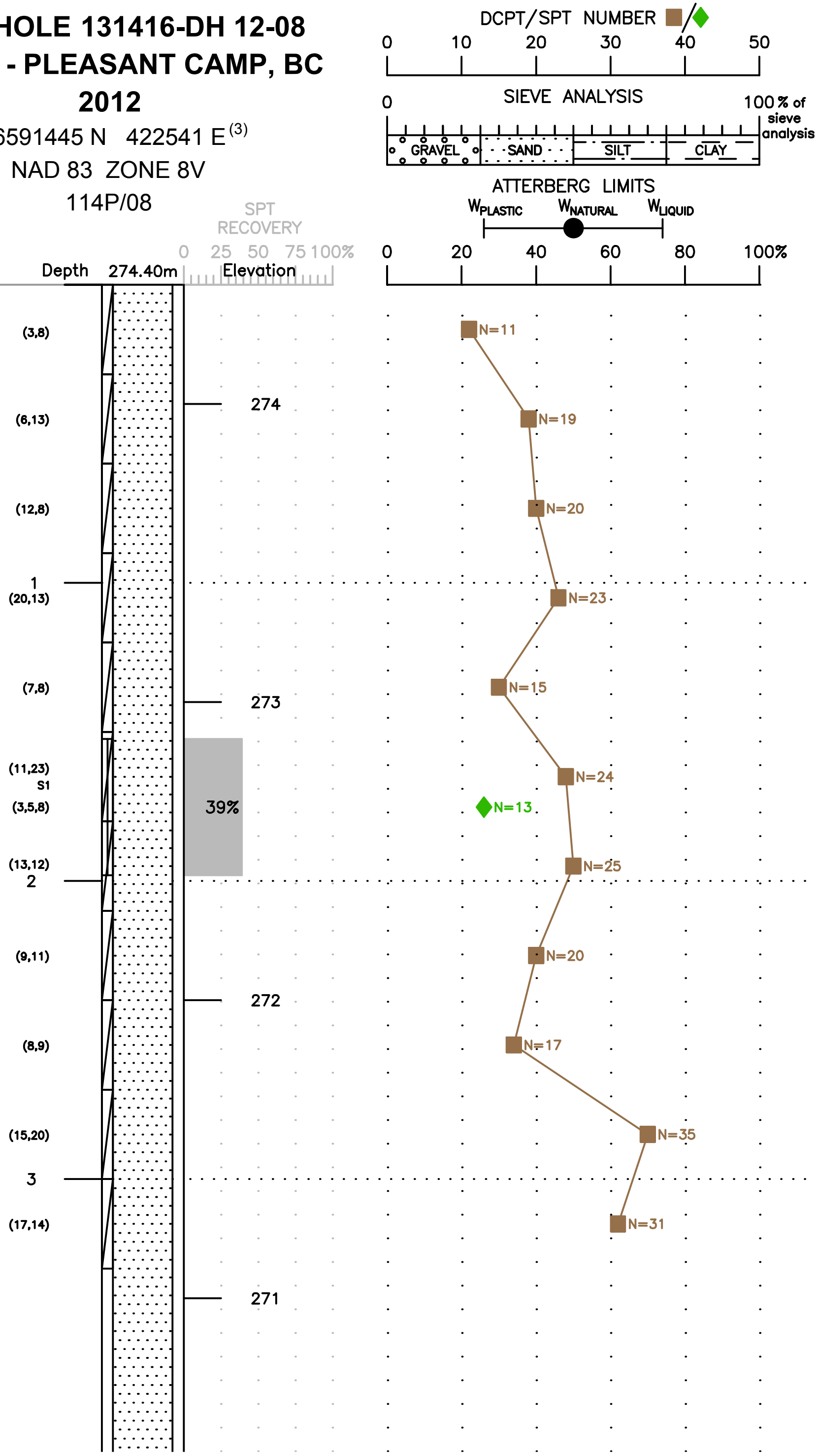
ACADDWG:\\P:\SLE\01 – British Columbia\JCS#131416–E011 CBSA Pleasant Camp Remedial Excavation\Drafting\Borehole\BH–131416–07.dwg

BOREHOLE 131416-DH 12-08
PWGSC - PLEASANT CAMP, BC
2012

6591445 N 422541 E(3)
NAD 83 ZONE 8V
114P/08

SAND: silty, trace gravel, fine to medium grained, non plastic, moist, brown (imported fill)

– at 1.5 m: loose, trace to some gravel, medium grained



NOTES: 1. Dynamic Cone Penetration / Standard Penetration Tests (SPT) conducted with 63.5 kg (140 lb) automatic trip hammer falling 762 mm (30 inches).
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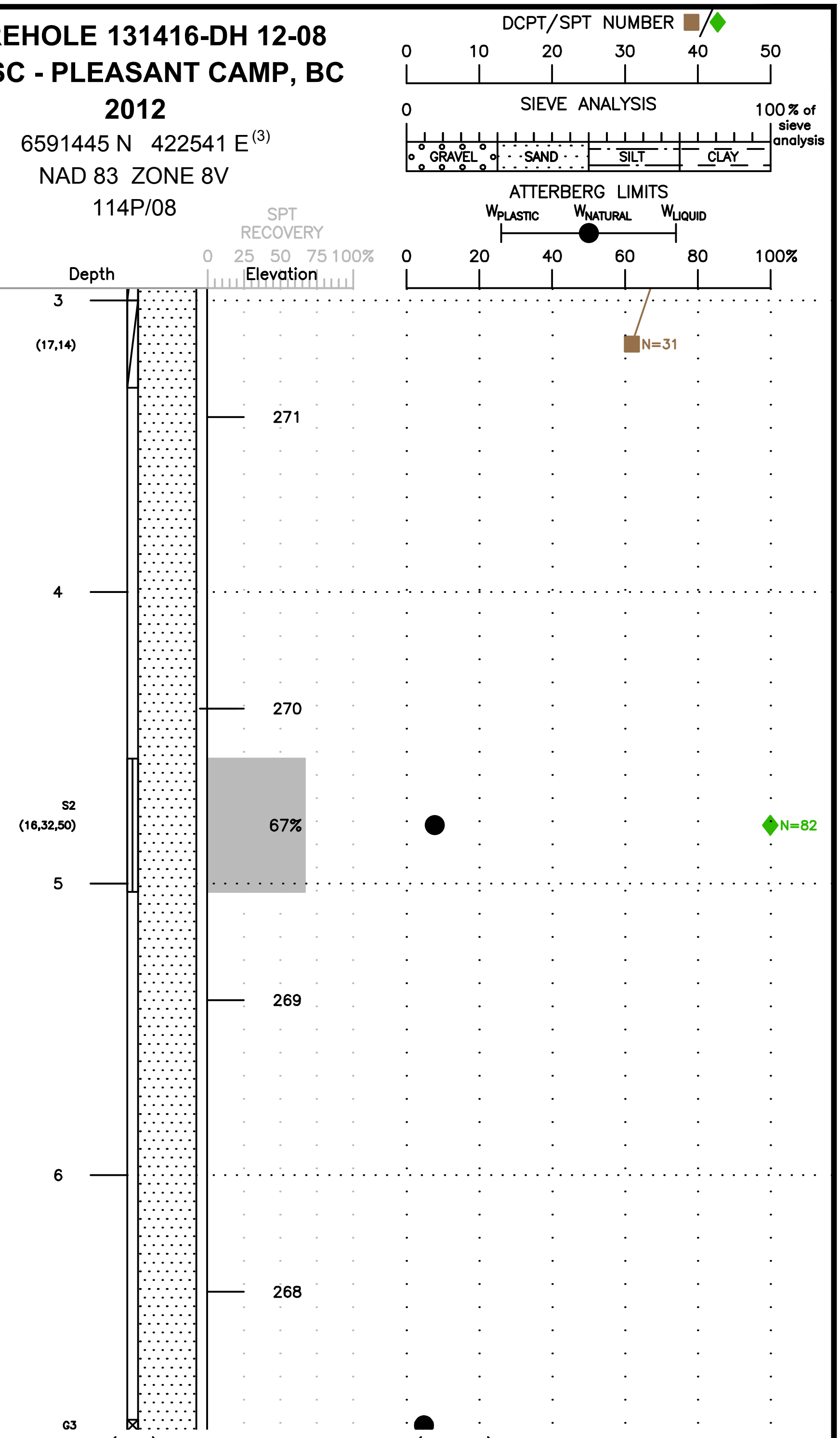
LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU		
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416		
DATE DRILLED	07–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE**	1:25	**DATE**	14–NOV–12

BOREHOLE 131416-DH 12-08
PWGSC - PLEASANT CAMP, BC
2012

6591445 N 422541 E(3)
NAD 83 ZONE 8V
114P/08



– at 4.6 m: white calcite rock seam, trace clay

– at 6.4 m: fine grained, dry, hard drilling

NOTES: 1. Dynamic Cone Penetration / Standard Penetration Tests (SPT) conducted with 63.5 kg (140 lb) automatic trip hammer falling 762 mm (30 inches).
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DATE DRILLED	07–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE** 1:25	**DATE** 14–NOV–12

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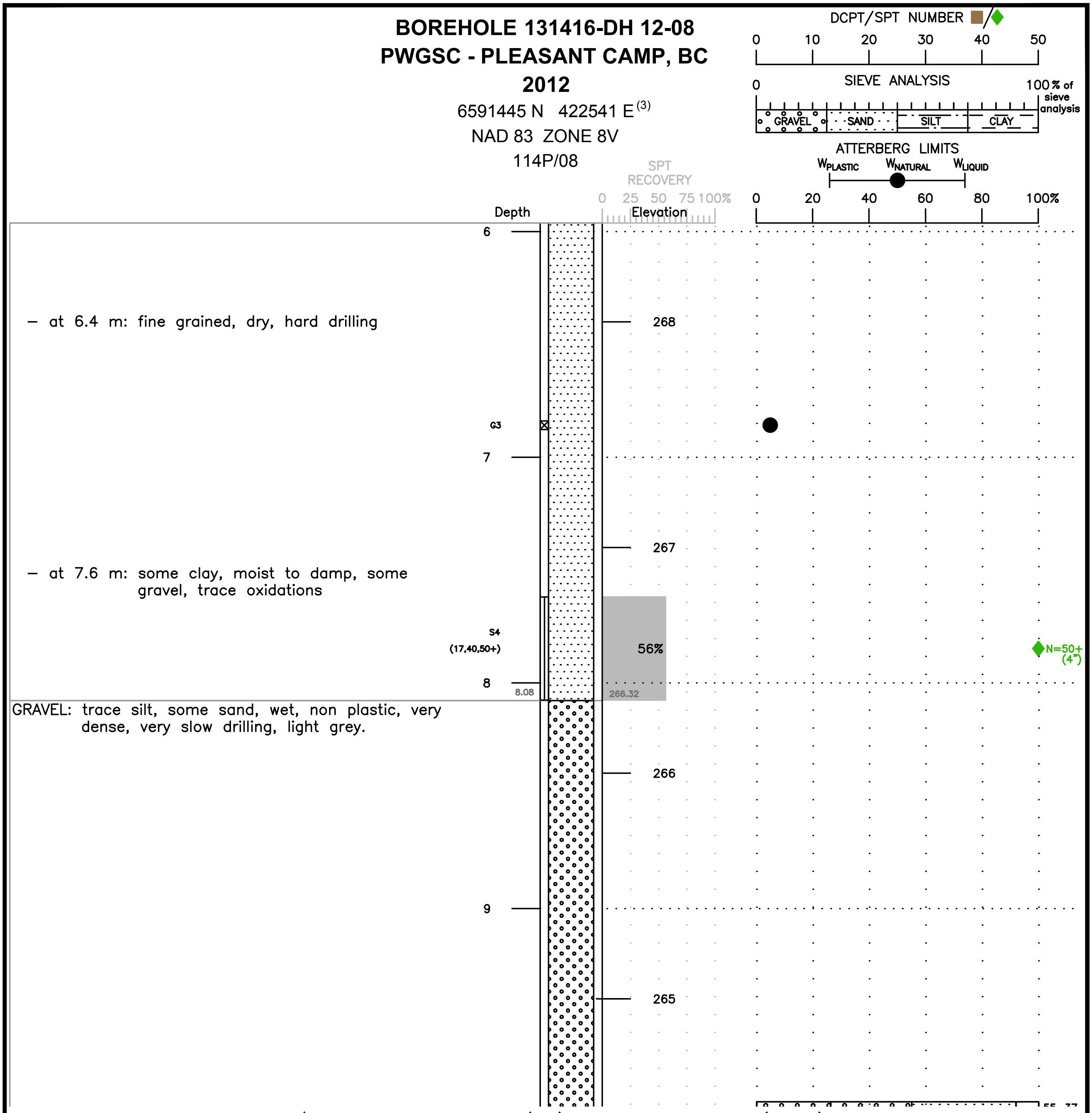
BOREHOLE 131416-DH 12-08
PWGSC - PLEASANT CAMP, BC
2012

6591445 N 422541 E $^{(3)}$
NAD 83 ZONE 8V
114P/08



– at 6.4 m: fine grained, dry, hard drilling

– at 7.6 m: some clay, moist to damp, some gravel, trace oxidations

GRAVEL: trace silt, some sand, wet, non plastic, very dense, very slow drilling, light grey.

NOTES:
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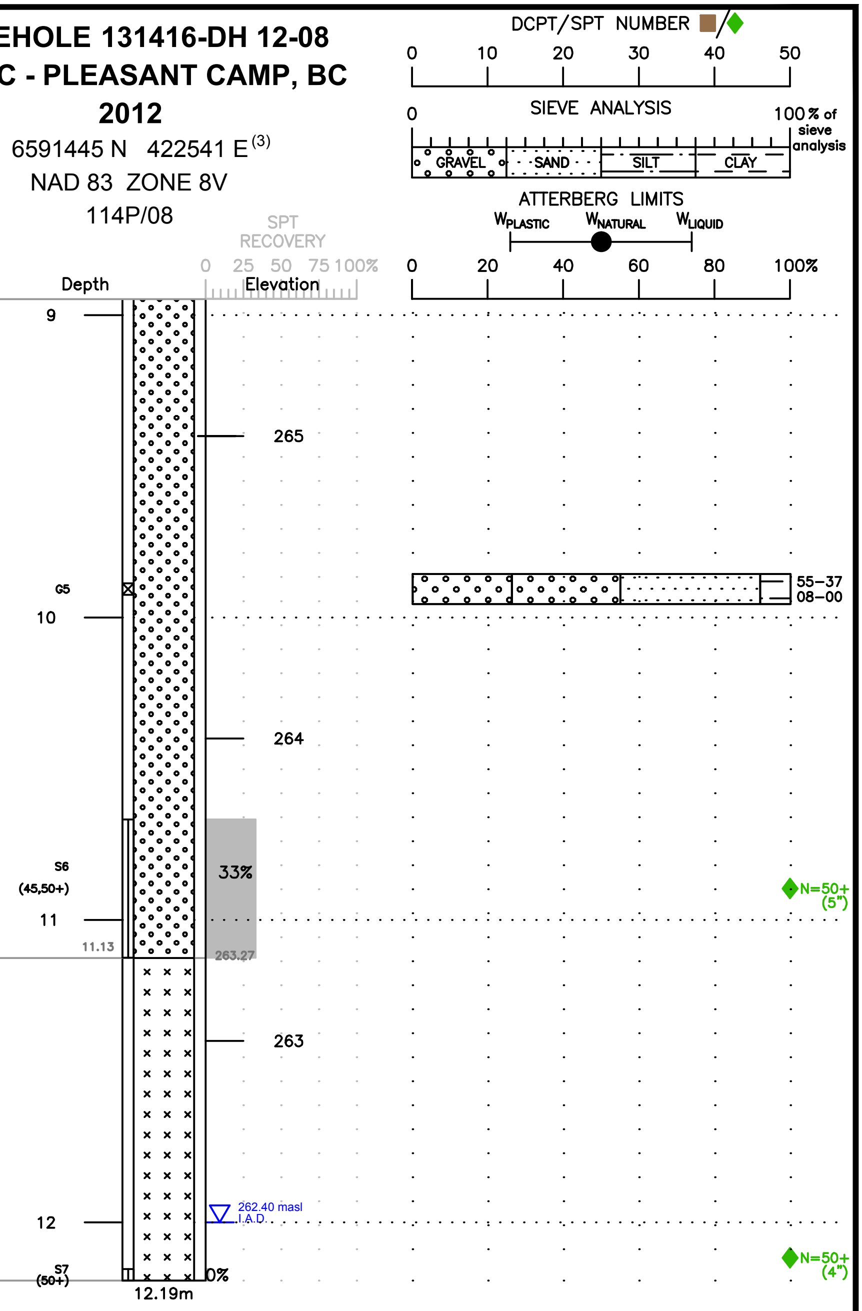
LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU		
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416		
DATE DRILLED	07–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE**	1:25	**DATE**	14–NOV–12

BOREHOLE 131416-DH 12-08
PWGSC - PLEASANT CAMP, BC
2012

6591445 N 422541 E (3)
NAD 83 ZONE 8V
114P/08



BEDROCK: light grey, hard and slow drilling

NOTES:
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5. Depths are in meters (m).

PAGE 4 OF 4

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LOGGED BY	N. SAFI	**OPERATOR**	T. HESSE	**DRAWN BY**	C. WU
GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416
DATE DRILLED	07–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE** 1:25	**DATE** 14–NOV–12

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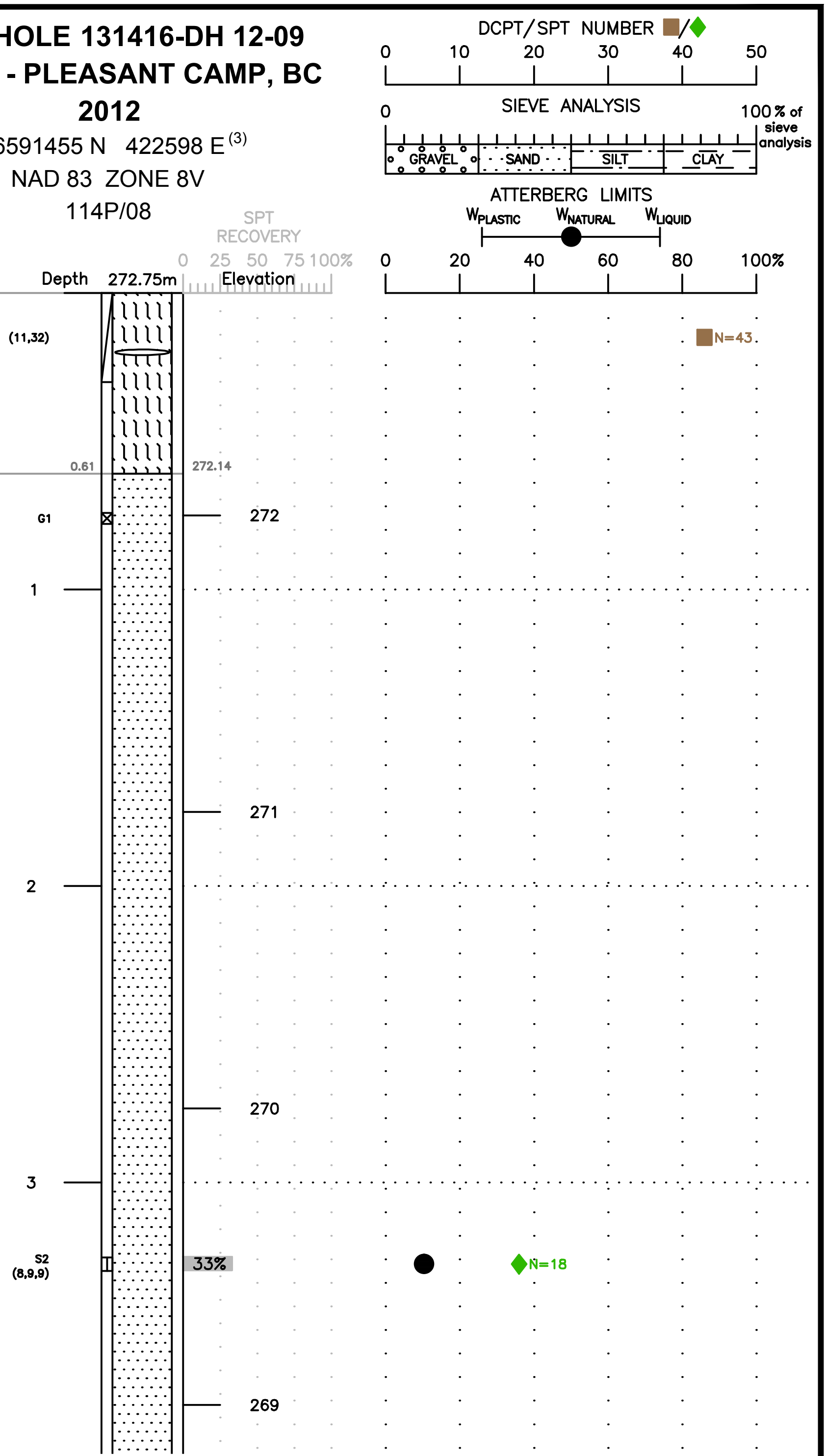
BOREHOLE 131416-DH 12-09
PWGSC - PLEASANT CAMP, BC
2012

6591455 N 422598 E$^{(3)}$
NAD 83 ZONE 8V
114P/08



GRAVEL (FILL): sandy, dry, brown.

- at 0.2 m: 450 mm rock (hard drilling) (imported fill)

SAND: some silt, trace gravel, fine to medium grained, non plastic, dry to damp, brown

- at 3.0 m: compact, moist, trace clay, trace oxidation, easy drilling

NOTES:
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4. Elevations are in meters above sea level (masl) and interpolated from contours (+/− 0.50 m).
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PAGE 1 OF 6

LIMITATION

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DATE DRILLED	08-OCT-12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE**	1:25	**DATE**	14-NOV-12

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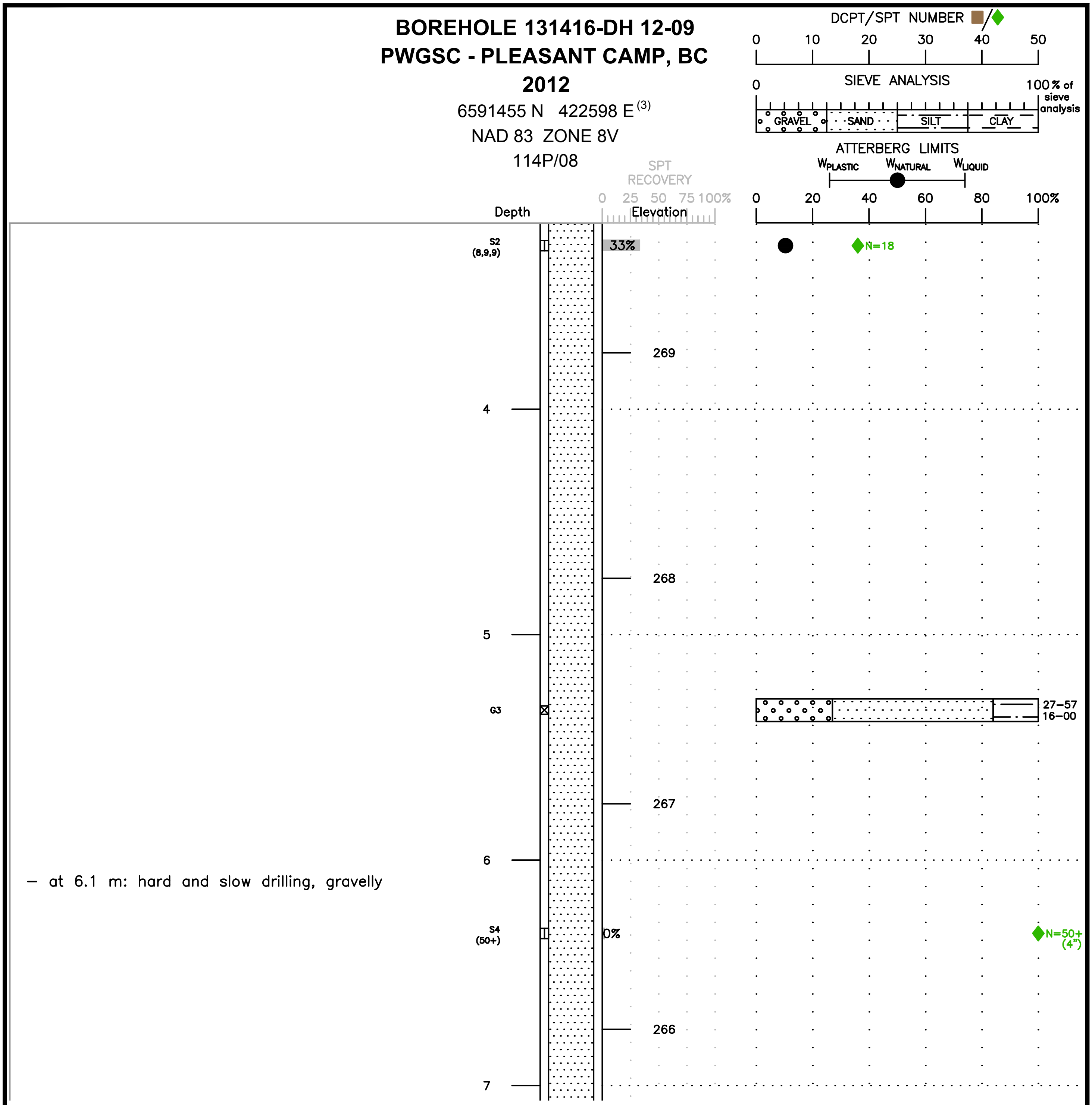
BOREHOLE 131416-DH 12-09
PWGSC - PLEASANT CAMP, BC
2012

6591455 N 422598 E (3)
NAD 83 ZONE 8V
114P/08



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DATE DRILLED	08–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE**	1:25	**DATE**	14–NOV–12

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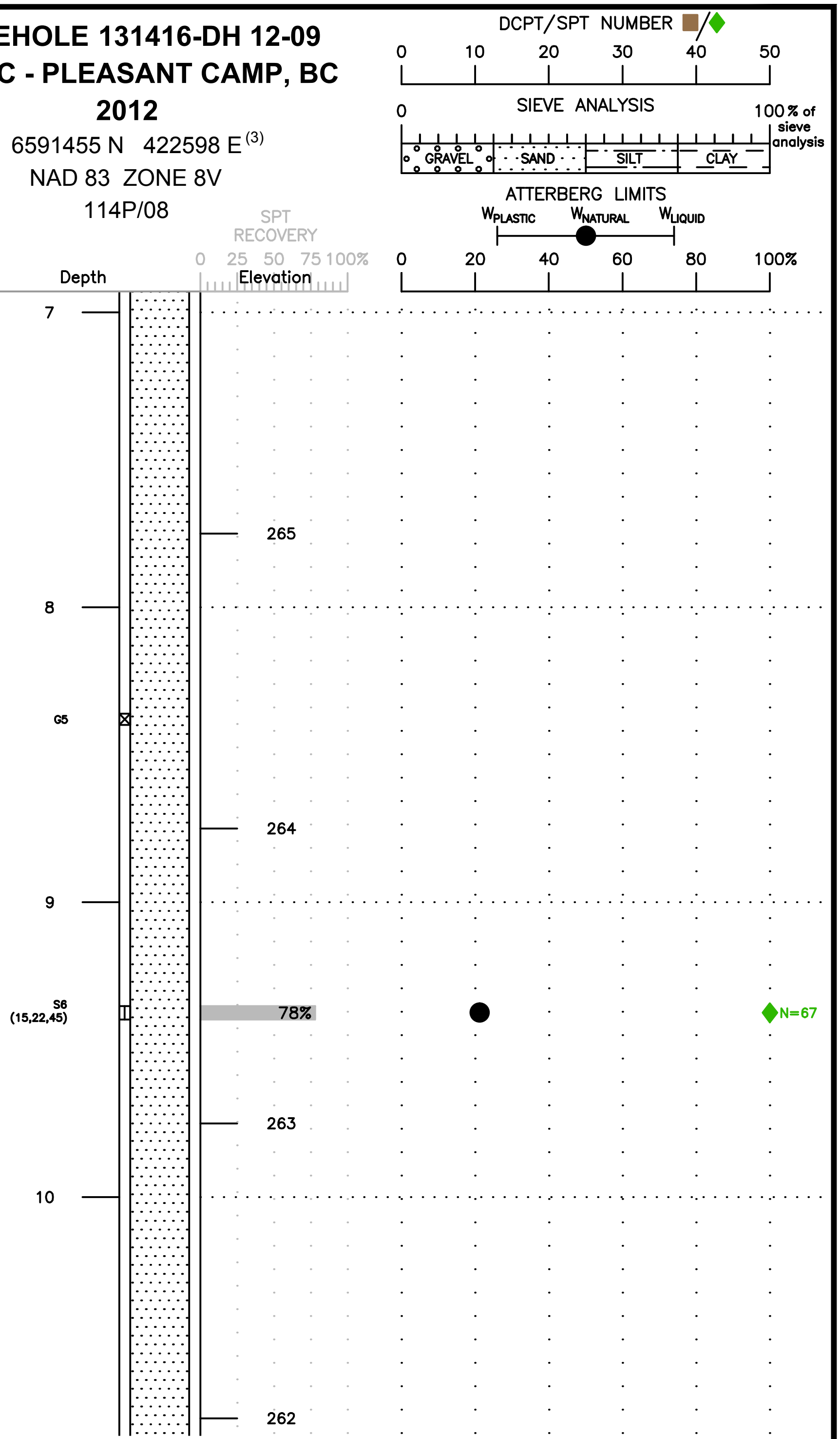
BOREHOLE 131416-DH 12-09
PWGSC - PLEASANT CAMP, BC
2012

6591455 N 422598 E[3]
NAD 83 ZONE 8V
114P/08



– at 7.6 m: dark grey, dry (drillers added water)

– at 9.1 m: sand silt, very dense, moist to wet

– at 9.9 m: light grey

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GEOLOGY BY	N/A	**DRILL RIG TYPE**	DR212	**PROJECT No.**	131416
DATE DRILLED	08–OCT–12	**ABANDONMENT**	CUTTINGS AND BENTONITE SEAL	**SCALE** 1:25	**DATE** 14–NOV–12

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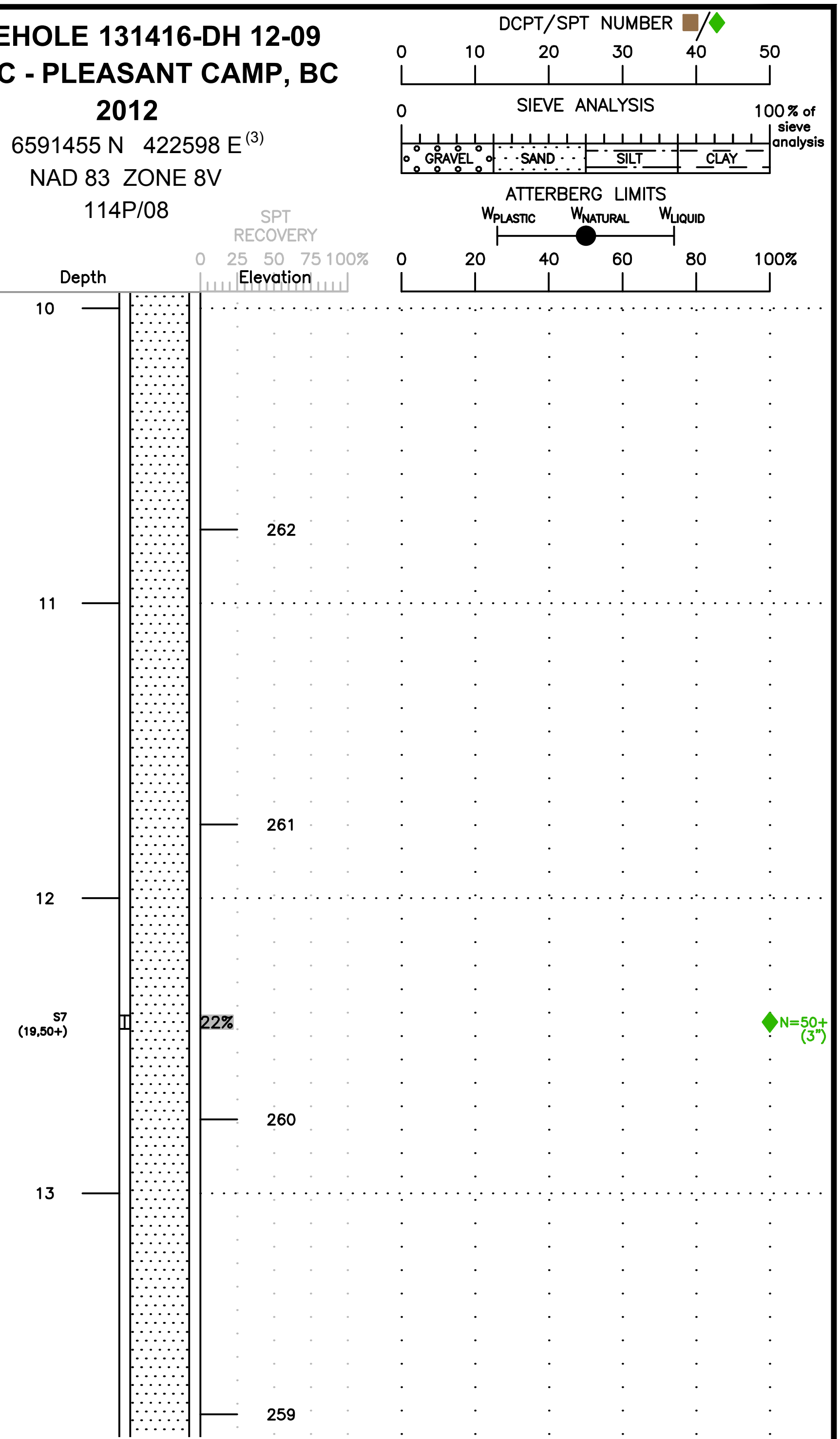
BOREHOLE 131416-DH 12-09
PWGSC - PLEASANT CAMP, BC
2012

6591455 N 422598 E (3)
NAD 83 ZONE 8V
114P/08



– at 11.3 m: coarse grained, brown

– at 13.7 m: light grey/brown, very dense, wet

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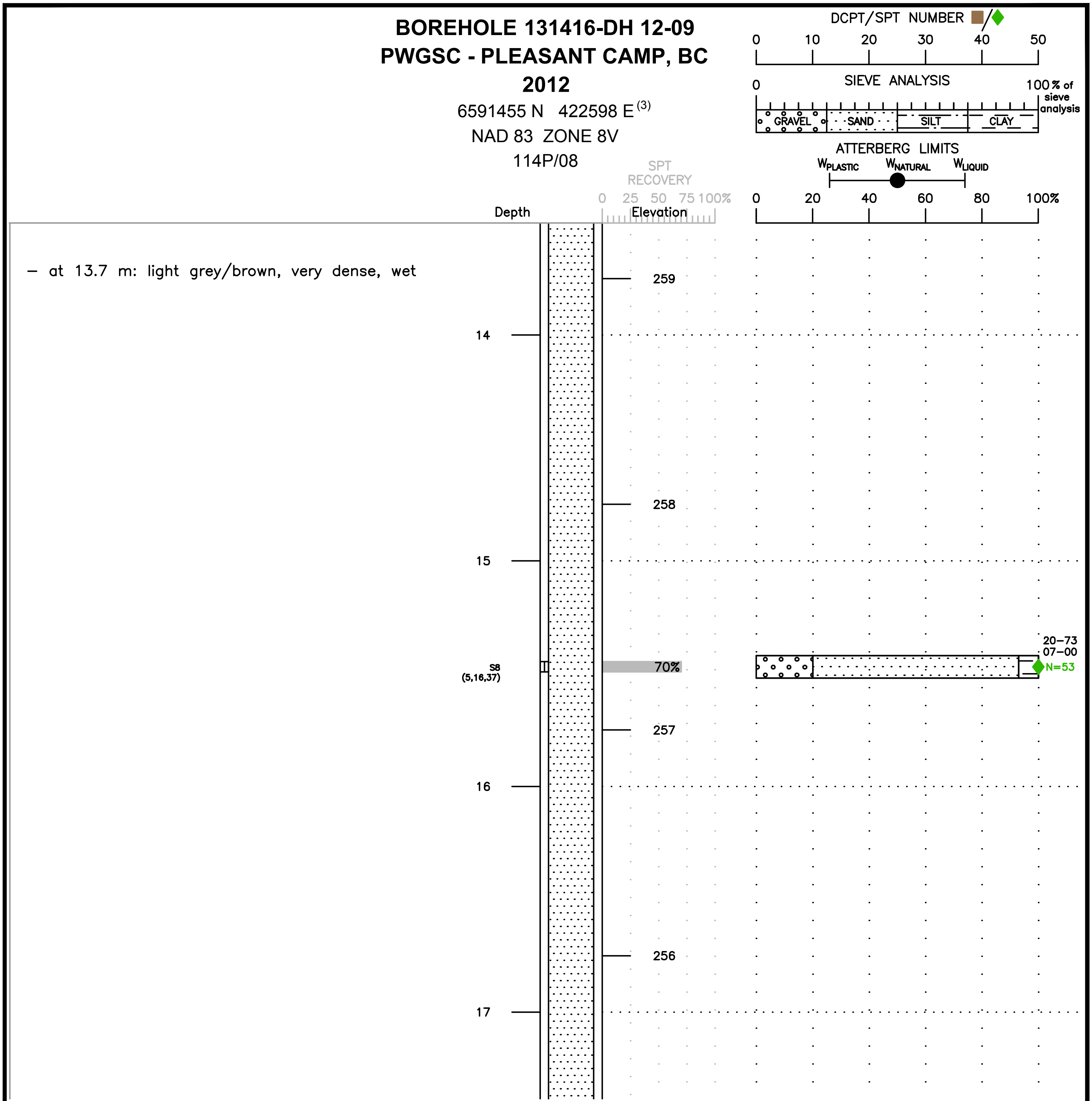
BOREHOLE 131416-DH 12-09
PWGSC - PLEASANT CAMP, BC
2012

6591455 N 422598 E (3)
NAD 83 ZONE 8V
114P/08



– at 13.7 m: light grey/brown, very dense, wet

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BOREHOLE 131416-DH 12-09
PWGSC - PLEASANT CAMP, BC
2012

6591455 N 422598 E (3)
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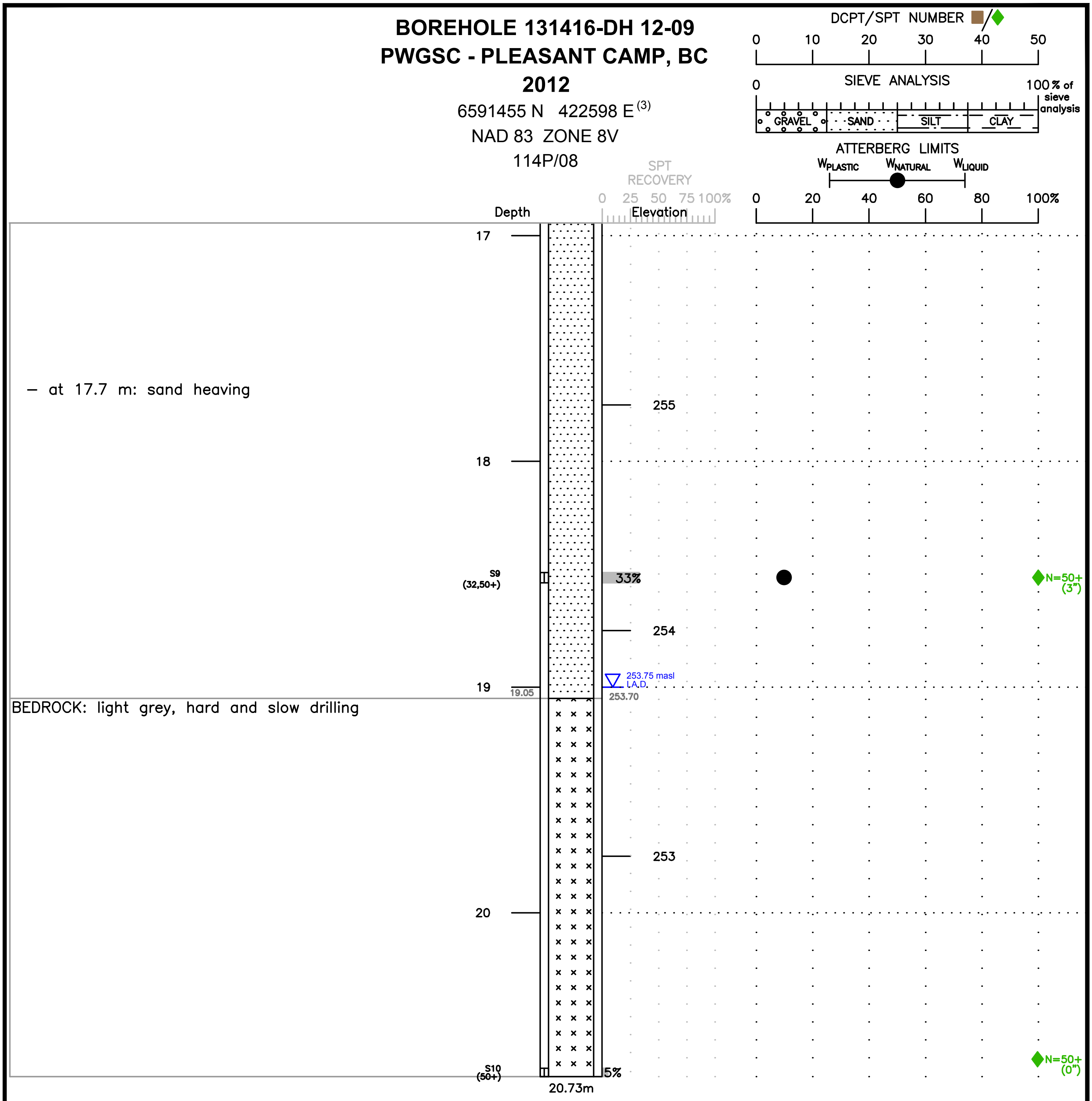

– at 17.7 m: sand heaving

BEDROCK: light grey, hard and slow drilling

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APPENDIX C

RESULTS OF SLOPE/W SLOPE STABILITY MODELING

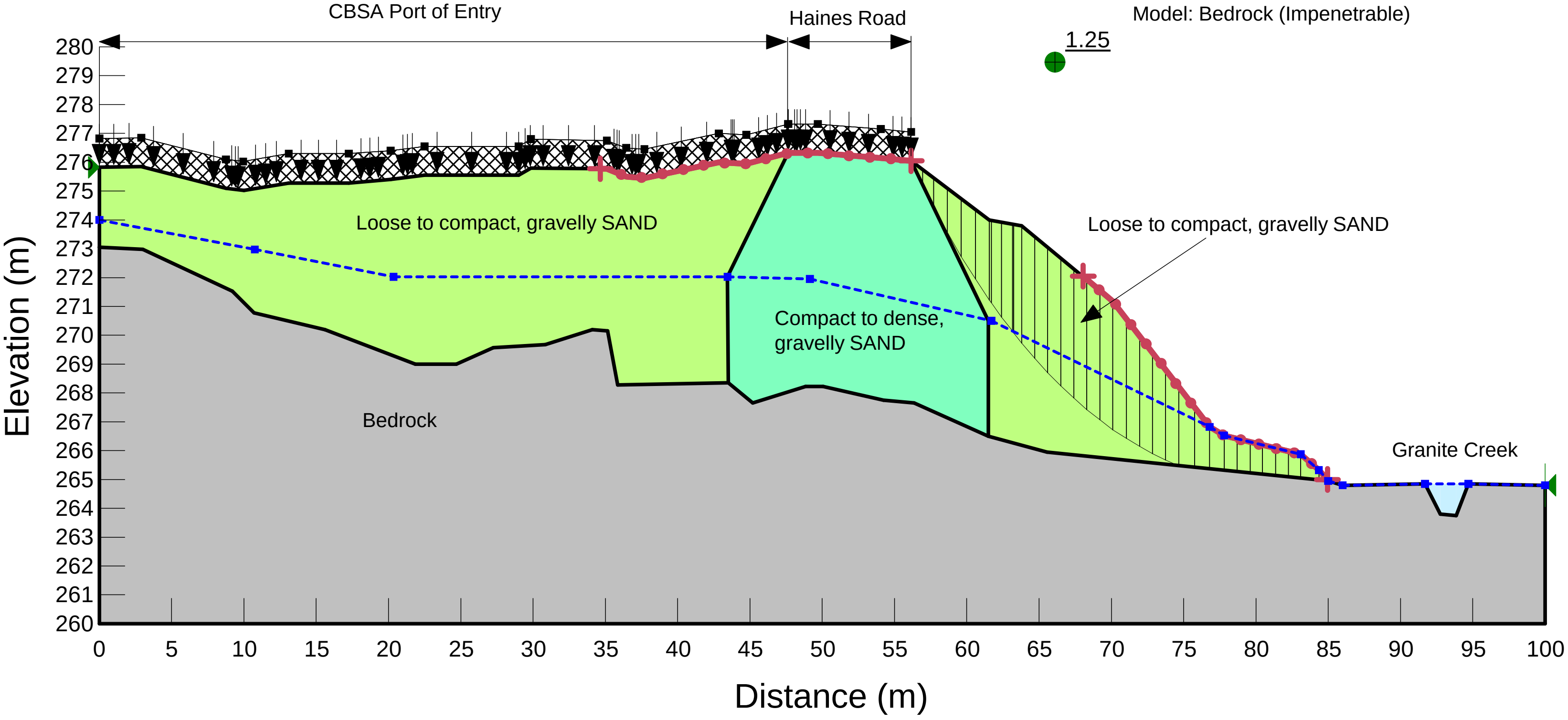
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Base Case (SLE Section C-C')
Static Loading
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 16 kN/m³
Horizontal Seismic Load (g): 0

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Base Case (Section C-C').gsz

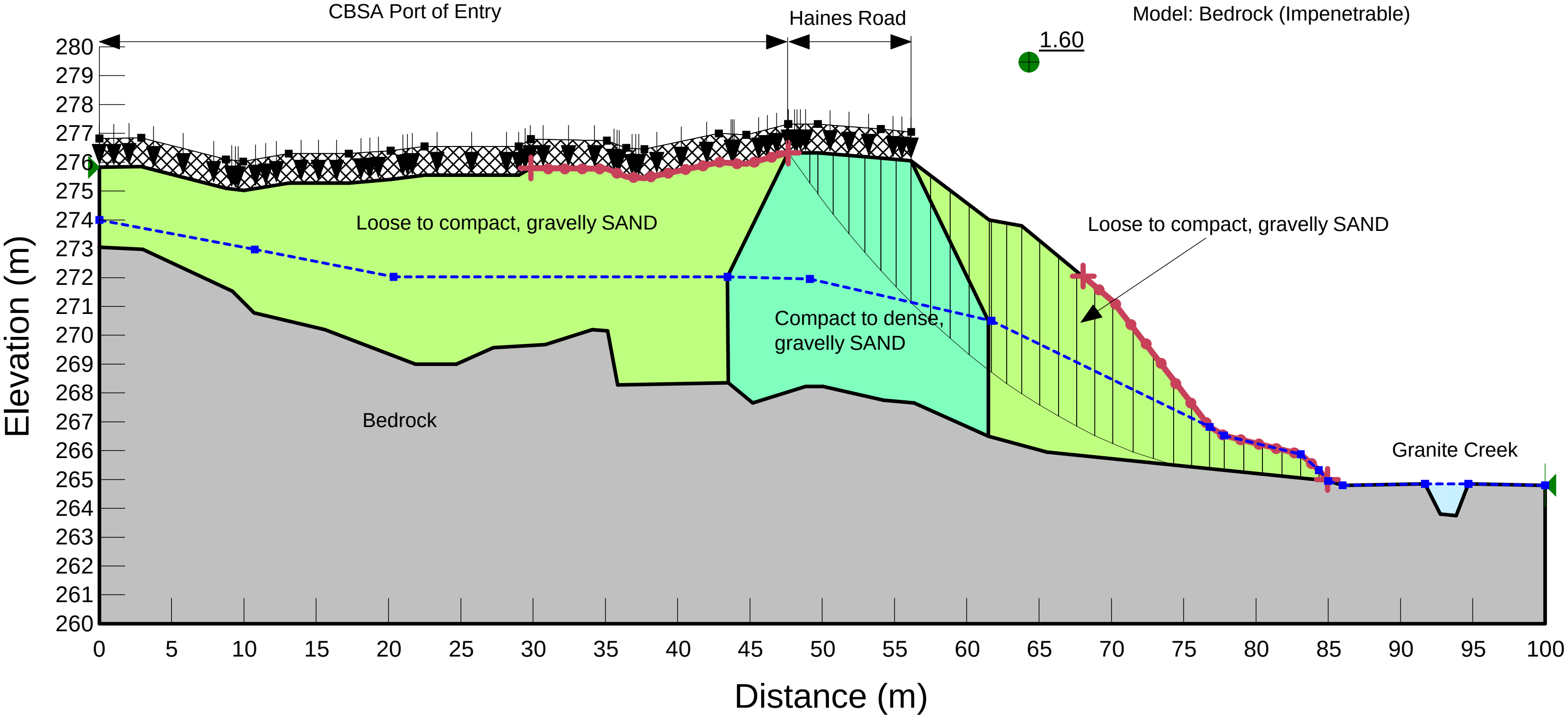
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Base Case (SLE Section C-C')
Static Loading - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 16 kN/m³
Horizontal Seismic Load (g): 0

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



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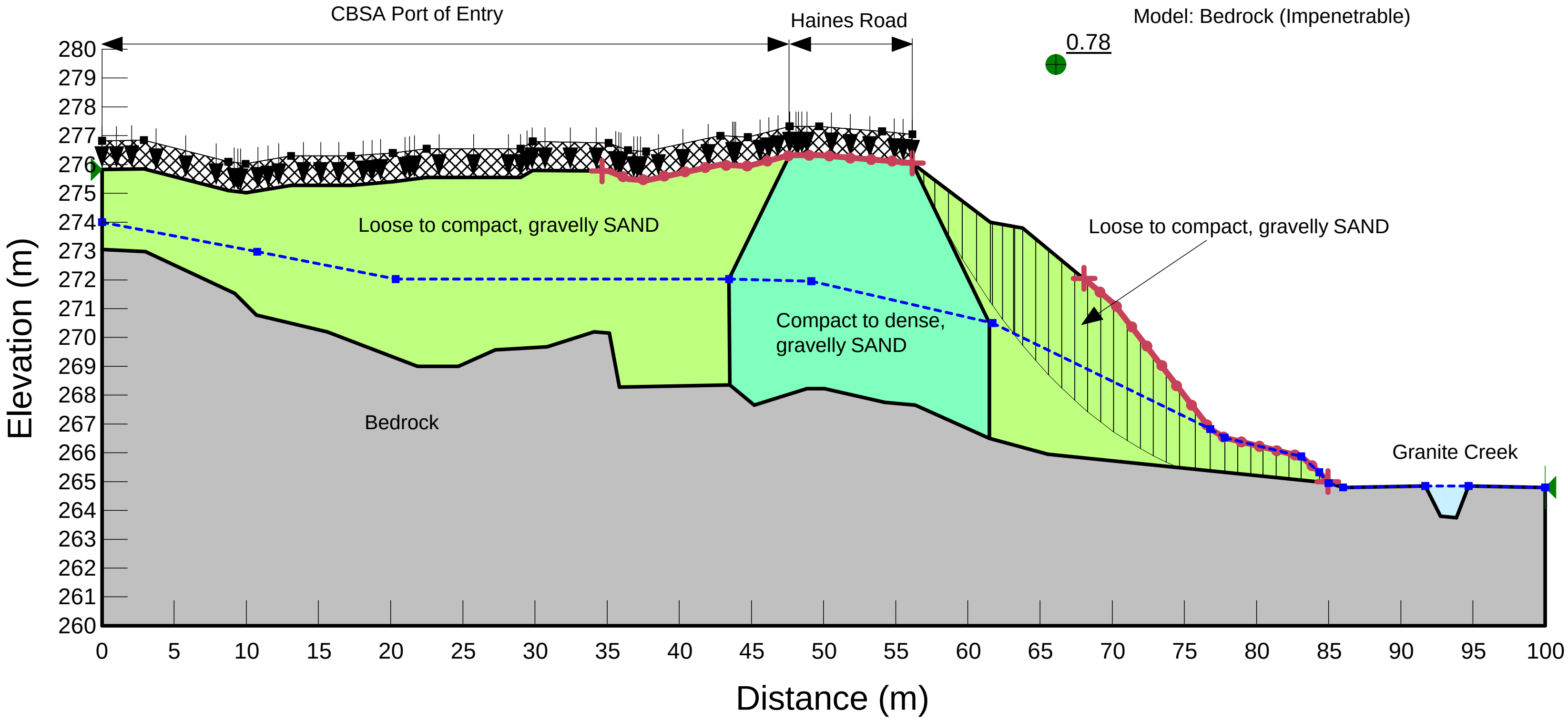
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Base Case (SLE Section C-C')
Pseudo-Static (Seismic) Loading
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.2

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Base Case (Section C-C').gsz

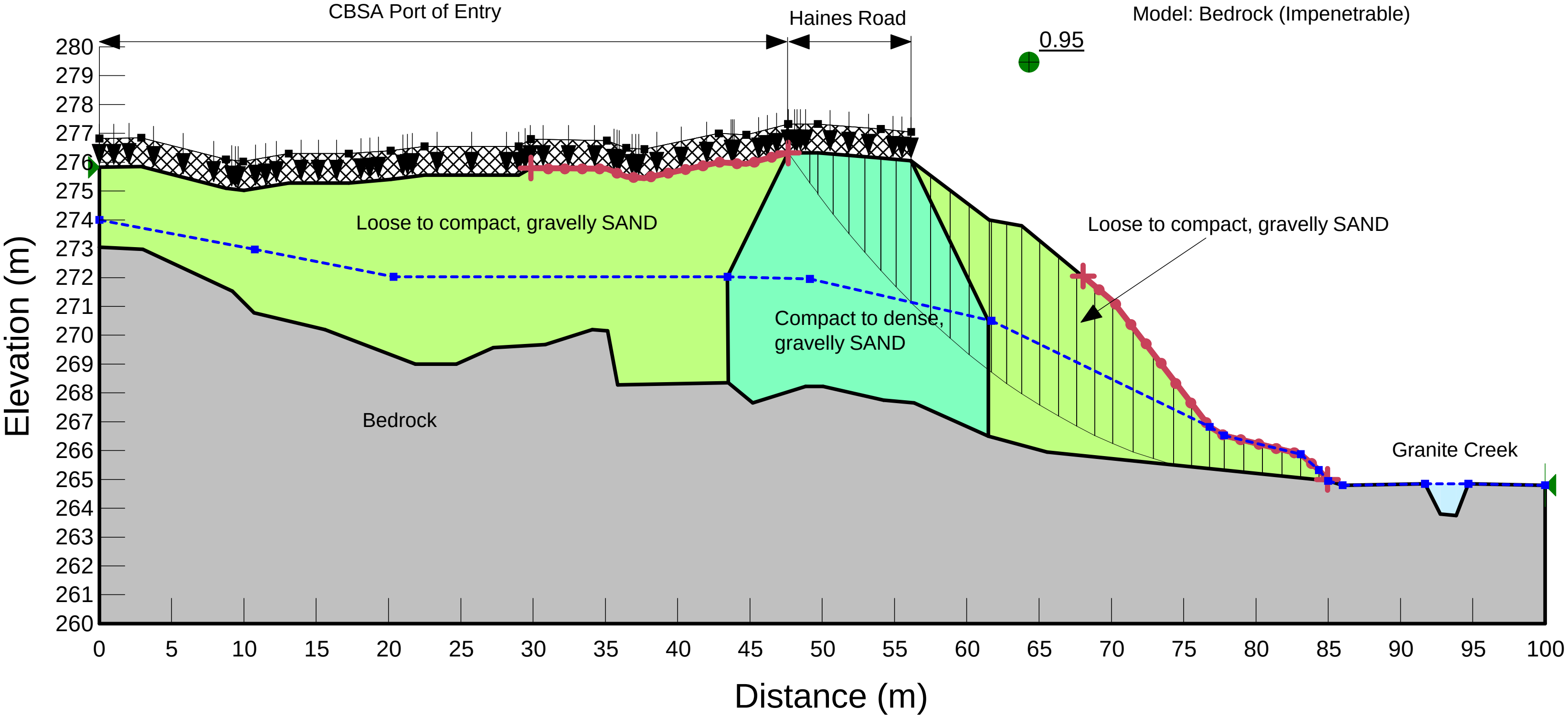
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Base Case (SLE Section C-C')
Pseudo-Static (Seismic) Loading - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m^3
Haines Road Traffic Live Load (kPa): 0 kN/m^3
Horizontal Seismic Load (g): 0.2

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m^3
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m^3
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Base Case (Section C-C').gsz

CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Base Case (SLE Section C-C')
Post-Seismic (Liquefied) Loading
TTEBA File W14103501-01
11/27/2014

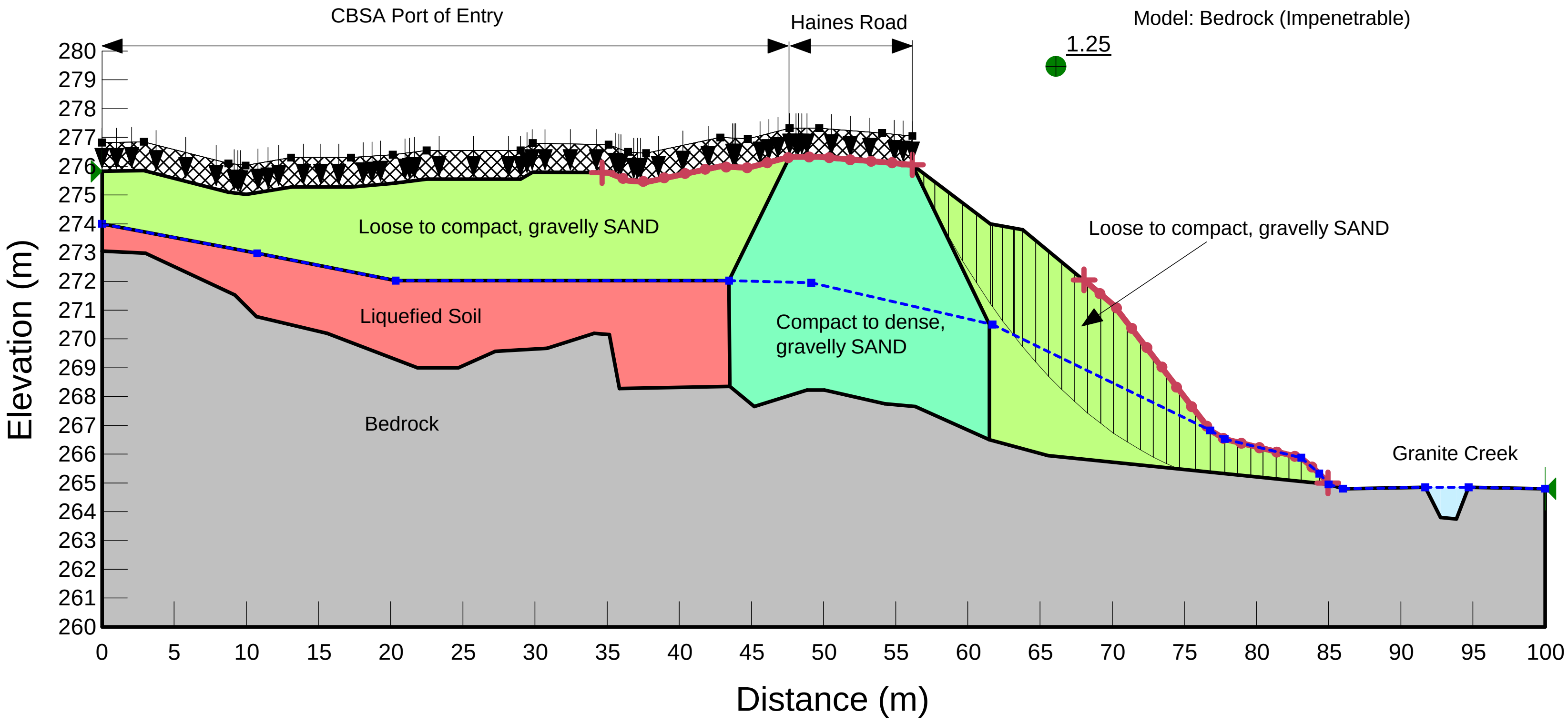
Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Liquefied Soil
Model: S=f(overburden)
Unit Weight: 18 kN/m³
Tau/Sigma Ratio: 0.1

Name: Bedrock
Model: Bedrock (Impenetrable)

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Base Case (Section C-C').gsz

CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Base Case (SLE Section C-C')
Post-Seismic (Liquefied) Loading - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

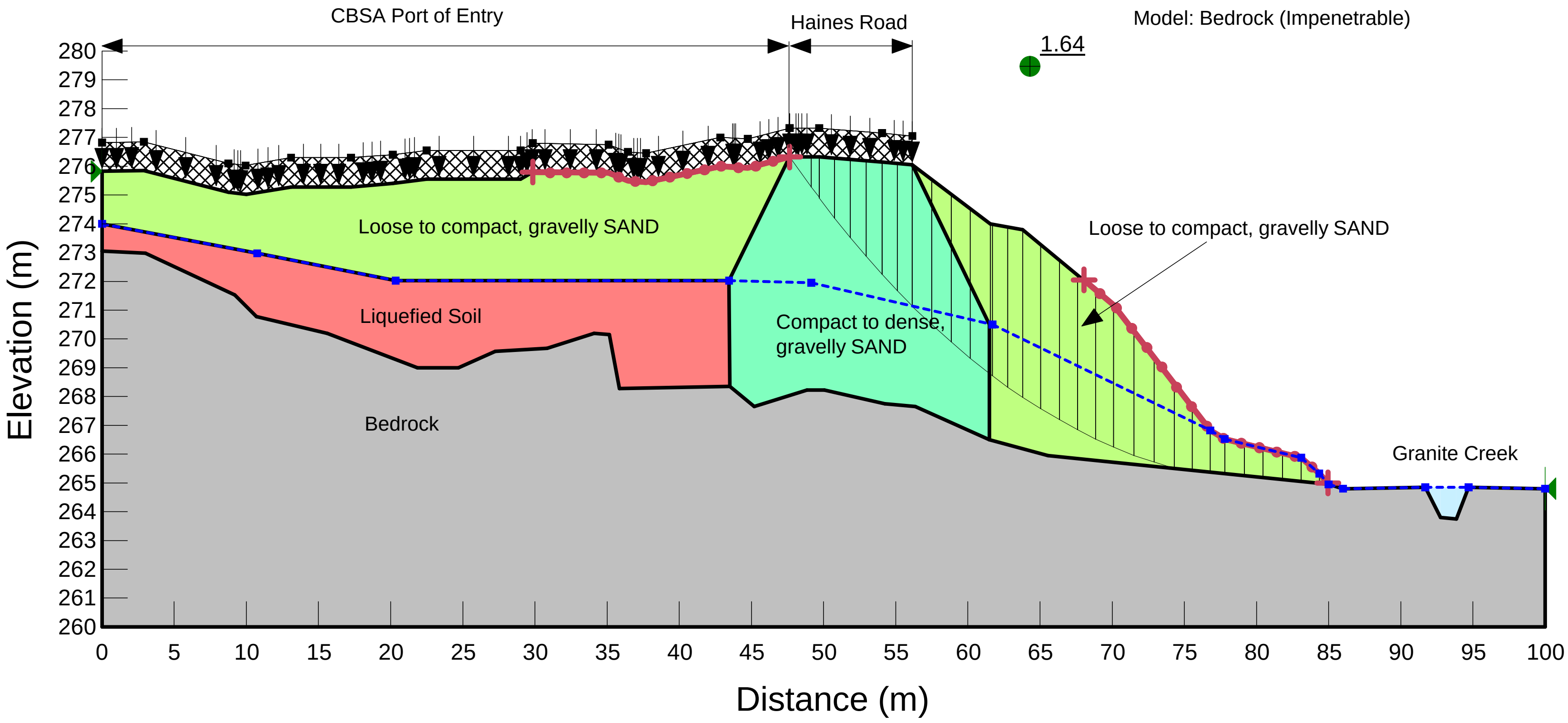
Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Liquefied Soil
Model: S=f(overburden)
Unit Weight: 18 kN/m³
Tau/Sigma Ratio: 0.1

Name: Bedrock
Model: Bedrock (Impenetrable)

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Base Case (Section C-C').gsz

CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Base Case (SLE Section C-C')
Worst Case (Seismic + Liquefaction)
TTEBA File W14103501-01
11/27/2014

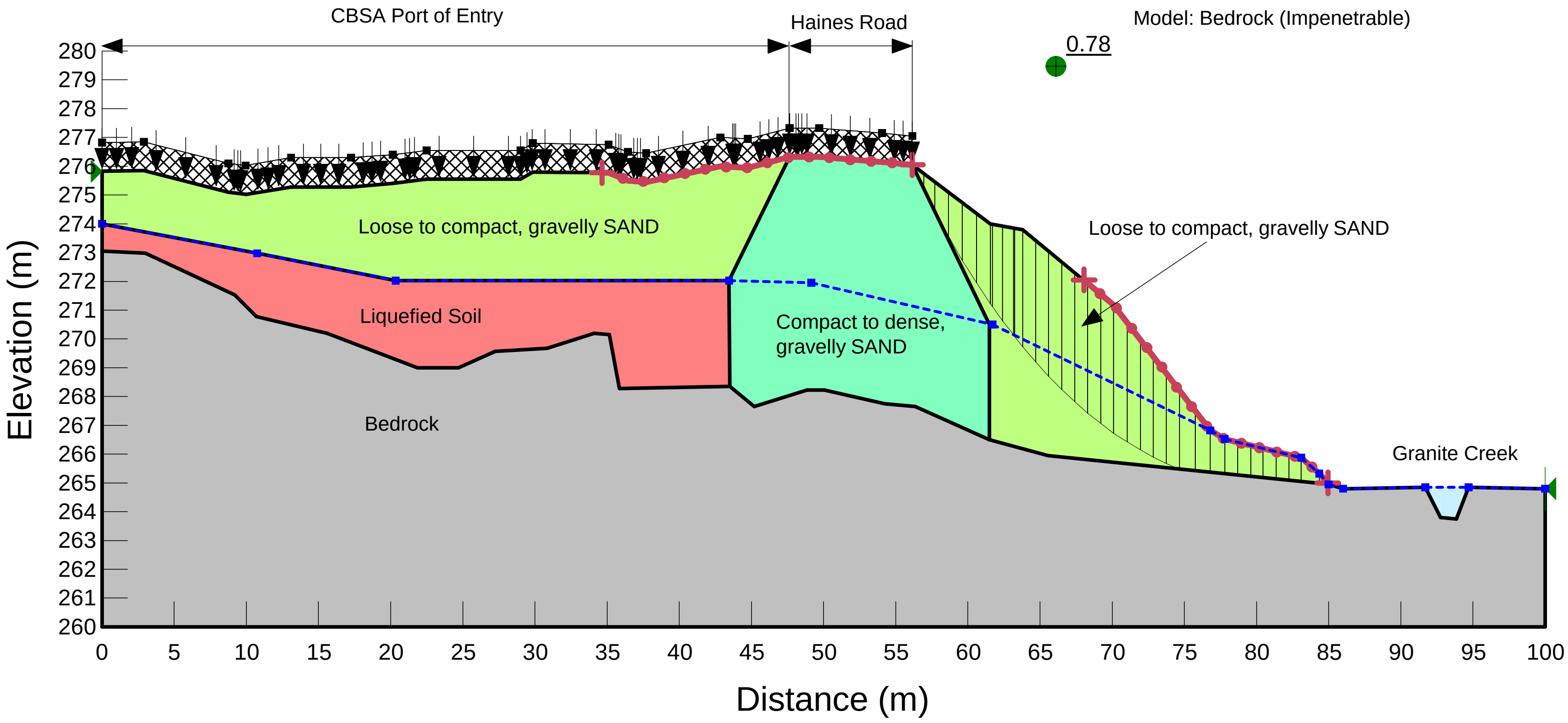
Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Liquefied Soil
Model: S=f(overburden)
Unit Weight: 18 kN/m³
Tau/Sigma Ratio: 0.1

Name: Bedrock
Model: Bedrock (Impenetrable)

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.2



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Base Case (Section C-C').gsz

CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Base Case (SLE Section C-C')
Worst Case (Seismic + Liquefaction) - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

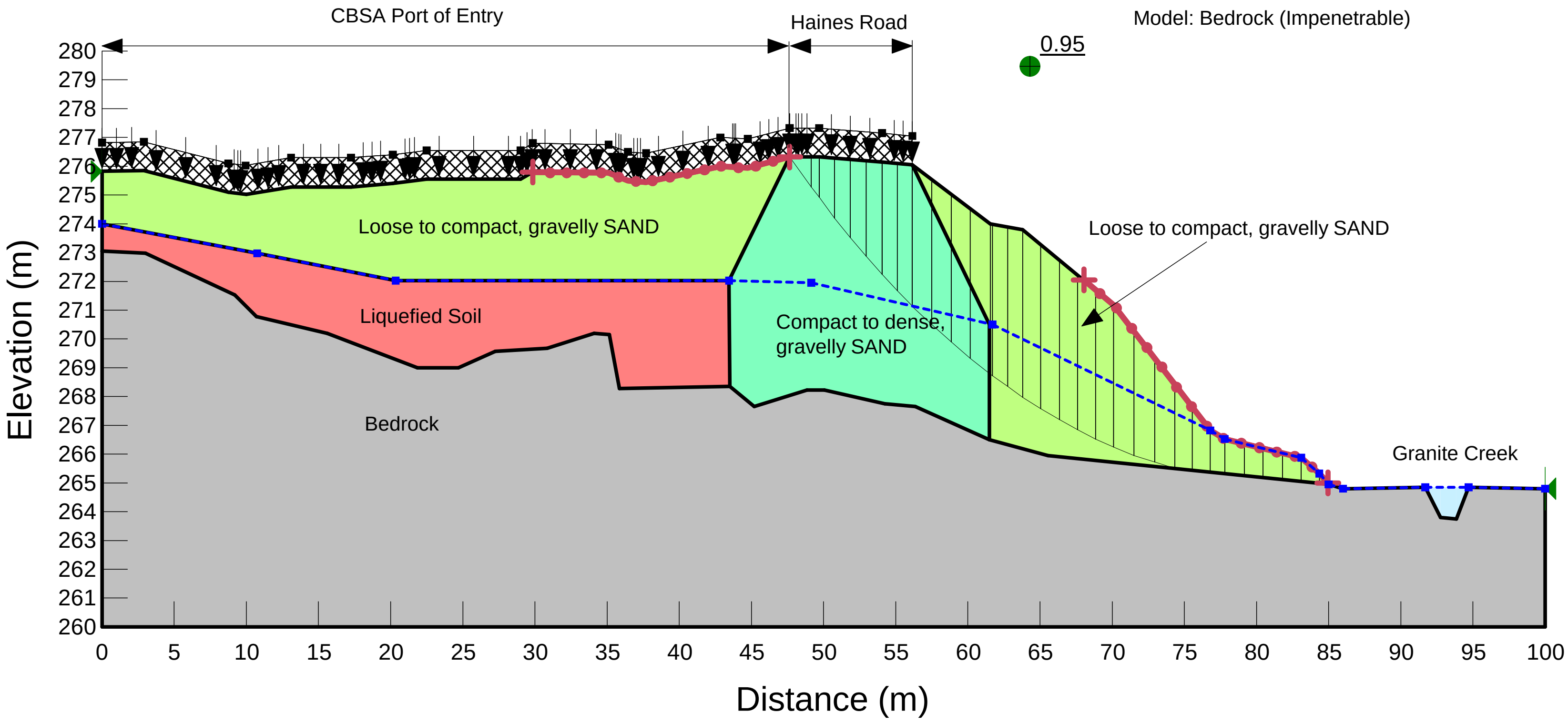
Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Liquefied Soil
Model: S=f(overburden)
Unit Weight: 18 kN/m³
Tau/Sigma Ratio: 0.1

Name: Bedrock
Model: Bedrock (Impenetrable)

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.2



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Base Case (Section C-C').gsz

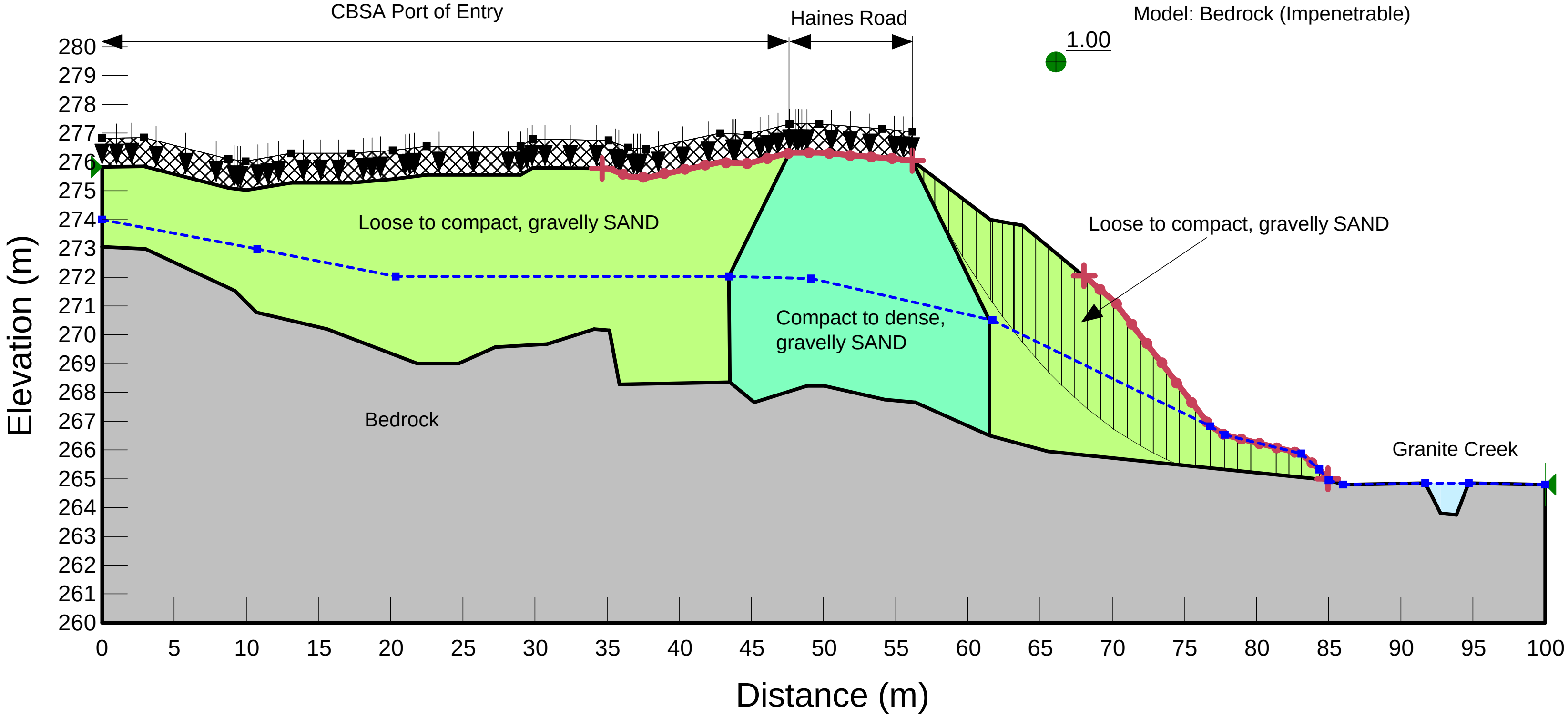
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Base Case (SLE Section C-C')
Yield Acceleration
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.085

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Base Case (Section C-C').gsz

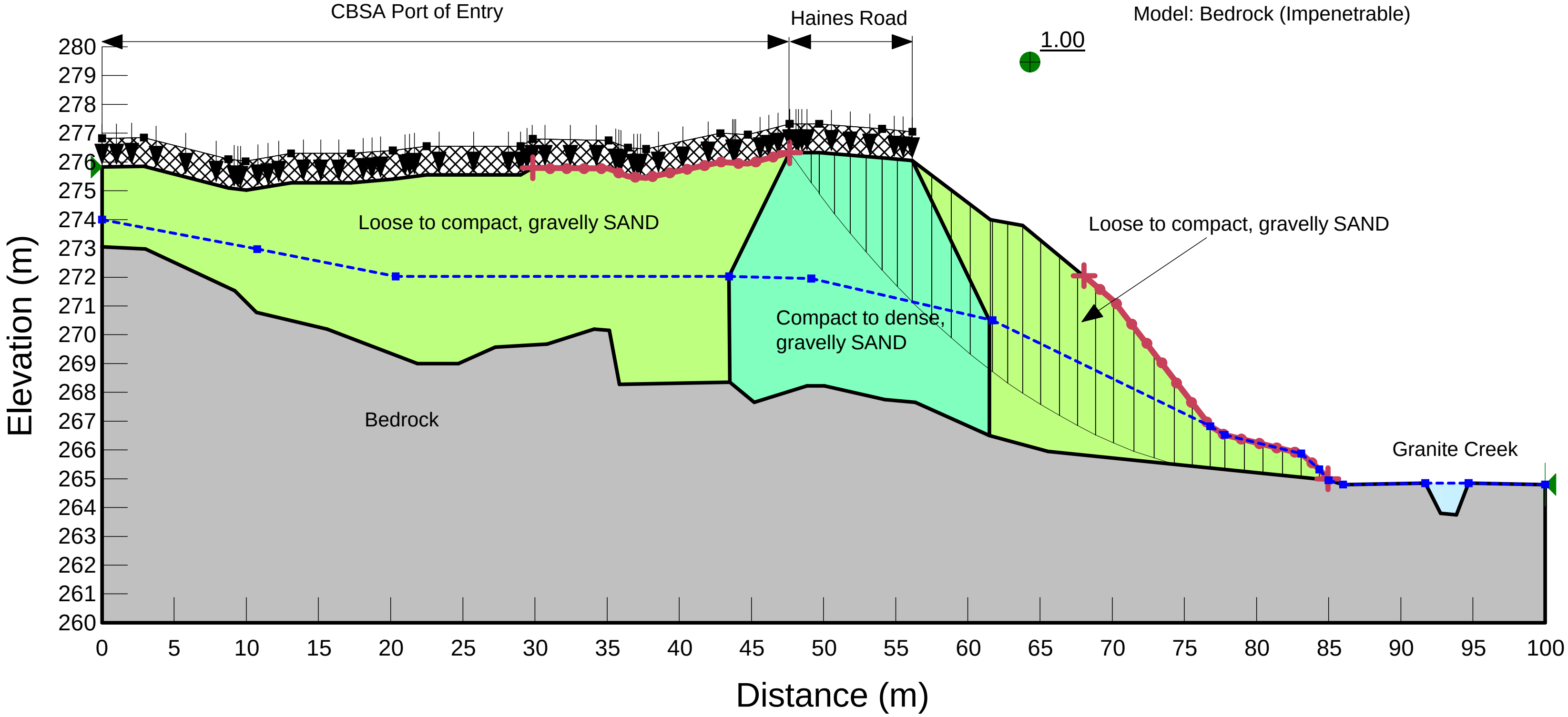
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Base Case (SLE Section C-C')
Yield Acceleration - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.18

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Base Case (Section C-C').gsz

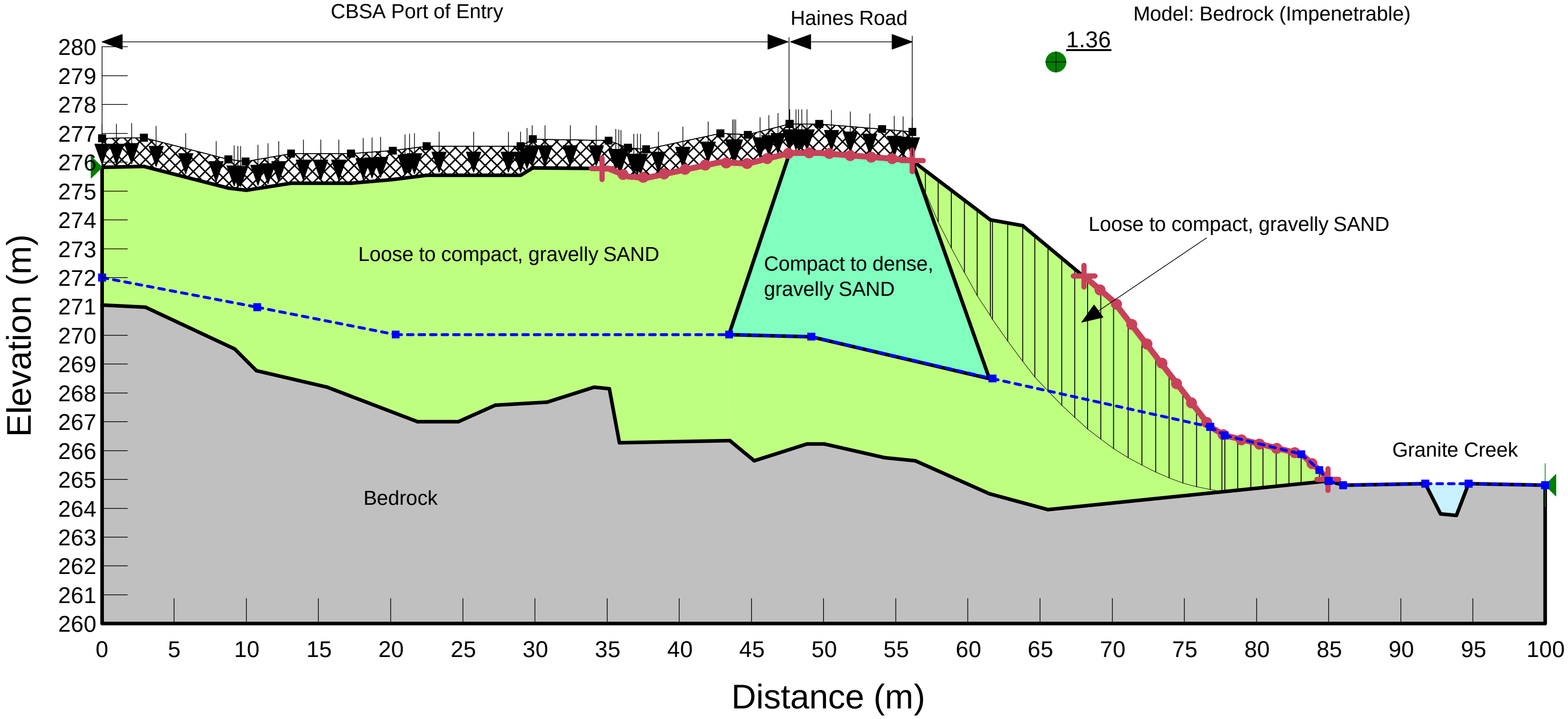
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Low Bedrock (-2 m)
Static Loading
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 16 kN/m³
Horizontal Seismic Load (g): 0

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Low Bedrock (-2m El).gsz

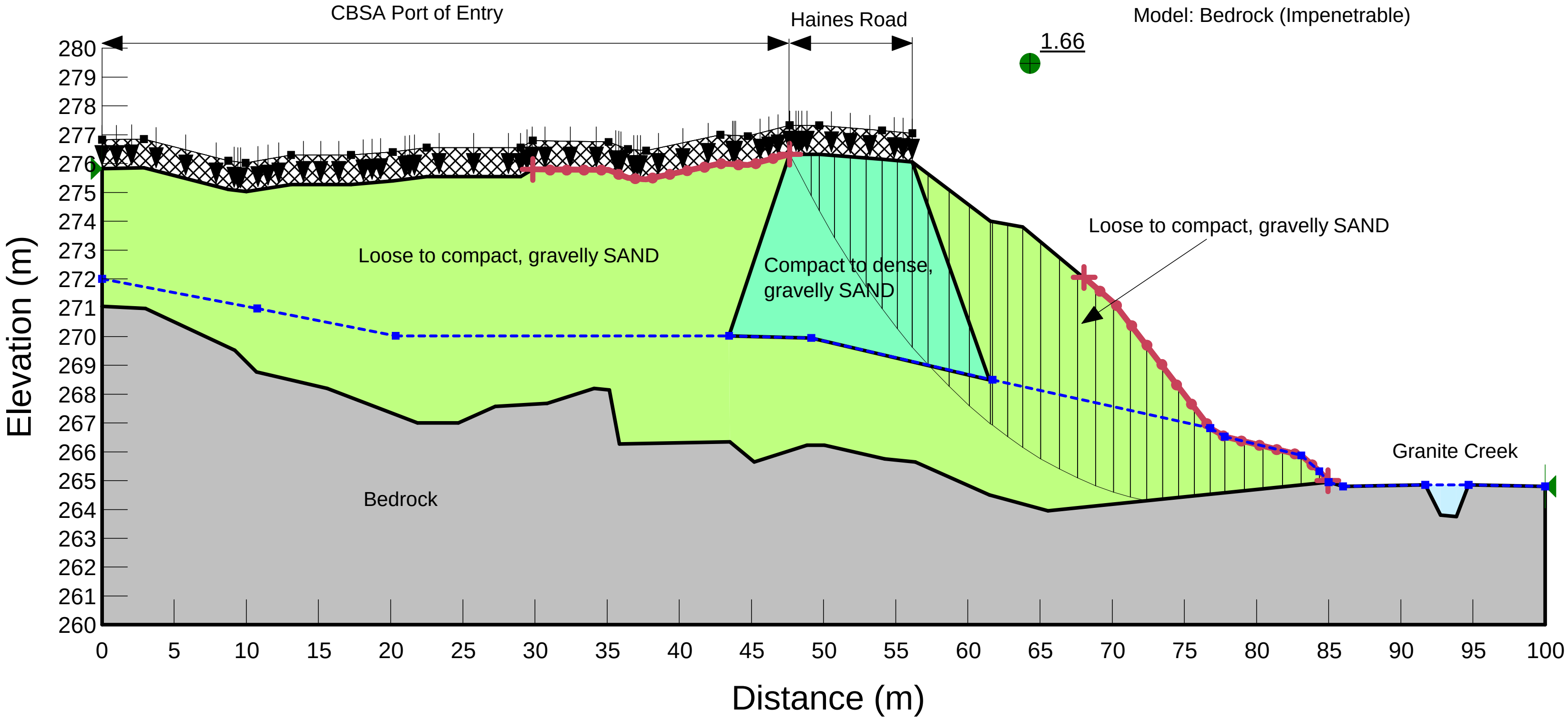
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Low Bedrock (-2 m)
Static Loading - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 16 kN/m³
Horizontal Seismic Load (g): 0

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Low Bedrock (-2m El).gsz

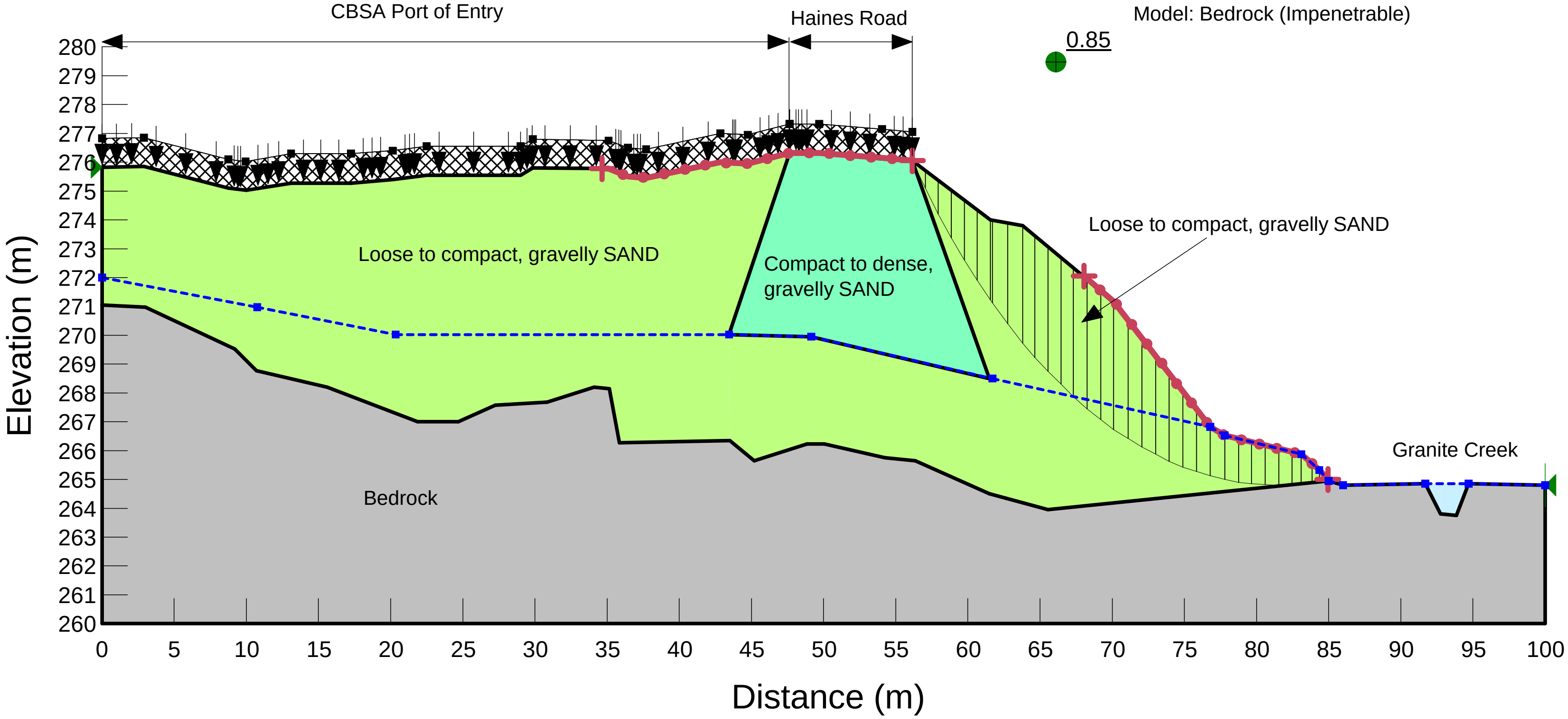
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Low Bedrock (-2 m)
Pseudo-Static (Seismic) Loading
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.2

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Low Bedrock (-2m El).gsz

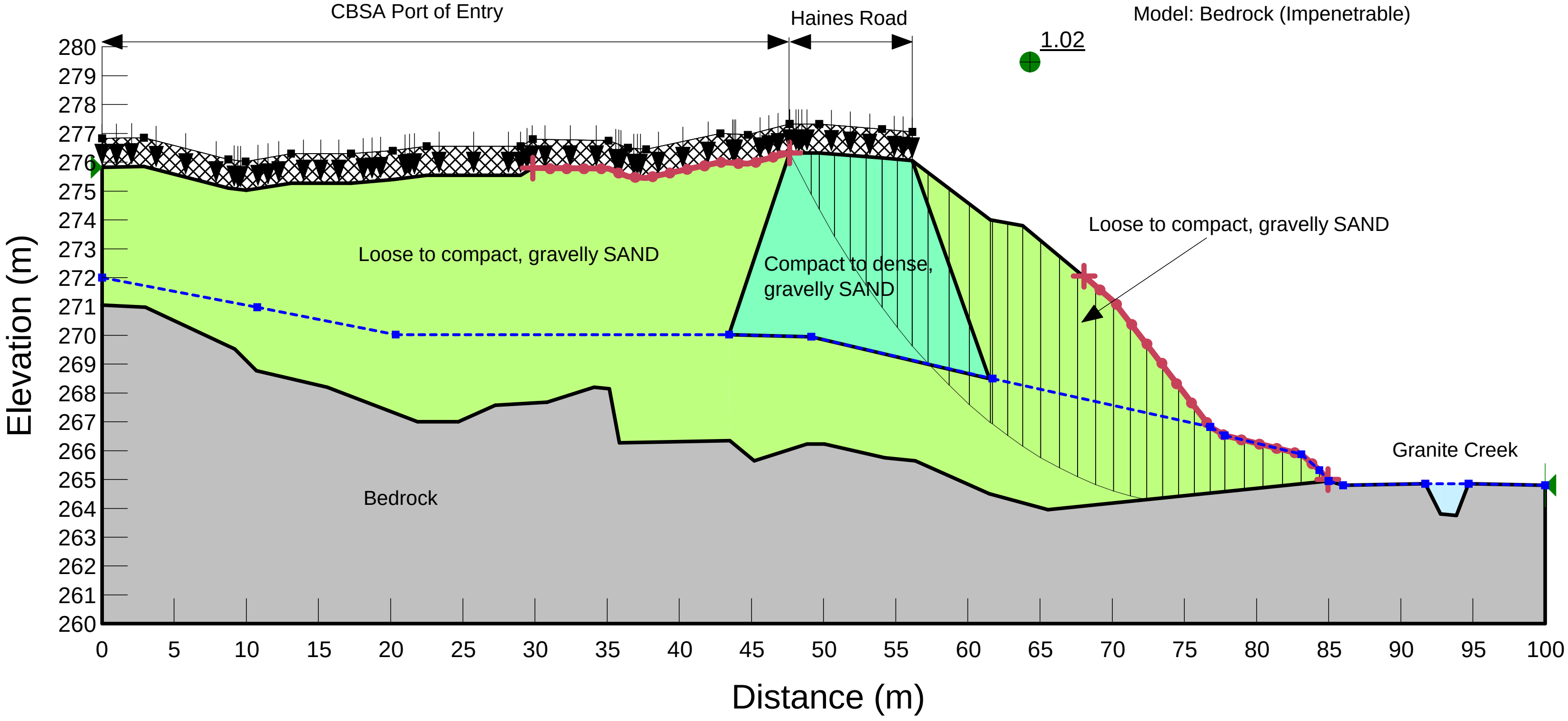
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Low Bedrock (-2 m)
Pseudo-Static (Seismic) Loading - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.2



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Low Bedrock (-2m El).gsz

CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Low Bedrock (-2 m)
Post-Seismic (Liquefied) Loading
TTEBA File W14103501-01
11/27/2014

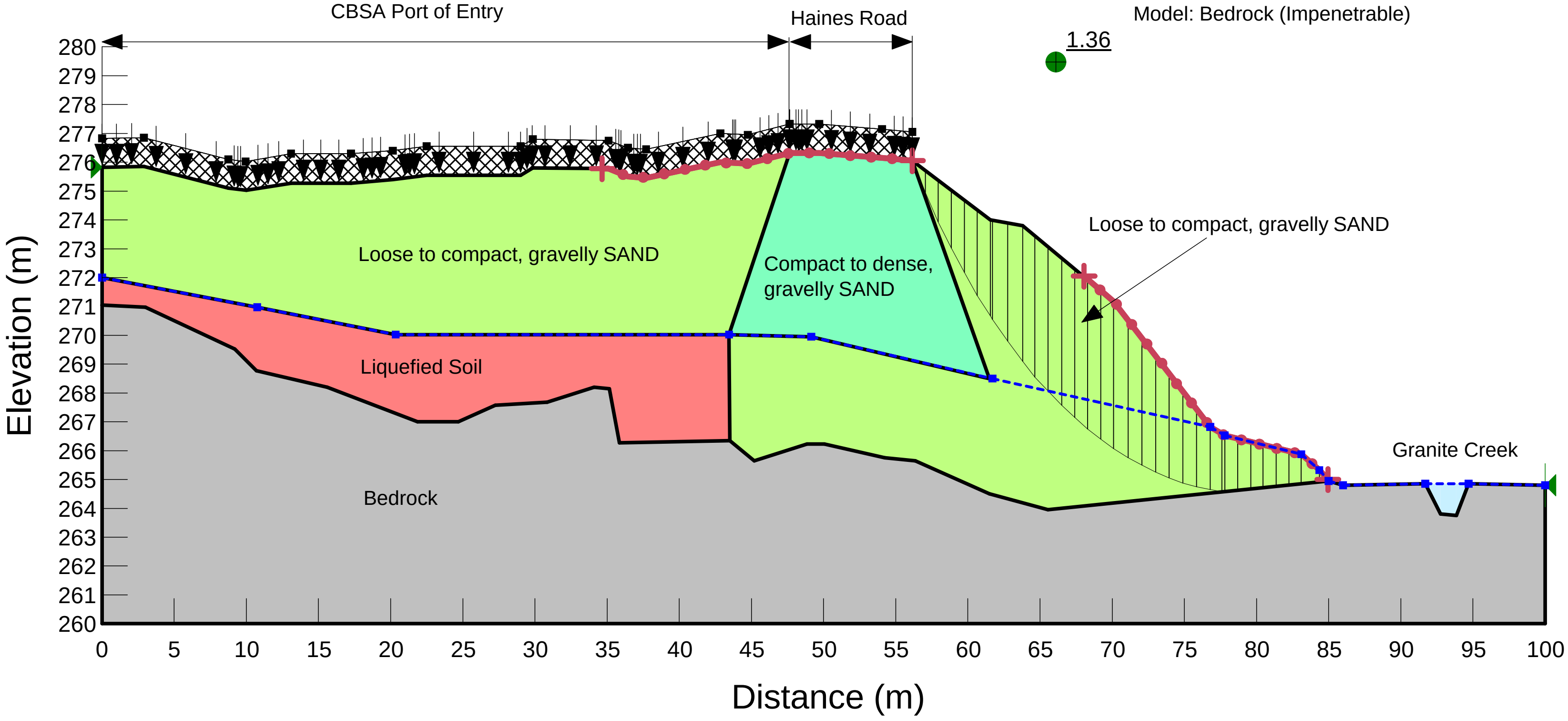
CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Liquefied Soil
Model: S=f(overburden)
Unit Weight: 18 kN/m³
Tau/Sigma Ratio: 0.1

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Low Bedrock (-2m El).gsz

CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Low Bedrock (-2 m)
Post-Seismic (Liquefied) Loading - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

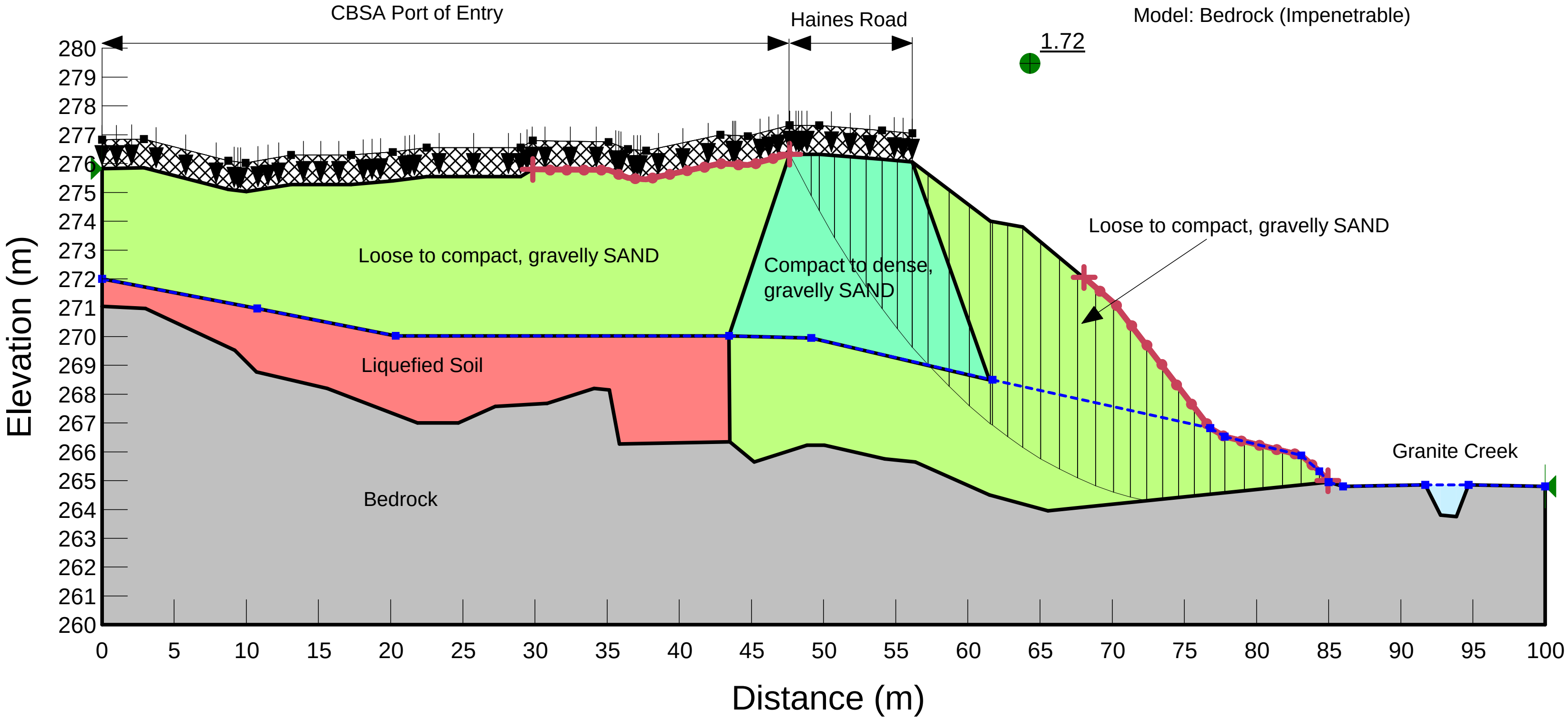
CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Liquefied Soil
Model: S=f(overburden)
Unit Weight: 18 kN/m³
Tau/Sigma Ratio: 0.1

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Low Bedrock (-2m El).gsz

CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Low Bedrock (-2 m)
Worst Case (Seismic + Liquefaction)
TTEBA File W14103501-01
11/27/2014

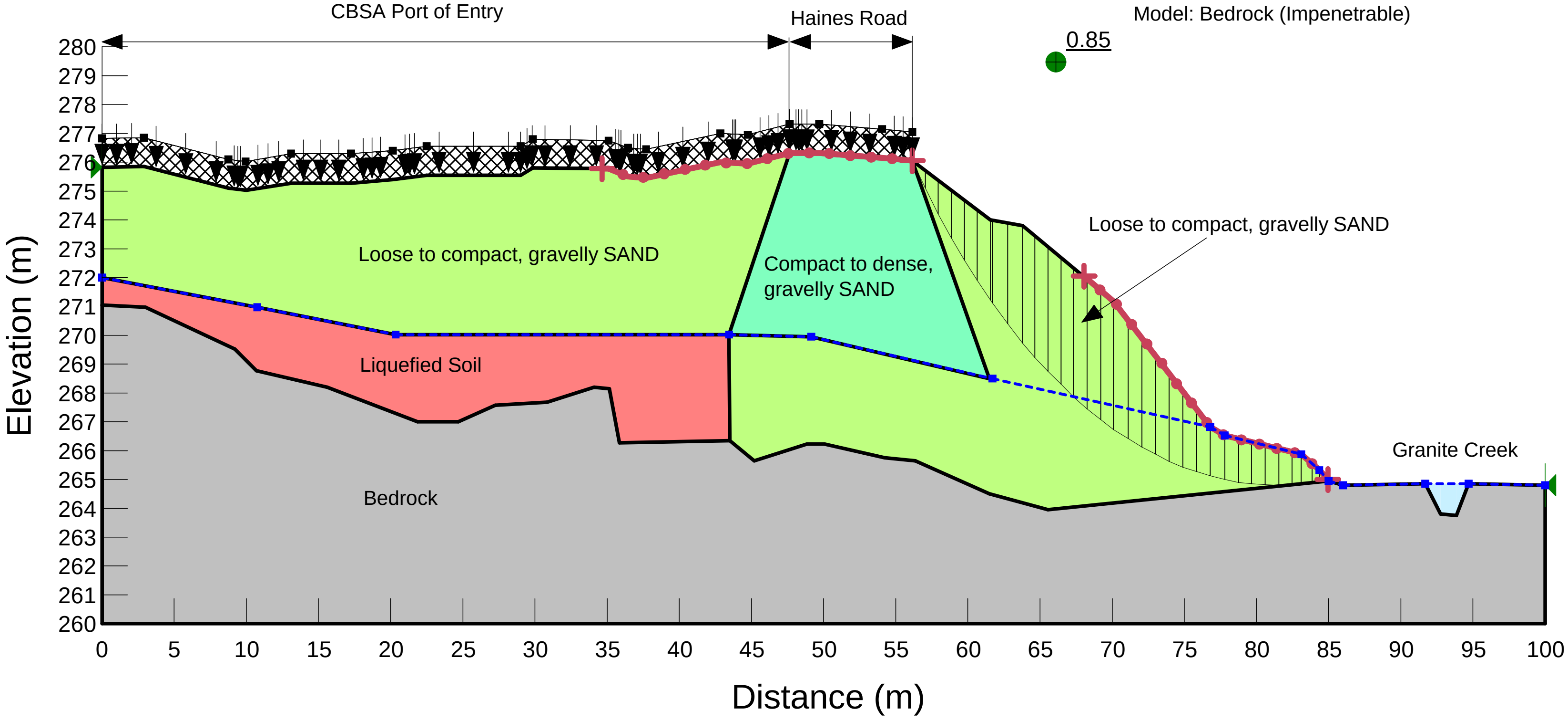
CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.2

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Liquefied Soil
Model: S=f(overburden)
Unit Weight: 18 kN/m³
Tau/Sigma Ratio: 0.1

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Low Bedrock (-2m El).gsz

CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Low Bedrock (-2 m)
Worst Case (Seismic + Liquefaction) - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

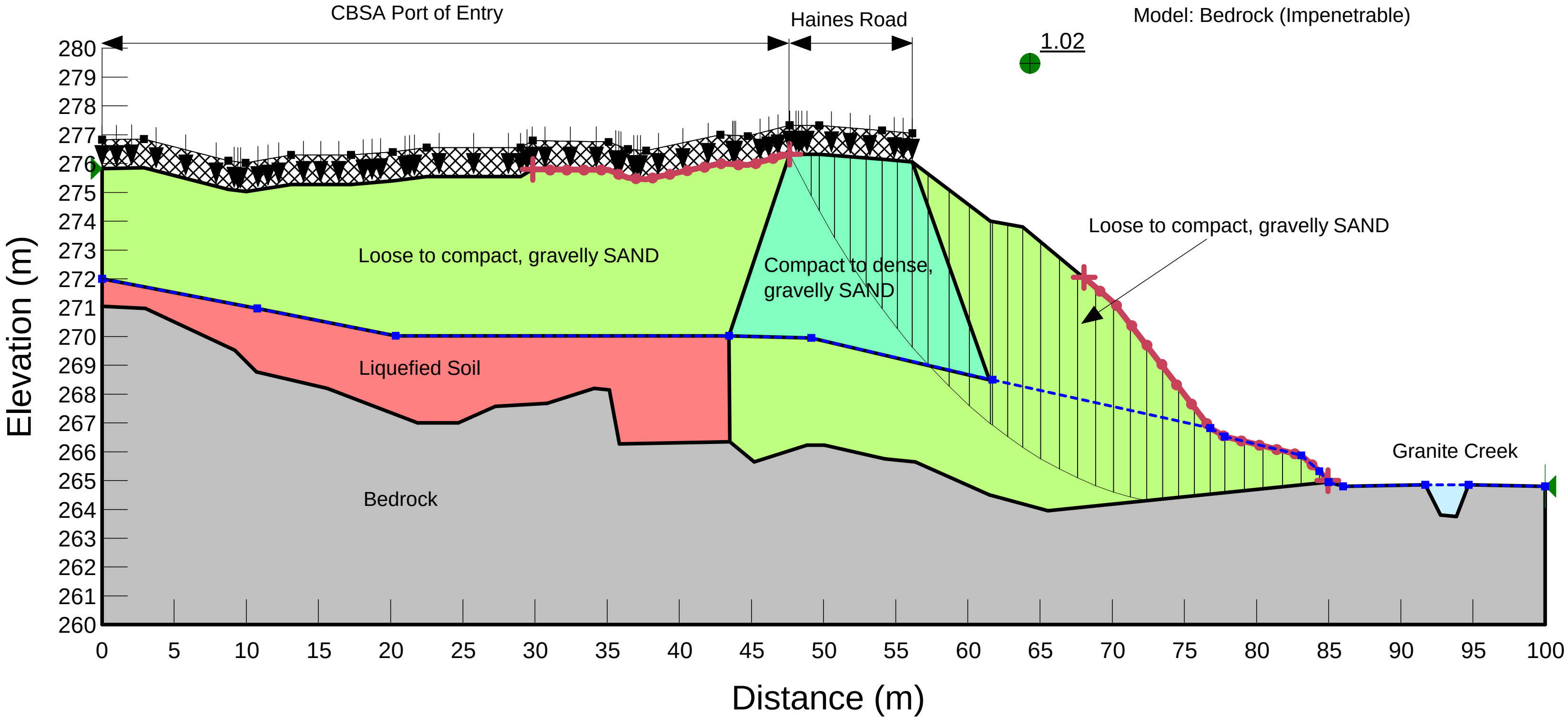
Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Liquefied Soil
Model: S=f(overburden)
Unit Weight: 18 kN/m³
Tau/Sigma Ratio: 0.1

Name: Bedrock
Model: Bedrock (Impenetrable)

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.2



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Low Bedrock (-2m El).gsz

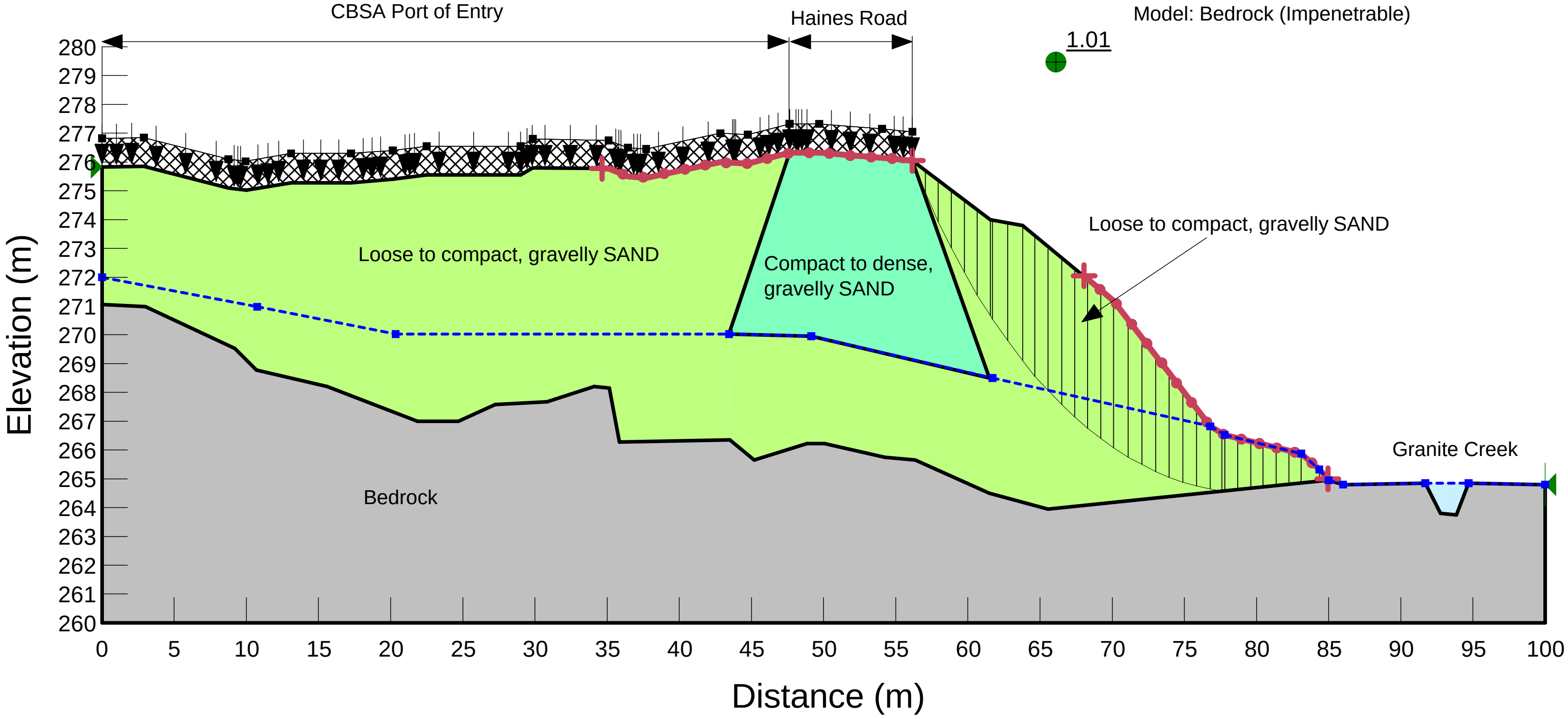
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Low Bedrock (-2 m)
Yield Acceleration
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.12

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Low Bedrock (-2m El).gsz

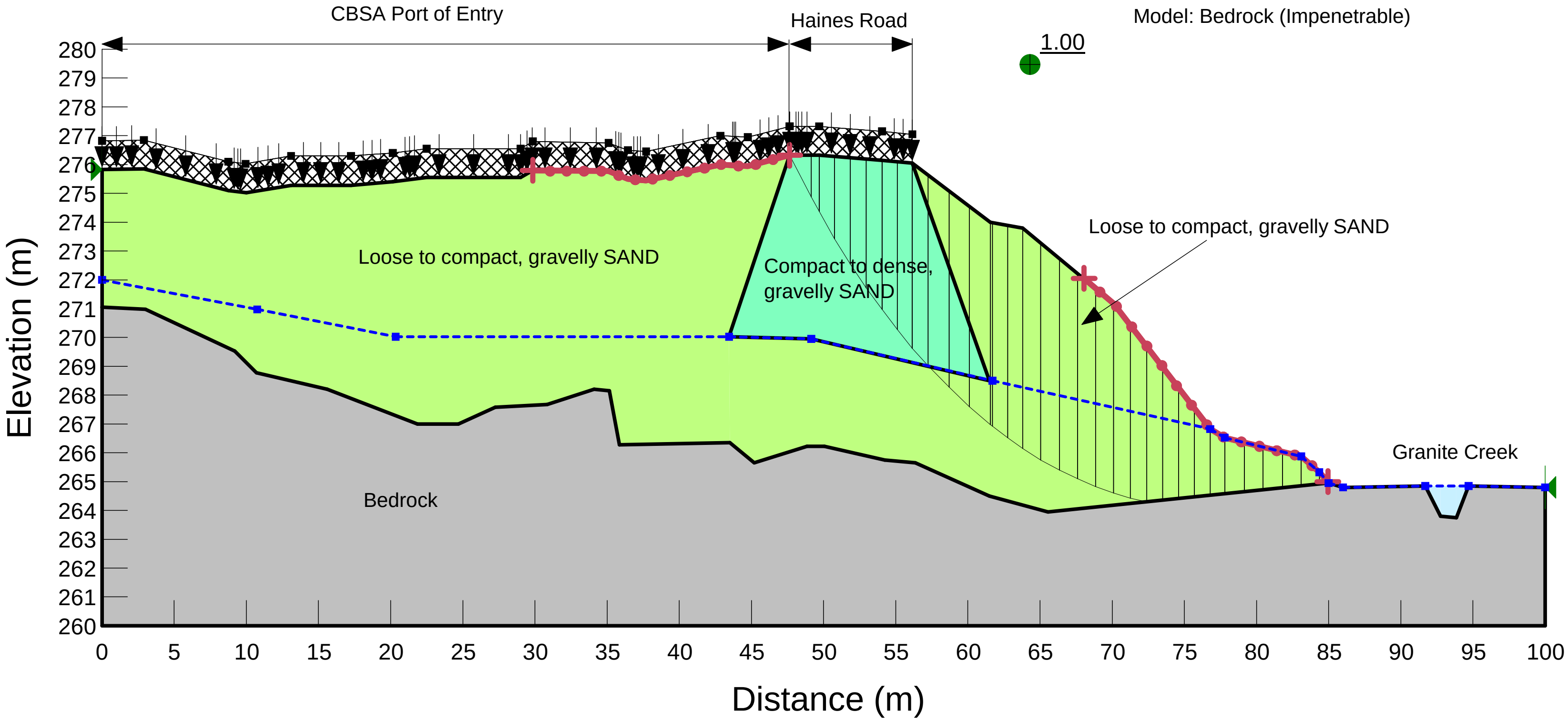
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: Low Bedrock (-2 m)
Yield Acceleration - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.21

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - Low Bedrock (-2m El).gsz

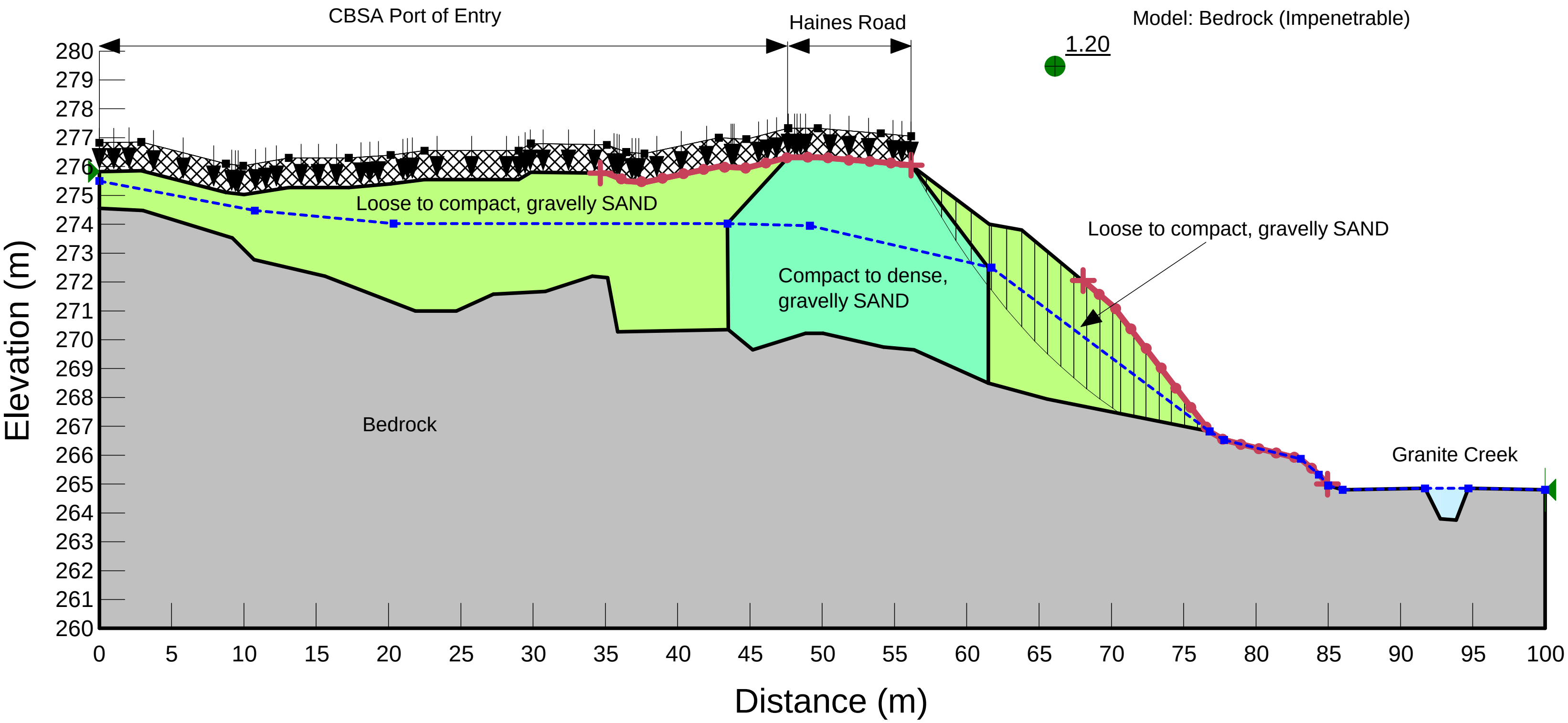
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: High Bedrock (+2 m)
Static Loading
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 16 kN/m³
Horizontal Seismic Load (g): 0

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - High Bedrock (+2m El).gsz

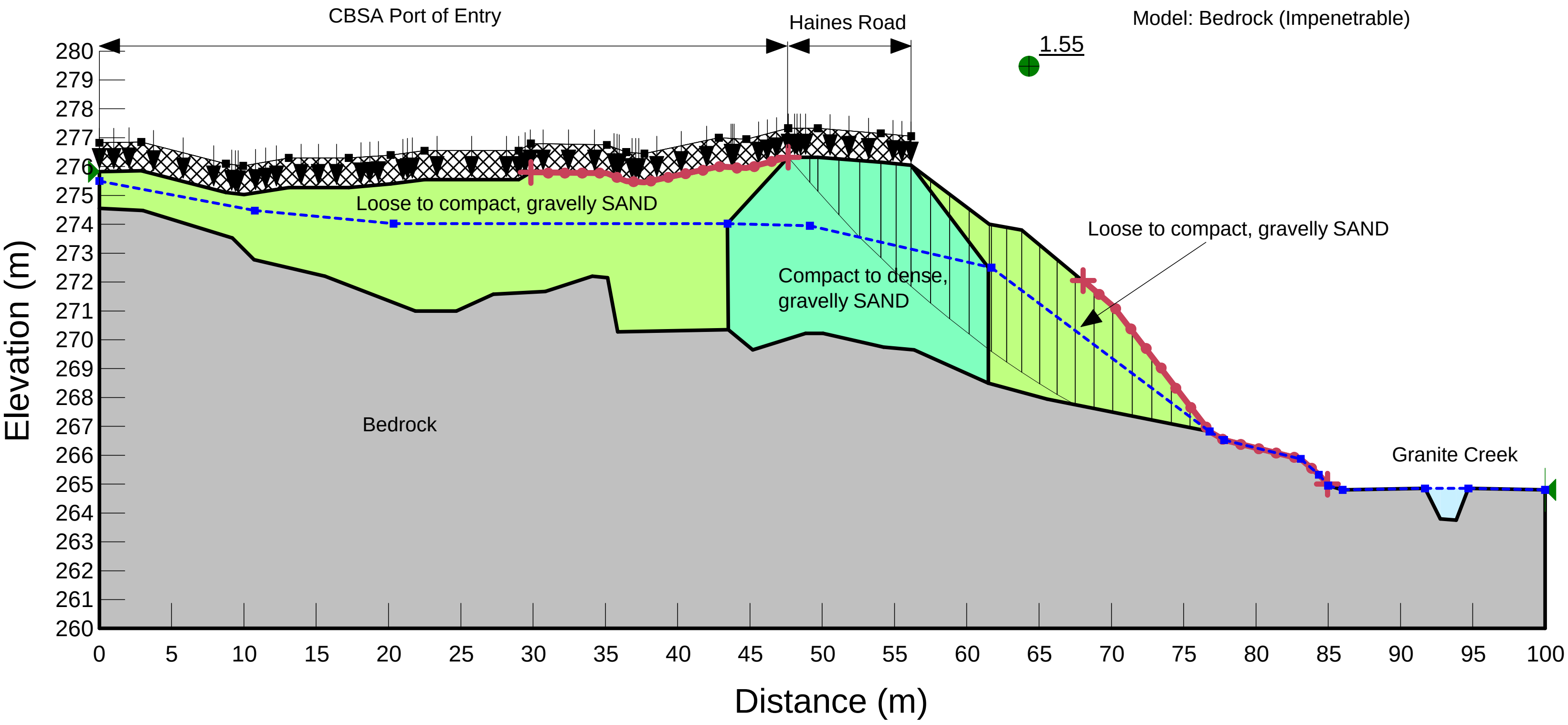
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: High Bedrock (+2 m)
Static Loading - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 16 kN/m³
Horizontal Seismic Load (g): 0

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - High Bedrock (+2m El).gsz

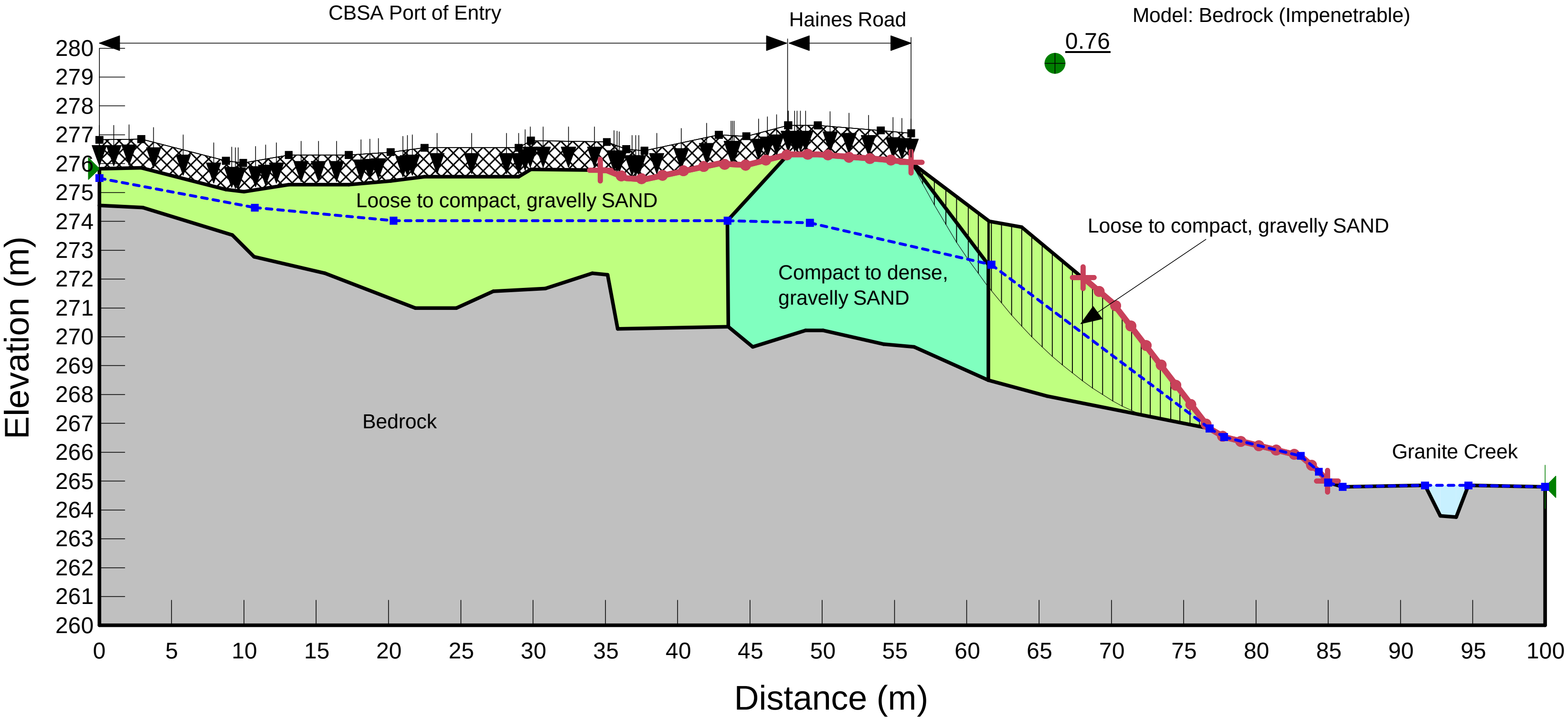
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: High Bedrock (+2 m)
Pseudo-Static (Seismic) Loading
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.2

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - High Bedrock (+2m El).gsz

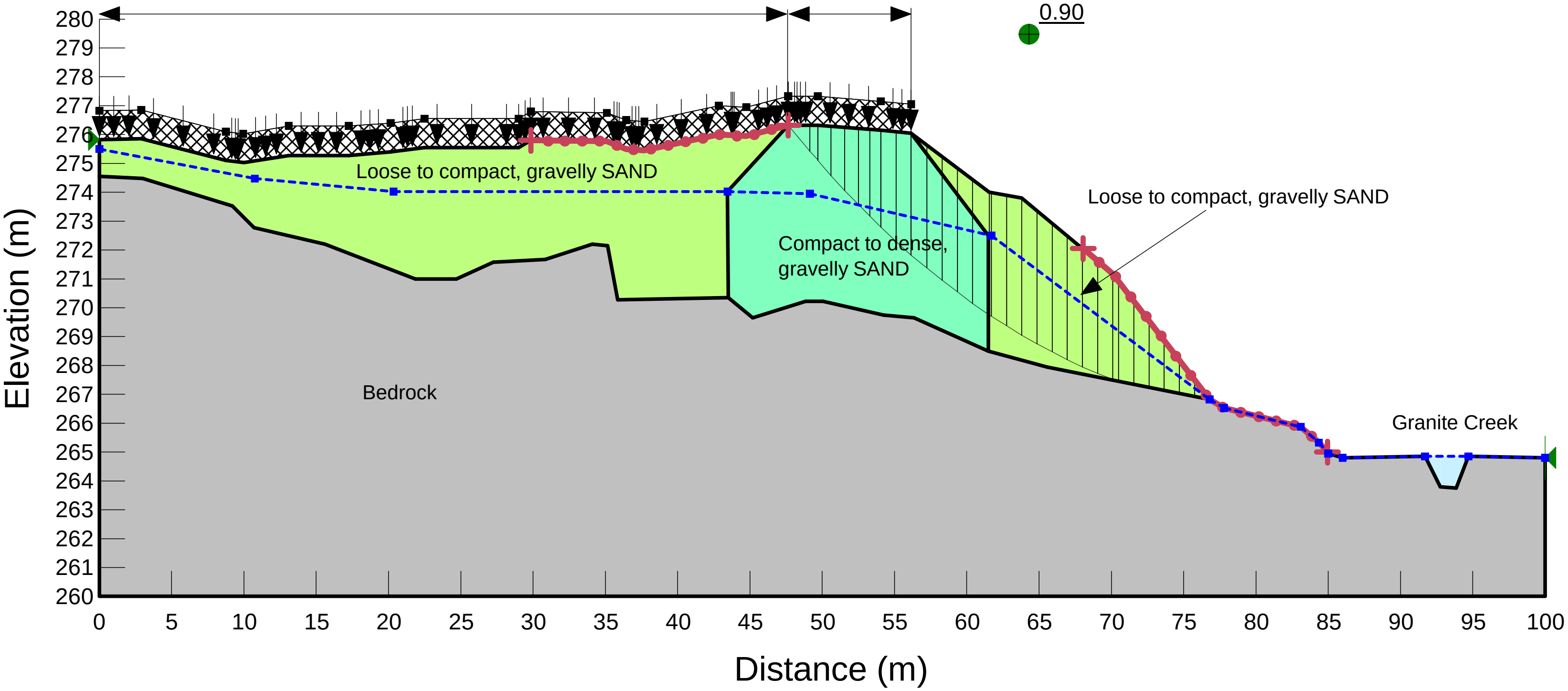
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: High Bedrock (+2 m)
Pseudo-Static (Seismic) Loading - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.2

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - High Bedrock (+2m El).gsz

CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: High Bedrock (+2 m)
Post-Seismic (Liquefied) Loading
TTEBA File W14103501-01
11/27/2014

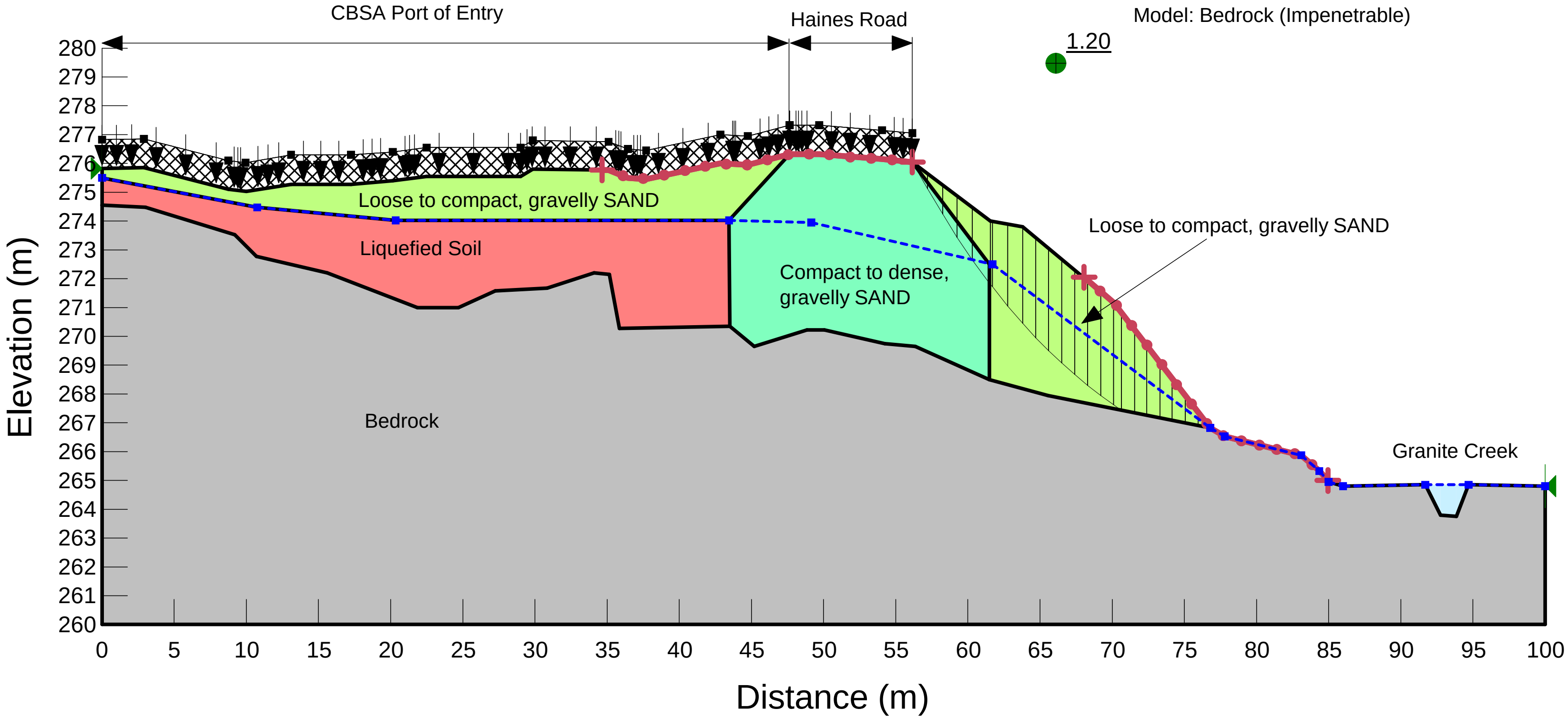
CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Liquefied Soil
Model: S=f(overburden)
Unit Weight: 18 kN/m³
Tau/Sigma Ratio: 0.1

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - High Bedrock (+2m El).gsz

CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: High Bedrock (+2 m)
Post-Seismic (Liquefied) Loading - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

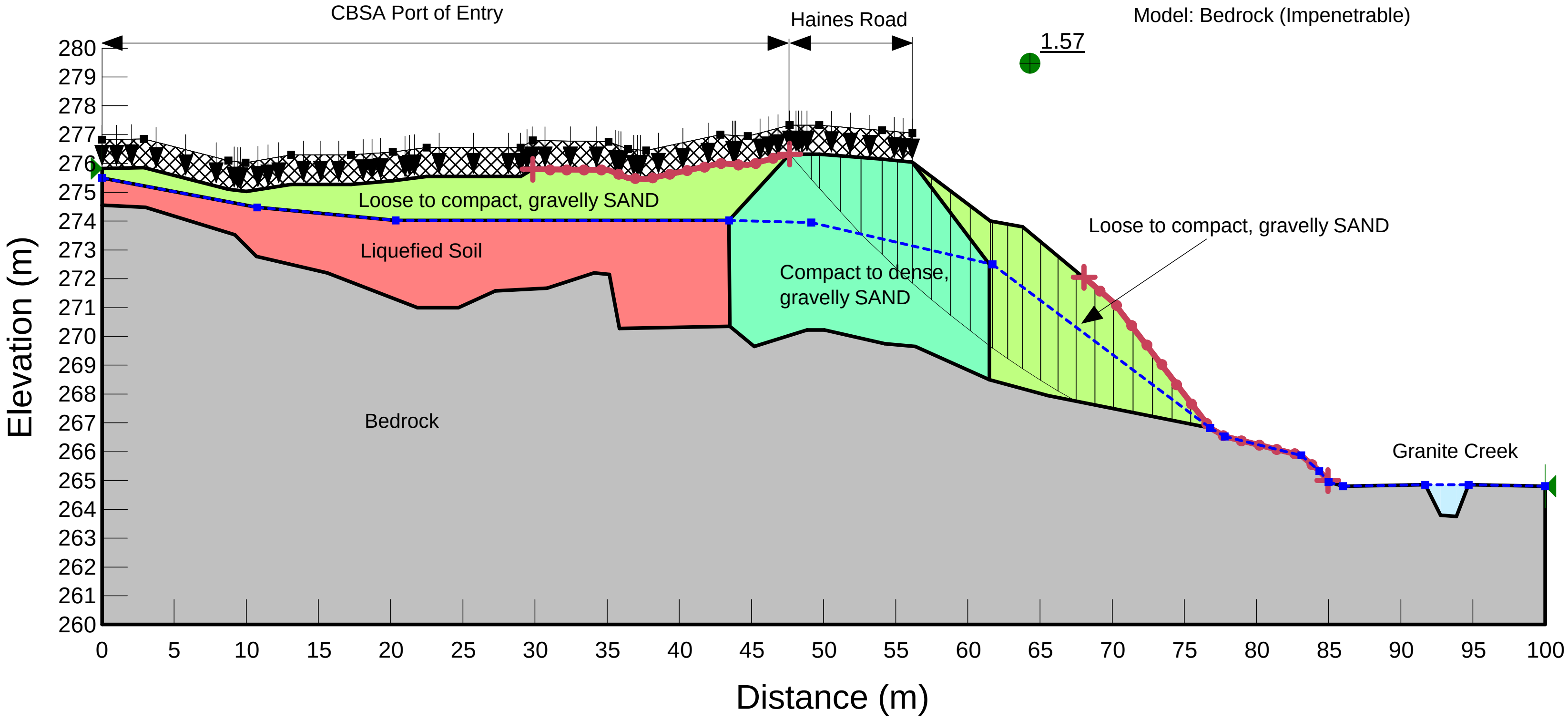
CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Liquefied Soil
Model: S=f(overburden)
Unit Weight: 18 kN/m³
Tau/Sigma Ratio: 0.1

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - High Bedrock (+2m El).gsz

CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: High Bedrock (+2 m)
Worst Case (Seismic + Liquefaction)
TTEBA File W14103501-01
11/27/2014

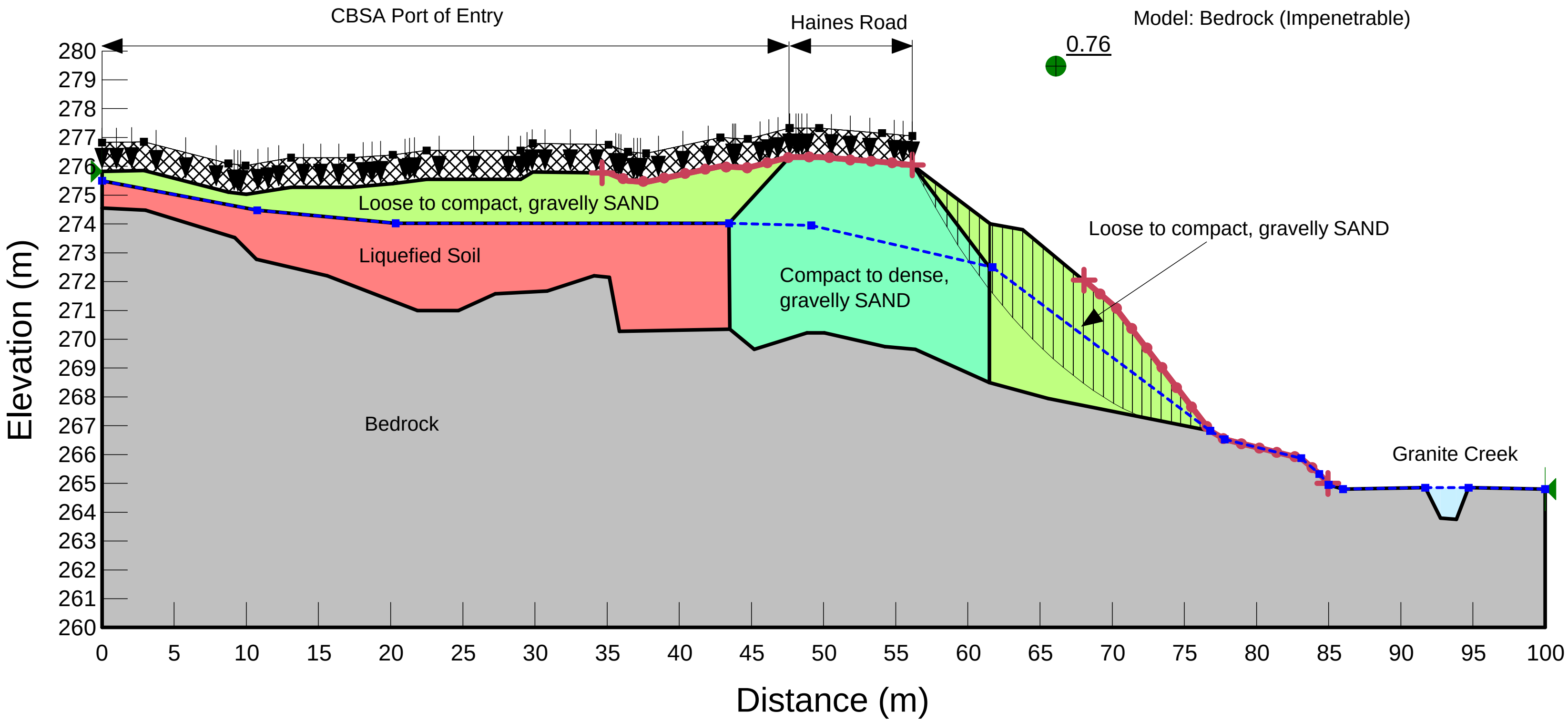
CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.2

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Liquefied Soil
Model: S=f(overburden)
Unit Weight: 18 kN/m³
Tau/Sigma Ratio: 0.1

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - High Bedrock (+2m El).gsz

CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: High Bedrock (+2 m)
Worst Case (Seismic + Liquefaction) - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

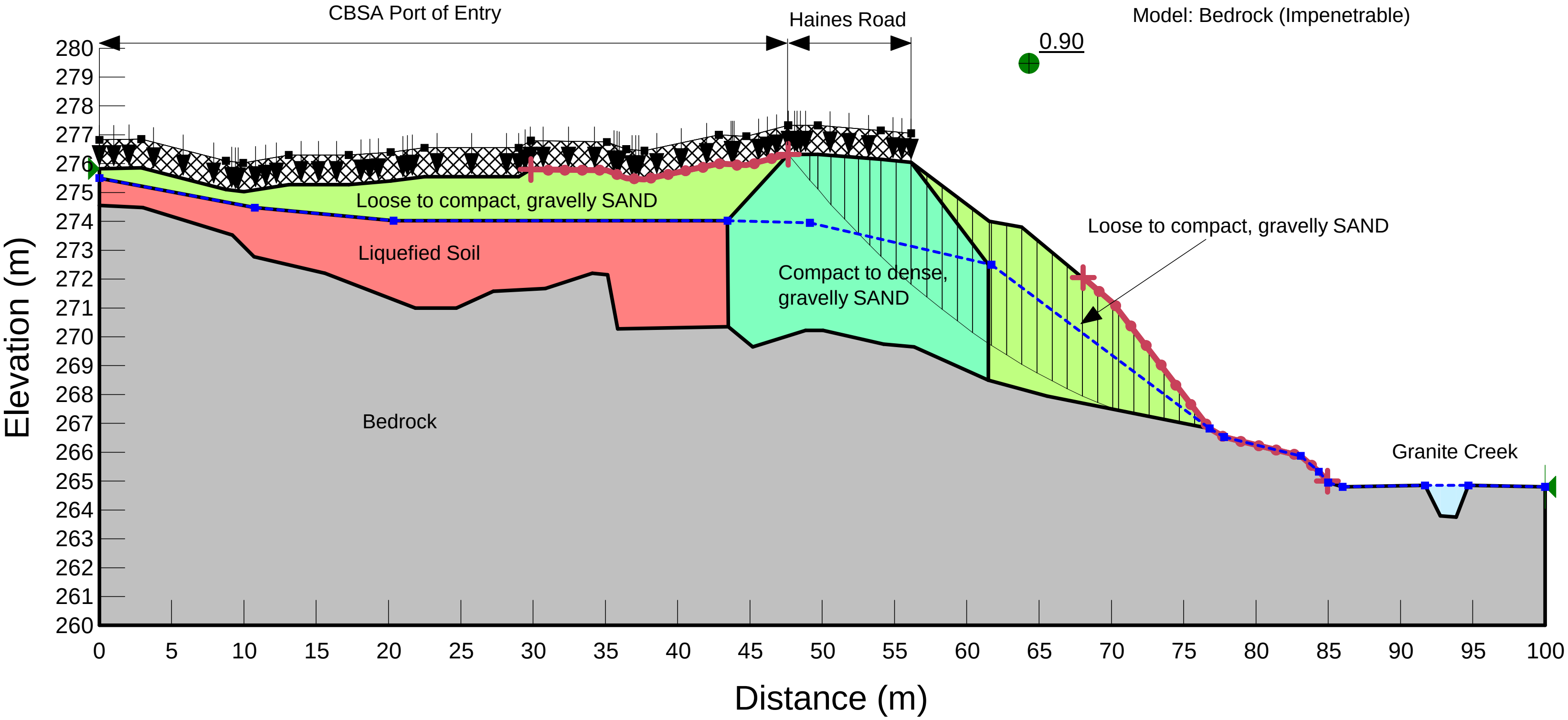
CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.2

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Liquefied Soil
Model: S=f(overburden)
Unit Weight: 18 kN/m³
Tau/Sigma Ratio: 0.1

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - High Bedrock (+2m El).gsz

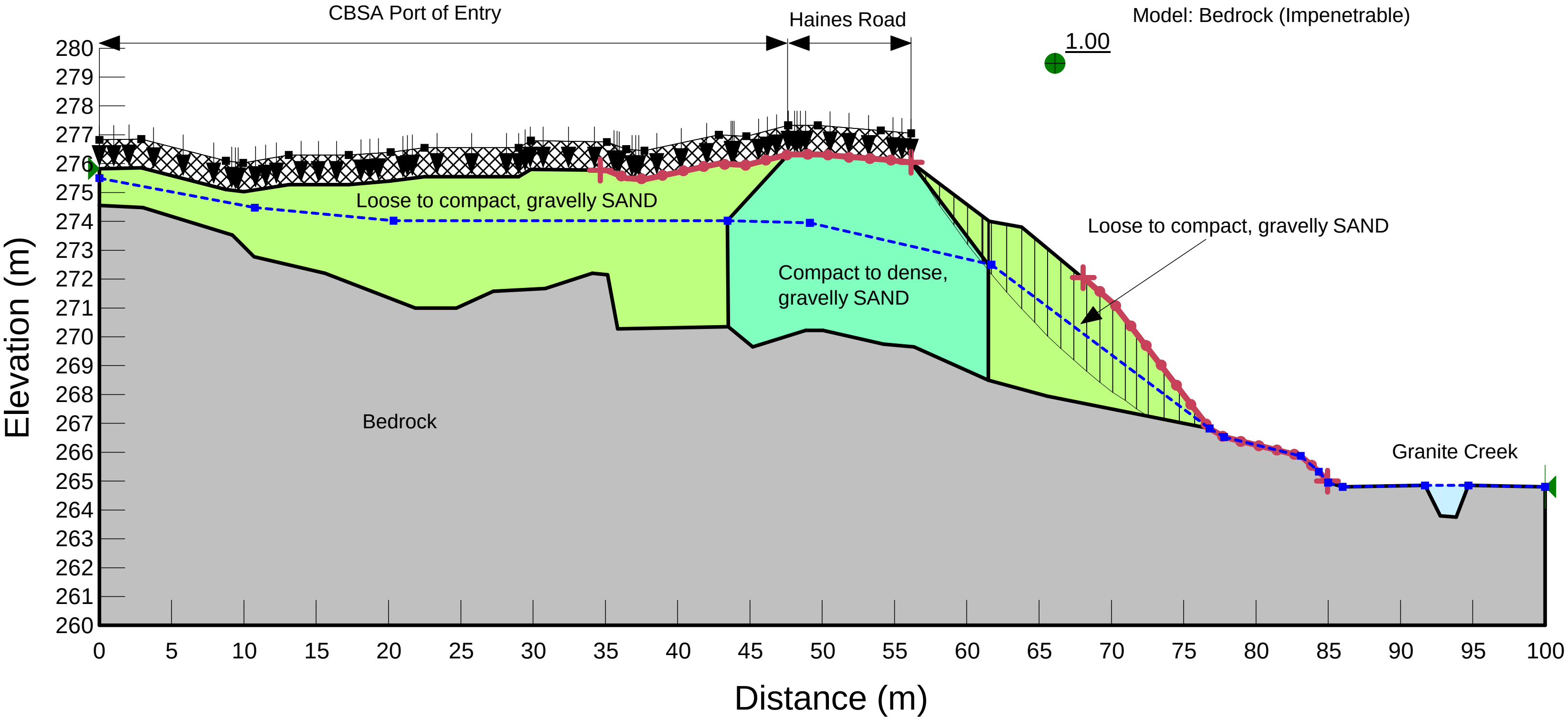
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: High Bedrock (+2 m)
Yield Acceleration
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.07

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - High Bedrock (+2m El).gsz

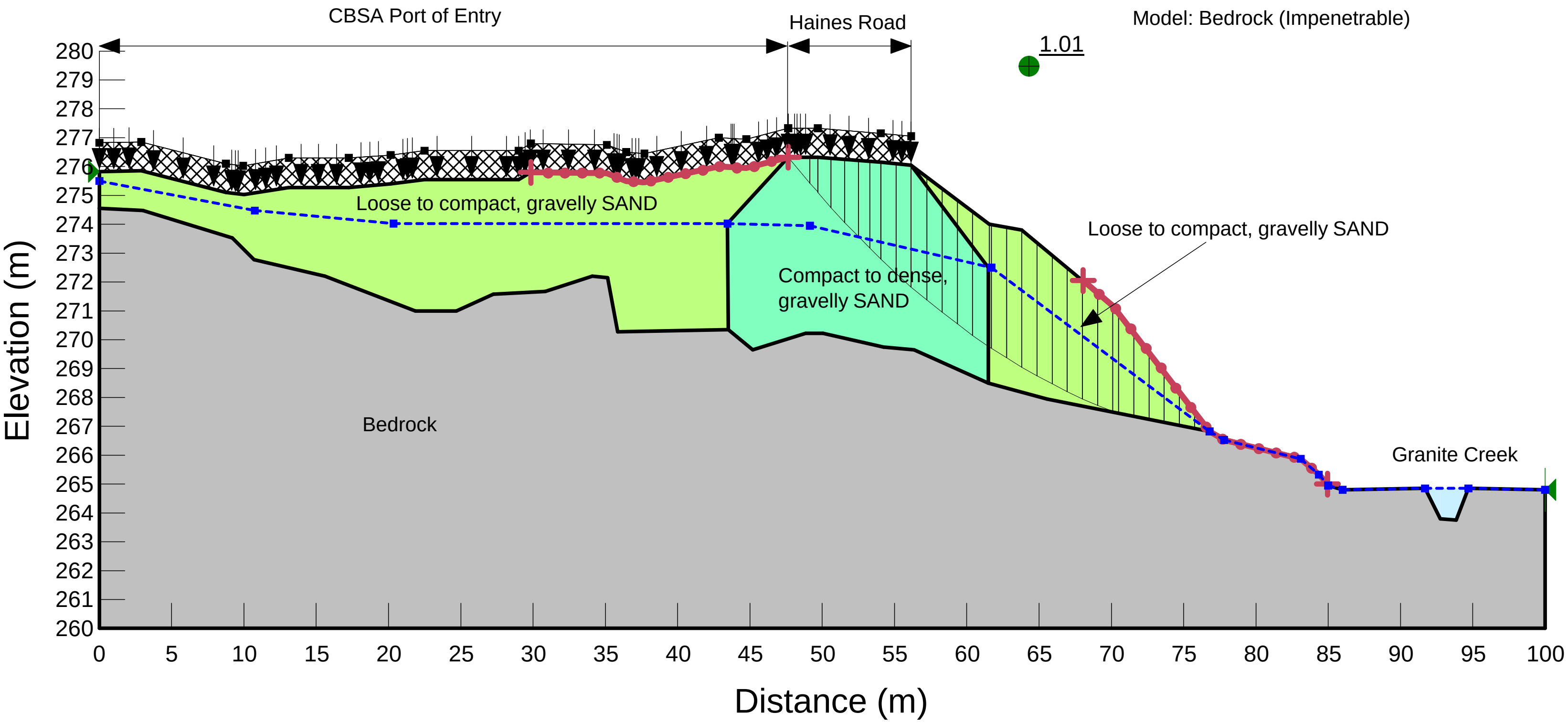
CBSA Port of Entry - Pleasant Camp, BC
Bedrock Elevation: High Bedrock (+2 m)
Yield Acceleration - Constrained Slip Surface
TTEBA File W14103501-01
11/27/2014

CBSA Building Loads (kPa): 10 kN/m³
Haines Road Traffic Live Load (kPa): 0 kN/m³
Horizontal Seismic Load (g): 0.155

Name: Loose-Compact, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 18 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Compact-Dense, gravelly SAND
Model: Mohr-Coulomb
Unit Weight: 19 kN/m³
Cohesion: 0 kPa
Phi: 36 °

Name: Bedrock
Model: Bedrock (Impenetrable)



Directory: C:\Users\adam.wallace.TT\Desktop\W14103501 - Pleasant Camp CBSA Building\SlopeW\Pleasant Camp - High Bedrock (+2m El).gsz

TETRA TECH EBA

February 2, 2015

ISSUED FOR USE
FILE: W14103501-01
Via Email:Julian.ho@pwgsc-tpsgc.ca

Public Works and Government Services Canada
Pacific Region
219 – 800 Burrard Street
Vancouver, BC V6Z 0B9

Attention: Julian Ho, P.Eng.

Subject: Rock Pit Design and Site Backfill Recommendations
CBSA Port of Entry - Pleasant Camp, BC

1.0 INTRODUCTION

Public Works and Government Services Canada (PWGSC) has retained Stantec Architecture Ltd. (Stantec) of Whitehorse, to provide engineering design services for proposed upgrades to the existing infrastructure at the Canada Border Services Agency (CBSA) Port of Entry at Pleasant Camp, BC. Tetra Tech EBA Inc. (Tetra Tech EBA) was retained by PWGSC to provide geotechnical input for the project.

This letter presents recommendations for the construction of a rock pit for subsurface disposal of water on the subject site and detailed recommendations for the backfill and compaction of a proposed contaminated soils excavation. Recommendations contained in this letter augment geotechnical recommendations previously provided by Tetra Tech EBA in the Geotechnical Evaluation dated December 9, 2014.

2.0 ROCK PIT DESIGN

Through discussions with Stantec, Tetra Tech EBA understands a rock pit design is required on the subject site for subsurface disposal of water from a hand washing sink and floor drains, as well as possible future water treatment facility backwash events. Tetra Tech EBA has sized the rock pit assuming a daily discharge of 45 litres from the hand sink and floor drains, and 2,275 litres (500 imperial gallons) per weekly backwash event. The assumed backwash event discharge volume and schedule was provided by Stantec.

Based on the subsurface soil conditions encountered during the Geotechnical Evaluation, Tetra Tech EBA has assumed the rock pit will be constructed in loose to compact gravelly sand. If the subsurface soil conditions encountered during construction of the rock pit vary from those described above, Tetra Tech EBA should be contacted to provide revised design recommendations.

Tetra Tech EBA has assumed the rock pit will be constructed in a location where snow is permitted to accumulate during the winter season. The rock pit design depth and specified rigid insulation, combined with natural insulation provided by snow cover, should keep the rock pit and surrounding accepting soils unfrozen all year.

A rock pit sized to accommodate up to 2,320 litres per event can be constructed on the subject site to dimensions and specifications shown on the attached Figure 1.

3.0 BACKFILL RECOMMENDATIONS

Through discussions with PWGSC, Tetra Tech EBA understands an excavation to remove contaminated soils will take place on the subject site. The excavation footprint will encompass zones identified as landscaping, buried utilities, roadways, and building foundations. Backfill and compaction recommendations specific to each of the above zones are summarized below.

3.1 Landscaping

Landscaping or general fill zones within the proposed excavation can be backfilled with native soil provided any deleterious material, such as organics, saturated soils, or construction debris, is removed from the soil. The native soil should be placed in lifts no greater than 200 mm in uncompacted thickness and compacted to at least 95% of standard proctor maximum dry density (SPMDD) as per ASTM D698.

3.2 Buried Utilities

Buried utilities exposed during the proposed excavation should be adequately supported with bracing. Buried utilities shall be surrounded on all sides by a bedding sand layer at least 0.15 m in thickness, compacted to at least 95% of SPMDD. Fill placed below buried utilities shall be non-frost-susceptible pit run gravel or approved alternative (as described in Section 6.1.1 “Site Preparation” of the Geotechnical Evaluation) placed in lifts no greater than 200 mm in uncompacted thickness and compacted to at least 95% SPMDD. Fill placed above buried utilities can be suitable native soil placed as described above in Section 3.1 Landscaping.

3.3 Roadways

Fill below existing or future roadways shall be placed and compacted as described in Section 6.3 “Pavement Design” of the Geotechnical Evaluation.

3.4 Building Foundations

Fill below future building foundations shall be placed and compacted as described in Section 6.1.1 “Site Preparation” of the Geotechnical Evaluation.

4.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Public Works and Government Services Canada and their agents. Tetra Tech EBA Inc. (Tetra Tech EBA) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Public Works and Government Services Canada, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Tetra Tech EBA’s General Conditions are attached to this report.

5.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech EBA Inc.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. T. PIGAGE
39066
Feb. 2/15

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
C. P. COWAN
29619
Feb 2/15

Prepared by:
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Reviewed by:
Chad Cowan, P.Eng.
Project Director – Yukon, Arctic Region
Direct Line: 867.668.9214
Chad.Cowan@tetratech.com

GENERAL CONDITIONS

GEOTECHNICAL REPORT

This report incorporates and is subject to these “General Conditions”.

1.0 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of Tetra Tech EBA’s Client. Tetra Tech EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than Tetra Tech EBA’s Client unless otherwise authorized in writing by Tetra Tech EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of Tetra Tech EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 ALTERNATE REPORT FORMAT

Where Tetra Tech EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed Tetra Tech EBA’s instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by Tetra Tech EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of Tetra Tech EBA’s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except Tetra Tech EBA. Tetra Tech EBA’s instruments of professional service will be used only and exactly as submitted by Tetra Tech EBA.

Electronic files submitted by Tetra Tech EBA have been prepared and submitted using specific software and hardware systems. Tetra Tech EBA makes no representation about the compatibility of these files with the Client’s current or future software and hardware systems.

3.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, Tetra Tech EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

4.0 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. Tetra Tech EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

5.0 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

6.0 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. Tetra Tech EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

7.0 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

8.0 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

9.0 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

10.0 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

11.0 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

12.0 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

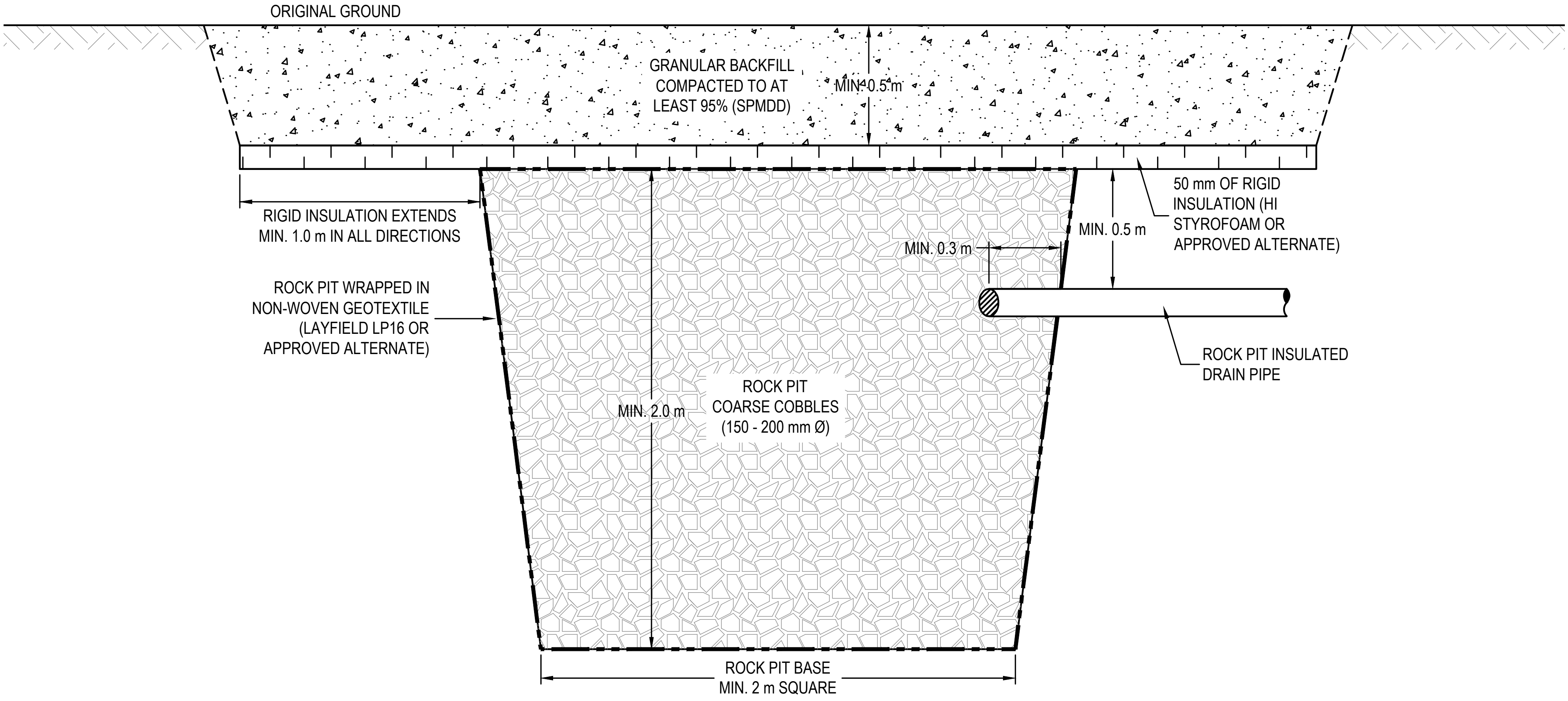
13.0 SAMPLES

Tetra Tech EBA will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

14.0 INFORMATION PROVIDED TO TETRA TECH EBA BY OTHERS

During the performance of the work and the preparation of the report, Tetra Tech EBA may rely on information provided by persons other than the Client. While Tetra Tech EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, Tetra Tech EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

Q:\Whitehorse\Data\0201drawings\Pleasant Camp\W14103501-01 CBSA Port of Entry\W14103501-01 Rock Pit Design.dwg [FIGURE 1] February 02, 2015 - 3:27:23 pm (BY: BUCHAN, CAMERON)



NOTE

- ROCK PIT SIZED TO ACCEPT 6 m^3 DISCHARGE EVENT
- THIS PLAN IS NOT TO SCALE

CLIENT

Public Works and Government Services Canada

TETRA TECH EBA

NEW CBSA BUILDING GEOTECHNICAL EVALUATION PLEASANT CAMP, BRITISH COLUMBIA

ROCK PIT DESIGN

PROJECT NO.	DWN	CKD	REV
W14103501-01	CB	JTP	0

OFFICE	DATE
EBA-WHSE	February 2, 2015

Figure 1

APPENDIX B – BUILDINGS CONDITIONS ASSESSMENT REPORT

**SNC•LAVALIN
Environment**

Division of
SNC-LAVALIN INC.
8648 Commerce Court
Burnaby, British Columbia
Canada V5A 4N6

Tel.: 604-515-5151
Fax: 604-515-5150

March 31, 2013

Project 131416

Public Works and Government Services Canada
401 - 1230 Government Street
Victoria, BC V8W 3X4

ATTENTION: Mr. Robert Price, Environmental Specialist

REFERENCE: **FY 2012/2013 Building Conditions Assessment
CBSA Port of Pleasant Camp Border Crossing, Pleasant Camp, BC**

EXECUTIVE SUMMARY

At the request of Public Works and Government Services Canada (PWGSC), SNC-Lavalin Inc., Environment & Water (E&W)[1] completed a Building Conditions Assessment (BCA) at the Canada Border Services Agency (CBSA) Port of Pleasant Camp Border Crossing Facility in Pleasant Camp, BC (the "site"). The work program was undertaken to evaluate existing or potential regulated and hazardous materials in the existing on-site buildings in preparation of port redevelopment and excavation planned in 2013.

The objective of the BCA was to identify potential regulated and/or hazardous materials of concern which may require special handling or management during future demolition and/or renovation activities as required under the British Columbia Occupational Health and Safety (OHSA) Regulation, Section 20.112 and Canada Labour Code Part II, Canada Occupational Health and Safety Regulations, Part X - Hazardous Substances.

The CBSA Port of Pleasant Camp border crossing facility is located on Haines Road (BC Highway 7) in the northwest corner of British Columbia, approximately 170 km south of Haines Junction, YT. The facility infrastructure consists of the following: a pump house, a secondary examination shelter (maintenance building), a double garage, a customs office, a generator building and adjoining water storage tank, a main fuel storage tank enclosure, a remediation system enclosure, eight (8) newer residences (Houses #1 to #8), and an original residence (House #9).

E&W personnel completed a room-by-room visual survey of the accessible areas of the buildings and related equipment to identify, document and quantify suspected regulated substances and hazardous materials including asbestos, lead-containing paint, polychlorinated biphenyls (PCBs), halocarbons (ozone depleting substance [ODSs] and Non-ODSs), mercury, silica, urea formaldehyde foam insulation (UFFI), other hazardous materials, solid and liquid wastes, radiological sources and/or substances, and mould. Representative sampling and laboratory analysis of suspected asbestos-containing materials (ACMs) and lead-containing paint was also completed.

---

[1] SNC-Lavalin Inc., Environment & Water (E&W) formerly known as SNC-Lavalin Inc., Environment Division (SLE).

The survey identified the following regulated and hazardous materials of potential concern at the site:

Asbestos-Containing Materials (ACMs)

Secondary Examination Shelter (Maintenance Building)

- black mastic around the three (3) windows
- light grey mastic around the window in the door on the south side

Customs Office Building

- grey putty surrounding an exterior vent on the north side and plugging a hole in the vinyl siding on the west side
- grey putty around the windows in the two (2) doors on the east and south sides
- white putty around the two (2) large windows on the south side
- grey mastic/putty surrounding a conduit on the east side
- potential asbestos-containing pipe joints
- drywall joint compound in a room (1 upper) on the top floor

Generator Building

- grey putty filling exterior holes in the vinyl siding/walls
- black mastic on the metal roof of the Old Area
- black mastic joining the exterior metal cladding pipe cover to the Water Storage Tank
- grey mastic joining the exterior metal cladding pipe cover to the Generator Building
- black shingles beneath the metal cladding on the ground pipe cover from the Water Storage Tank to the Generator Building
- drywall joint compound on the walls of the Old Area

House #9

- grey mastic/putty around exterior electrical boxes and surrounding the roof chimney flashing
- yellow/tan vinyl sheet flooring located in Kitchen, Mudroom, Bathroom, Bedroom #2 and Foyer on the main floor
- potential asbestos-containing wire covering within buildings
- potential asbestos-containing pipe joints

Lead-Containing Paint (lead concentrations > 600 mg/kg)

Customs Office Building

- black paint on basement window frame (four locations: two on north side, one on east side, one on west side)
- grey paint on concrete floor (Files Room)

Generator Building

- black paint on exterior doors, trim and south side vents
- tan paint with the presence of lead on the drywall behind the insulation panels of the Old Area

House #9

- black paint on exterior trim
- white paint on exterior wooden surfaces (north side of building)
- grey paint on exterior wooden steps (northeast and northwest corners of building)
- white paint on interior walls (Dining Room)
- grey paint on concrete floor (same as on stairs to basement)

Other Lead-Containing Materials

- four (4) lead-containing batteries were observed in the Generator Building
- potential lead-containing pipe joints were observed in the Customs Office Building and House #9
- lead vent stacks were observed on the Customs Office Building roof and potentially on the roof of House #9 (inaccessible);

Polychlorinated Biphenyls (PCBs)

- possible PCBs in ballasts for light fixtures throughout

Halocarbons (Ozone Depleting Substances [ODSs] and Non-ODSs)

- known or suspected halocarbons (ODSs) were identified in the refrigerator and water cooler (has been replaced since the date of the survey and halocarbon information is unknown) in the Customs Office Building Kitchen and in the freezer in the Basement of House #9. Known halocarbons (Non-ODSs) were identified in the refrigerator and water cooler in the kitchen of House #9.

Mercury

- mercury vapours in fluorescent light tubes, high intensity discharge (HID) lamps throughout and mercury ampoules in several thermostats throughout the various buildings

Silica

- silica in concrete and mortar construction materials (i.e., poured concrete slabs/floors, concrete blocks, mortar, plaster and ceramic tiles)

Solid and Liquid Wastes

- refuse observed throughout the site included general garbage, scrap metal (lead), oil change equipment, etc.

Other Hazardous Materials

- hazardous consumer products including oils, solvents, compressed gas cylinders, fire extinguishers, vehicle maintenance supplies, cleaners, etc.
- as noted above, four (4) batteries were observed in the Generator Building
- potential for hazardous liquids to be stored in the Water Storage Tank
- several above ground storage tanks (ASTs) used for heating oil (diesel) throughout the site
- possible residual hydrocarbon liquids and/or vapours in the presumed empty diesel AST (currently not in use) in the Secondary Examination Shelter (Maintenance Building)

There is also the potential for underground asbestos-containing cement pipes in the area. The identification of potential ACMs below ground is not within the scope of this report, and should be addressed during any excavation at the site.

Regulated substances and hazardous materials in good condition and/or sealed/contained are not expected to pose a hazard to building occupants in the short term; however, E&W understands that PWGSC intends to demolish the majority of the older existing buildings at the site. In conjunction with this work, it is recommended that PWGSC retains qualified abatement, disposal and demolition contractors to conduct pre-demolition activities specified in Tables 1 to 7. A management program should also be implemented to mitigate any potential risks associated with any regulated substances and hazardous materials that will remain in any buildings left intact.

LIST OF ABBREVIATIONS

ACM	Asbestos-Containing Materials
AST	Aboveground Storage Tank
BCA	Building Condition Assessment
CBSA	Canada Border Service Agency
CEPA	Canadian Environmental Protection Agency
EMA	Environmental Management Act
HW	Hazardous Waste
HWR	Hazardous Waste Regulation
ODS	Ozone Depleting Substance
OHSA	Occupational Health and Safety Act
OSHR	Occupational Health and Safety Regulation
PCBs	Polychlorinated Biphenyls
PLM	Polarized Light Microscopy
PWGSC	Public Works and Government Services Canada
E&W	SNC-Lavalin Inc., Environment & Water (E&W), formerly known as SNC-Lavalin Inc., Environment Division (SLE)
TDG	*Transportation of Dangerous Goods Act, 1992* (TDG), S.C. 1992, c. 34, as amended up to 2009, c. 9.
UFFI	Urea Formaldehyde Foam Insulation

INTRODUCTION

At the request of Public Works and Government Services Canada (PWGSC), SNC-Lavalin Inc., Environment & Water (E&W)[2] has prepared this letter to report results of a Building Conditions Assessment (BCA) at the Canada Border Services Agency (CBSA) Port of Pleasant Camp Border Crossing Facility in Pleasant Camp, BC (the "site"). The work program was undertaken to evaluate existing or potential regulated and hazardous materials in the existing on-site buildings in preparation of port redevelopment and excavation planned in 2013. This report documents the methodology used to complete the work program as described in SLE's (now known as E&W) proposal, dated July 30, 2012[3], and provides a summary of the findings.

BACKGROUND

The CBSA Port of Pleasant Camp border crossing facility is located on Haines Road (BC Highway 7) in the northwest corner of British Columbia, approximately 170 km south of Haines Junction, YT as shown on the attached Drawing 131416-L01.

The facility infrastructure consists of the following: a pump house, a secondary examination shelter (maintenance building), a double garage, a customs office, a generator building and adjoining water storage tank, a main fuel storage tank enclosure, a remediation system enclosure, eight (8) newer residences (Houses #1 through #8), and an original residence (House #9). The general site layout is shown on the attached Drawing 131416-BM1.

All work was conducted in accordance with the PWGSC Standing Offer Agreement (SOA) for Phase I, II and III Environmental Site Assessments (E0276-092730/006/XSB).

OBJECTIVE AND SCOPE OF WORK

The objective of the BCA was to identify potential regulated and/or hazardous materials of concern which may require special handling or management during future demolition and/or renovation activities as required under applicable legislation, and notably the British Columbia Occupational Health and Safety (OHSA) Regulation, Section 20.112 and Canada Labour Code Part II, Canada Occupational Health and Safety Regulations, Part X - Hazardous Substances.

E&W personnel completed the work program on August 31 and September 1, 2012 that included the following tasks:

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[2] SNC-Lavalin Inc., Environment & Water (E&W) formerly known as SNC-Lavalin Inc., Environment Division (SLE).

[3] *FY 2012/2013 Work Plan and Cost Estimate for Annual Monitoring and Sampling Event and Building Conditions Assessment, CBSA Port of Pleasant Camp Border Crossing, Pleasant Camp, BC*, dated July 30, 2012

- a room-by-room visual survey of the accessible areas of the buildings and related equipment to identify, document and quantify suspected regulated substances and hazardous materials including asbestos, lead-containing paint, polychlorinated biphenyls (PCBs), halocarbons (ODSs and Non-ODSs), mercury, silica, urea formaldehyde foam insulation (UFFI), other hazardous materials, solid and liquid wastes, radiological sources and/or substances, and mould; and
- representative sampling and laboratory analysis of suspected asbestos-containing materials (ACMs) and lead-containing paint.

REGULATORY FRAMEWORK

Federal and Provincial regulations require that prior to major renovations, salvage or demolition of a building or structure, regulated building materials on a site must be identified and properly controlled, removed and/or disposed. In addition, these regulated building materials must be disposed at a suitably permitted facility in accordance with the applicable regulations. The following regulations relate to these materials:

Federal

- Various Regulations made under the Canadian Environmental Protection Act (CEPA), 1999, S.C. 1999, c. 33, as amended up to 2012, include specialized handling and/or disposal requirements for materials including lead, PCBs, mercury, halocarbons (ODSs and Non-ODSs), radiological sources and/or substances and solid/hazardous wastes. Regulations include:
  - Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149);
  - Federal Halocarbon Regulations, 2003 (SOR/2003-289);
  - Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations, 2008 (SOR/2008-197);
  - Interprovincial Movement of Hazardous Waste Regulations (SOR/2002-301);
  - Ozone-Depleting Substances Regulations, 1998 (SOR/99-7);
  - PCB Regulations (SOR/2008-273); and
  - PCB Waste Export Regulations, 1996 (SOR/97-109).
- Transportation of Dangerous Goods (TDG) Act, 1992, S.C. 1992, c. 34, as amended up to 2009, c. 9, requires that radioactive materials must be transported in accordance with the provisions of the Act.

- Hazardous Products Act (R.S.C., 1985, c. H-3), as amended up to 2011, prohibits the sale or importation of UFFI into Canada.
- Human Resources Social Development Canada (HRSDC), Canada Labour Code Part II and Canada Occupational Health and Safety Regulations (SOR/2002-208), Part X – Hazardous Substances, as amended, require that all hazardous substances in the workplace, including asbestos, be identified and controlled to minimize potential exposure to workers.
- As of January 1, 2011, the National Joint Council adopted, as a minimum requirement, that all departments and agencies comply with PWGSC Policy DP 057, Asbestos Management. The policy applies to PWGSC managers, supervisors and employees where the duties required to be undertaken involve the removal, repair or maintenance of ACM. The departmental policy and associated code of practice apply to any building or facility in which friable material, that may contain asbestos, has been used, and all repairs, alterations or maintenance of any building or facility where ACM may exist.

Provincial

- WorkSafe BC Occupational Health and Safety Regulation (OHSR)[4], B.C. Reg. 296/97, as amended, requires that materials including any asbestos, lead or other heavy metal or toxic substance, and flammable or explosive materials that may be handled, disturbed or removed during demolition must be identified and removed or safely contained prior to demolition. In addition, a copy of the observation report identifying these materials must be available at the work site. WorkSafe BC Occupational Health and Safety (OHS) Guidelines have been developed to help interpret and apply OHSR requirements and assist with providing ways of compliance.
- Environmental Management Act (EMA), S.B.C. 2003, c. 53, as am. by S.B.C. 2004, c. 18., Ozone Depleting Substances (ODS) and Other Halocarbons Regulation, BC Reg. 387/99, including amendments up to B.C. Reg. 4/2010 require ODSs to be recovered from equipment prior to disposal.
- Hazardous Waste Regulation (HWR), B.C. Reg. 63/88, including amendments up to B.C. Reg. 63/2009, requires all Hazardous Wastes (HW) to be properly managed and disposed.

We note that at the time of this report, with the exception of vermiculite, asbestos-containing material means any manufactured article or other material which contains 0.5% or more asbestos by weight as defined by the BC OHSR, as amended. Based on the WorkSafe BC OHS Guidelines, vermiculite insulation determined to contain any asbestos is considered an ACM.

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[4] *WorkSafeBC Occupational Health and Safety Regulation (OHSR),* BC Reg. 296/97, Amended by B.C. Reg. 230/2011, effective April 15, 2012.

GENERAL OBSERVATIONS

Pump House

The pump house is situated on a concrete slab adjacent to a rock / concrete wall next to Granite Creek (north portion of the site). A concrete sump (approximately 1 m diameter and 2.4 m depth) is beneath the north portion of the pump house, which contains the intake pipe for the water supply for the site. Blue painted plywood is currently covering the sump. The interior walls and ceiling are constructed of white painted plywood. Fibreglass insulation was noted in the ceiling cavity.

One (1) window was identified on the east wall of the pump house and at the time of inspection, was boarded up. The exterior walls are wood construction with tar paper beneath white painted wood siding. The roof consists of corrugated metal over wood; no tar paper was identified beneath the corrugated metal.

Garage

The garage consists of two (2) bays (north and south). The north bay consists of a concrete floor and unpainted wooden interior walls and ceiling. The south bay consists of a concrete floor with walls and a ceiling of white painted wood with portions covered with drywall. No drywall tape or compound was identified.

Four (4) windows were identified on the garage (2 on the north side and two 2 on the south side). The exterior wall covering is vinyl siding over wood; no tar paper was identified beneath the vinyl siding. The roof consists of corrugated metal over roof shingles; no tar paper was identified beneath the shingles.

Secondary Examination Shelter (Maintenance Building)

The secondary examination shelter has a concrete slab on grade with interior walls and ceilings consisting of white painted drywall finished with tape and compound. Fibreglass insulation was identified in the walls and ceiling spaces. Two (2) identical metal bay doors are located on the south wall. Three (3) similar windows (2 on the east side and 1 on the west side) and three (3) exterior doors (1 on the east side, 1 on the west side and 1 on the south side) were identified. The exterior door on the south side of the building contains a window.

The exterior walls were covered with white vinyl siding; no tar paper was identified beneath the siding. The roof consists of corrugated metal sheets.

Two (2) thermostats were observed on the east wall along with a ceiling mounted fuel oil heater and an above ground storage tank (AST) containing heating oil tank (1,136 L capacity). Several fluorescent light fixtures and/or high intensity discharge (HID) lamps with ballasts were also identified.

A general waste bin was identified within the building along with vehicle and equipment maintenance parts, tools and supplies such as: paint, detergent, ice salt, oil (engine, gear, hydraulic), filters, propane, gasoline cans, sorbents, welding equipment (and associated large cylinders of oxygen and acetylene and smaller cylinders of methylacetylene propadiene gas), a compressor, a welding generator, glues, fire extinguishers, an empty 1,136 L capacity AST, batteries, scrap metal (including lead), and various cleaners.

Water Storage Tank and Adjoining Pipe Cover

The water storage tank is a wood stave tank with a metal roof and an impermeable liner. It is unknown as to the details of the materials within the tank; however, based on available information, the tank is assumed to store water. Associated piping runs along the ground from the east side of the tank into the generator building and is covered with a wooden box. The top of the box is covered with shingles beneath corrugated metal sheets.

Main Fuel Storage Tank Enclosure

The main fuel storage tank enclosure consists of a concrete floor with approximately 1 m high concrete walls. The interior is lined with an impermeable liner and contains a 19,575 L capacity AST used to store heating oil (diesel) to be distributed to all day use tanks throughout the site. The east and west walls of the enclosure above the concrete consists of white painted plywood. The roof consists of corrugated metal painted with black over red paint.

Generator Building

The original generator building underwent renovations including installation of a 3 m addition to the south end. The newer section is apparent based on observations of the roof connections, concrete flooring joint, and differences in the interior wall construction and wall coverings.

The generator building floor is grey painted concrete slab on grade resting approximately 0.8 m below the ground surface. The interior walls of the older area consist of tan painted drywall finished with tape and compound. The interior walls of the newer area consist of unpainted drywall finished with tape and compound. All walls and ceiling were covered with fibreglass insulation panels. The older area insulation panels contained black backing and were glued onto the walls with black glue. The newer area insulation panels contained no backing and were glued onto the wall with white glue. Fibreglass insulation was identified in the walls and ceiling spaces.

Six (6) thermostats were identified in the building: 3 on the west wall (1 of which contains 1 ampoule of mercury), 2 on the east wall (1 of which contains 1 ampoule of mercury), and 1 non-mercury containing thermostat on the south wall. Several fluorescent light fixtures with ballasts were also identified.

Two (2) back-up generators are also located within the building (each containing 2 acid/lead batteries). The fire suppression system (pumps, etc.) is located on the west side within the generator building along with the water treatment system (filters, retention tanks, chlorine tank and dosing pump). A furnace is located in the northwest corner and an approximately 1,100 L capacity heating oil AST is located in the southeast corner. Several miscellaneous items were also identified within the building such as oil, paints, paint thinner, cleaning solvents, and hypochlorite (for chlorine dosing pump).

The exterior of the building is covered with white vinyl siding; tar paper was identified beneath the siding. Siding on the original building and the addition were identified to be the same material suggesting that the building was re-sided during the addition. The roof on the original building consists of metal cladding over asphalt shingles over tar paper. The newer area roof consists of metal cladding over plywood.

Three (3) windows (2 on the west side and 1 on the east side) and two (2) exterior doors (1 on the south side and 1 double door on the east side) were identified. Three (3) vents were also identified (2 on the north side for the back-up generators, and 1 on the south side).

Customs Office Building

The customs office consists of three (3) levels (top, main and basement). The top level contains two (2) rooms (identified herein as "1 upper" and "2 upper" which also contains a kitchen). The kitchen area in 2 upper contains a sink and storage cupboards. Furniture polish, floor finish and cleaners were identified in the kitchen cupboards. Older wiring was also identified under the sink. The flooring in the two (2) rooms consists of pink vinyl floor tile over wood. The walls and ceiling consist of white painted finished drywall. An attic access was identified on the north and south walls of 1 upper, which contained fibreglass insulation. Vertical cast iron pipes were noted in the north attic. The ceiling space was inaccessible during the survey.

The main floor consists of several rooms including two (2) office spaces, a washroom, kitchen, holding cell, file area, foyer and hallway. Based on available information, the main floor has undergone renovations to several areas including the front office (office 2), the file area, and foyer. The flooring consists of green/grey vinyl sheet flooring exceptions in the file area, which has white vinyl floor tiles over the green/grey vinyl sheet flooring, and in the holding cell, which has white vinyl floor tiles. The ceiling consists of drop-tiles, except in the holding cell which has white painted finished drywall, similar to the walls in the holding cell and the upper walls in office 1. The remaining walls consist of wood panel and plastic (file room), wood panel over unfinished drywall (kitchen, hall, foyer and office 2), and ceramic tile in the washroom.

The main floor kitchen contains a sink, refrigerator and water cooler (which have since been replaced since the date of the survey). Several cleaners were also identified in the kitchen cupboards. One (1) thermostat was identified in office 2 (containing 1 ampoule of mercury).

The basement consists of five (5) rooms including an electrical room, furnace room, files room, evidence room, and weapons room. The flooring in the basement consists of grey painted concrete. The outer walls consist of white painted concrete (building foundation). Interior walls (separating rooms) consist of wood, unfinished drywall, or finished drywall. The ceiling in the basement is open wood joists. A 1,136 L capacity heating oil AST is located in the northwest corner of the basement (furnace room). The furnace and hot water tank is located adjacent a brick chimney on the west wall of the basement (furnace room). Several cast iron pipe joints and old electrical wiring were identified in several of the rooms in the basement. Some containers of floor sealer and cleaners were also identified in the electrical room next to the staircase.

The exterior of the office building consists of metal cladding roof over shingles; no tar paper was identified beneath the shingles. The building is covered with white vinyl siding with tar paper beneath. The canopy on the south side of the office building is covered with a metal cladding roof over tar paper; no shingles were identified beneath the metal cladding. Several fluorescent light fixtures and/or HID lamps with ballasts were also identified inside and outside of the office building.

Two (2) exterior doors provide access to the main floor of the office building. Both doors have small windows. There are also two (2) large windows on the south side, three (3) windows on the east side, four (4) windows on the north side, and five (5) windows on the west side of the building. Several roof vents were identified and are made of either lead or plastic.

House #9

House #9 consists of three (3) levels (top, main and basement). The top level is made up of two (2) bedrooms (bedroom 3 and bedroom 4) and five (5) closets. The flooring on the top level consists of laminate flooring over orange vinyl floor tiles. The walls and ceiling consist of white painted finished drywall with the exception of curved areas, which consist of fibreboard coated with drywall joint compound. Fibreglass insulation was identified in the exterior wall spaces as well as the ceiling space.

The main floor is made up of two (2) bedrooms (bedroom 1 and bedroom 2), a hallway, living room, dining room, mud room, foyer, bathroom and full kitchen (contains refrigerator, stove, etc.). The flooring consists of original hardwood in the living and dining rooms; laminate flooring over yellow/tan vinyl sheet flooring over orange vinyl floor tiles in the kitchen, mudroom, foyer and bedroom 2; laminate flooring over orange vinyl floor tiles in the hallway and bedroom 1; and, tan vinyl sheet flooring over yellow/tan vinyl sheet flooring over orange vinyl floor tiles in the bathroom. Walls and ceiling consist of white painted finished drywall. A refrigerator and water cooler was identified in the kitchen. A thermostat (containing 1 ampoule of mercury) was identified in the hallway on the west wall across from the kitchen.

The basement is made up of one (1) large room and a smaller cold room built in the southwest corner. The flooring consists of grey painted concrete and the walls consist of white painted concrete, with the exception of the interior cold room walls, which consist of white painted wood. Two (2) sets of washers and dryers were identified (along the north and west walls). A sump pump was identified along the north wall (for flooding). The furnace and hot water tank was identified in the northeast corner. A thermostat (containing 1 ampoule of mercury) was identified adjacent the furnace (on the north side of the staircase). An unused stand-up freezer was identified to the east of the staircase, along with a 1,136 L capacity heating oil AST.

A fluorescent light fixture with a ballast was identified in the basement along with several cast iron pipe joints (approximately 50) and old electrical wiring.

The exterior walls are covered with white vinyl siding over brown tar paper. The roof consists of metal cladding over black tar paper. Several newer and older windows were identified surrounding the house; no window mastic was identified. A covered patio extends the length of the house and is located on the north (back) side. The exterior door on the north side of the house contains a large window and the exterior door on the south side (front door) does not have a window. Potential lead vent stacks were observed on the roof.

The remediation system enclosure is a newer metal clad structure, and it is understood that it can be and would be transported off site as a whole unit; therefore, a detailed inspection of the structure was not warranted.

The following sections describe material-specific inspection methods and rationale used in completing the work program. Photograph documentation of the site visit is included in Attachment 1.

METHODOLOGY

Asbestos-Containing Materials (ACMs)

Asbestos is a general name for highly fibrous silicate materials which are valued for their heat- and chemical-resistant properties. Although there are many types of asbestos, commercially significant types include chrysotile, amosite and crocidolite.

The friability of an ACM is a measure of the ease with which the material can be ground or pulverized, and provides a theoretical measure of the ease with which asbestos fibres can be released into the air. Friable ACMs are generally identified as materials which can be crumbled, pulverized and/or reduced to powder by hand pressure, such as some ceiling tiles, thermal insulation and fire proofing. Non-friable ACMs are hard products with bound asbestos, such as floor tiles, pipes, siding, etc. These products pose no danger of releasing airborne fibres unless cut, sawn, ground, or sanded.

With the exception of vermiculite, materials containing 0.5% or more asbestos by dry weight are considered to be ACMs requiring specialized handling, removal and disposal practices as defined in the OHSR. Based on the WorkSafe BC OHS Guidelines, vermiculite insulation determined to contain any asbestos is considered an ACM.

Most use of friable asbestos (i.e., sprayed insulation and pipe/boiler wrap) in Canada ended in approximately 1973. The use of ACMs in construction (ceiling tiles, vinyl floor tiles, acoustic panels, roofing felts, gaskets, curtains, plasters, joint filling compound, and asbestos-concrete pipe and panels) generally ceased voluntarily in the mid 1970s; however, experience has shown that ACMs manufactured previously and held in inventory have been used during the construction/renovation of building until at least the 1990s. Asbestos may still be used in vinyl floor tile and cement products because of its strength, resistance to corrosive chemicals and ability to withstand high temperatures.

Inspection for potential ACMs included but was not limited to: interior ceilings, walls, flooring material, exterior walls, caulking and piping. Intrusive sampling methods were implemented where possible, to identify suspect material that may be hidden. Effort was made to identify potential ACMs; however, the survey was non-destructive and in some instances, ACMs may be hidden and/or inaccessible in roofing systems, and ceiling, wall, and floor cavities. Should additional unidentified materials be encountered during subsequent activities, they must be handled as ACMs until/unless testing confirms otherwise.

Seventy-seven (77) potential ACM samples were collected for laboratory analysis. The location, type and condition of the potential ACMs were documented during the site visit. The approximate sampling locations are indicated on Drawings BM2 through BM7. Detailed descriptions of ACMs observed on site are summarized in Table 1. Sampling was generally conducted in accordance with the OHSR.

Samples for laboratory analysis were collected in sealable plastic bags and submitted to International Asbestos Testing Laboratories (IATL) located in Mt. Laurel, New Jersey, U.S.A under Chain of Custody protocols. IATL is accredited by the National Voluntary Accreditation Program (NVAP). Analysis of bulk samples for determination of asbestos content was performed using polarized light microscopy (PLM) procedures detailed in the US Environmental Protection Agency (EPA) "Methods for the Determination of Asbestos in Bulk Building Materials, US EPA Report No. 600/R-93/116".

Asbestos, if present, was identified as one (1) or more fibrous asbestos minerals, including chrysotile, amosite and crocidolite, where possible.

Analytical results for suspect ACM samples A1 to A77 are summarized in Table 1 and related Laboratory Certificates of Analysis are provided in Attachment 2.

Lead-Containing Materials

Paints can contain different concentrations of lead (depending on age, colour, durability rating, etc.); therefore, E&W personnel inspected the site to determine primary paint colour(s) that has been widely applied to different building components. The approach was to try to obtain samples from structures on site that may reasonably need to be cut, ground, or sanded during renovation, demolition or deconstruction. Factory painted metal surfaces were not sampled as the paint is applied in thin layers, making it difficult to obtain a sufficient quantity of paint sample to analyze.

The "*Federal Hazardous Products Act*" (1976) limited the quantity of lead permissible in newly manufactured paints to 5,000 parts per million (ppm) by weight (0.5%). On May 4, 2005, the "*Surface Coating Materials Regulations*" was promulgated (later amended in 2011) and the limit on the amount of lead in paint was reduced to 90 ppm (or µg/g) by weight (0.009%). The requirements of this regulation are only directly applicable to surface coatings of consumer products, such as furniture, children's toys and pencils.

In the US, paints containing levels of lead in excess of 5,000 mg/kg (5,000 ppm) trigger specific abatement/demolition requirements as referenced in the US Department of Housing and Urban Development (HUD) Guidelines for the "Evaluation and Control of Lead Based Paint Hazards in Housing". We note that the WorkSafe BC guidance document "Lead-Containing Paints and Coatings Preventing Exposure in the Construction Industry" will be used for the purposes of this assessment.

The presence of lead-containing paint or surface coatings is not an environmental concern but could pose a potential exposure risk to workers in the event that lead based paint or surface coatings is burned and/or becomes airborne during renovation/demolition activities. WorkSafe BC OHSR, Guidelines Part 5 defines lead-containing surface coatings as a paint or other surface material that dries to a solid film that contains over 90 mg/kg (90 ppm) dry weight of lead. However, BC regulations do not require lead controls for surface coatings containing <600 mg/kg. Thus, coatings containing >600 mg/kg (600 ppm) were considered lead-based.

Based on visual observations, the primary paint colour(s) most widely-applied in the building were determined and sampled. Twenty-eight (28) paint samples were collected from various surfaces on site. Approximate sampling locations are shown on Drawings BM2 through BM7.

Paint samples for laboratory analysis were collected in sealable plastic bags and submitted to Maxxam Analytics Inc. (Maxxam) of Burnaby, BC under Chain of Custody protocols. Analysis of bulk samples for determination of metals content was performed using Inductively Coupled Argon Plasma, Atomic Emission Spectroscopy (ICP-AES) procedures and PCBs using Gas Chromatography (GC), EPA 8082 Method.

Four (4) lead-containing batteries were observed in the generator building and if not re-used, due to their acid content, would require specialized handling and disposal practices during renovation/demolition. Lead may also be present in joints of copper and/or iron piping in the Customs Office Building and House #9, and on the vent stacks on the Customs Office Building and House #9 roofs; however, lead in these forms is not expected to be of concern during the renovation/demolition.

Suspected and/or confirmed lead-containing materials, and analytical results for paint samples are summarized in Table 2 and related Laboratory Certificates of Analysis are provided in Attachment 2.

Polychlorinated Biphenyls (PCBs)

PCBs are manmade chemicals that were manufactured on a commercial scale in 1929. PCBs can be in liquid or solid form, depending on the degree of chlorination. The excellent insulating and thermal properties of PCBs led to their application in a wide variety of products ranging from carbonless copy paper to heat exchange and hydraulic fluids, as well as their use in electrical transformers and capacitors. Historical use of PCBs in electrical equipment manufactured in Canada, such as transformers, fluorescent lamp ballasts and capacitors, was common prior to approximately 1977.

Once present in the environment, PCBs can accumulate in body tissues. PCBs have been linked to reproductive effects such as low birth weight in humans and other birth defects in wildlife. These effects, extreme persistence and their ability to bioaccumulate, prompted the federal government to regulate PCBs.

The use of PCBs was prohibited by the Canadian Environmental Protection Act in heat transfer and electrical equipment installed after August 1977, and in transformers and capacitors installed after June 1980. However, experience has shown that electrical equipment manufactured previously and held in inventory may still be in use.

Accessible areas were assessed for items or equipment that could possibly contain PCBs such as transformers, fluorescent light fixtures (and associated ballasts), metal halide and HID lamps. As buildings were typically powered at the time of inspection, equipment dismantling to allow detailed inspection was beyond the scope, and manufacturer and/or date codes on light ballast labels could not be recorded due to accessibility issues.

Materials suspected to contain PCBs are summarized in Table 3.

Halocarbons (Ozone-Depleting Substances [ODSs] and Non-ODSs)

ODSs generally contain chlorine, fluorine, bromine, carbon, and hydrogen in varying proportions and are often described by the general term halocarbons. Chlorofluorocarbons (CFCs), carbon tetrachloride, and methyl chloroform are important human-produced ozone-depleting gases that have been used in many applications including refrigeration, air conditioning, foam blowing, cleaning of electronics components, and as solvents. Another important group of human-produced halocarbons is the halons, which contain carbon, bromine, fluorine, and (in some cases) chlorine, and have been mainly used as fire extinguishers.

In the late 1940s CFCs began to be used as the propellant in aerosols. This use hit its peak in the late 1970s, when CFC was identified as an ODS and aerosols became the main target of public action. In the 1980s, they were widely used as coolants in refrigerators and air conditioners, as solvents in degreasers and cleaners and to dilute gas mixtures, and as blowing agents in the production of foams.

Halocarbon-containing refrigerant (ODSs and Non-ODSs) should be recovered by qualified personnel and disposed of in accordance with the CEPA (e.g., Federal Halocarbon Regulations, 2003 [SOR/2003-289], EMA and B.C. Reg. 387/99).

E&W personnel observed the interior and exterior spaces of the site to identify if air conditioning units, refrigerators, freezers, water coolers, or other sources of halocarbons (ODSs and Non-ODSs) existed. If a unit was identified, the manufacturer's nameplate (if accessible) was observed to determine the type and amount of refrigerant used. Materials suspected or confirmed to contain halocarbons (ODSs and Non-ODSs) are summarized in Table 4.

Mercury

Mercury has widespread use in commercial/residential products including electrical switches, barometers, thermometers, and fluorescent light tubes. It also has many commercial, medical and industrial applications. Often mercury is also present as a constituent in surface finishing materials and paint. A potential concern of mercury is its persistence in the environment when released at a landfill following disposal. Special considerations must be taken during the disposal of items containing mercury. Potential worker exposure to mercury would be regulated by B.C. Reg. 296/97, and disposal by the CEPA and B.C. Reg. 63/88.

The interior of the buildings was observed for thermostats that may contain small amounts of liquid mercury. The covers of thermostats found were opened to assess the presence of mercury ampoules. The interior and exterior spaces of the site were observed for fluorescent light tubes and/or bulbs which contain mercury vapour. Materials suspected or observed to contain mercury are summarized in Table 5.

Silica Containing Materials

Silica occurs naturally as a crystalline material in rock, sand, concrete and cement, and therefore is likely present in poured concrete walls/floors, concrete blocks and mortar. Silica dust is toxic and potential worker exposure would be regulated under B.C. Reg. 296/97. Silica dust can be generated through such processes, such as breaking, drilling, hammering, blasting, grinding, crushing, or sandblasting silica-containing materials.

The site was assessed for potential silica containing building materials. Materials suspected to contain silica are summarized in Table 6.

Urea Formaldehyde Foam Insulation (UFFI)

UFFI was developed in Europe in the 1950s as an improved means of insulating difficult-to-reach cavities in house walls. It was typically injected through 1 cm to 2 cm diameter holes drilled in interior or exterior walls. During the 1970s, when concerns about energy efficiency led to efforts to improve insulation in Canada, UFFI became an important insulation product for existing buildings. Most installations occurred between approximately 1970 and December 1980. The use of a urea formaldehyde-based resin in the manufacture of UFFI can lead to the release of formaldehyde gas during the curing process and afterwards. Formaldehyde is an irritant, and exposure to high concentrations of formaldehyde can cause burning sensations in the eyes, nose and throat. Long-term exposure to moderate formaldehyde concentrations (at levels lower than those causing irritation) may also be linked to respiratory symptoms and allergic sensitivity, especially in children. At very high concentrations, formaldehyde can cause cancer of the nasal cavity.

UFFI may also deteriorate when wet and can release increased amounts of formaldehyde if installed incorrectly. As well, there is a related concern that the moist foam could support mould growth, which could in turn adversely affect the health of the occupants.

UFFI has been prohibited from sale or importation into Canada under the Hazardous Products Act since December 1980. The prohibition includes all urea formaldehyde-based thermal insulation used to insulate buildings. This includes melamine urea and other urea formaldehyde resins.

Interior and exterior spaces were inspected to identify for indicators of the potential presence of UFFI. No holes indicative of the possible injection of UFFI were identified in the interior or exterior walls of the on-site buildings.

Other Hazardous Materials

Workplace hazardous materials information system (WHMIS) requirements in B.C. Reg. 296/97 require that hazardous materials present in a workplace must be labelled to warn building occupants and workers of potential related hazards. Worker training is also required.

Accessible areas of the building and site were assessed for the presence of potential hazardous materials (e.g., hazardous consumer products, heating oil ASTs, potential hazardous liquids and vapours). A list of all hazardous materials identified is summarized in Table 7.

Solid and Liquid Wastes

E&W personnel observed accessible areas of the building and site for solid and/or liquid wastes. An inventory of these potentially hazardous materials (e.g., ASTs, scrap metal, motor oil, etc.) is summarized in Table 7.

Any remaining materials should be properly disposed per proper landfill procedures.

Radiological Sources and/or Substances

Radioactive sources and/or substances may be present in smoke detection devices. Radioactive materials are listed under the TDG Act. Substances with a specific radioactivity greater that 70 kBq/kg are considered Class 7 (Radioactive Materials) within the TDG Act and must be transported in accordance with the provisions of the TDG Act. The Nuclear Safety and Control Act (1997, C. 9), Nuclear Substances and Radiation Devices Regulations (SOR/2000-207), advises that radioactive substances that do not contain more than 185 kBq of americium 241 or where it is in a commercial or industrial facility, more than 740 kBq of americium 241 is considered as a radioactive source under the TDG Act. These levels may be reached if more than 20 radioactive smoke detection devices are collected and stored together.

The accessible areas of the site were observed for potential radiological sources and/or substances. No suspected radiological sources or substances were identified at the site.

Mould

Moulds are microscopic, plant-like organisms that are composed of long filaments called hyphae. When hyphae are numerous enough to be seen by eye they form a cottony mass called a mycelium. These have numerous and sometimes distinctive forms and colour.

Mould spores frequently travel through ambient air and reproduce by spores that germinate in suitable environments. The potential presence of mould was assessed based on the New York City Department of Health and Mental Hygiene publication entitled "Guidelines on Assessment and Remediation of Fungi in Indoor Environments" (2008) and "CCA 82 - Mould Guidelines for the Canadian Construction Industry" (2004) by Canadian Construction Association (CCA).

Visual inspections were conducted for evidence of potential mould growth and conditions which may contribute to mould growth (sources of water infiltration, water staining, etc.). No evidence of mould was observed in accessible areas of the site.

REGULATED AND HAZARDOUS MATERIAL INVENTORIES

A detailed inventory of survey results is presented for each regulated and hazardous material of potential concern in Tables 1 to 7. This information also includes recommendations for removal/handling during the renovation/demolition activities where required.

RECOMMENDATIONS FOR PRE-DEMOLITION ABATEMENT ACTIVITIES

E&W understands that PWGSC intends to demolish the majority of the older existing buildings at the site. In conjunction with this work, it is recommended that PWGSC retains qualified abatement, disposal and demolition contractors to conduct pre-demolition activities specified in Tables 1 to 7. PWGSC should request that these contractors submit the following documentation to verify their qualifications and ability to complete the work in a responsible manner in accordance with existing applicable regulations:

- training records (WHMIS, asbestos management, work at height, etc.);
- site-specific health and safety plan including emergency response plan;
- notice of project for work involving asbestos (NOPA) to be filed with WorkSafe BC prior to undertaking abatement;
- site-specific work procedures and exposure control plan for handling materials of concern (included with NOPA); and
- proposed waste disposal locations and bills of lading/manifests documenting final waste destinations.

B.C Reg. 296/97 (as amended) requires that ACMs be removed in advance of building or equipment demolition (or renovation). All federal agencies are also required to comply with PWGSC Policy DP 057, Asbestos Management. Assuming non-friable ACMs can be removed intact or with limited breakage, the identified ACMs can be removed in accordance with moderate risk procedures as outlined in the WorkSafe BC "Safe Work Practices for Handling Asbestos" (2006). Detailed inspections in conjunction with demolition activities would be required to identify any ACMs that may have been inaccessible during this work program.

The abatement contractor needs to assess the risk of exposure to airborne asbestos fibres based on the method of removal planned or selected, as well as other potential risks associated with other contamination anticipated during demolition (e.g., presence of ACMs that are impractical to pre-remove including, for example, mastic).

If buildings are not going to be demolished, and workers will continue to occupy/work in the areas, exposure risks should be assessed and controls must be implemented to address these risks. In this case, the development of an asbestos management plan would be required and must be kept on site.

Based on lead paint analytical results, the majority of paints sampled contain some lead. The presence of lead in paint is not an environmental concern but could pose a potential exposure risk to workers in the event that lead-based paint is burned and/or becomes airborne during demolition activities; as such, torching and grinding of painted building materials should be minimized. Further, concrete contains silica that may become airborne during demolition. An exposure control plan must be developed in accordance with B.C. Reg. 296/97 (as amended) and implemented to minimize the generation of dust and airborne particulates that may include lead and silica.

Once electrical equipment has been de-energized, light ballasts and transformers should be removed, segregated, individually inspected, sorted based on manufacturer labelling/coding as PCB or non-PCB-containing, and eventually disposed accordingly. Light bulbs need to be removed intact and segregated for proper off-site recycling/disposal (that includes vapour capture procedures).

Known or suspected halocarbon refrigerants (ODSs and Non-ODSs) should be recovered by qualified personnel and disposed in accordance with the Federal Halocarbon Regulations, 2003 (SOR/2003-289), EMA and B.C. Reg. 387/99.

All thermostats must be inspected and the mercury containing ampoules must be removed prior to renovation/demolition and reused, recycled or disposed of in accordance with HWR.

All ASTs must be removed prior to renovation/demolition and disposed of appropriately by a qualified contractor in accordance with Regulations made under CEPA (e.g., Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations, 2008 [SOR/2008-197]).

NOTICE TO READER

This report has been prepared by SNC-Lavalin Inc., Environment & Water (E&W) for Canada, who has been party to the development of the scope of work for this project and understands its limitations. Copyright of this report vests with Her Majesty the Queen in Right of Canada. This report was prepared in accordance with a services contract between E&W and Canada, including General Conditions 2035 of the Standard Acquisition Clauses and Conditions (SACC) Manual.

This report is intended to provide information to Canada to assist it in making business decisions. E&W is not a party to the various considerations underlying the business decisions, and does not make recommendations regarding such business decisions.

The findings, conclusions and recommendations in this report have been developed in a manner consistent with the level of skill normally exercised by environmental professionals currently practising under similar conditions in the area. The findings contained in this report are based, in part, upon information provided by others. If any of the information is inaccurate, modifications to the findings, conclusions and recommendations may be necessary.

The findings, conclusions and recommendations presented by E&W in this report reflect E&W's best judgement based on the site conditions at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. Substances other than those described may exist within the site, reported substance parameters may exist in areas of the site not investigated, and concentrations of substances greater or less than those reported may exist between sample locations.

The findings and conclusions of this report are valid only as of the date of this report. If site conditions change, new information is discovered, or unexpected site conditions are encountered in future work, including excavations, borings, or other studies, the findings, conclusions and/or recommendations of this report should be re-evaluated. It is recommended that users of this report should engage a suitably qualified professional to assist in interpreting the significance, if any, of the findings.

We trust this report is sufficient for your requirements. Should you have any questions or concerns, please do not hesitate to contact the undersigned.

S. M. FROUD
36029
July 4/13.

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SNC-LAVALIN INC., ENVIRONMENT & WATER

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TABLES

1: Asbestos-Containing Materials - Port of Pleasant Camp Border Crossing Facility, Pleasant Camp, BC
2: Lead-Containing Materials - Port of Pleasant Camp Border Crossing Facility, Pleasant Camp, BC
3: PCB-Containing Materials - Port of Pleasant Camp Border Crossing Facility, Pleasant Camp, BC
4: Halocarbon Containing Materials (ODSs and Non-ODSs) - Port of Pleasant Camp Border Crossing Facility, Pleasant Camp, BC
5: Mercury Containing Materials - Port of Pleasant Camp Border Crossing Facility, Pleasant Camp, BC
6: Silica Containing Materials - Port of Pleasant Camp Border Crossing Facility, Pleasant Camp, BC
7: UFFI and Other Hazardous Materials - Port of Pleasant Camp Border Crossing Facility, Pleasant Camp, BC

DRAWINGS

- 131416-L01 – Location Plan
- 131416-BM1 – Pleasant Camp Facility Overview
- 131416-BM2 – Asbestos and Paint Sample Location Plan – Generator Building, Fire Water Storage Tank and Main Storage Tank Enclosure
- 131416-BM3 – Asbestos and Paint Sample Location Plan – House 9, Main Floor and Basement
- 131416-BM4 – Asbestos and Paint Sample Location Plan – House 9, Upper Floor and Exterior
- 131416-BM5 – Asbestos and Paint Sample Location Plan – Customs Office Exterior and Upper Floor
- 131416-BM6 – Asbestos and Paint Sample Location Plan – Customs Office Main Floor and Basement
- 131416-BM7 – Asbestos and Paint Sample Location Plan – Maintenance Building, Pump House and Garage

ATTACHMENTS

1: Photographs
2: Laboratory Analytical Reports

TABLES

TABLE 1: Asbestos-Containing Materials - Port of Pleasant Camp Border Crossing Facility, Pleasant Camp, B.C.

Material of Concern/Location	Results	Pre-Renovation/Demolition Requirement/Recommendation
ASBESTOS CONTAINING MATERIALS (ACMs)		
Suspect ACMs sampled:	Analytical Result:	BC Reg. 296/97 (as amended) requires that ACMs be removed in advance of building demolition or renovation by a qualified asbestos removal contractor. Work should be performed in accordance with the BC OHSR and HWR, Canada Labour Code Part II, Canada Occupational Health and Safety Regulations, Part X, - Hazardous Substances, and PWGSC Policy DP 057 - Asbestos Management. Assuming non-friable ACMs can be removed intact or with limited breakage, it is expected that ACMs identified can be removed in accordance with moderate risk procedures as outlined in the WorkSafe BC "Safe Work Practices for Handling Asbestos" (2006). If encountered during the renovation/demolition program, any unidentified material suspected to contain asbestos must be treated as asbestos until testing proves otherwise.
Secondary Examination Shelter (Maintenance Building)		
- Sample A1: Drywall joint compound (north wall)	Non-asbestos	
- Sample A2: Black mastic around east wall window (3 windows [2 on east wall, 1 on west wall])	**2.2% Chrysotile**	
- Sample A20: Drywall joint compound (interior wall) - **same as Sample A1**	Non-asbestos	
- Sample A21: Light grey mastic around door window (south side of building)	**12% Chrysotile**	
- Sample A22: Off-white mastic surrounding pipe entering ceiling on west side (3 locations [1 on west side, 1 on north side, 1 on east side])	Non-asbestos	
Customs Office Building		
Exterior		
- Sample A4: Black roof shingles (beneath metal roof)	Non-asbestos	
- Sample A5: Black tar paper (beneath vinyl siding)	Non-asbestos	
- Sample A6: Grey putty surrounding exterior vent on north side (2 locations [2nd location on west side plugging hole in vinyl siding])	**10% Chrysotile**	
- Sample A7: Grey putty surrounding door window on east side (2 doors [1 on east side, 1 on south side])	**12% Chrysotile**	
- Sample A8: White window glazing surrounding basement window on east side (4 windows [1 on west side, 2 on north side, 1 on east side])	Non-asbestos	
- Sample A9: Black tar paper (beneath metal canopy roof)	Non-asbestos	
- Sample A23: Grey cementitious window sealant (surrounding basement window on west side)	Non-asbestos	
- Sample A24: White putty surrounding large south facing windows (2 windows)	**10% Chrysotile**	
- Sample A25: Light grey putty surrounding conduit entering building (center of west side)	Non-asbestos	
- Sample A56: Grey mastic/putty surrounding conduit entering building (east side beside staircase)	**3.1% Chrysotile**	
Top Floor		
- Sample A10: Grey putty surrounding conduit entering floor (1 Upper [2 locations])	Non-asbestos	
- Sample A11: Drywall joint compound (1 Upper)	**1.9% Chrysotile**	
- Sample A12: Pink vinyl floor tile (1 Upper)	Non-asbestos	
- Sample A27: Layer 1 - Black plastic stair slip guards (Upper Stairwell)	Non-asbestos	
- Sample A27: Layer 2 - Black mastic on stair slip guards (Upper Stairwell)	Non-asbestos	
- Sample A28: Drywall joint compound (2 Upper)	Non-asbestos	
Main Floor		
- Sample A13: White/tan ceiling tile (Kitchen)	Non-asbestos	
- Sample A14: Layer 1 - Green/grey vinyl sheet flooring (Kitchen)	Non-asbestos	
- Sample A14: Layer 2 - Yellow mastic (Kitchen)	Non-asbestos	
- Sample A15: White vinyl floor tile (File Room)	Non-asbestos	
- Sample A16: Off-white mastic on tall black rubber baseboards (File Room)	Non-asbestos	
- Sample A17: White grout from wall tiles (Washroom)	Non-asbestos	
- Sample A18: Yellow mastic on short black rubber baseboards (Washroom)	Non-asbestos	
- Sample A19: Layer 1 - Grey ceramic wall tile (Washroom)	Non-asbestos	
- Sample A19: Layer 2 - Yellow mastic on wall tile (Washroom)	Non-asbestos	
- Sample A19: Layer 3 - White calk on wall tile (Washroom)	Non-asbestos	
- Sample A19: Layer 4 - Tan mastic on wall tile (Washroom)	Non-asbestos	
- Sample A26: Drywall joint compound (Supervisor's Office [Office #1])	Non-asbestos	
Basement		
- Sample A29: Layer 1 - Black plastic stair slip guards (Basement Stairwell)	Non-asbestos	
- Sample A29: Layer 2 - Clear mastic on stair slip guards (Basement Stairwell)	Non-asbestos	
- Sample A30: Drywall joint compound (Basement Stairwell) - **same as Sample A26**	Non-asbestos	
- Sample A31: Drywall joint compound (Electrical Room) **- same as Sample A26**	Non-asbestos	
- Sample A32: Clear mastic on silver tape used on silver wrap on water piping (Electrical Room)	Non-asbestos	
- Sample A33: Grey chimney brick mortar (Furnace Room)	Non-asbestos	
- Sample A34: Off-white mastic on blue rubber baseboards (Weapon Room)	Non-asbestos	
- Potential asbestos-containing pipe joints and electrical wiring coatings indentified throughout the Customs Office Building	Not Sampled	
Garage		
- Sample A3: Black roof shingle (beneath metal roof)	Non-asbestos	
- Sample A50: Grey window glazing (exterior [4 windows])	Non-asbestos	
Pump House		
- Sample A35: Dark brown tar paper (behind wood siding)	Non-asbestos	
Generator Building		
Exterior		
- Sample A43: Dark brown tar paper (behind vinyl siding)	Non-asbestos	
- Sample A44: Off-white window glazing surrounding window (1 window [northernmost on west side])	Non-asbestos	
- Sample A45: Off-white window glazing between glass panels (1 window [southernmost on west side])	Non-asbestos	
- Sample A46: Grey putty filling exterior holes in siding/walls (7 locations [3 on north side, 2 on east side, 2 on south side])	**10% Chrysotile**	
- Sample A47: Dark brown tar paper (beneath roof shingles [Old Area])	Non-asbestos	
- Sample A48: Blue/black roof shingles (beneath metal roof [Old Area])	Non-asbestos	
- Sample A49: Black mastic (along metal roof joint between New and Old Area)	Non-asbestos	
- Sample A57: Black mastic (on metal roof [Old Area])	**10% Chrysotile**	
Interior		
- Sample A36: Black fibrous back-up generator cloth joint (2 Generators)	Non-asbestos	
- Sample A37: Dark grey pipe gasket (Fire Suppression System) - approximately 7 gaskets	**25% Chrysotile**	
- Sample A38: Black backing on yellow fiberglass wall panels (Old Area [walls and ceiling])	Non-asbestos	
- Sample A39: Drywall joint compound (Old Area [walls and ceiling])	**2.1% Chrysotile**	
- Sample A40: Black mastic on backing of yellow fiberglass wall panels (Old Area [walls and ceiling])	Non-asbestos	
- Sample A41: Layer 1 - Off-white mastic on backing of yellow fiberglass wall panels (New Area [walls and ceiling])	Non-asbestos	
- Sample A41: Layer 2 - Yellow insulation wall panels (New Area [walls and ceiling])	Non-asbestos	
- Sample A42: Drywall joint compound (New Area [walls and ceiling])	Non-asbestos	
Water Storage Tank and Adjoining Pipe Cover		
- Sample A51: Black shingles (beneath metal on ground pipe cover from tank to generator building)	**3.1% Chrysotile**	
- Sample A52: Black mastic (joining metal pipe cover to water storage tank)	**1.2% Chrysotile**	
- Sample A53: Grey mastic (joining metal pipe cover to water storage tank)	Non-asbestos	
- Sample A54: Grey mastic (joining metal pipe cover to generator building)	**3.5% Chrysotile**	
Main Fuel Storage Tank Enclosure		
- Sample A55: Layer 1 - Black mastic (surrounding roof vent pipe)	Non-asbestos	
House #9		
Exterior		
- Sample A58: Black tar paper (beneath metal roof)	Non-asbestos	
- Sample A59: Grey mastic/putty around grey electrical box on east side (5 locations [3 on east side - 2 electrical boxes and 1 filled hole, 1 on west side - electrical box, 1 on roof - surrounding chimney flashing)	**3.5% Chrysotile**	
- Sample A60: White window mastic (door on north side of building)	Non-asbestos	
- Sample A61: Brown tar paper (beneath vinyl siding)	Non-asbestos	
Top Floor		
- Sample A74: Drywall joint compound (Bedroom #3)	Non-asbestos	
- Sample A75: Drywall joint compound (Bedroom #4 Closet) - **same as Sample A74**	Non-asbestos	
- Sample A76: Orange vinyl floor tile (Upstairs Hallway)	Non-asbestos	
- Sample A77: Wall fiberboard (Bedroom #3 Closet #2)	Non-asbestos	
Main Floor		
- Sample A65: Drywall joint compound (Living Room) - **same as Sample A74**	Non-asbestos	
- Sample A66: Yellow/tan vinyl sheet flooring (Kitchen [above orange vinyl floor tiles])	**20% Chrysotile**	
- Sample A67: Brown vinyl floor tile (Bathroom [bottom layer of flooring])	Non-asbestos	
- Sample A68: Yellow/tan vinyl sheet flooring (Bathroom [middle layer of flooring]) - **same as Sample A66**	**30% Chrysotile**	
- Sample A69: Tan vinyl sheet flooring (Bathroom [top layer of flooring])	Non-asbestos	
- Sample A70: White mastic on brown rubber baseboard (Bathroom)	Non-asbestos	
- Sample A71: Yellow/tan vinyl sheet flooring beneath laminate (Foyer) - **same as Sample A66**	**30% Chrysotile**	
- Sample A72: Orange vinyl floor tile beneath Sample A71 (Foyer) - **same as Sample A76**	Non-asbestos	
- Sample A73: Drywall joint compound (Bedroom #2) - **same as Sample A74**	Non-asbestos	
Basement		
- Sample A62: Grey duct taping on furnace piping (above furnace)	Non-asbestos	
- Sample A63: Orange vinyl floor tile (stairwell landing) - **same as Sample A74**	Non-asbestos	
- Potential asbestos-containing pipe joints and electrical wiring coatings indentified throughout House #9	Not Sampled	

TABLE 2 : Lead-Containing Materials - Port of Pleasant Camp Border Crossing Facility, Pleasant Camp, B.C.

Material of Concern/Location	Results	Pre-Renovation/Demolition Requirement/Recommendation
LEAD CONTAINING MATERIALS		
Paint		
Suspect Paints sampled:	Analytical Result:	Lead based paint (>600 mg/kg) is present onsite. Lead in this form is not expected to be of concern for disposal purposes; however, in order to minimize exposure from all paint, torching and grinding of all painted building materials should be minimized. It is recommended to develop an exposure control plan in accordance with BC Reg. 296/97 (as amended) and implemented to minimize the generation of dust and airborne particulates that may include silica and lead. Requirements in Canada Labour Code Part II, and Canada Occupational Health and Safety Regulations (SOR/2002-208), Part X – Hazardous Substances would also apply, and include identifying and controlling lead hazards to minimize potential exposure to workers.
Secondary Examination Shelter (Maintenance Building)		
- Sample P1: White paint on interior walls	3.1 mg/kg	
- Sample P7: White paint on exterior doors and frames	11.2 mg/kg	
- Sample P8: Black paint on exterior bay doors	14.6 mg/kg	
Customs Office Building		
Exterior		
- Sample P3: White paint on exterior doors (2 locations [1 on east side, 1 on south side])	587 mg/kg	
- Sample P4: Black paint on basement window frame (4 locations [2 on north side, 1 on east side, 1 on west side]) - same as trim paint	**1470 mg/kg**	
Top Floor		
- Sample P5: White paint on interior walls (1 Upper) - same as 2 Upper	267 mg/kg	
Main Floor		
- Sample P9: White paint on interior walls (Supervisor's Office [Office #1])	381 mg/kg	
Basement		
- Sample P10: Grey paint on steps to basement (Stairwell to Basement)	264 mg/kg	
- Sample P11: White paint (**same as Sample P9)** over tan paint (Stairwell to Basement)	287 mg/kg	
- Sample P12: Grey paint on concrete floor (Files Room) -**same as Sample P10**	**2170 mg/kg**	
- Sample P13: White paint on wood and concrete walls (Weapons Room)	< 2.0 mg/kg	
Garage		
- Sample P2: Black paint on exterior building trim - same as garage door	50.1 mg/kg	
Pump House		
- Sample P14: Blue paint on wooden well cover	104 mg/kg	
- Sample P15: White paint on wooden interior walls	463 mg/kg	
- Sample P16: White paint on wooden exterior siding	126 mg/kg	
Generator Building		
Exterior		
- Sample P19: Black paint on exterior doors, trim and south side vents	**3610 mg/kg**	
- Sample P20: White paint around windows and north side vents over red paint (north side vents)	25.8 mg/kg	
Interior		
- Sample P17: Grey paint on concrete floor	432 mg/kg	
- Sample P18: Tan paint on drywall behind insulation panels (Old Area [walls and ceiling])	**12400 mg/kg**	
Main Fuel Storage Tank Enclosure		
- Sample P21: White paint on exterior east and west wooden walls	16.6 mg/kg	
- Sample P22: Black over red paint on metal roof	88.7 mg/kg	
House #9		
Exterior		
- Sample P6: Black paint on exterior trim	**1790 mg/kg**	
- Sample P23: White paint on exterior wooden surfaces (north side of building)	**3020 mg/kg**	
- Sample P24: Grey paint on exterior wooden steps (northeast and northwest corners of building)	**1070 mg/kg**	
Top Floor		
- Sample P28: White paint on interior walls (Bedroom #3)	< 2.0 mg/kg	
Main Floor		
- Sample P27: White paint on interior walls (Dining Room)	**1740 mg/kg**	
Basement		
- Sample P25: Grey paint on concrete floor (same as on stairs to basement)	**2020 mg/kg**	
- Sample P26: White paint on concrete walls (same as wooden ceiling beam)	6.0 mg/kg	
Other Materials		
Generator Building - Four (4) lead containing batteries were identified	n/a	If not re-used, batteries (lead and acid containing) should be handled/disposed of in accordance with the Federal Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149), Interprovincial Movement of Hazardous Waste Regulations (SOR/2002-301), Canada Labour Code Part II, Canada Occupational Health and Safety Regulations (SOR/2002-208), Part X – Hazardous Substances, BC Occupationa Health and Safety Regulation (OHSR; BC Reg. 296/97), and B. Hazardous Waste Regulation (HWR; BC Reg. 63/88).
Customs Office Building - two (2) lead vent stacks were observed on the roof, and lead containing pipe joints may be present in interior piping House #9 - Potentially two (2) lead vent stacks on the roof (inaccessible at time of inspection), and lead containing pipe joints may be present in interior piping	n/a	In order to minimize exposure from lead, torching and grinding of suspected lead containing materials should be minimized. It is recommended to develop an exposure control plan in accordance with BC Reg. 296/97 (as amended) and implemented to minimize the generation of dust and airborne particulates that may include lead. Requirements in Canada Labour Code Part II, and Canada Occupational Health and Safety Regulations (SOR/2002-208), Part X – Hazardous Substances would also apply, and include identifying and controlling lead hazards to minimize potential exposure to workers.

TABLE 3: PCB-Containing Materials - Port of Pleasant Camp Border Crossing Facility, Pleasant Camp, B.C.

POLYCHLORINATED BIPHENYLS		
Approximately 50 fluorescent light ballasts and/or high intensity discharge lamp ballasts were identified on site	Potential PCB containing ballasts	Prior to renovation/demolition, remove all light ballasts, inspect for PCB-containing and/or suspect PCB-containing ballasts as per Environment Canada publication, Identification of Lamp Ballasts Containing PCBs, Report EPS 2/CC/2, August 1991. Place known or suspect PCB-containing ballasts in an 18-gauge steel painted drum with a close fitting removable steel lid on top of a gasket of PCB-resistant material. Drums should be disposed of in Canada in accordance with the BC HWR, Canadian TDG Act, and Regulations made under CEPA.
A transformer/electrical box was located west of the main fuel storage tank enclosure. Details are not available.	Unknown if PCB containing oil is present	It is assumed that the proposed renovation/demolition program will not require removal of the transformer/electrical box. However, if removal will be required, a qualified contractor should be used to correctly identify and characterize any hazardous materials and appropriately dispose of and/or recycle at an approved facility in accordance with the BC HWR, Canadian TDG Act, and Regulations made under CEPA.

TABLE 4 : Halocarbon-Containing Materials (ODSs and Non-ODSs) - Port of Pleasant Camp Border Crossing Facility, Pleasant Camp, B.C.

HALOCARBON CONTAINING SUBSTANCES		
Customs Office Building (Kitchen) - One (1) refrigerator - inaccessible label. Customs Office Building (Kitchen) - One (1) water cooler - replaced since survey was completed. House #9 (Basement) - One (1) freezer - Model GU17L (Electrolux), Serial # KJ10424, Refrigerant - 10oz of CFC 12-Dichlorodifluromethane (R12)	Potential or confirmed Chlorofluorocarbons (ODS) containing	ODS refrigerants should be recovered by qualified personnel and disposed of in accordance with Regulations made under CEPA (e.g. the Federal Halocarbon Regulations, 2003 [SOR/2003-289]), the BC EMA and BC Reg. 387/99.
House #9 (Kitchen) - One (1) refrigerator - Model GR9FHKXPQ00 (Whirlpool), Serial # ES4533118, Refrigerant - 4oz of R134a House #9 - One (1) water cooler - Model D25 (Whirlpool), Serial # EJY4818815, Refrigerant - 1.07oz of R134a.	Non-Chlorofluorocarbons containing (Non-ODS)	A Non-ODS refrigerant (R134a) was identified on the site which contains hydrofluorocarbons (HFC) that are regulated in the Federal Halocarbon Regulations, 2003 [SOR/2003-289] as per item 11 (HFC) of Schedule 1 – List of Halocarbons. As a result, halocarbon-containing Non-ODS refrigerants should be recovered by qualified personnel and disposed of in accordance with Federal Regulations.

TABLE 5 : Mercury-Containing Materials - Port of Pleasant Camp Border Crossing Facility, Pleasant Camp, B.C.

MERCURY		
Secondary Examination Shelter (Maintenance Building) - Two (2) thermostats were observed along the east wall (1 ampoule Hg each). Customs Office Building (Office #2) - One (1) thermostat was observed on the north wall (1 ampoule Hg). Generator Building - Two (2) thermostats were observed [center thermostat on west wall and southernmost thermostat on east wall] (1 ampoule Hg each) House #9 (Basement) - One (1) thermostat was observed on north side of staircase near furnace (1 ampoule Hg). House #9 (Main Floor - Hall) - One (1) thermostat was observed on the west wall of the hallway outside the Kitchen next to Bedroom #2 (1 ampoule Hg).	Mercury containing	The mercury containing ampoules must be removed prior to renovation/demolition and reused, recycled or disposed of in accordance with the BC HWR and applicable Regulations made under CEPA.
Pump House - One (1) thermostat was observed on the south wall. Generator Building - Four (4) themostats were observed (northernmost thermostat on east and west walls, southernmost thermostat on west wall and thermostat on south wall)	Non-mercury containing	No pre-renovation/demolition requirements necessary.
Approximately 100 fluorescent lights and/or high intensity discharge lamps were identified on site	Mercury vapour containing	Light bulbs and tubes need to be removed intact and segregated for proper off-site recycling/disposal (that includes vapour capture procedures) in accordance with the BC HWR and applicable Regulations made under CEPA.

TABLE 6 : Silica-Containing Materials - Port of Pleasant Camp Border Crossing Facility, Pleasant Camp, B.C.

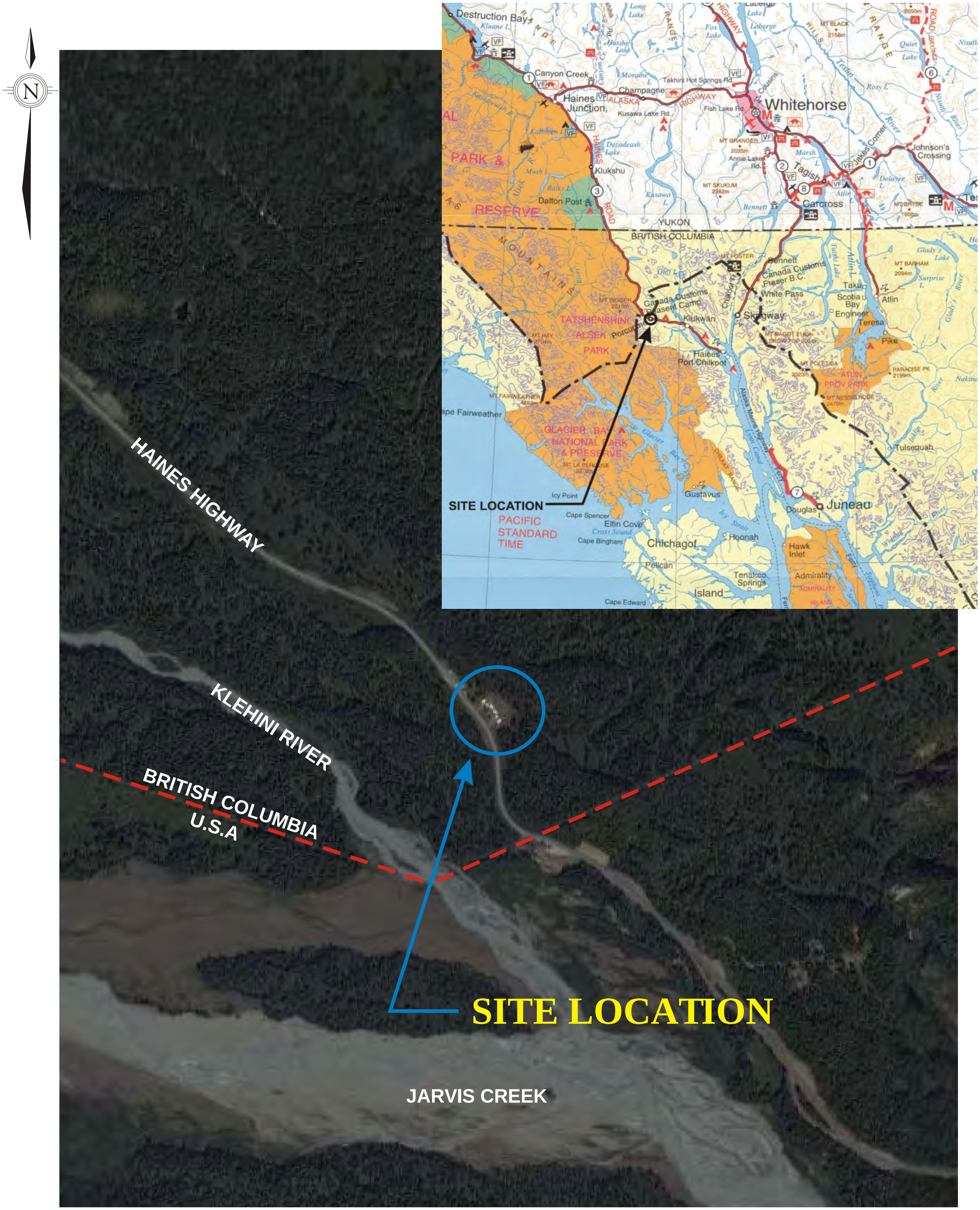
SILICA CONTAINING MATERIALS		
Concrete building materials (foundation, floor, walls) in the buildings.	Silica containing	Concrete contains silica that may become airborne during renovations/demolition. An exposure control plan must be developed in accordance with B.C. Reg. 296/97 (as amended) and implemented to minimize the generation of dust and airborne particulates that may include silica and lead. Requirements in Canada Labour Code Part II, and Canada Occupational Health and Safety Regulations (SOR/2002-208), Part X – Hazardous Substances would also apply, and include identifying and controlling silica hazards to minimize potential exposure to workers.

TABLE 7 : UFFI and Other Hazardous Materials - Port of Pleasant Camp Border Crossing Facility, Pleasant Camp, B.C.

UREA FORMALDEHYDE FOAM INSULATION		
No holes indicative of the possible injection of UFFI were identified in the interior or exterior walls of the buildings.	No UFFI identified	No pre-renovation/demolition requirements.
OTHER HAZARDOUS MATERIALS		
Various consumer-packaged materials were observed throughout the site including oils, solvents, compressed gas cylinders, fire extinguishers, vehicle maintenance supplies, cleaners, etc. The Water Storage Tank is assumed to hold water (based on available information); however, there is potential that the tank may be holding potentially hazardous liquid.	Potentially hazardous	Contents of the Water Storage Tank must be confirmed prior to renovation/demolition. These materials must be removed prior to renovation/demolition. However, if these materials are to be disposed of or recycled, it is the responsibility of the qualified contractor to correctly identify and characterize the wastes noted and dispose or recycle or reuse as appropriate.
Main Fuel Storage Tank - One (1) 19,575 L diesel AST Generator Building - One (1) estimated 1,136 L diesel AST House #9 - Basement - One (1) 1,136 L diesel AST Customs Office Building - Basement - One (1) 1,136 L diesel AST Secondary Examination Shelter [Maintenance Buidling] - One (1) 1,136 L diesel AST currently in use and One (1) 1,136 L diesel AST currently not in use and presumed empty	Possible residual hydrocarbon liquids/vapours	All ASTs must be removed prior to renovation/demolition and disposed of appropriately by a qualified contractor in accordance with Regulations made under CEPA (e.g. Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations, 2008 [SOR/2008-197]).
SOLID AND LIQUID WASTES		
Refuse was observed throughout the buildings including general garbage, scrap metal (lead), oil change equipment, etc.	Potential for solid/liquid waste	These materials must be removed prior to renovation/demolition. However, if these materials are to be disposed of or recycled, it is the responsibility of the qualified contractor to correctly identify and characterize the wastes noted and dispose or recycle as appropriate.
RADIOLOGICAL SOURCES AND SUBSTANCES		
No radiological sources or substances were identified at the site	None identified	No pre-renovation/demolition requirements necessary.
MOULD		
No evidence of mould was observed in the buildings	None identified	No pre-renovation/demolition requirements necessary.

DRAWINGS

- 131416-L01 – Location Plan
- 131416-BM1 – Pleasant Camp Facility Overview
- 131416-BM2 – Asbestos and Paint Sample Location Plan – Generator Building, Fire Water Storage Tank and Main Storage Tank Enclosure
- 131416-BM3 – Asbestos and Paint Sample Location Plan – House 9, Main Floor and Basement
- 131416-BM4 – Asbestos and Paint Sample Location Plan – House 9, Upper Floor and Exterior
- 131416-BM5 – Asbestos and Paint Sample Location Plan – Customs Office Exterior and Upper Floor
- 131416-BM6 – Asbestos and Paint Sample Location Plan – Customs Office Main Floor and Basement
- 131416-BM7 – Asbestos and Paint Sample Location Plan – Maintenance Building, Pump House and Garage



SNC·LAVALIN
Environment

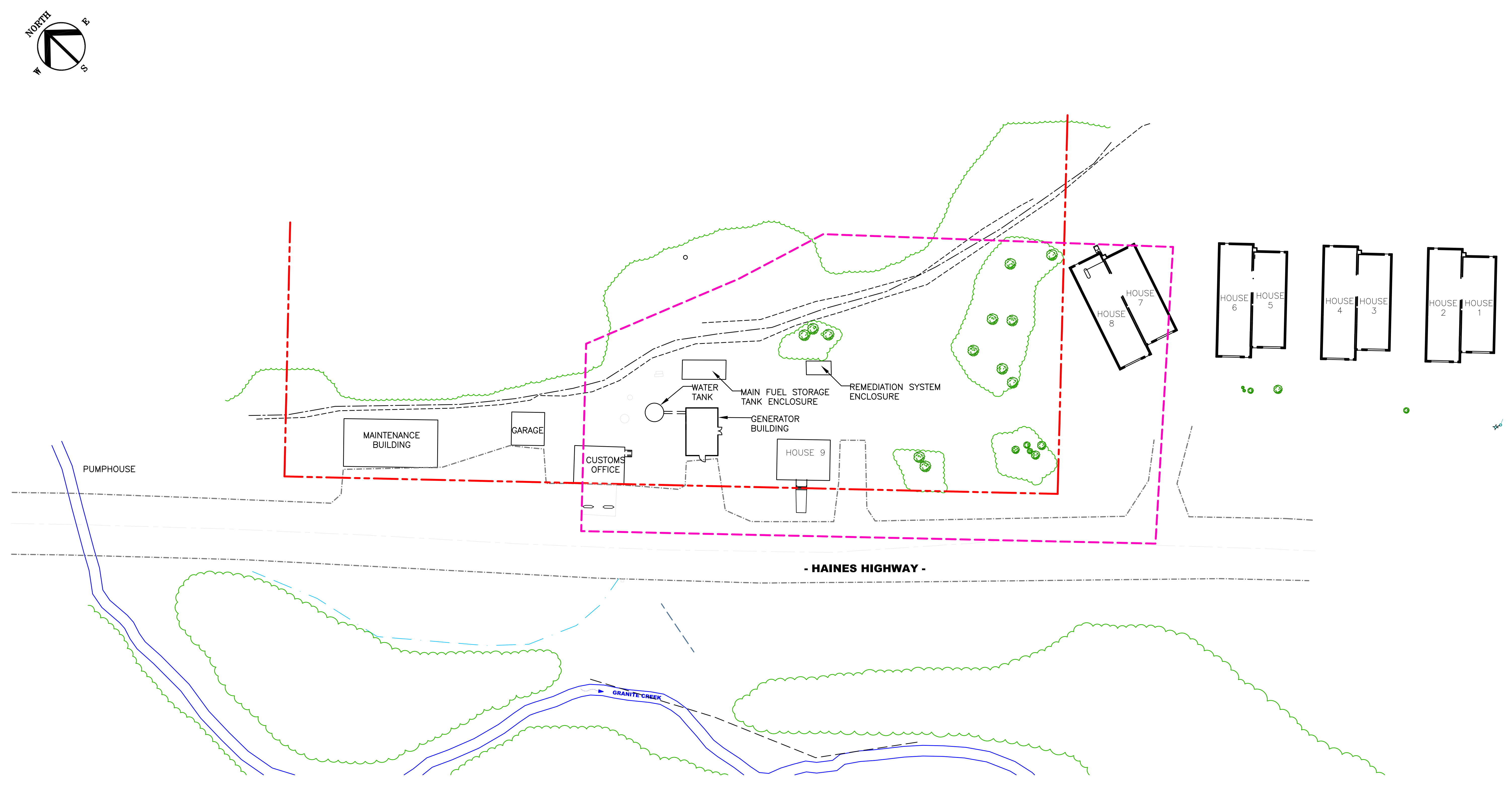
DATE: 2011 03 31
SCALE: N.T.S
DRN BY: CP
CHK BY: DWB

CLIENT NAME:
PUBLIC WORKS
AND GOVERNMENT
SERVICES CANADA

PROJECT LOCATION:
CBSA BORDER CROSSING
PLEASANT CAMP, BC

LOCATION PLAN

DWG NO: 131416- L01
CORELFILE: 131416- L01.CDR



LEGEND

0 1 METRES 5

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. SCALE IS APPROXIMATE. SITE VERIFY ALL BUILDING MEASUREMENTS AND CONFIGURATIONS. ACM QUANTITIES ARE APPROXIMATE, ABATEMENT CONTRACTOR TO VERIFY.

REFERENCE DRAWINGS

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	NOV. 2005	YUKON ENGINEERING SERVICES

REVISIONS

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1	2013–06–24	ISSUED TO CLIENT	PES	TDD
0	2012–12–07	ISSUED AS DRAFT	MGM	TDD

SNC·LAVALIN Environment

CLIENT NAME:
PUBLIC WORKS &
GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, BC

PLEASANT CAMP FACILITY OVERVIEW

DWN BY: MGM
SCALE: AS NOTED
DATE: 2012–12–03
DWG No: REV.: 1
CHK'D: TDD
PLOT: 20130624.1441
CADFILE: 131416BMR1
131416-BM1

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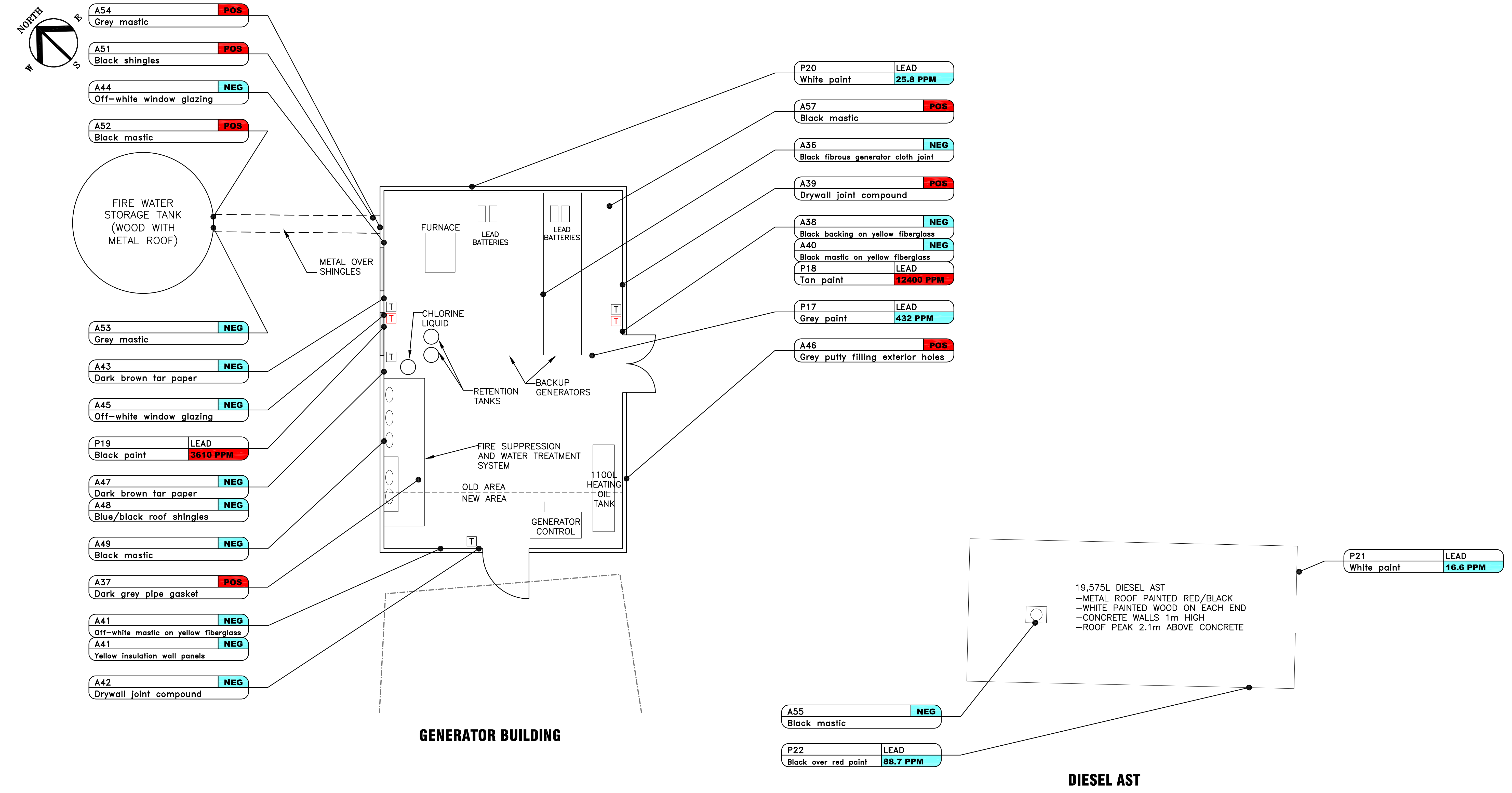

LEGEND

0 1 5
METRES

ASBESTOS SAMPLE RESULTS:

SAMPLE NUMBER
RESULTS OF ANALYSIS
A-32 POS
TAR PAPER
DESCRIPTION OF MATERIAL

NEG = NON ASBESTOS MATERIAL **NEG**
POS = ASBESTOS MATERIAL **POS**

PAINT SAMPLE RESULTS:

SAMPLE NUMBER
MATERIAL OF CONCERN
P– –
– –
DESCRIPTION OF MATERIAL
RESULTS OF ANALYSIS

SAMPLE EQUAL OR LESS THAN STANDARD **≤600PPM**
SAMPLE GREATER THAN STANDARD **>600PPM**

T THERMOSTAT
T THERMOSTAT CONTAINING MERCURY

NOTES

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CLIENT NAME:
PUBLIC WORKS & GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, BC

ASBESTOS AND PAINT SAMPLE LOCATION PLAN - GENERATOR BUILDING, FIRE WATER STORAGE TANK AND MAIN STORAGE TANK ENCLOSURE

DWN BY: MGM
SCALE: AS NOTED
DATE: 2012–12–03
DWG No: **131416-BM2**
REV.: **1**
CHK'D: TDD
PLOT: 20130624.1442
CADFILE: 131416BMR1

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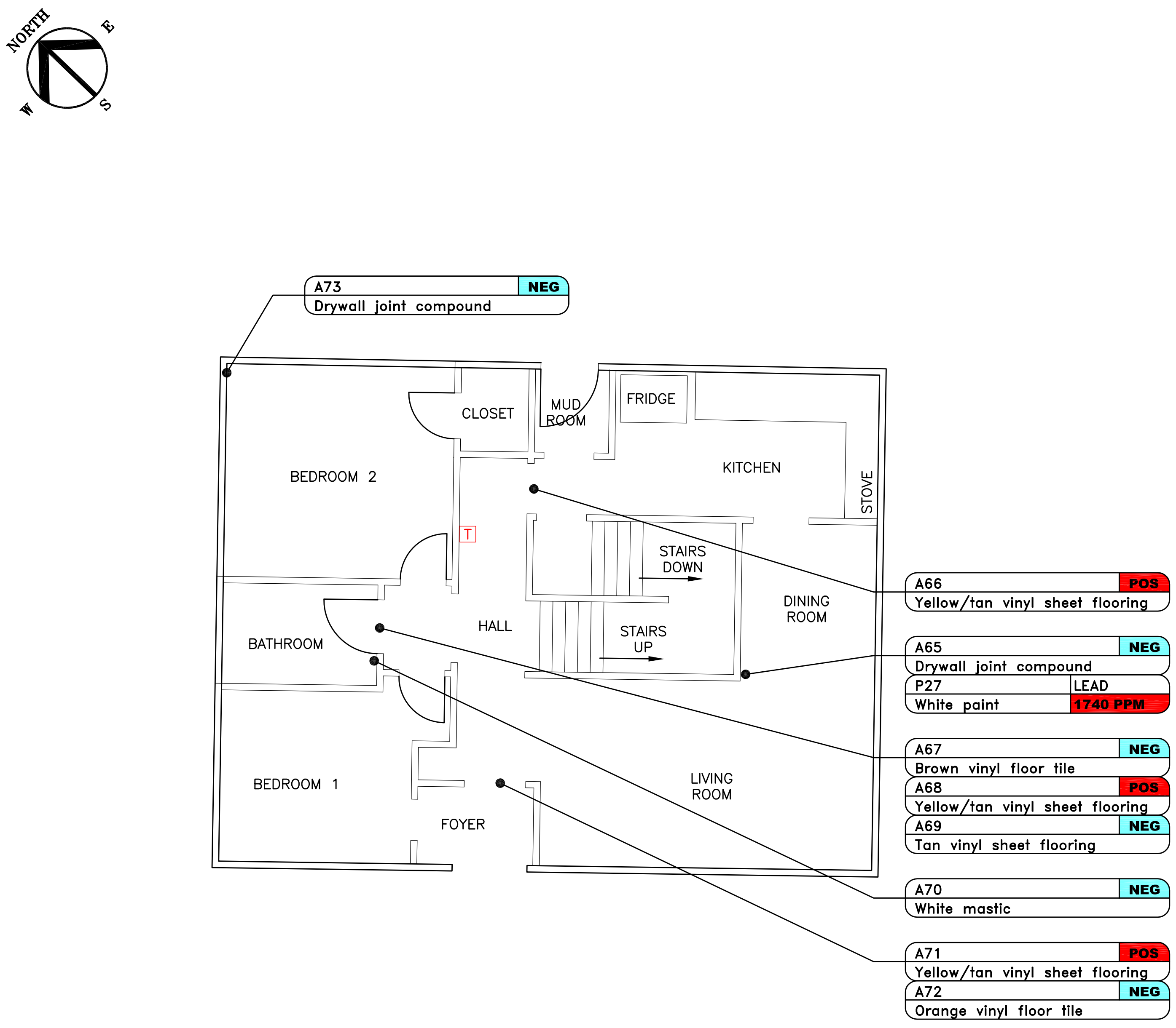
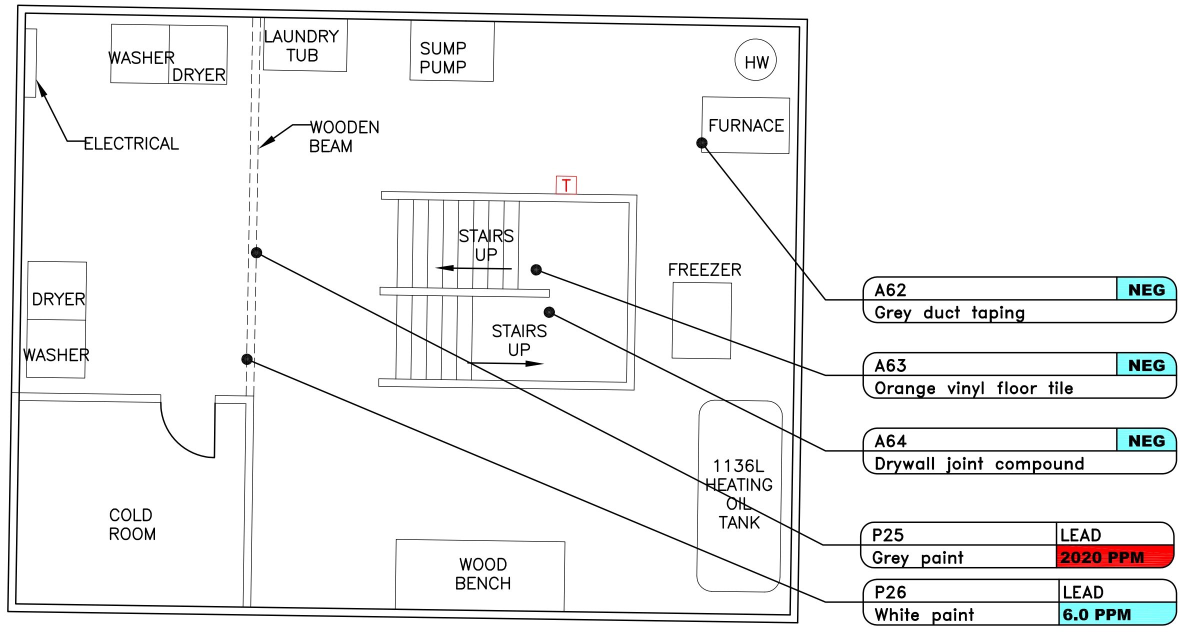


MAIN FLOOR



BASEMENT

LEGEND

0 1 METRES 5

ASBESTOS SAMPLE RESULTS:

SAMPLE NUMBER — A–32
RESULTS OF ANALYSIS
TAR PAPER — DESCRIPTION OF MATERIAL

NEG = NON ASBESTOS MATERIAL 🟦 NEG
POS = ASBESTOS MATERIAL 🟥 POS

PAINT SAMPLE RESULTS:

SAMPLE NUMBER — P–
MATERIAL OF CONCERN — –
DESCRIPTION OF MATERIAL — –
RESULTS OF ANALYSIS

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SAMPLE GREATER THAN STANDARD 🟥 >600PPM

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SNC·LAVALIN Environment

CLIENT NAME:
PUBLIC WORKS &
GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, BC

TITLE:
ASBESTOS AND PAINT SAMPLE LOCATION PLAN - HOUSE 9, MAIN FLOOR AND BASEMENT

DWN BY: MGM	SCALE: AS NOTED	DATE: 2012–12–03	DWG No: REV.: **1**
CHK'D: TDD	PLOT: 20130624.1443	CADFILE: 131416BMR1	**131416-BM3**

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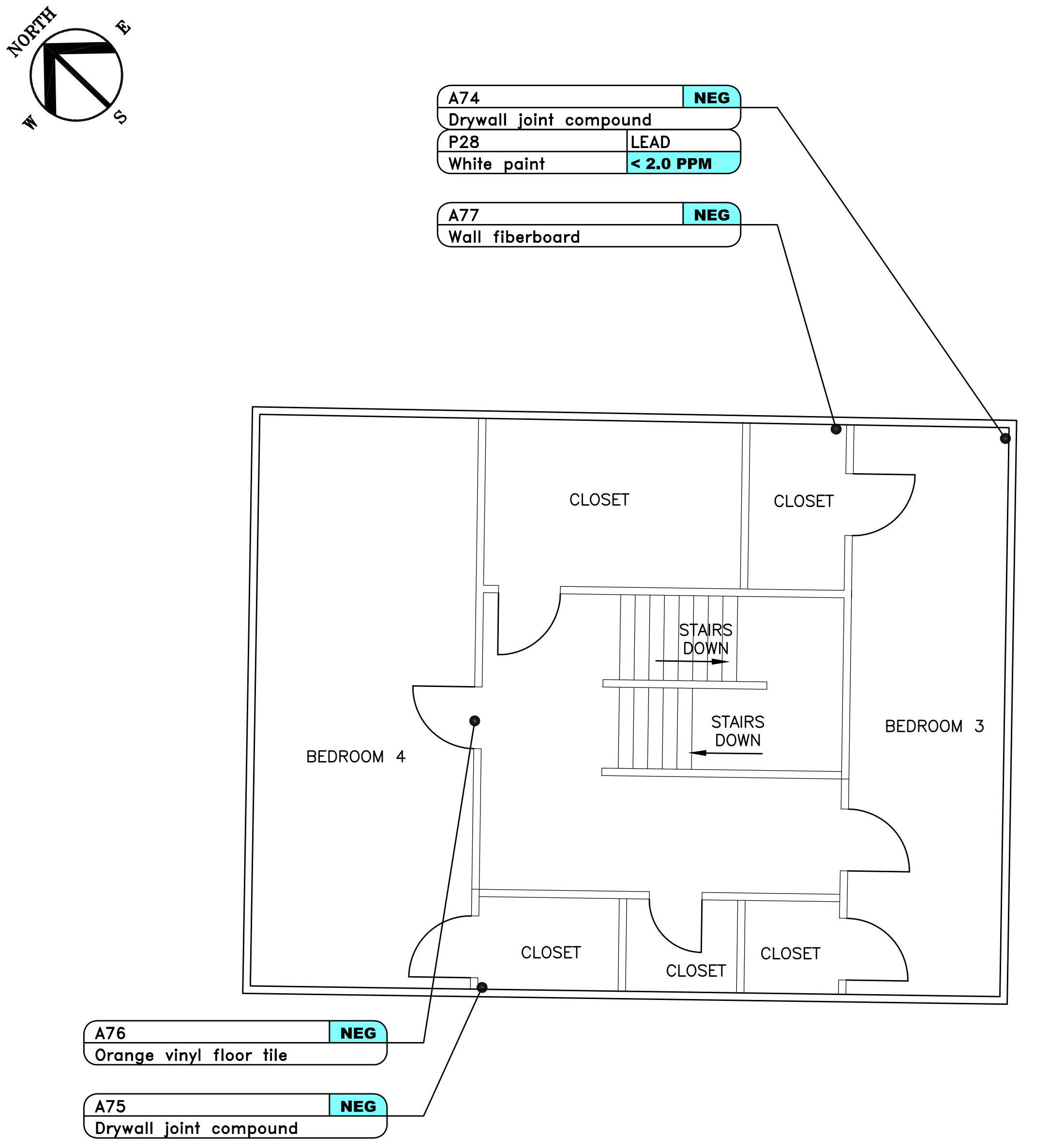
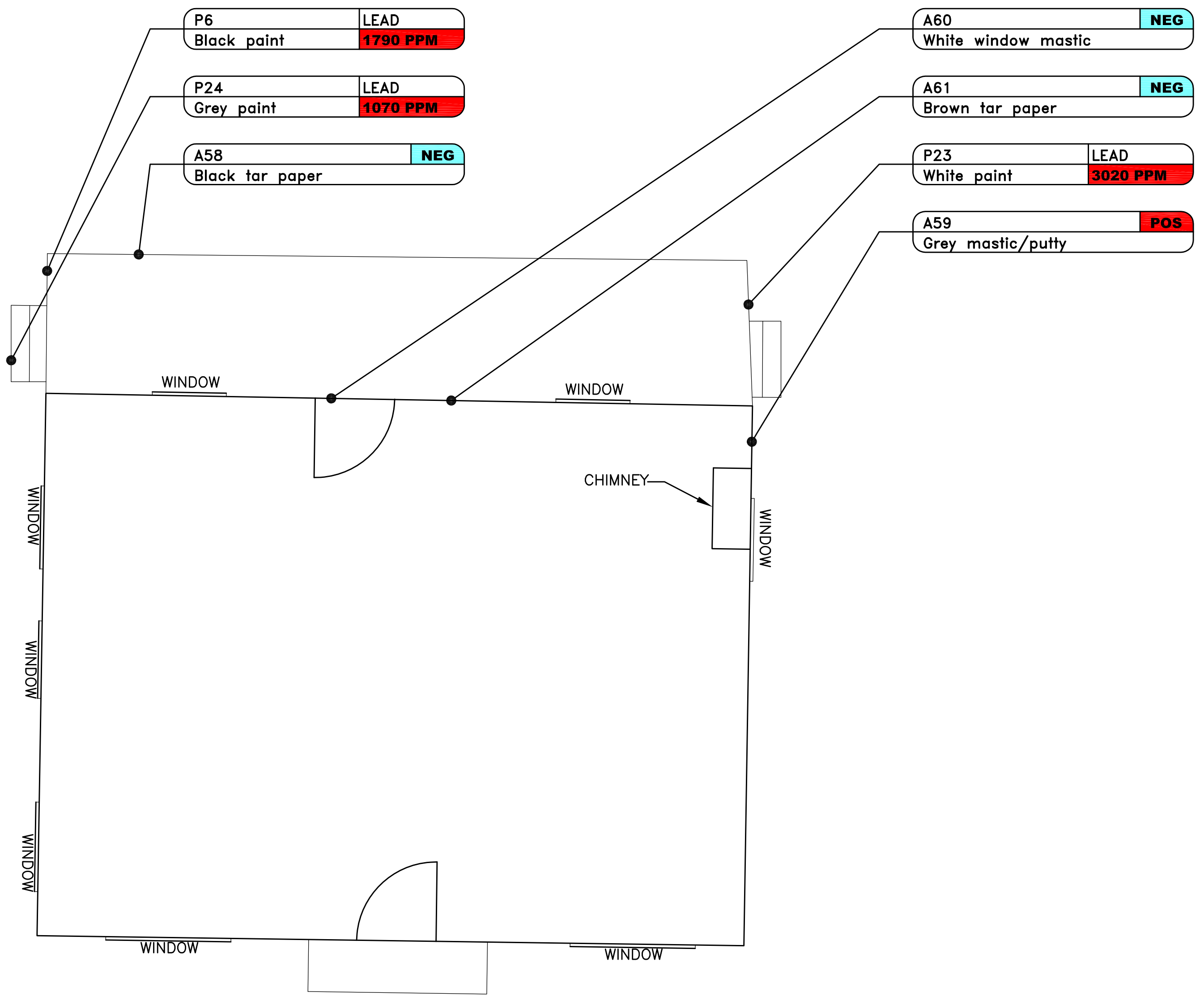


UPPER FLOOR



EXTERIOR

LEGEND

0 1 5 METRES

ASBESTOS SAMPLE RESULTS:

SAMPLE NUMBER — A–32 — RESULTS OF ANALYSIS
TAR PAPER — DESCRIPTION OF MATERIAL

NEG = NON ASBESTOS MATERIAL **NEG**
POS = ASBESTOS MATERIAL **POS**

PAINT SAMPLE RESULTS:

SAMPLE NUMBER — P– — MATERIAL OF CONCERN –
– DESCRIPTION OF MATERIAL — RESULTS OF ANALYSIS

SAMPLE EQUAL OR LESS THAN STANDARD **≤600PPM**
SAMPLE GREATER THAN STANDARD **>600PPM**

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T THERMOSTAT CONTAINING MERCURY

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DWG. NO.	DATE	DESCRIPTION

REVISIONS

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REV.	DATE	DESCRIPTION	BY	CHK

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Environment

CLIENT NAME:
PUBLIC WORKS &
GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, BC

TITLE: **ASBESTOS AND PAINT SAMPLE LOCATION PLAN - HOUSE 9, UPPER FLOOR AND EXTERIOR**

DWN BY: MGM	SCALE: AS NOTED	DATE: 2012–12–03	DWG No: REV.: 1
CHK'D: TDD	PLOT: 20130624.1444	CADFILE: 131416BMR1	131416-BM4

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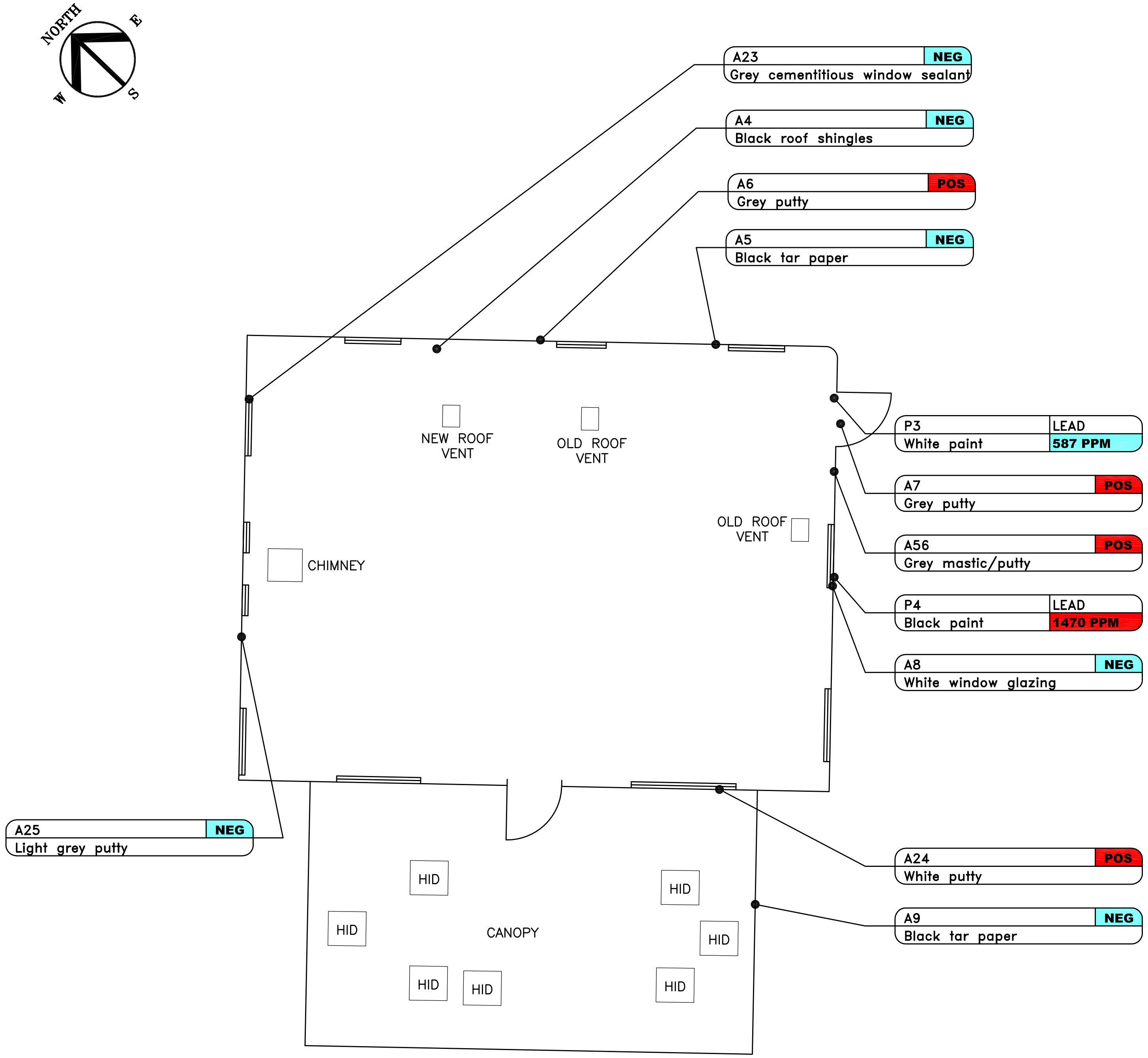
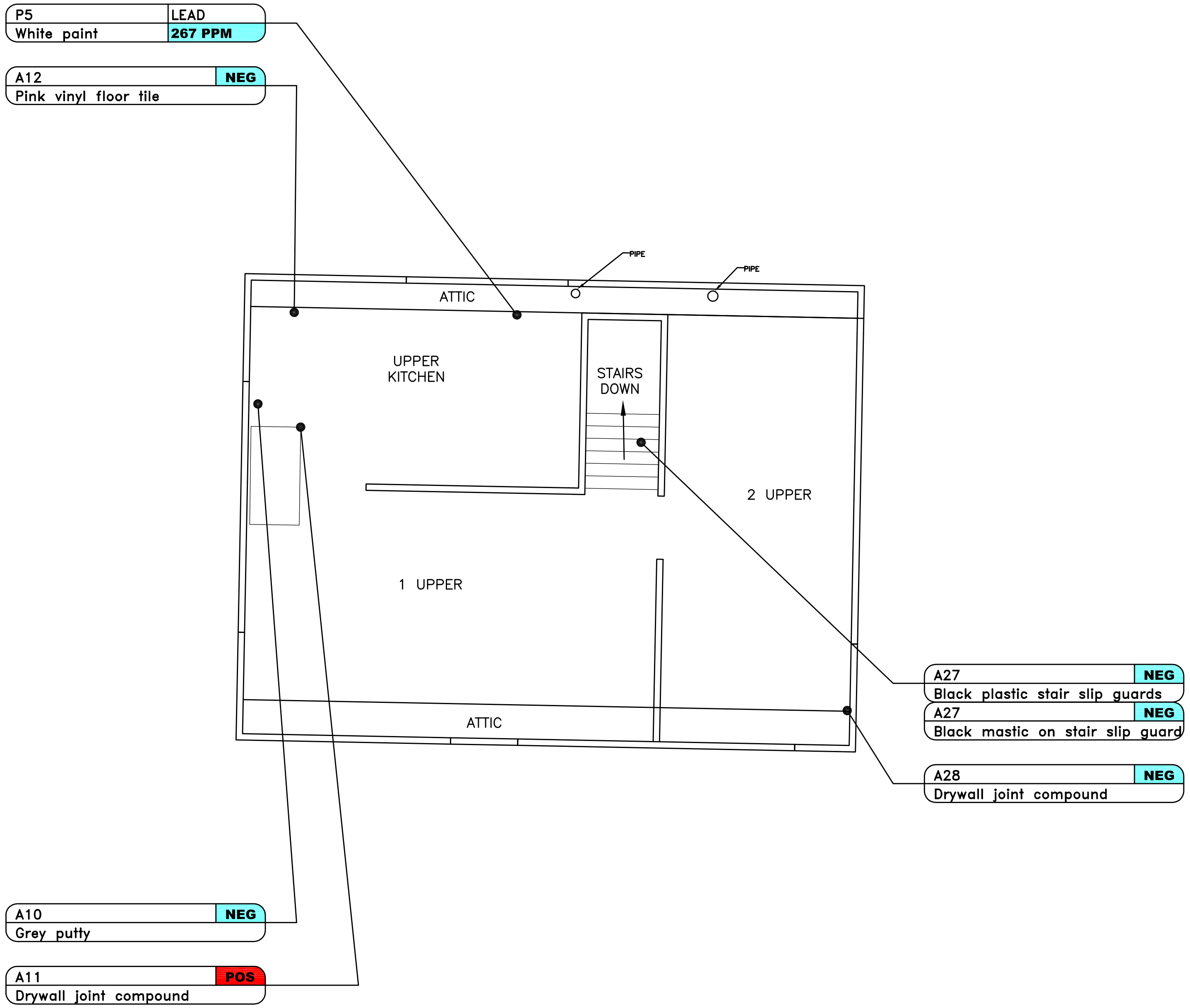


EXTERIOR



UPPER FLOOR

LEGEND

0 1 5 METRES

ASBESTOS SAMPLE RESULTS:

SAMPLE NUMBER — A–32
RESULTS OF ANALYSIS — POS
DESCRIPTION OF MATERIAL — TAR PAPER

NEG = NON ASBESTOS MATERIAL NEG
POS = ASBESTOS MATERIAL POS

PAINT SAMPLE RESULTS:

SAMPLE NUMBER — P–
MATERIAL OF CONCERN — –
DESCRIPTION OF MATERIAL — –
RESULTS OF ANALYSIS

SAMPLE EQUAL OR LESS THAN STANDARD ≤600PPM
SAMPLE GREATER THAN STANDARD >600PPM

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SNC·LAVALIN Environment

CLIENT NAME:
PUBLIC WORKS &
GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, BC

TITLE: **ASBESTOS AND PAINT SAMPLE LOCATION PLAN - CUSTOMS OFFICE EXTERIOR AND UPPER FLOOR**

DWN BY: MGM	SCALE: AS NOTED	DATE: 2012–12–03	DWG No: REV.: **1**
CHK'D: TDD	PLOT: 20130624.1445	CADFILE: 131416BMR1	**131416-BM5**

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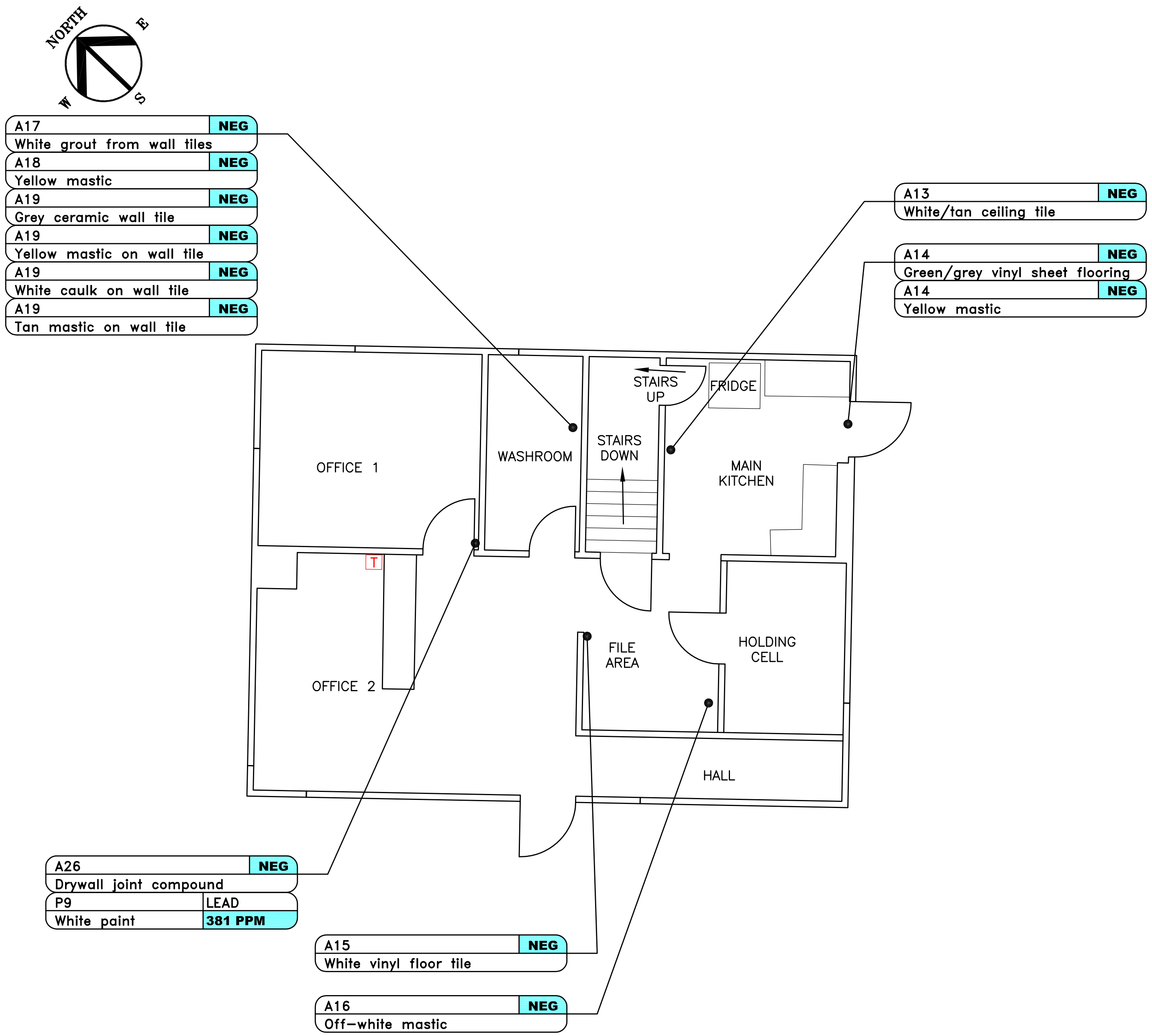
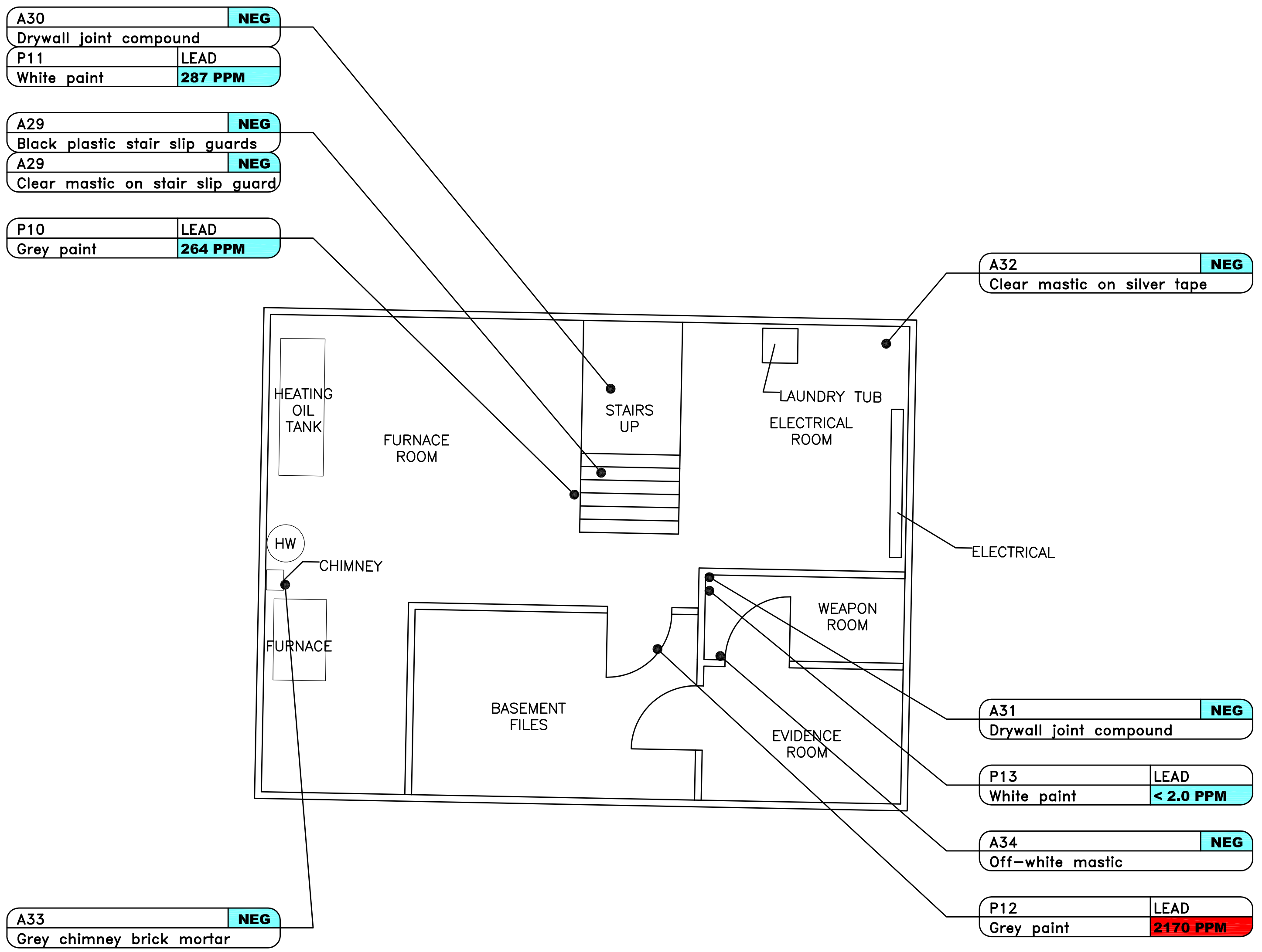


MAIN FLOOR



BASEMENT

LEGEND

0 1 5 METRES

ASBESTOS SAMPLE RESULTS:

SAMPLE NUMBER — RESULTS OF ANALYSIS

A–32 | POS

TAR PAPER

DESCRIPTION OF MATERIAL

NEG = NON ASBESTOS MATERIAL **NEG**

POS = ASBESTOS MATERIAL **POS**

PAINT SAMPLE RESULTS:

SAMPLE NUMBER — MATERIAL OF CONCERN

P– | –

–

DESCRIPTION OF MATERIAL — RESULTS OF ANALYSIS

SAMPLE EQUAL OR LESS THAN STANDARD **≤600PPM**

SAMPLE GREATER THAN STANDARD **>600PPM**

T THERMOSTAT

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0	2012–12–07	ISSUED AS DRAFT	MGM	TDD

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Environment

CLIENT NAME:
PUBLIC WORKS &
GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, BC

TITLE: **ASBESTOS AND PAINT SAMPLE LOCATION PLAN - CUSTOMS OFFICE MAIN FLOOR AND BASEMENT**

DWN BY: MGM	SCALE: AS NOTED	DATE: 2012–12–03	DWG No: REV.: **1**
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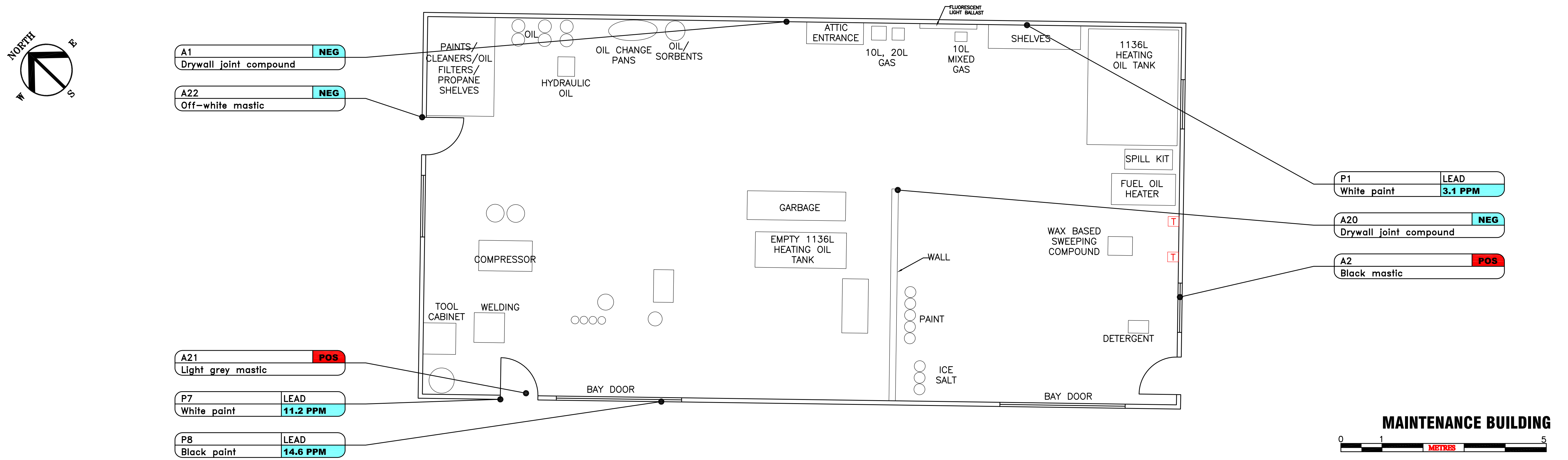
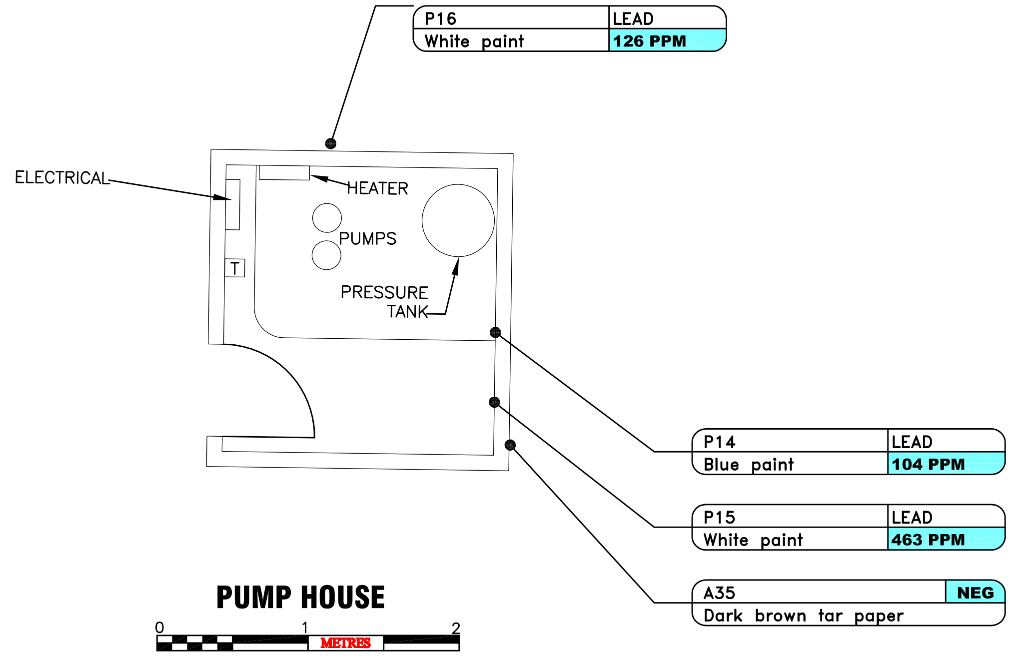
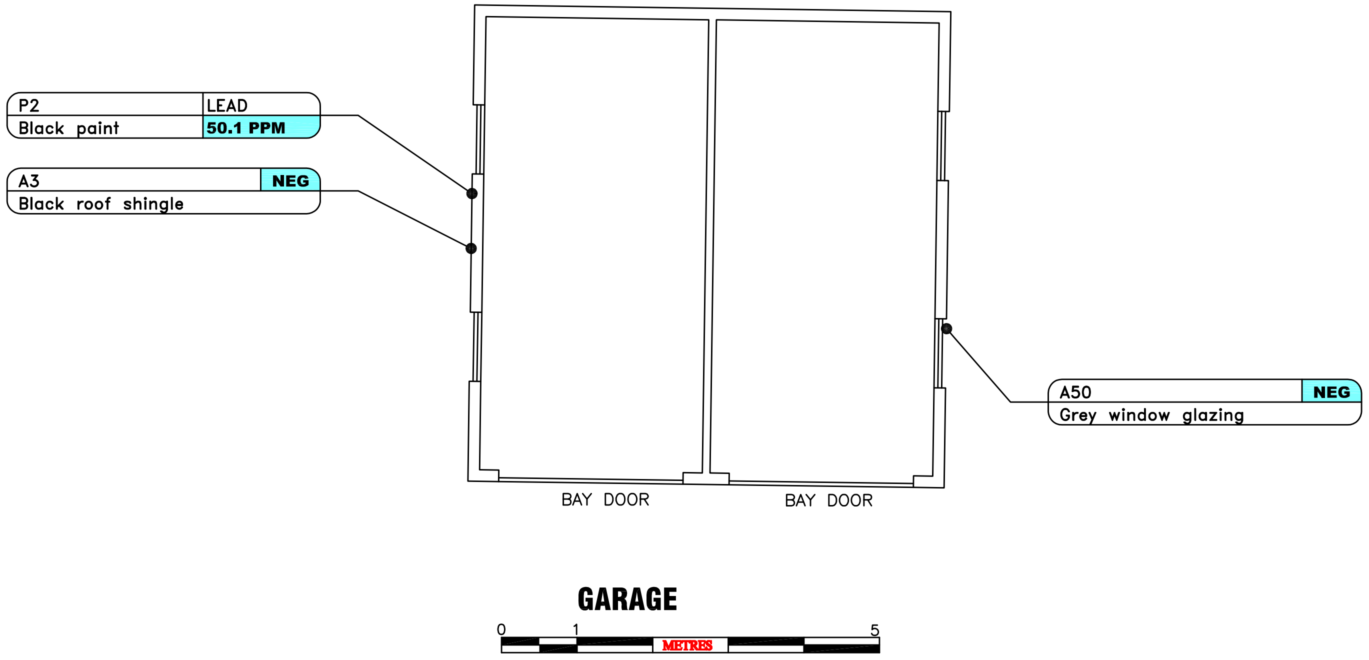


MAINTENANCE BUILDING



PUMP HOUSE



GARAGE

LEGEND

ASBESTOS SAMPLE RESULTS:

SAMPLE NUMBER — A-32 — RESULTS OF ANALYSIS

TAR PAPER — DESCRIPTION OF MATERIAL

NEG = NON ASBESTOS MATERIAL 🟦 NEG

POS = ASBESTOS MATERIAL 🟥 POS

PAINT SAMPLE RESULTS:

SAMPLE NUMBER — P- — MATERIAL OF CONCERN —

DESCRIPTION OF MATERIAL — — RESULTS OF ANALYSIS

SAMPLE EQUAL OR LESS THAN STANDARD 🟦 ≤600PPM

SAMPLE GREATER THAN STANDARD 🟥 >600PPM

T THERMOSTAT

T THERMOSTAT CONTAINING MERCURY

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REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
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0	2012-12-07	ISSUED AS DRAFT	MGM	TDD

SNC·LAVALIN
Environment

CLIENT NAME:
PUBLIC WORKS &
GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, BC

TITLE: **ASBESTOS AND PAINT SAMPLE LOCATION PLAN - MAINTENANCE BUILDING, PUMP HOUSE AND GARAGE**

DWN BY: MGM
SCALE: AS NOTED
DATE: 2012-12-03
DWG No: 131416-BM7
REV.: 1
CHK'D: TDD
PLOT: 20130624.1448
CADFILE: 131416BMR1

PATH: P:\CURRENT PROJECTS\PUBLIC WORKS AND GOV'T SERVICES CANADA\131416\GEOMATICS\CAD\131416BMR1.DWG

ATTACHMENT 1

Photographs

Main Fuel Storage Tank Enclosure

Main Fuel Storage Tank Enclosure - 1 - Facing northwest.

Customs Office

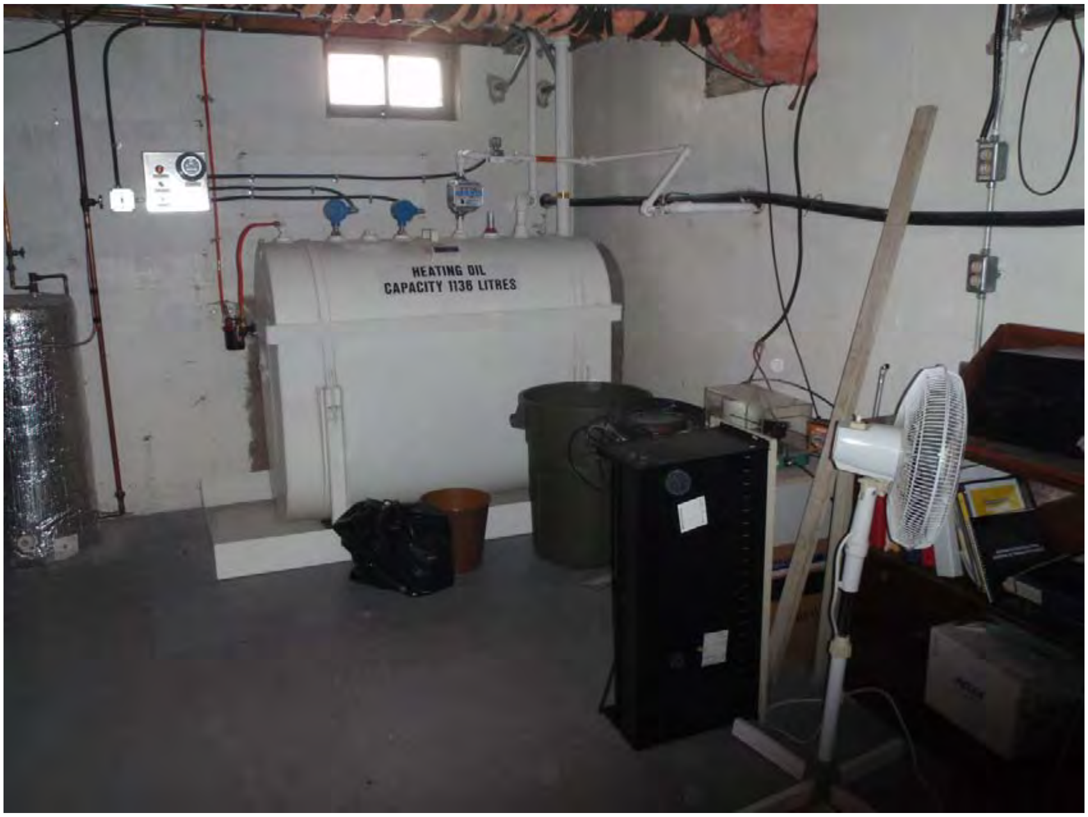
Customs Office - 1 - Facing northwest.

Customs Office - 2 - Facing southeast.

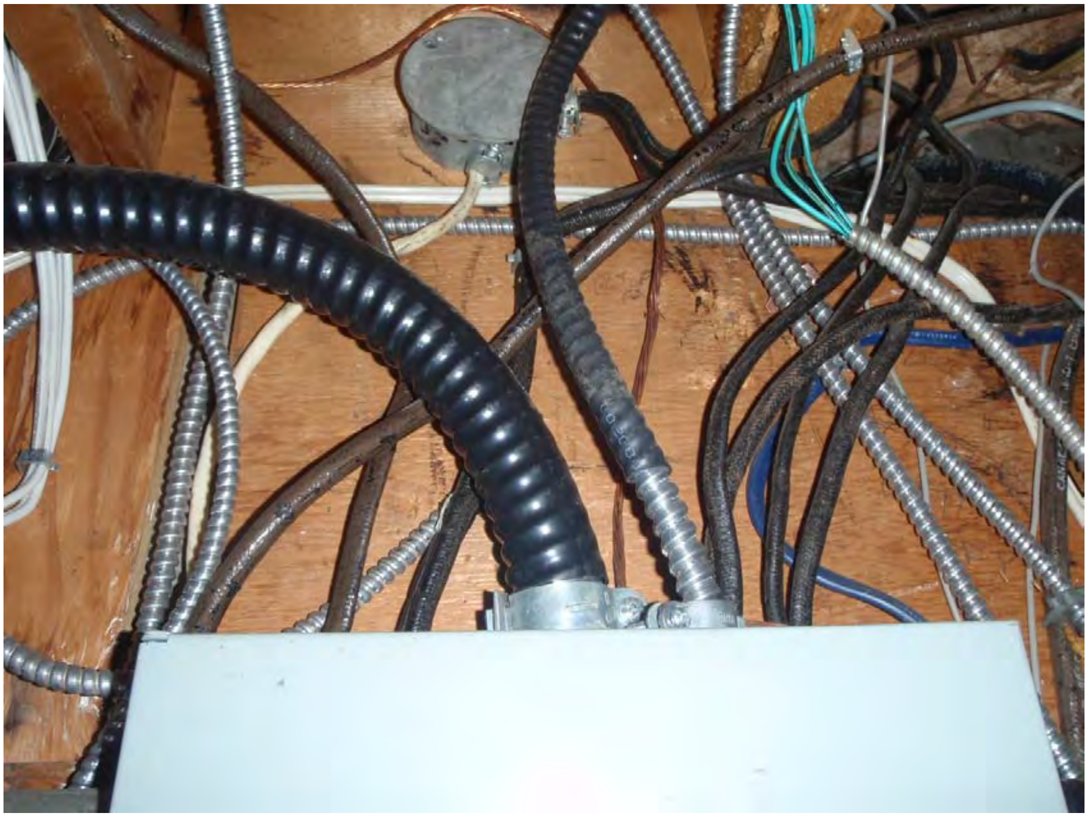
Customs Office - 3 - Upstairs kitchen area.

Customs Office - 4 - Main floor kitchen area.

Customs Office - 5 - Furnace, chimney and hot water tank in basement.



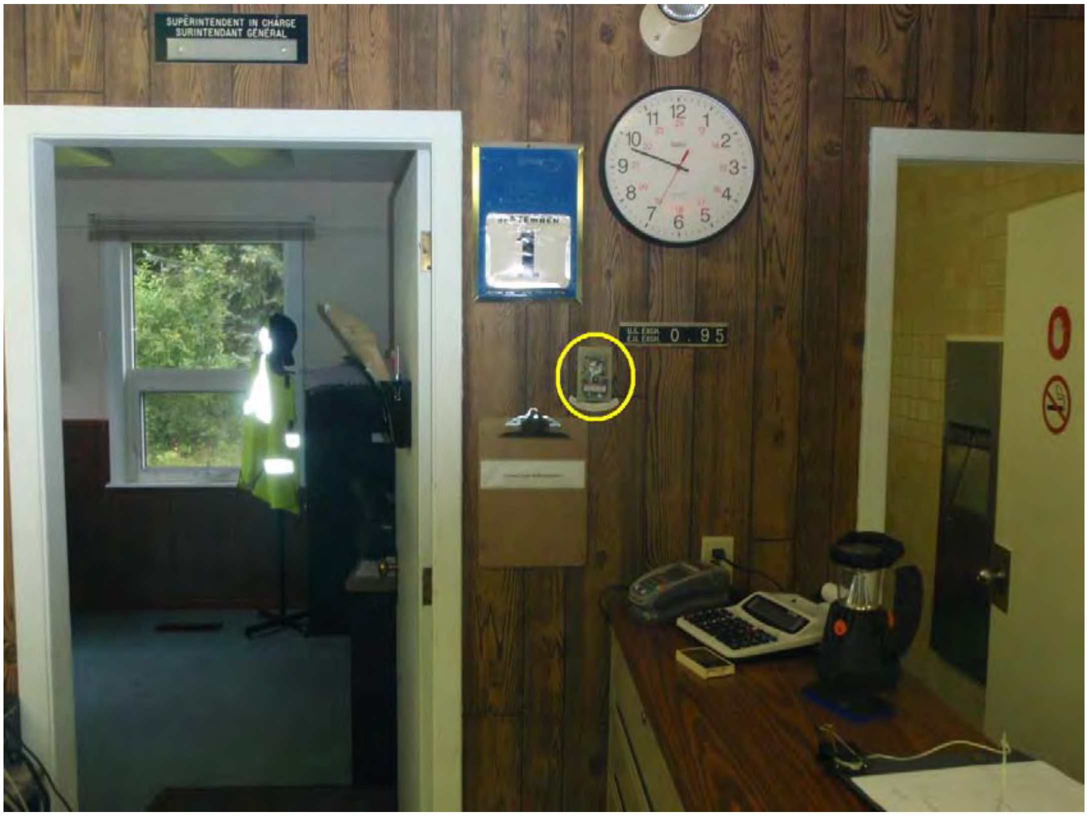
Customs Office - 6 - Heating oil tank in basement (northwest corner).



Customs Office - 7 - Old wiring in the basement electrical room.

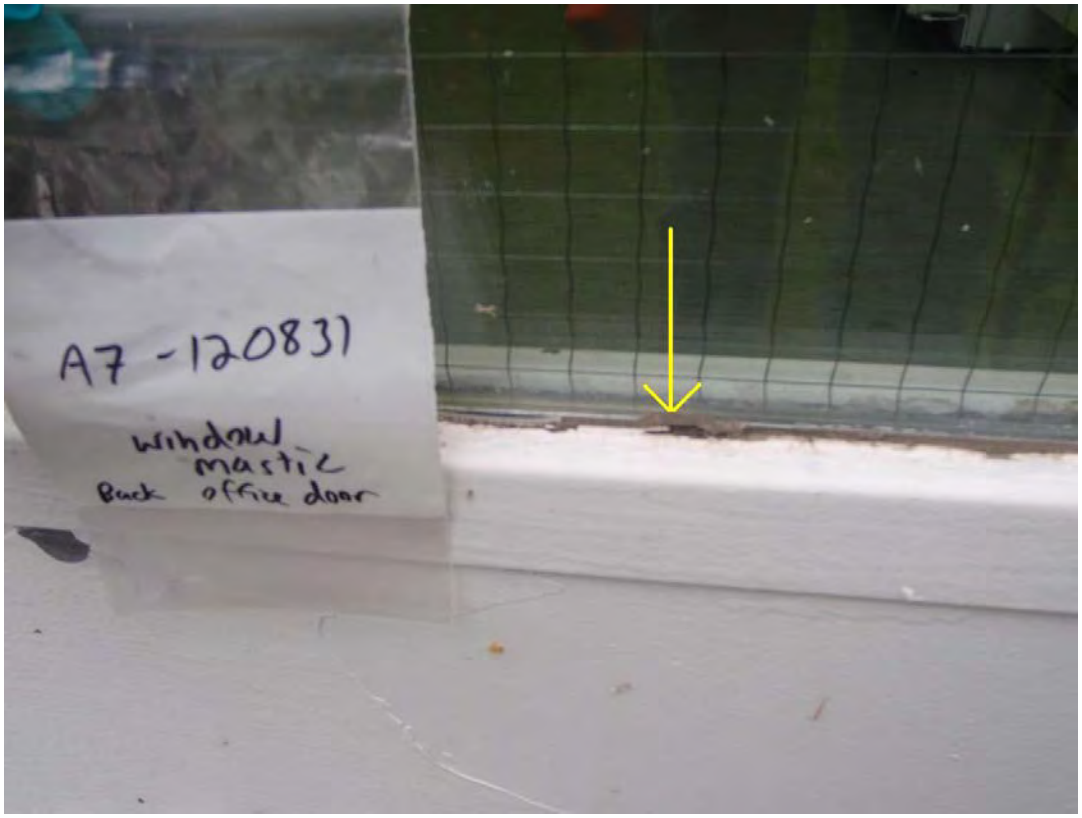
Customs Office - 8 - Various floor sealers and cleaners in basement electrical room.

Customs Office - 9 - Cast iron piping in basement.

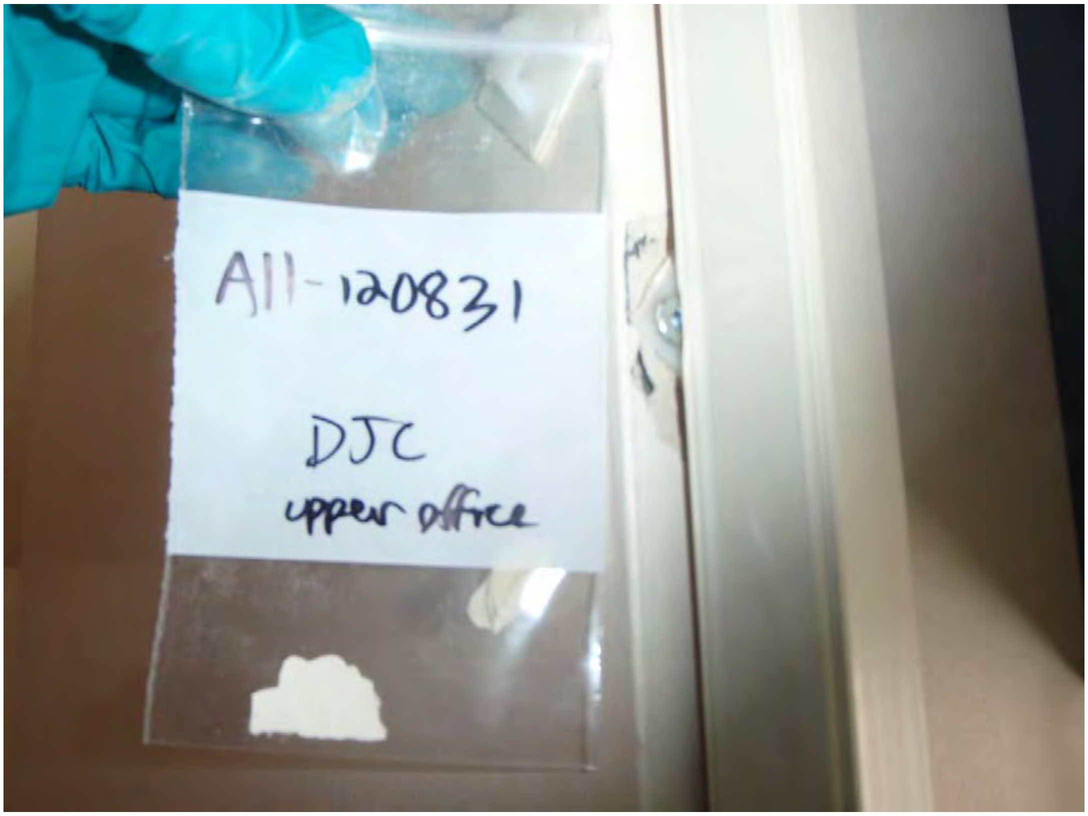


Customs Office - 10 - Mercury containing thermostat in Office 2.

Customs Office - 11 - Asbestos-containing grey putty (A6) surrounding exterior vent on north side of building.

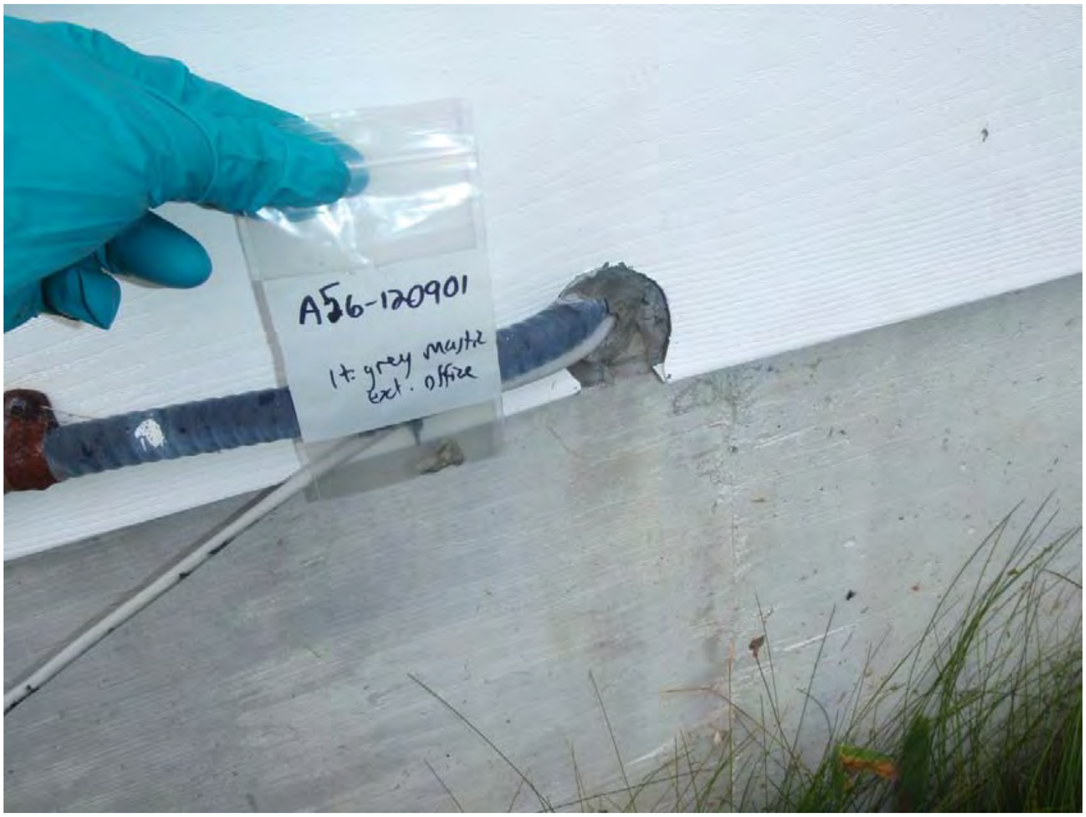


Customs Office - 12 - Asbestos-containing grey putty (A7) surrounding door window on east side of the building.



Customs Office - 13 - Asbestos-containing drywall joint compound (A11) in 1 Upper.

Customs Office - 14 - Asbestos-containing white putty (A24) surrounding large south facing windows of the building.



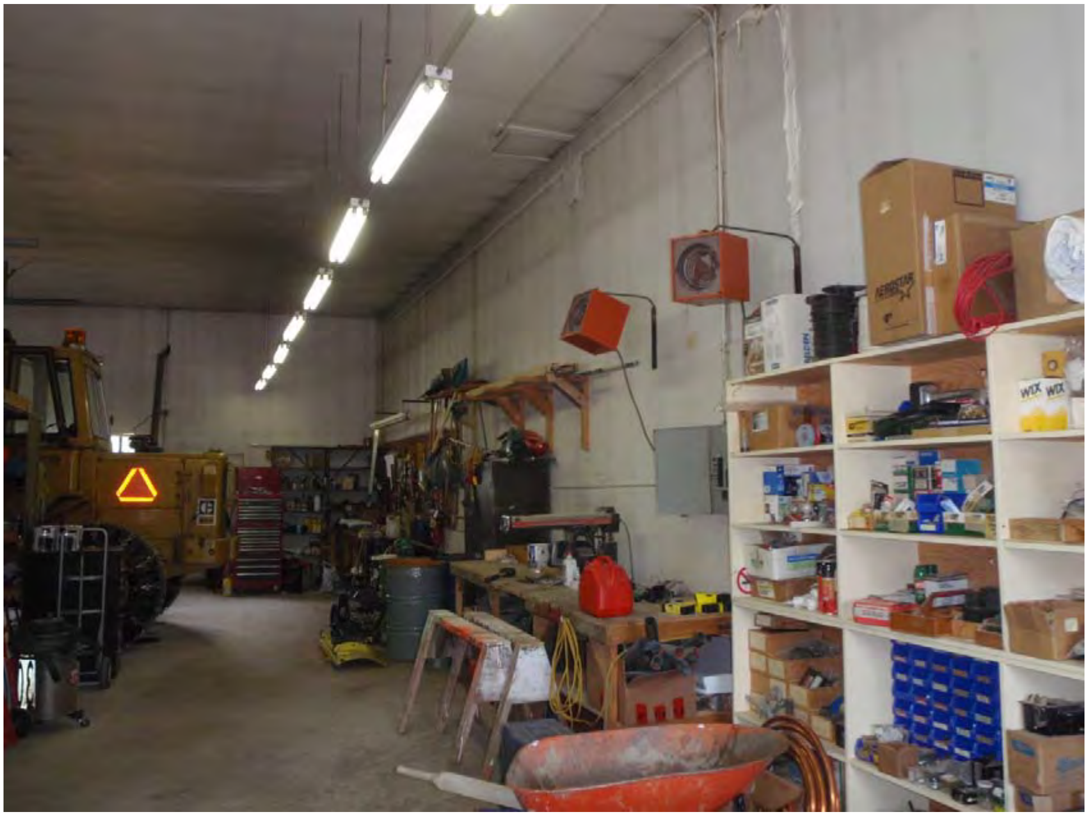
Customs Office - 15 - Asbestos-containing mastic (A56) surrounding conduit entering the building.

Secondary Examination Shelter

Secondary Examination Shelter - 1 - Facing northeast.

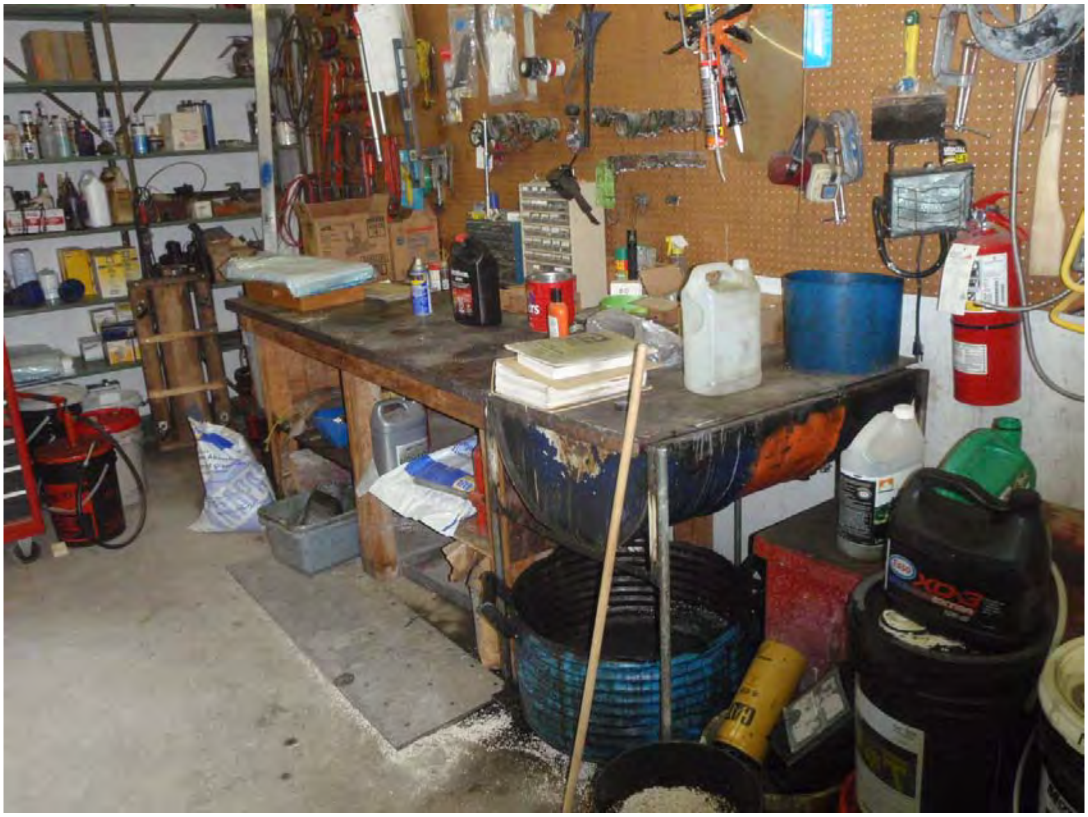
Secondary Examination Shelter - 2 - Facing north.

Secondary Examination Shelter - 3 - Facing northwest.



Secondary Examination Shelter - 4 - Interior facing northwest.

Secondary Examination Shelter - 5 - Shelving with paints, solvents, etc.



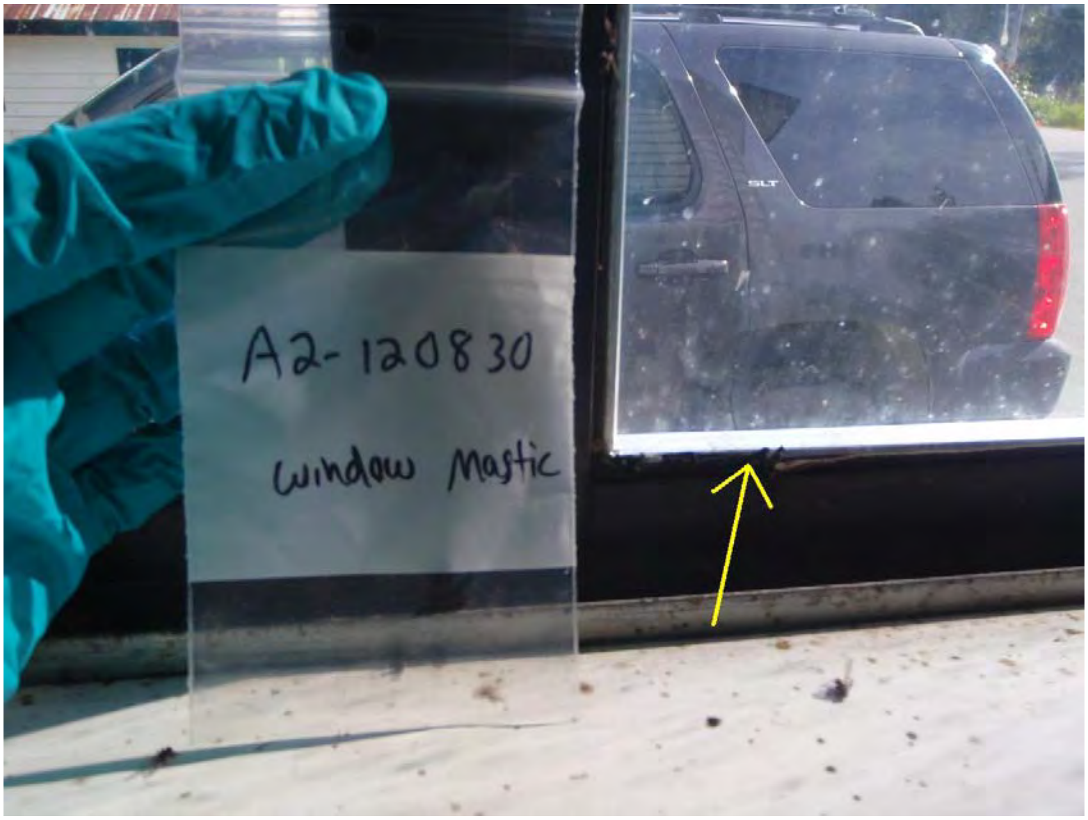
Secondary Examination Shelter - 6 - Oil change equipment, oils, etc.

Secondary Examination Shelter - 7 - Heating oil tank in northeast corner of building.

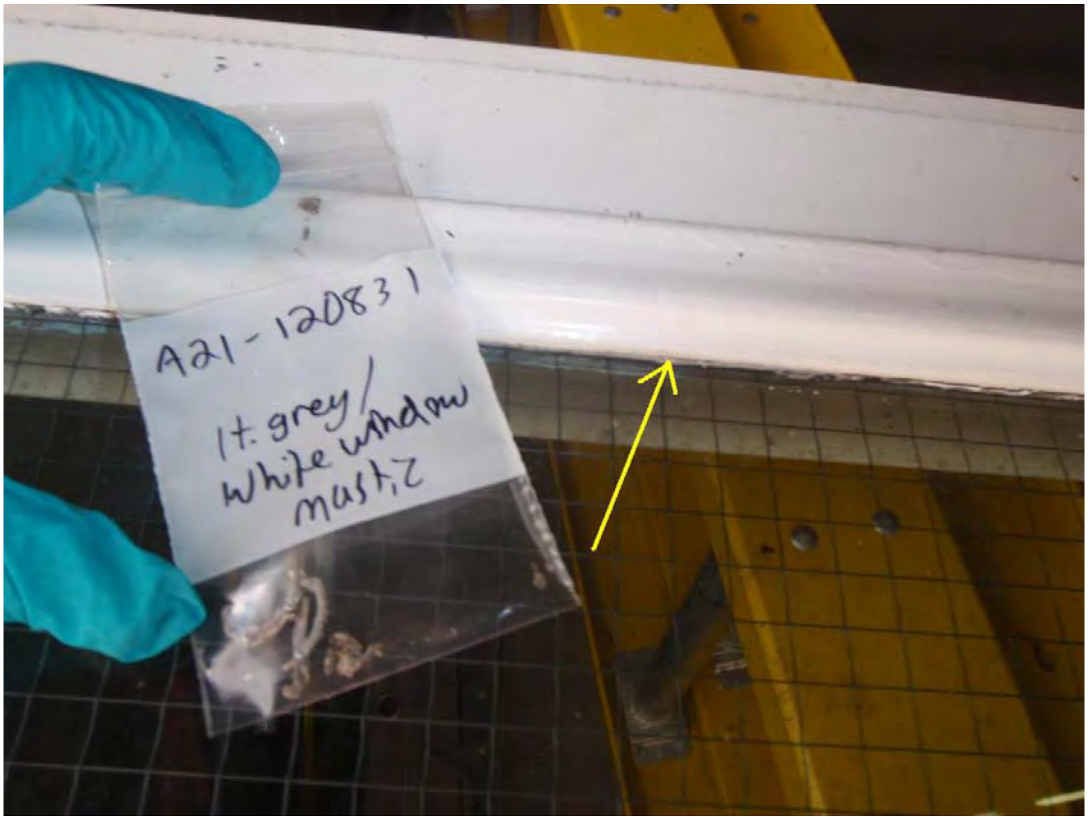
Secondary Examination Shelter - 8 - Unused AST.

Secondary Examination Shelter - 9 - Thermostat (1 of 2) on east wall.

Secondary Examination Shelter - 10 - Thermostat (2 of 2) on east wall.



Secondary Examination Shelter - 11 - Asbestos-containing window mastic (A2) on east wall (southern most window).



Secondary Examination Shelter - 12 - Asbestos-containing light grey window mastic (A21) on south door window.

Garage

Garage - 1 - Facing northwest.

Garage - 2 - East bay of garage.

Garage - 3 - West bay of garage.

Generator Building

Generator Building - 1 - Facing northeast.

Generator Building - 2 - Facing southwest.

Generator Building - 3 - Separation between newer and older sections.

Generator Building - 4 - Facing southwest at newer area.

Generator Building - 5 - Water treatment and fire suppression system.

Generator Building - 6 - Chlorine tank and dosing pump for water treatment system.

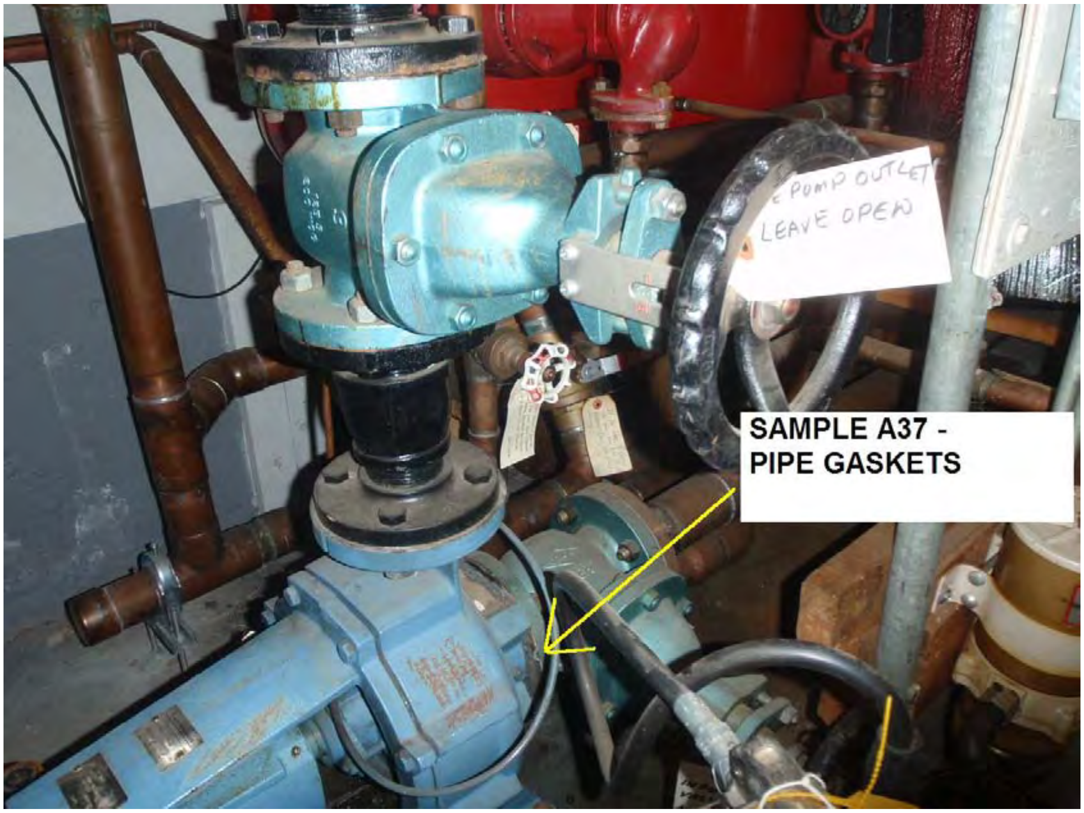
Generator Building - 7 - Diesel AST in southeast corner of building.

Generator Building - 8 - Back-up generators.

Generator Building - 9 - Lead batteries for back-up generators (2 for each generator).

Generator Building - 10 - Mercury containing thermostat on east wall.

Generator Building - 11 - Mercury containing thermostat on west wall.



SAMPLE A37 - PIPE GASKETS

Generator Building - 12 - Asbestos-containing pipe gaskets (A37) in fire suppression system piping.

Generator Building - 13 - Asbestos-containing drywall joint compound (A39) on older area drywall.

Generator Building - 14 - Asbestos-containing grey putty (A46) filling exterior holes in vinyl siding (1 of 7 locations).

Generator Building - 15 - Asbestos-containing mastic (A57) on older area of metal roof.

Generator Building - 16 - Lead-based paint on older area drywall.

House #9

House #9 - 1 - Facing northeast.

House #9 - 2 - Facing southwest.

House #9 - 3 - Living room and dining room.

House #9 - 4 - Main floor kitchen.

House #9 - 5 - Main floor bathroom.

House #9 - 6 - Upstairs.

House #9 - 7 - Furnace and hot water tank in basement.

House #9 - 8 - Cold room in basement.

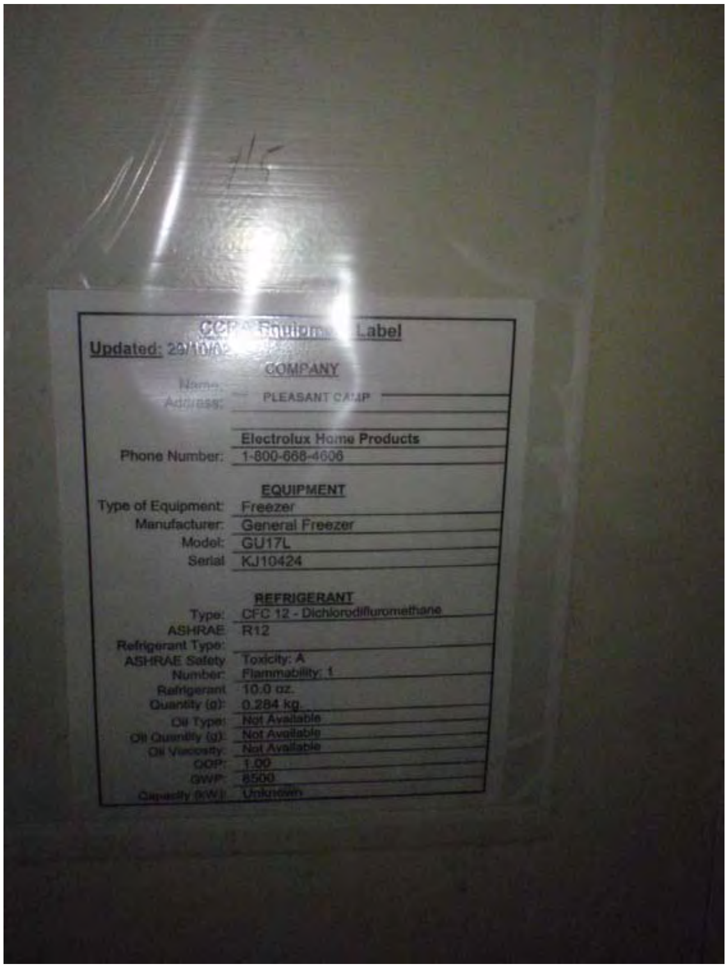
House #9 - 9 - Floor sump in basement.

House #9 - 10 - Cast iron piping in basement.

House #9 - 11 - Heating oil tank in southeast corner of basement.

House #9 - 12 - Older wiring in basement.

House #9 - 13 - Stand-up freezer in basement.



CCR Equipm Label

Updated: 29/10/0

COMPANY

Name:

Address: PLEASANT CAMP

Electrolux Home Products

Phone Number: 1-800-668-4606

EQUIPMENT

Type of Equipment: Freezer

Manufacturer: General Freezer

Model: GU17L

Serial KJ10424

REFRIGERANT

Type: CFC 12 - Dichlorodifluromethane

ASHRAE Refrigerant Type: R12

ASHRAE Safety Number: Toxicity: A Flammability: 1

Refrigerant Quantity (g): 10.0 oz. 0.284 kg

Oil Type: Not Available

Oil Quantity (g): Not Available

Oil Viscosity: Not Available

ODP: 1.00

GWP: 8500

Capacity (kW): Unknown

House #9 - 14 - Tag on back of stand-up freezer in basement.

Whirlpool®

60 HZ / 1 PHASE/ 115 V
DESIGN PRESSURE 140 P. S. I. LOW 330 P. S. I. HIGH
PRESSION DE SERVICE 140 PSI BASSE 330 PSI HAUTE

FULL LOAD AMP/ DEMANDE DE COURANT À PLEINE CHARGE 6.5

OZ R 134a 4.000

TYPE 19TFA

MFG. DATE/ DATE DE FABR. 11-05

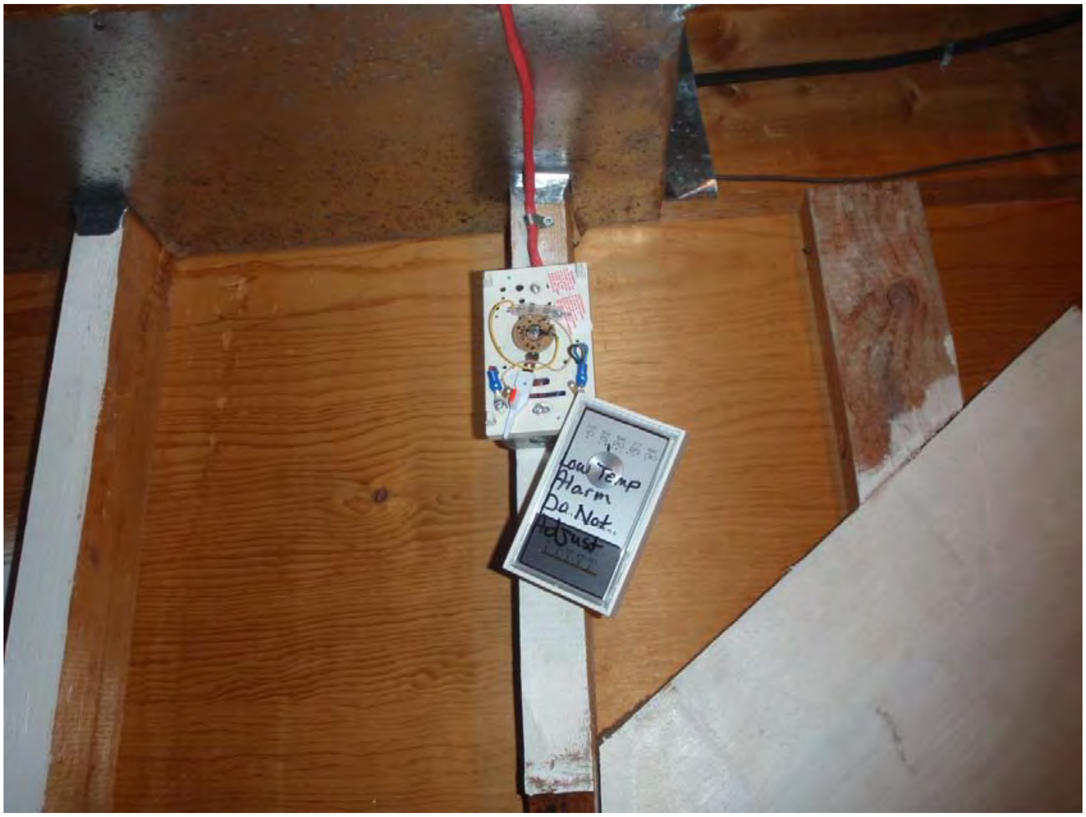
MOD. GR9FHKXPQ00

SER. ES4533118

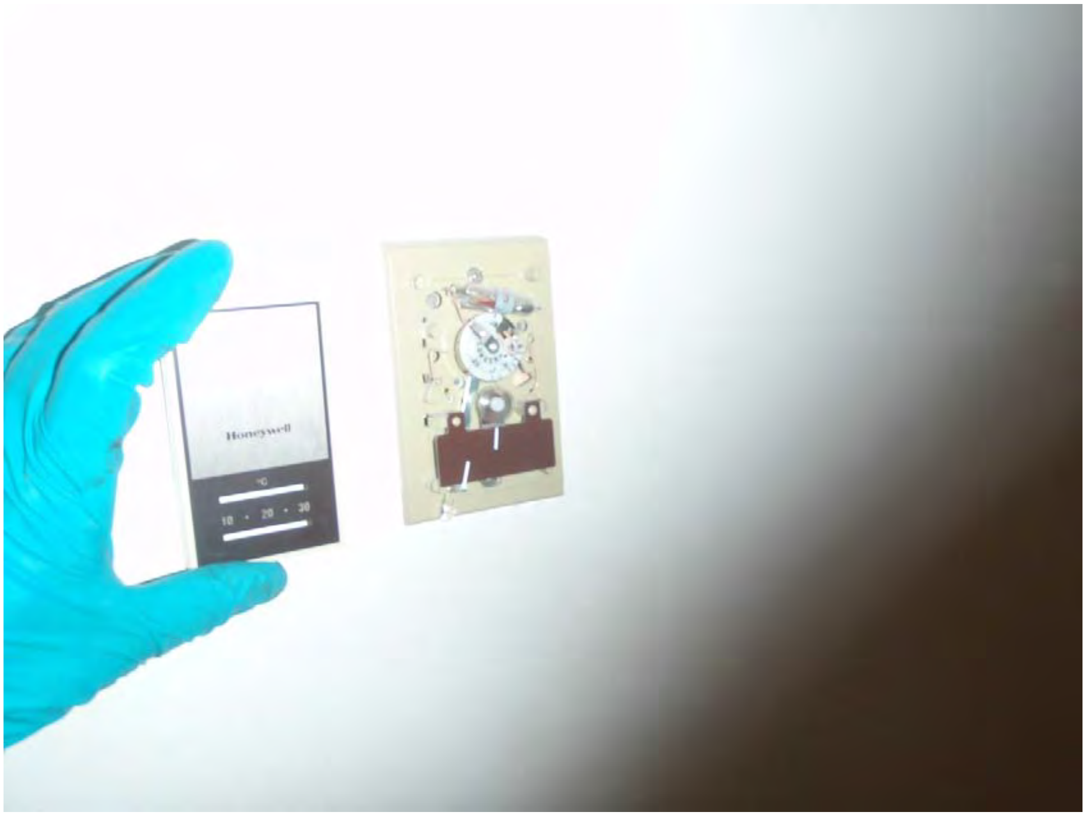
LISTED HOUSEHOLD REFRIGERATOR REFRIGERATEUR HOMOLOGUÉ -APPLICATION FAMILIALE

Whirlpool is a Registered Trademark of/Marque deposée de Whirlpool, U.S.A., Benton Harbor MI 49022.

House #9 - 15 - Tag on back of refrigerator in main floor kitchen.



House #9 - 16 - Mercury containing thermostat next to furnace in basement.

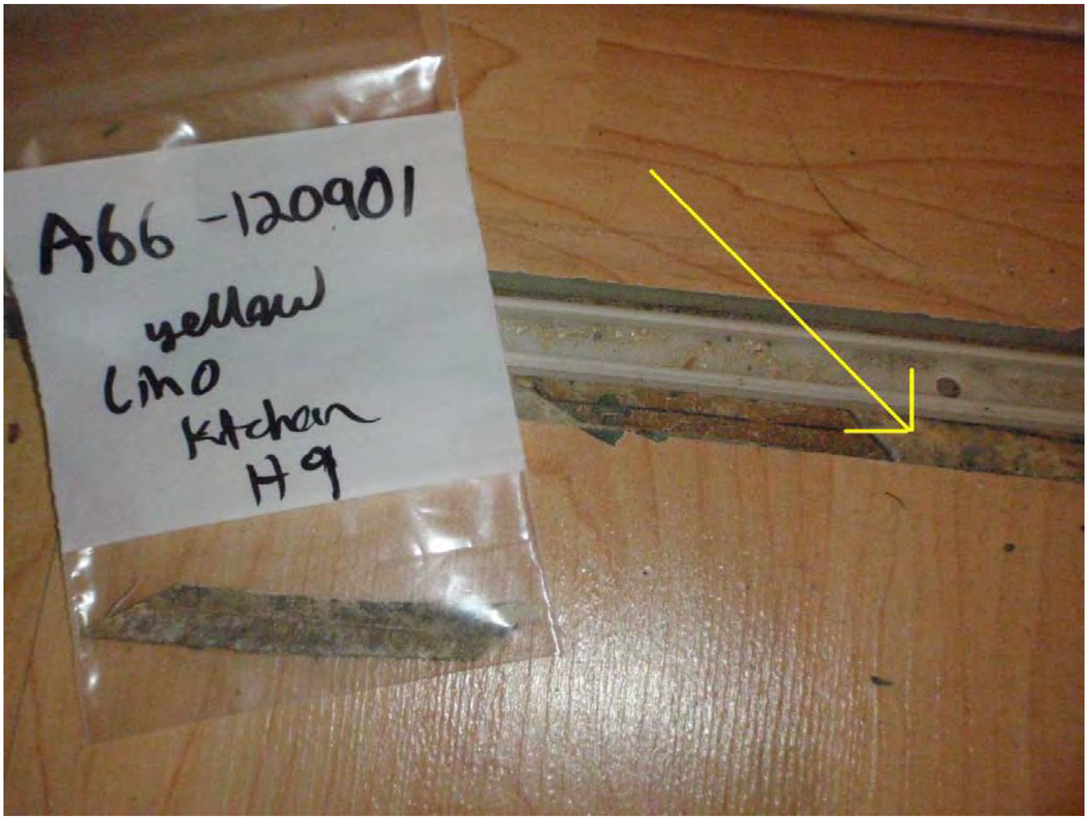


House #9 - 17 - Mercury containing thermostat on west wall of hallway on main floor.

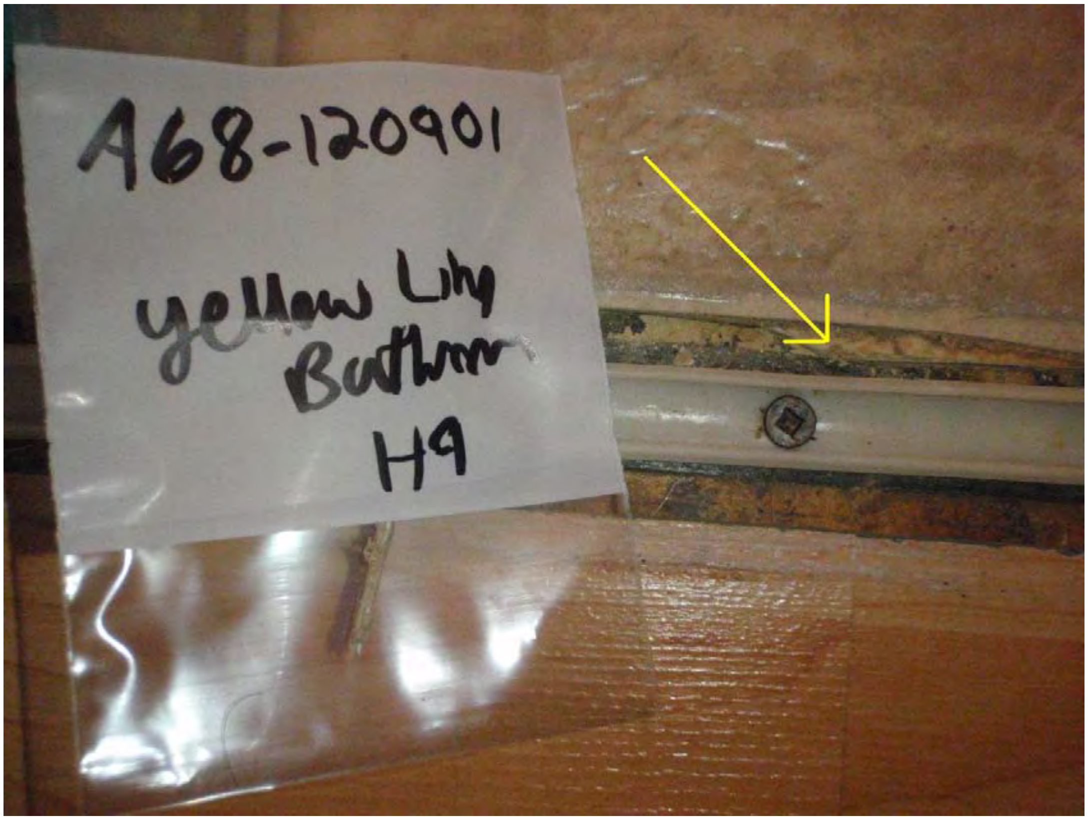
House #9 - 18 - Non-asbestos orange vinyl floor tiles throughout house.

House #9 - 19 - Asbestos-containing mastic (A59) surrounding electrical boxes.

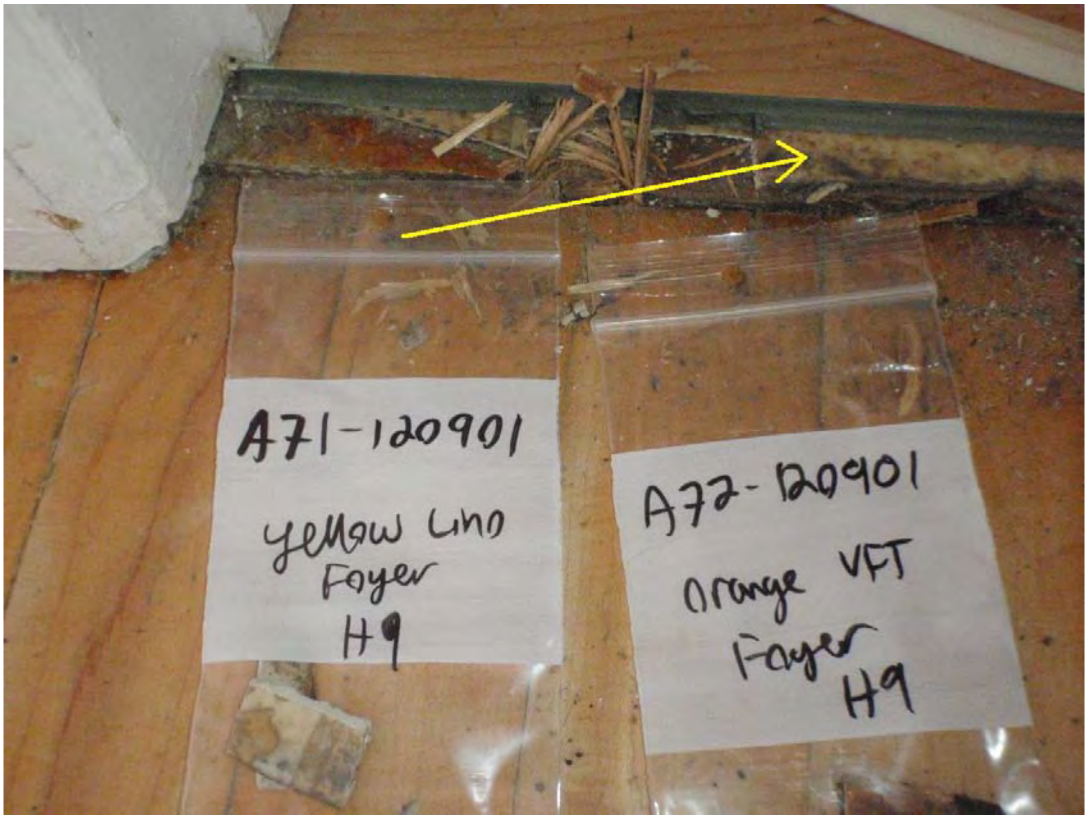
House #9 - 20 - Potentially asbestos-containing mastic (similar to A59) around chimney flashing.



House #9 - 21 - Asbestos-containing yellow linoleum flooring (A66) in the kitchen.



House #9 - 22 - Asbestos-containing yellow linoleum flooring (A68) in the bathroom.



House #9 - 23 - Asbestos-containing yellow linoleum flooring (A71) in the foyer.

Pump House

Pump House - 1 - Facing northwest.

Pump House - 2 - Interior of pump house.

Pump House - 3 - Non-mercury containing thermostat on south wall.

Water Storage Tank

Water Storage Tank - 1 - Facing north.

Water Storage Tank - 2 - Metal cladding over ground piping between Water Storage Tank and Generator Building.

Water Storage Tank - 3 - Asbestos-containing shingle (A51) beneath metal cladding on ground piping.

Water Storage Tank - 4 - Asbestos-containing mastic (A52) joining metal pipe covering to Water Storage Tank.

Water Storage Tank - 5 - Asbestos-containing mastic (A54) joining metal pipe cover to Generator Building.

Remedial System Enclosure

Remedial System Enclosure - 1 - Facing northeast.

ATTACHMENT 2

Laboratory Analytical Reports

IATL **International Asbestos Testing Laboratories**

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: SNC-Lavalin, Inc.
8648 Commerce Court
Burnaby BC V5A 4N6

Report Date: 9/25/2012
Report No.: 285817
Project: Pleasant Camp
Project No.: 131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793090 **Description / Location:** White Joint Compound
Client No.: A1-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793091 **Description / Location:** Black Caulk
Client No.: A2-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 2.2	Chrysotile	None Detected	None Detected	PC 97.8

Lab No.: 4793092 **Description / Location:** Black Shingle
Client No.: A3-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Cellulose	70

Lab No.: 4793093 **Description / Location:** Black Shingle
Client No.: A4-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Cellulose	70

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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This report shall not be reproduced except in full, without written approval of the laboratory.

Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Solebello

Approved By:

Date: 9/25/2012

Frank E. Ehrenfeld, III
Laboratory Director

CERTIFICATE OF ANALYSIS

Client:	SNC-Lavalin, Inc.	**Report Date:**	9/25/2012
	8648 Commerce Court	**Report No.:**	285817
	Burnaby BC V5A 4N6	**Project:**	Pleasant Camp
		Project No.:	131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793094 **Description / Location:** Black Tar Paper
Client No.: A5-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	85	Cellulose	15

Lab No.: 4793095 **Description / Location:** Grey Putty
Client No.: A6-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
10	Chrysotile	None Detected	None Detected	90

Note: Different material than indicated on Sample Log / Description.

Lab No.: 4793096 **Description / Location:** Grey Putty
Client No.: A7-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
12	Chrysotile	None Detected	None Detected	88

Note: Different material than indicated on Sample Log / Description.

Lab No.: 4793097 **Description / Location:** Off-White Glazing
Client No.: A8-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Note: Different material than indicated on Sample Log / Description.

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Solebello

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client: SNC-Lavalin, Inc.
8648 Commerce Court
Burnaby BC V5A 4N6

Report Date: 9/25/2012
Report No.: 285817
Project: Pleasant Camp
Project No.: 131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793098 **Description / Location:** Black Tar Paper
Client No.: A9-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	85	Cellulose	15

Lab No.: 4793099 **Description / Location:** Grey Putty
Client No.: A10-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	5	Cellulose	95

Lab No.: 4793100 **Description / Location:** Off-White Joint Compound
Client No.: A11-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.9	Chrysotile	None Detected	None Detected	PC 98.1

Lab No.: 4793101 **Description / Location:** Pink/Off-White Vinyl Sheet Flooring
Client No.: A12-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	50	Cellulose	50

Note: Different material than indicated on Sample Log / Description.

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Solebello

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client:	SNC-Lavalin, Inc. 8648 Commerce Court Burnaby BC V5A 4N6	**Report Date:**	9/25/2012
		Report No.:	285817
		Project:	Pleasant Camp
		Project No.:	131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793102 **Description / Location:** White/Tan Ceiling Tile
Client No.: A13-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	35	Cellulose	30
		35	Fibrous Glass	

Lab No.: 4793103 **Description / Location:** Green Vinyl Sheet Flooring
Client No.: A14-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793103 **Description / Location:** Yellow Mastic **Layer No.:** 2
Client No.: A14-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793104 **Description / Location:** Off-White Floor Tile
Client No.: A15-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Solebello

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client: SNC-Lavalin, Inc.
8648 Commerce Court
Burnaby BC V5A 4N6

Report Date: 9/25/2012
Report No.: 285817
Project: Pleasant Camp
Project No.: 131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793105 **Description / Location:** Off-White Mastic
Client No.: A16-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793106 **Description / Location:** White Grout
Client No.: A17-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793107 **Description / Location:** Yellow Mastic
Client No.: A18-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Solebello

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client:	SNC-Lavalin, Inc.	**Report Date:**	9/25/2012
	8648 Commerce Court	**Report No.:**	285817
	Burnaby BC V5A 4N6	**Project:**	Pleasant Camp
		Project No.:	131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793108 **Description / Location:** Grey Ceramic Tile
Client No.: A19-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793108 **Description / Location:** Yellow Mastic **Layer No.:** 2
Client No.: A19-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793108 **Description / Location:** White Caulk **Layer No.:** 3
Client No.: A19-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793108 **Description / Location:** Tan Mastic **Layer No.:** 4
Client No.: A19-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	Trace	Cellulose	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Solebello

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client: SNC-Lavalin, Inc.
8648 Commerce Court
Burnaby BC V5A 4N6

Report Date: 9/25/2012
Report No.: 285817
Project: Pleasant Camp
Project No.: 131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793109 **Description / Location:** White Joint Compound
Client No.: A20-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793110 **Description / Location:** Grey Putty
Client No.: A21-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
12	Chrysotile	None Detected	None Detected	88

Note: Different material than indicated on Sample Log / Description.

Lab No.: 4793111 **Description / Location:** Off-White Mastic
Client No.: A22-120831

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793112 **Description / Location:** Grey/Black Cementitious
Client No.: A23-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

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Analysis Performed By: L. Solebello

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client: SNC-Lavalin, Inc.
8648 Commerce Court
Burnaby BC V5A 4N6

Report Date: 9/25/2012
Report No.: 285817
Project: Pleasant Camp
Project No.: 131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793113 **Description / Location:** Off-White Putty
Client No.: A24-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
10	Chrysotile	None Detected	None Detected	90

Note: Different material than indicated on Sample Log / Description.

Lab No.: 4793114 **Description / Location:** Lt. Grey Putty
Client No.: A25-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	3	Cellulose	97

Note: Different material than indicated on Sample Log / Description.

Lab No.: 4793115 **Description / Location:** White Joint Compound
Client No.: A26-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Solebello

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client:	SNC-Lavalin, Inc.			**Report Date:**	9/25/2012
	8648 Commerce Court			**Report No.:**	285817
	Burnaby	BC	V5A 4N6	**Project:**	Pleasant Camp
				Project No.:	131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793116 **Description / Location:** Black Plastic
Client No.: A27-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793116 **Description / Location:** Black Mastic **Layer No.:** 2
Client No.: A27-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793117 **Description / Location:** Off-White Joint Compound
Client No.: A28-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

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Analysis Performed By: L. Solebello

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client: SNC-Lavalin, Inc.
8648 Commerce Court
Burnaby BC V5A 4N6

Report Date: 9/25/2012
Report No.: 285817
Project: Pleasant Camp
Project No.: 131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793118 **Description / Location:** Black Plastic
Client No.: A29-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793118 **Description / Location:** Clear Mastic **Layer No.:** 2
Client No.: A29-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793119 **Description / Location:** Off-White Joint Compound
Client No.: A30-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793120 **Description / Location:** White Joint Compound
Client No.: A31-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Solebello

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client:	SNC-Lavalin, Inc. 8648 Commerce Court Burnaby BC V5A 4N6	**Report Date:**	9/25/2012
		Report No.:	285817
		Project:	Pleasant Camp
		Project No.:	131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793121 **Description / Location:** Clear Mastic
Client No.: A32-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793122 **Description / Location:** Grey Mortar
Client No.: A33-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793123 **Description / Location:** Off-White Mastic
Client No.: A34-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793124 **Description / Location:** Dk. Brown Tar Paper
Client No.: A35-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	85	Cellulose	15

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Solebello

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client: SNC-Lavalin, Inc.
8648 Commerce Court
Burnaby BC V5A 4N6

Report Date: 9/25/2012
Report No.: 285817
Project: Pleasant Camp
Project No.: 131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793125 **Description / Location:** Black Fibrous
Client No.: A36-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	50	Fibrous Glass	50

Lab No.: 4793126 **Description / Location:** Dk. Grey Gasket
Client No.: A37-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
25	Chrysotile	None Detected	None Detected	75

Lab No.: 4793127 **Description / Location:** Black/Yellow Insulation
Client No.: A38-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	50	Fibrous Glass	50

Lab No.: 4793128 **Description / Location:** Off-White Joint Compound
Client No.: A39-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 2.1	Chrysotile	None Detected	None Detected	PC 97.9

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Solebello

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client: SNC-Lavalin, Inc.
8648 Commerce Court
Burnaby BC V5A 4N6

Report Date: 9/25/2012
Report No.: 285817
Project: Pleasant Camp
Project No.: 131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793129 **Description / Location:** Black Mastic
Client No.: A40-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	Trace	Fibrous Glass	100

Lab No.: 4793130 **Description / Location:** Off-White Mastic
Client No.: A41-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793130 **Description / Location:** Yellow Insulation **Layer No.:** **2**
Client No.: A41-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	90	Fibrous Glass	10

Lab No.: 4793131 **Description / Location:** Off-White Joint Compound
Client No.: A42-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Solebello

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client: SNC-Lavalin, Inc.
8648 Commerce Court
Burnaby BC V5A 4N6

Report Date: 9/25/2012
Report No.: 285817
Project: Pleasant Camp
Project No.: 131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793132 **Description / Location:** Dk. Brown Tar Paper
Client No.: A43-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	85	Cellulose	15

Lab No.: 4793133 **Description / Location:** Off-White Glazing
Client No.: A44-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Note: Different material than indicated on Sample Log / Description.

Lab No.: 4793134 **Description / Location:** Off-White Glazing
Client No.: A45-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	2	Wollastonite	98

Note: Different material than indicated on Sample Log / Description.

Lab No.: 4793135 **Description / Location:** Grey Putty
Client No.: A46-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
10	Chrysotile	None Detected	None Detected	90

Note: Different material than indicated on Sample Log / Description.

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: L. Solebello

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client:	SNC-Lavalin, Inc.	**Report Date:**	9/25/2012
	8648 Commerce Court	**Report No.:**	285817
	Burnaby BC V5A 4N6	**Project:**	Pleasant Camp
		Project No.:	131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793136 **Description / Location:** Dk. Brown Tar Paper
Client No.: A47-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	85	Cellulose	15

Lab No.: 4793137 **Description / Location:** Blue/Black Shingle
Client No.: A48-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	40	Cellulose	60

Lab No.: 4793138 **Description / Location:** Black Mastic
Client No.: A49-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	20	Cellulose	80

Lab No.: 4793139 **Description / Location:** Grey Glazing
Client No.: A50-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: B. Faulseit

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client: SNC-Lavalin, Inc.
8648 Commerce Court
Burnaby BC V5A 4N6

Report Date: 9/25/2012
Report No.: 285817
Project: Pleasant Camp
Project No.: 131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793140 **Description / Location:** Black Roof Material
Client No.: A51-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 3.1	Chrysotile	30	Cellulose	PC 66.9

Lab No.: 4793141 **Description / Location:** Black Mastic
Client No.: A52-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.2	Chrysotile	None Detected	None Detected	PC 98.8

Lab No.: 4793142 **Description / Location:** Grey Mastic
Client No.: A53-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793143 **Description / Location:** Grey Mastic
Client No.: A54-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 3.5	Chrysotile	None Detected	None Detected	PC 96.5

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: B. Faulseit

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client:	SNC-Lavalin, Inc.	**Report Date:**	9/25/2012
	8648 Commerce Court	**Report No.:**	285817
	Burnaby BC V5A 4N6	**Project:**	Pleasant Camp
		Project No.:	131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793144 **Description / Location:** Black Mastic
Client No.: A55-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793145 **Description / Location:** Grey Mastic
Client No.: A56-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 3.1	Chrysotile	None Detected	None Detected	PC 96.9

Lab No.: 4793146 **Description / Location:** Black Mastic
Client No.: A57-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
10	Chrysotile	None Detected	None Detected	90

Lab No.: 4793147 **Description / Location:** Black Tar Paper
Client No.: A58-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	50	Cellulose	50

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: B. Faulseit

Date: 9/25/2012

IATL **International Asbestos Testing Laboratories**

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: SNC-Lavalin, Inc.
8648 Commerce Court
Burnaby BC V5A 4N6

Report Date: 9/25/2012
Report No.: 285817
Project: Pleasant Camp
Project No.: 131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793148 **Description / Location:** Grey Mastic
Client No.: A59-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 3.5	Chrysotile	None Detected	None Detected	PC 96.5

Lab No.: 4793149 **Description / Location:** White Mastic
Client No.: A60-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793150 **Description / Location:** Brown Tar Paper
Client No.: A61-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	50	Cellulose	50

Lab No.: 4793151 **Description / Location:** Grey Wrap
Client No.: A62-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: B. Faulseit

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client:	SNC-Lavalin, Inc.	**Report Date:**	9/25/2012
	8648 Commerce Court	**Report No.:**	285817
	Burnaby BC V5A 4N6	**Project:**	Pleasant Camp
		Project No.:	131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793152 **Description / Location:** Tan Floor Tile
Client No.: A63-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Cellulose	70

Lab No.: 4793153 **Description / Location:** White Joint Compound
Client No.: A64-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793154 **Description / Location:** White Joint Compound
Client No.: A65-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793155 **Description / Location:** Tan Vinyl Sheet Flooring
Client No.: A66-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
20	Chrysotile	20	Cellulose	60

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: B. Faulseit

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client: SNC-Lavalin, Inc.
8648 Commerce Court
Burnaby BC V5A 4N6

Report Date: 9/25/2012
Report No.: 285817
Project: Pleasant Camp
Project No.: 131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793156 **Description / Location:** Brown Floor Tile
Client No.: A67-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Cellulose	70

Lab No.: 4793157 **Description / Location:** Tan Vinyl Sheet Flooring
Client No.: A68-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
30	Chrysotile	None Detected	None Detected	70

Lab No.: 4793158 **Description / Location:** Tan Vinyl Sheet Flooring
Client No.: A69-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Cellulose	70

Lab No.: 4793159 **Description / Location:** White Mastic
Client No.: A70-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: B. Faulseit

Date: 9/25/2012

CERTIFICATE OF ANALYSIS

Client:	SNC-Lavalin, Inc.		**Report Date:**	9/25/2012
	8648 Commerce Court		**Report No.:**	285817
	Burnaby BC	V5A 4N6	**Project:**	Pleasant Camp
			Project No.:	131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793160 **Description / Location:** Tan Vinyl Sheet Flooring
Client No.: A71-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
30	Chrysotile	None Detected	None Detected	70

Lab No.: 4793161 **Description / Location:** Brown Floor Tile
Client No.: A72-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Cellulose	70

Lab No.: 4793162 **Description / Location:** Tan Joint Compound
Client No.: A73-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793163 **Description / Location:** Tan Joint Compound
Client No.: A74-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: B. Faulseit

Date: 9/25/2012

IATL **International Asbestos Testing Laboratories**

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: SNC-Lavalin, Inc.
8648 Commerce Court
Burnaby BC V5A 4N6

Report Date: 9/25/2012
Report No.: 285817
Project: Pleasant Camp
Project No.: 131416-H012

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 4793164 **Description / Location:** Tan Joint Compound
Client No.: A75-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 4793165 **Description / Location:** Tan Floor Tile
Client No.: A76-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	50	Cellulose	50

Lab No.: 4793166 **Description / Location:** Tan Ceiling Tile
Client No.: A77-120901

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	90	Cellulose	10

Accreditations: **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any agency of the U.S. government
This report shall not be reproduced except in full, without written approval of the laboratory.

Analytical Method: EPA 600/R-93/116, by Polarized Light Microscopy

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: B. Faulseit

Date: 9/25/2012

Your Project #: 131416-H012
Site#: PLEASANT CAMP
Site Location: PLEASANT CAMP, BC
Your C.O.C. #: G001653, G001654, G021335

Attention: Tim Drozda
SNC LAVALIN ENVIRONMENT INC.
8648 COMMERCE COURT
BURNABY, BC
CANADA V5A 4N6

Report Date: 2012/09/21

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B282740
Received: 2012/09/14, 18:00

Sample Matrix: PAINT
Samples Received: 28

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Elements by ICP-AES (acid extr. solid)	28	2012/09/20	2012/09/20	BBY7SOP-00018	SW846 6010C

* Results relate only to the items tested.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Kim Domino, Burnaby Senior Project Manager
Email: KDomino@maxxam.ca
Phone# (604) 638-5018

==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

LEAD IN PAINT CHIPS (PAINT)

Maxxam ID		EL9674	EL9675	EL9676	EL9677	EL9678	EL9679	EL9680	EL9681	EL9682	EL9683		
Sampling Date		2012/08/31	2012/08/31	2012/08/31	2012/08/31	2012/08/31	2012/08/31	2012/08/31	2012/08/31	2012/09/01	2012/09/01		
	UNITS	**P1-120831**	**P2-120831**	**P3-120831**	**P4-120831**	**P5-120831**	**P6-120831**	**P7-120831**	**P8-120831**	**P9-120901**	**P10-120901**	**RDL**	**QC Batch**
Total Metals by ICP													
Total Lead (Pb)	mg/kg	3.1	50.1	587	1470	267	1790	11.2	14.6	381	264	2.0	6185640

Maxxam ID		EL9684	EL9684	EL9685	EL9714	EL9715	EL9716	EL9717	EL9718		
Sampling Date		2012/09/01	2012/09/01	2012/09/01	2012/09/01	2012/09/01	2012/09/01	2012/09/01	2012/09/01		
	UNITS	**P11-120901**	**P11-120901 Lab-Dup**	**P12-120901**	**P13-120901**	**P14-120901**	**P15-120901**	**P16-120901**	**P17-120901**	**RDL**	**QC Batch**
Total Metals by ICP											
Total Lead (Pb)	mg/kg	287	302	2170	<2.0	104	463	126	432	2.0	6185640

Maxxam ID		EL9719	EL9720	EL9721	EL9721	EL9722	EL9723		
Sampling Date		2012/09/01	2012/09/01	2012/09/01	2012/09/01	2012/09/01	2012/09/01		
	UNITS	**P18-120901**	**P19-120901**	**P20-120901**	**P20-120901 Lab-Dup**	**P21-120901**	**P22-120901**	**RDL**	**QC Batch**
Total Metals by ICP									
Total Lead (Pb)	mg/kg	12400	3610	25.8	27.4	16.6	88.7	2.0	6185640

Maxxam ID		EL9724	EL9725	EL9726	EL9727	EL9728	EL9729		
Sampling Date		2012/09/01	2012/09/01	2012/09/01	2012/09/01	2012/09/01	2012/09/01		
	UNITS	**P23-120901**	**P24-120901**	**P25-120901**	**P26-120901**	**P27-120901**	**P28-120901**	**RDL**	**QC Batch**
Total Metals by ICP									
Total Lead (Pb)	mg/kg	3020	1070	2020	6.0	1740	<2.0	2.0	6185640

RDL = Reportable Detection Limit

QUALITY ASSURANCE REPORT

			Method Blank		RPD		QC Standard	
QC Batch	**Parameter**	**Date**	**Value**	**UNITS**	**Value (%)**	**QC Limits**	**% Recovery**	**QC Limits**
6185640	Total Lead (Pb)	2012/09/20	<2.0	mg/kg	5.9	35	95	80 - 120

N/A = Not Applicable

RPD = Relative Percent Difference

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

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Maxxam Job#: B282740

CHAIN OF CUSTODY RECORD

Page: 1 of 3

G 001653

Invoice To: Require Report? Yes ☒ No ☐

Company Name: SNC-LAVALIN ENVIRONMENT
Contact Name: TIM DROZDA
Address: 8648-commerce Court
Bby BC PC: V5A 4N6
Phone / Fax#: Ph: 604-515-5151 Fax: 604-515-5150
E-mail: tim.drozda@snclavalin.com

Report To:

Company Name: same as invoice
Contact Name:
Address:
PC:
Phone / Fax#: Ph: Fax:
E-mail

PO #:
Quotation #:
Project #: 131416-H012
Proj. Name: Pleasant Camp
Location: Pleasant Camp, BC
Sampled By: TIM DROZDA

REGULATORY REQUIREMENTS SERVICE REQUESTED:

☐ CSR
☐ CCME
☐ BC Water Quality
☐ Other
☐ DRINKING WATER

☒ Regular Turn Around Time (TAT)
(5 days for most tests)
☐ RUSH (Please contact the lab)
☐ 1 Day ☐ 2 Day ☐ 3 Day
Date Required:

Special Instructions:
Return Cooler ☐ **Ship Sample Bottles (please specify)** ☐
include: dave.bridger@snclavalin.com

ANALYSIS REQUESTED

	Sample Identification	Lab Identification	Sample Type	Date/Time Sampled	BTEX/VPH ☐ MTBE ☐	VOC/VPH ☐	EPH ☐ TEH ☐	PAH ☐ LEPH/HEPH ☐	CCME-PHC (Fractions 1-4 Plus BTEX)	CCME-PHC (Fractions 2-4)	CCME BTEX (Fraction 1 Plus BTEX)	PCB ☐	Phenols by 4AAP ☐ Phenols by GCMS ☐	TOG ☐ MOG ☐ SWOG ☐	Dissolved Metals Field Filtered? Y ☐ N ☐	Dissolved Metals Field Acidified? Y ☐ N ☐	Totals Metals Field Acidified? Y ☐ N ☐	Nitrate ☐ Nitrite ☐ Ammonia ☐	Chloride ☐ Fluoride ☐ Sulphate ☐	Total Suspended Solids-TSS ☐ TDS ☐	pH ☐ Conductivity ☐ Alkalinity ☐	BOD ☐	COD ☐	Coliform, Total & E.coli ☐ Fecal ☐	Asbestos ☐	Lead in paint chips						HOLD ☐
1	P1-120831	EL9674	Paint chips	12-08-31																						X						
2	P2-120831	EL9675																								X						
3	P3-120831	EL9676																								X						
4	P4-120831	EL9677																								X						
5	P5-120831	EL9678																								X						
6	P6-120831	EL9679																								X						
7	P7-120831	EL9680																								X						
8	P8-120831	EL9681																								X						
9	P9-120901	EL9682		12-09-01																						X						
10	P10-120901	EL9683																								X						
11	P11-120901	EL9684																								X						
12	P12-120901	EL9685																								X						

B282740

Samples are from a Drinking Water Source serving multiple households ☐ **YES**

Laboratory Use Only

*Relinquished by:	Date (YY/MM/DD):	Time:	Received by:	Date (YY/MM/DD):	Time:	Time Sensitive	Temperature on Receipt (°C)	Custody Seal Intact on Cooler?
	12/09/14	1500	ISAAC WANG	2012/09/14	18:00	☐	N/A	Yes ✓ No

*IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

COC-1020 (03/10)

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Maxxam

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CHAIN OF CUSTODY RECORD

Page: 2 of 3

G 001654

Maxxam Job#: B282740

Invoice To: Require Report? Yes ☒ No ☐

Company Name: SNC-LAVALIN ENVIRONMENT
Contact Name: TIM DROZDA
Address: 8648 - commerce Court
Bby, BC PC: V5A 4N6
Phone / Fax#: Ph: 604-515-5151 Fax: 604-515-5150
E-mail tim.drozda@snclavalin.com

Report To:

Company Name: same as invoice
Contact Name:
Address:
PC:
Phone / Fax#: Ph: Fax:
E-mail

PO #:
Quotation #:
Project #: 131416-H012
Proj. Name: Pleasant Camp
Location: Pleasant Camp, BC
Sampled By: TIM Drozda

REGULATORY REQUIREMENTS SERVICE REQUESTED:

- ☐ CSR
- ☐ CCME
- ☐ BC Water Quality
- ☐ Other
- ☐ DRINKING WATER

- ☒ Regular Turn Around Time (TAT) (5 days for most tests)
- ☐ RUSH (Please contact the lab)
- ☐ 1 Day ☐ 2 Day ☐ 3 Day
- Date Required:

Special Instructions:

Return Cooler ☐ **Ship Sample Bottles (please specify)** ☐

include: dave.bridger@snclavalin.com

ANALYSIS REQUESTED

	Sample Identification	Lab Identification	Sample Type	Date/Time Sampled	BTEX/VPH MTBE	VOC/VPH	EPH TEH	PAH LEPH/HEPH	CCME-PHC (Fractions 1-4 Plus BTEX)	CCME-PHC (Fractions 2-4)	CCME BTEX (Fraction 1 Plus BTEX)	PCB	Phenols by 4AAP Phenols by GCMS	TOG MOG SWOG	Dissolved Metals Field Filtered? Y N	Dissolved Metals Field Acidified? Y N	Totals Metals Field Acidified? Y N	Nitrate Nitrite Ammonia	Chloride Fluoride Sulphate	Total Suspended Solids-TSS TDS	pH Conductivity Alkalinity	BOD	COD	Coliform, Total & E.coli Fecal	Asbestos	Lead in paint chips						HOLD
1	P13-120901	EL9714	Paint chip	12-09-91																						X						
2	P14-120901	EL9715	↓	↓																						X						
3	P15-120901	EL9716																								X						
4	P16-120901	EL9717																								X						
5	P17-120901	EL9718																								X						
6	P18-120901	EL9719																								X						
7	P19-120901	EL9720																								X						
8	P20-120901	EL9721																								X						
9	P21-120901	EL9722																								X						
10	P22-120901	EL9723																								X						
11	P23-120901	EL9724																								X						
12	P24-120901	EL9725	↓	↓																						X						

Samples are from a Drinking Water Source serving multiple households ☐ YES

B282740

Laboratory Use Only

*Relinquished by:	Date (YY/MM/DD):	Time:	Received by:	Date (YY/MM/DD):	Time:	Time Sensitive	Temperature on Receipt (°C)	Custody Seal Intact on Cooler?
	12/09/14	1500	ISAAC WANG	2012/09/14	18:00	☐	N/A	Yes ☑ No ☐

*IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTO [illegible] N ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

COC-1020 (03/10)

Maxxam International Corporation o/a Maxxam Analytics

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CHAIN OF CUSTODY RECORD

Page: 3 of 3

G 021335

Maxxam Job#: B282740

Invoice To: Require Report? Yes ☒ No ☐

Company Name: SNC-LAVALIN ENVIRONMENT
Contact Name: TIM Drozda
Address: 8648-commerce court
Bby, BC PC: V5A 4N6
Phone / Fax#: Ph: 604-515-5151 Fax: 604-515-5150
E-mail tim.drozda@snclavalin.com

Report To:

Company Name: same as invoice
Contact Name:
Address:
PC:
Phone / Fax#: Ph: Fax:
E-mail

PO #:
Quotation #:
Project # : 131416-H012
Proj. Name: Pleasant Camp
Location: Pleasant Camp, BC
Sampled By: Tim Drozda

REGULATORY REQUIREMENTS SERVICE REQUESTED:

☐ CSR
☐ CCME
☐ BC Water Quality
☐ Other
☐ DRINKING WATER

☒ Regular Turn Around Time (TAT)
(5 days for most tests)
☐ RUSH (Please contact the lab)
☐ 1 Day ☐ 2 Day ☐ 3 Day
Date Required:

Special Instructions:
Return Cooler ☐ **Ship Sample Bottles (please specify)** ☐
include: dave.bridger

ANALYSIS REQUESTED

	Sample Identification	Lab Identification	Sample Type	Date/Time Sampled	BTEX/VPH ☐ MTBE ☐	VOC/VPH ☐	EPH ☐ TEH ☐	PAH ☐ LEPH/HEPH ☐	CCME-PHC (Fractions 1-4 Plus BTEX)	CCME-PHC (Fractions 2-4)	CCME BTEX (Fraction 1 Plus BTEX)	PCB ☐	Phenols by 4AAP ☐ Phenols by GCMS ☐	TOG ☐ MOG ☐ SWOG ☐	Dissolved Metals Field Filtered? Y ☐ N ☐	Dissolved Metals Field Acidified? Y ☐ N ☐	Total Metals Field Acidified? Y ☐ N ☐	Nitrate ☐ Nitrite ☐ Ammonia ☐	Chloride ☐ Fluoride ☐ Sulphate ☐	Total Suspended Solids-TSS ☐ TDS ☐	pH ☐ Conductivity ☐ Alkalinity ☐	BOD ☐	COD ☐	Coliform, Total & E.coli ☐ Fecal ☐	Asbestos ☐	lead in paint chips						HOLD ☐
1	P25-120901	EL9726	Paint chips	12-09-01																						X						
2	P26-120901	EL9727	↓	↓																						X						
3	P27-120901	EL9728																								X						
4	P28-120901	EL9729																								X						
5																																
6																																
7																																
8																																
9																																
10																																
11																																
12																																

B282740

Samples are from a Drinking Water Source? YES ☐ NO ☐
Does source supply multiple households? YES ☐ NO ☐

Laboratory Use Only

*Relinquished by:	Date (YY/MM/DD):	Time:	Received by:	Date (YY/MM/DD):	Time:	Time Sensitive	Temperature on Receipt (°C)	Custody Seal Intact on Cooler?
	12/09/14	1500	ISAAC WANG	2012/09/14	18:00	☐	N/A	Yes ✓ No

*IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

COC-1020 (05/10)

Maxxam International Corporation o/a Maxxam Analytics

APPENDIX C – HAZARDOUS MATERIALS ASSESSMENT REPORT

Golder Associates Ltd.

500 – 4260 Still Creek Drive
Burnaby, British Columbia, Canada V5C 6C6
Telephone 604 296-4200
Fax 604 298-5253

REPORT ON

HAZARDOUS MATERIALS ASSESSMENT
CANADA BORDER SERVICES AGENCY
PLEASANT CAMP PORT OF ENTRY
PLEASANT CAMP, BRITISH COLUMBIA

Submitted to:

Public Works and Government Services Canada
Environmental Services & Greening Government Operations
#641 - 800 Burrard Street
Vancouver, BC
V6Z 2V8

DISTRIBUTION:

3 Copies - Public Works and Government Services Canada
2 Copies - Golder Associates Ltd.

February 14, 2007 06-1437-024

EXECUTIVE SUMMARY

Golder Associates Ltd. was retained by Public Works and Government Services Canada (PWGSC) – Office of Greening Government Operations on behalf of the Canada Border Services Agency to conduct a non-destructive hazardous materials assessment of the buildings located at Pleasant Camp Port of Entry, in Pleasant Camp, British Columbia (Subject Buildings). The work also included a hazardous material storage facilities assessment.

The hazardous materials assessment focused on asbestos-containing materials and lead-based paints including a detailed inspection, sampling, and analysis of samples. The assessment also included a visual inspection for ozone depleting substances, elemental mercury, radioactive sensors and polychlorinated biphenyls (PCBs). An assessment of hazardous material storage facilities was carried out to assess current hazardous material storage and the need for storage cabinets, ventilation and spill containment to be implemented.

The following buildings were included in this assessment:

- Customs Office;
- Pump House;
- Maintenance Building;
- Garage – House #1 and House #2;
- Garage – House #3 and #4;
- Garage – Customs Office; and,
- House #1 through #5

Asbestos-Containing Materials

Asbestos-containing materials were identified as described below:

- Drywall joint compound in the Customs Office and House #3;
- Floor tiles in the basement of House #1, House #2 and House #4;

- Brown, stone patterned sheet flooring on the stair landing of House #2, House #3 and House #4;

- Brown, octagonal patterned sheet flooring in the kitchen, bathroom and front and rear mudrooms on the main floor of House #5;

- Grey mastic around utility service boxes and electrical connections on the exterior of House #1 through 4;

- Grey and white mastic around pipe penetrations on the exterior of House #5;

- Black mastics on the roofs of House #1 through 4 and the Garage for House #1 and 2;

- Black and grey mastic used to fill penetrations on the exterior of the Customs Office; and,

- Grey gasket material on the generators in the Generator Building.

With the exception of the Diesel Storage Building, all black mastics on the roofs of the Subject Buildings should be assumed to contain asbestos.

Fire door insulation was not able to be sampled during this assessment because sampling would cause damage to the fire doors. Therefore, all fire doors should be treated as asbestos-containing until additional sampling proves otherwise.

Based on the criteria established by PWGSC – Office of Greening Government Operations, in the document titled "*Evaluation and Recommendation Criteria for Control of Asbestos Containing Materials (ACM)*," Action 7 - Routine Surveillance should be instituted regarding the management of identified ACMs.

Based on the above-stated conclusions, recommendations regarding the management of identified asbestos-containing materials are summarized in the tables provided in Appendix V.

Prior to renovation or demolition work, identified ACM that may be impacted must be removed or protected from impact in accordance with the requirements of the Canada Labour Code and the Workers' Compensation Board of British Columbia. If suspect asbestos-containing materials are encountered, that were not identified in this assessment, they should be sampled to determine conclusively if the are asbestos-containing or not.

Asbestos-containing wastes should be disposed of in accordance with the requirements of the British Columbia Ministry of Environment and transported in accordance with the requirements of the federal Transportation of Dangerous Good Act and Regulations.

Lead-Based Paint

Lead-based paints were identified as described below:

- The black paint identified to be present on metal piping in the basement of the Customs Office;
- The white exterior and white interior trim paint in the Pump House;
- The green paint on the pumps in the Pump House;
- The orange and red paint identified on the metal garden house holder located on the exterior of House #3;
- The interior grey paint identified on the interior stairs and door sills, and the exterior white paint identified on the porch of House #5;
- The red paint identified on the exterior fire hose box of the Garage for House #1 and 2;
- The exterior black paint identified on the exterior door, window trim and garage door of the Garage for Customs Office;
- The interior green paint identified on the ceiling mounted heating unit and the interior red paint identified on the fire house box in the Maintenance Building;
- The interior orange, dark green, green and red paints identified on the generators and pumps in the Generator Building;
- If a colour of paint was determined to contain lead, all paints of a similar colour on similar substrates within a Subject Buildings is assumed to be lead-based;
- Lead-based paints that will be impacted through activities in a manner likely to cause airborne lead-containing dust, (i.e., through welding, torch cutting, grinding, sanding or sandblasting) should be controlled through the development and implementation of an Exposure Control Plan (ECP). The requirements for such a plan are provided in Part 5 of British Columbia Occupational Health and Safety Regulation 296/97, as amended by BC Reg. 312/2003, current to the date of the work; and,

- Waste materials containing lead-based paint should be tested for lead leachate potential to assist in disposing of lead-containing waste materials in accordance with the requirements of the Ministry of Environment and the Federal Transportation of Dangerous Good Act and Regulations, current to the date of the work.

Ozone-Depleting Substances

Equipment containing ozone-depleting substances were identified or suspected to contain ODS as follows:

- The domestic refrigerators in the kitchens of House #1 through 4 and the Customs Office;

- The domestic freezers in the basements of House #1 through 4 and Customs Office; and,

- A wall mounted air conditioning unit in Customs Office.

Handling and disposal of equipment containing ozone-depleting substances should be conducted in accordance with the British Columbia Regulation 387/99 – Ozone-Depleting Substances and Other Halocarbons Regulation, as amended by BC Regulation 321/2004, respecting the appropriate management of ozone-depleting substances within the province of British Columbia. Wastes containing ozone-depleting substances should be transported in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.

Mercury

Fluorescent light bulbs suspected to contain mercury vapour were identified throughout the Subject Buildings.

Seventeen (17) mercury-containing thermostats were identified in the Subject Buildings.

When taken out of service, mercury-containing equipment should be disposed of in accordance with the requirements of the British Columbia Ministry of Environment and transported in accordance with the requirements of the federal Transportation of Dangerous Goods Act and Regulations.

Polychlorinated Biphenyls

Two (2) fluorescent light ballast suspected to contain polychlorinated biphenyls were identified within the Subject Buildings. However, due to the limitations of the survey, not all fluorescent light ballasts could be inspected.

If identified to be PCB-containing, ballasts should be handled, stored, and disposed of in accordance with the requirements of the British Columbia Occupational Health and Safety Regulation 296/97, as amended, the Ministry of Environment and the Federal Transportation of Dangerous Good Act and Regulations, current to the date of the work.

Radioactive Materials

Twenty-four (24) smoke detectors containing radioactive materials were identified in the Subject Buildings.

When taken out of service, the radioactive materials should be removed in accordance with the requirements of the Atomic Energy Control Act (Atomic Energy Control Regulations), Workers' Compensation Board of British Columbia and the Canada Labour Code.

Radioactive waste should be disposed of in accordance with the requirements of the British Columbia Ministry of Environment and transported in accordance with the requirements of the federal Transportation of Dangerous Goods Act and Regulations.

Heating Oil Tanks

The heating oil storage tanks were generally observed to be free of pitting and perforations but some rust was observed. There were areas of corrosion noted on the tanks, particularly near the recent welds. Staining around the filler pipes was noted on many of the tanks.

The secondary containment systems observed appears to be adequately sized and constructed for the tanks. At the Generator Building, the volume of the secondary containment is compromised by storage of other materials within the containment.

Where corrosion is apparent on the heating oil tanks, particularly near the recent welds, painting with corrosion resistant paint should be considered.

Staining around the filler pipes was noted on many of the tanks and the tightness of the fittings should be inspected.

At the generator building, the additional materials stored inside the secondary containment should be removed to ensure the 110% capacity is maintained.

Other Hazardous Materials Storage

The only building where significant quantities of hazardous materials were stored was the Maintenance Building. A number of containers used were not clearly labelled or the previous labels were not removed or obliterated in accordance with WHMIS and TDG requirements.

Batteries were stored without secondary containment on an overloaded shelf in the maintenance building and without secondary containment in the generator building.

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LIST OF APPENDICES

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Public Works and Government Services Canada – Office of Greening Government Operations (PWGSC OGGO) on behalf of the Canada Border Services Agency (CBSA) to conduct a non-destructive hazardous materials assessment of the buildings located at Pleasant Camp Port of Entry, in Pleasant Camp, British Columbia (Subject Buildings). The work also included a hazardous material storage facilities was assessment in the Subject Buildings. The assessment was completed from September 18, 2006 to September 22, 2006, by Stephen Hone and Steven Penner.

2.0 ASSESSMENT SCOPE AND OBJECTIVES

The hazardous materials assessment focused on asbestos-containing materials (ACMs) and lead-based paints (LBPs) including a detailed inspection, sampling, and analysis of samples. The assessment also included a visual inspection for ozone depleting substances (ODS), elemental mercury (Hg), radioactive sensors (smoke detectors) and polychlorinated biphenyls (PCBs).

This assessment will assist the CBSA, in conjunction with PWGSC OGGO, in implementing the existing Asbestos Management Plan and establishing an inventory of hazardous building materials.

In addition, an assessment of hazardous material storage facilities was carried out in the Site Buildings, to assess current hazardous material storage and assess the need for storage cabinets, ventilation and spill containment to be implemented at the Site.

The following buildings were included in this assessment:

- Customs Office;
- Pump House;
- Maintenance Building;
- Garage – House #1 and House #2;
- Garage – House #3 and #4;
- Garage – Customs Office; and,
- House #1 through #5

3.0 ASSESSMENT CRITERIA

The hazardous materials assessment was completed to assist CBSA in its policy to remove friable asbestos prior to renovations and to minimize the potential exposure risk to building occupants and maintenances personnel, and to reduce long term maintenance cost.

Risk assessments were conducted on each asbestos-containing material confirmed to be present within the buildings. The risk assessment methodology was carried out in accordance with the criteria established by PWGSC OGGO in the document titled "*Evaluation and Recommendation Criteria for Control of Asbestos Containing Materials (ACM)*". A copy of this document is provided in Appendix I.

4.0 ASSESSMENT PROCESSES

The assessment was non-destructive in nature and included provisions of an inventory of hazardous materials identified within accessible areas of the Subject Buildings on a floor-by-floor and room-by-room basis. An area is defined as accessible if it is above a suspended ceiling tile, within an access hatch or behind a closed door, not impeded by any structure, article or item and did not negatively impact the operations of the facility. An area enclosed by cement block, plaster, solid lumber, etc., where demolition is required to gain entry, is considered inaccessible and was not included in this assessment.

Unless specifically noted the following areas were inaccessible or not part of the requested scope of work and were not surveyed:

- Roof and attic space in House #5 and the Customs Office;
- Wall, ceiling and floor spaces behind existing finishes; and,
- Concealed roofing and flooring materials.

5.0 ASSESSMENT METHODOLOGY

5.1 Asbestos-Containing Materials

The assessment included provisions of an inventory of ACMs identified within accessible areas of the Subject Buildings.

The systems to be reviewed for ACM assessment included:

- Structural – systems including fireproofing on beams, open and solid webbed joist systems, Q-deck and roof;
- Mechanical – systems insulation including hot water and steam system, condensate system, chilled water system, glycol system, domestic hot and cold water, emergency generator exhaust, boiler units, heat exchangers, reboiler units, asbestos cement piping, wall joint compound, asbestos sheet products; and,
- Architectural – systems including texture coats, sheet flooring, vinyl floor tile, acoustical spray-applied materials, condensation control applications, ceiling tile, boarding, drywall joint compound, asbestos sheet products.

A systematic sampling of identified suspect ACMs was conducted as part of the assessment. The bulk asbestos samples were submitted to International Asbestos Testing Laboratories (IATL) in Mt. Laurel, New Jersey for asbestos content analysis. IATL is accredited in accordance with the National Voluntary Laboratory Accreditation Program (NVLAP). IATL's NVLAP laboratory code is 101165-0.

5.2 Lead-Based Paints

A systematic sampling of identified suspect LBPs was conducted as part of the assessment. The paint samples were submitted to AGAT Laboratories in Mississauga, Ontario for lead content analysis using background-corrected Flame Atomic Absorption Spectrophotometry. AGAT is accredited by the Canadian Association of Environmental Analytical Laboratories (CAEAL). AGATs CAEAL laboratory number is 3200.

5.3 Other Hazardous Building Materials

During the investigation, the Subject Buildings were visually assessed for the potential presence of other hazardous building materials limited to PCBs in fluorescent light ballasts and transformers, mercury in thermostats and fluorescent light tubes, ozone-depleting substances in refrigerators and air conditioning units, and radioactive sensors in smoke detectors.

5.4 Air Sampling

As requested by PWGSC OGGO, Golder collected air samples to determine the concentration of fibres in air in Residence #3, where floor tiles have reportedly been damaged. Golder's CAEAL accredited laboratory provided qualified analysis of the samples following the National Institute of Occupational Safety and Health (NIOSH) Test Method 7400. Golder's CAEAL laboratory number is 3377.

5.5 Assessment of Hazardous Materials Storage Facilities

A visual assessment of current hazardous material storage facilities was carried out in the Subject Buildings, and recommendations to identifying necessary storage cabinets, ventilation and spill containment requirements was undertaken.

6.0 REGULATORY FRAMEWORK

6.1 Federal Legislation

In federal jurisdictions, hazardous building materials are regulated by Human Resources Development Canada (HRDC) under the Canada Labour Code, Part II. The requirements for the handling and control of hazardous substances in the workplace are detailed in the Canadian Occupational Health and Safety Regulations *"Part X, Hazardous Substances"*. Section 10.19 defines the limits of exposure to airborne chemical agents as the limits prescribed by the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs).

6.1.1 Lead-Based Paint

In April of 2005, Canada adopted the Surface Coating Material Regulations. This regulation replaces the Hazardous Products (Liquid Coating Materials) Regulations and provides a new standard for lead in paint. The lead content of new paints and other liquid coatings is restricted to 0.06% (by weight) or 600 parts per million (ppm) in most instances by the new regulation. However, as the Surface Coating Material Regulations is intended for new paint products, industry standard has been to use the United States Department of Housing and Urban Development (HUD) Guideline of 0.5% (by weight) or 5,000 ppm to classify applied paint products as lead-based paint or not. In keeping with industry standard, we have used the 5,000 ppm standard to classify paints assessed by this assessment.

6.1.2 Polychlorinated Biphenyls

PCBs are used as a dielectric fluid in electrical equipment such as fluorescent lamp ballasts and electrical transformers. The use of capacitors in fluorescent lamp ballasts was common up to 1980. The Federal Chlorobiphenyls Regulation, SOR/91-152 prohibits the use of PCBs in this electrical equipment installed after July 1, 1980. The Federal Chlorobiphenyls Regulation, SOR/92-507, outlines the handling, storage and disposal of PCBs and PCB-containing equipment.

6.1.3 Ozone-Depleting Substances

In 1994, the federal government filed the Ozone-Depleting Substances Regulations to amend controls on production and consumption of chlorofluorocarbons (CFC), halons, tetrachloride and methyl-chloroform. The Federal Halocarbon Regulations, effective July 1, 1999, was filed to ensure uniformity with respect to the release, recovery and recycling of ODS and their halocarbon alternatives in refrigeration and air conditioning.

Canadian Environmental Protection Act (1999), Ozone-Depleting Substances Regulations, 1998, controls the import, manufacture, use, sale, and export of ODS. The regulation also requires that permits be obtained to import or export used, recovered, recycled and reclaimed ODS.

6.1.4 Radioactive Materials

Radioactive materials are regulated under the Atomic Energy Control Act, under the *"Atomic Energy Control Regulations"*. These regulations provide guidance for the safe handling, storage and disposal of such materials.

6.1.5 Transportation of Dangerous Goods

The transportation of dangerous goods and waste dangerous goods is governed under the *"Transportation of Dangerous Goods"* (TDG) Act and Regulation which outline the requirements for containment, handling, and transportation of dangerous goods and waste dangerous goods.

6.1.6 Hazardous Material Storage Facilities

The storage of flammable and other reactive materials is governed by the National Fire Code (2005). The Fire Code refers to CAN-CSA B139 for Oil Burning Appliances for design and installation of fuel systems for oil fired heating furnaces.

General requirements for fuel storage tanks are provided in the CCME document, "Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products".

6.2 Provincial Regulations

In British Columbia, the management of hazardous materials in the workplace is regulated by the Workers' Compensation Board of British Columbia (WorkSafeBC) under the Workers' Compensation Act (effective April 15, 1998), as amended by the Workers' Compensation (Occupational Health and Safety) Amendment Act (effective October 1, 1999).

6.2.1 Hazardous and Non-Hazardous Wastes

In British Columbia, environmental matters pertaining to waste generally fall under the jurisdiction of the British Columbia Ministry of Environment (MoE), pursuant to the Environmental Management Act. The key waste regulation under the Environmental Management Act relating to hazardous building materials is the Hazardous Waste Regulation (HWR), BC Reg. 63/88, as amended.

The HWR, established by the British Columbia MoE, provides guidance for the proper handling, storage, transportation, treatment, recycling and disposal of hazardous wastes in the province. The regulation also outlines the materials and criteria to be used to characterize waste as hazardous.

6.2.2 Asbestos-Containing Materials

ACMs are regulated under Part 6 (sections 6.1 to 6.32) of British Columbia Occupational Health and Safety Regulation (BC Reg.) 296/97, as amended. Additionally, WorkSafeBC has published "*Safe Handling of Asbestos, A Manual of Standard Practices*". This manual outlines basic information on asbestos and asbestos products, health hazards requirements for worker protection, safe work procedures and principles that should be followed in selecting the most suitable technique for the safe abatement of ACM. This document provides a guide to current practices that are to be followed in the Province of British Columbia.

6.2.3 Lead-Based Paint

Lead is regulated under Part 6 (sections 6.59 to 6.69) of British Columbia Occupational Health and Safety Regulation (BC Reg.) 296/97, as amended. These sections of the regulation apply to any workplace where a worker is or may be exposed to potentially hazardous levels of inorganic lead.

6.2.4 Ozone-Depleting Substances

Provincial regulatory framework providing the requirements for the safe management, storage and disposal of ODSs is provided in British Columbia Regulation (BC Reg.) 387/99 – Ozone-Depleting Substances Regulation respecting the appropriate management of ODSs within the province of British Columbia. Schedule A in the regulation lists all ozone-depleting refrigerant types.

7.0 FACILITY BUILDINGS DESCRIPTION

The Subject Buildings consisted of residential houses with garages, a maintenance building, pump and tank sheds, and an office. Construction details were provided in the PWGSC OGGO document titled "*Draft Terms of Reference to Engage Consultant to Complete Hazardous Materials Assessment for Canada Border Services Agency Facility in Pleasant Camp, Yukon Territory,"* dated August 2006. On site information pertaining to the Subject Buildings was provided to Golder by Marinka Darling, Superintendent with the CBSA. The locations of the Subject Buildings included in this assessment are indicated on the Site Plan provided in Figure 1. A description of the Subject Buildings are provided in Table 1, below. Photographs of the Subject Buildings are provided in Appendix IV.

TABLE 1: Summary of Subject Buildings

Customs Office
Site Description: The Customs Office was built in 1957 (see Photograph 1 in Appendix IV). The building consists of three floors with approximately 202 square metres of office and administrative space. The building is a wood framed structure supported on concrete foundations with a full basement level. Interior finishes on the upper floors are painted drywall and wood panels, drywall and fibre ceiling tile ceilings and floor tiles. The exterior finishes consist mainly of vinyl siding and the roof is metal. The attic space contained fibreglass insulation. Golder was informed that the main floor of the building had undergone renovations. The building was occupied during the time of this assessment.
Pump House
Site Description: The Pump House was built in the mid 1970's (see Photograph 2 in Appendix IV). The Pump House consists of a one-storey, wood frame structure supported on a concrete foundation and is approximately 5.2 square metres in size. Interior finishes are painted drywall with a concrete floor. The exterior finishes consist mainly of aluminium siding and the roof is metal. The Pump House was unoccupied during the time of this assessment.
Residences – House #1 - #4
Site Description: The four residences were constructed in 1979 (see Photographs 3 through 6 in Appendix IV). Each residence consists of full or partially finished basements with an upper main floor and is approximately 224 square metres in size. Each residence is similar in construction and finishing. The buildings are wood framed on concrete foundations. Interior finishes are painted and unfinished drywall and wood panels, drywall ceilings and the floors are sheet flooring, vinyl tiles and laminate. The exterior finishes consist mainly of aluminium siding and the roof is metal. The attic space was observed to contain fibreglass insulation. The residences were reportedly pre-fabricated structures, assembled from two sections on site. Additionally the original flooring materials were reported to have been replaced in various areas of the buildings.

House #1, #2, and #4 four were occupied and House #3 was unoccupied at the time of this assessment.

Residence – House #5

Site Description: House #5 was constructed in 1958 (see Photograph 7 in Appendix IV). The residence consists of a partially finished basement with two upper floors and is approximately 214 square metres in size. The building is a wood framed structure on a concrete foundation. Interior finishes consisted of painted plaster walls and ceilings and the floors are sheet flooring, vinyl tiles and wood. The exterior finishes consist mainly of vinyl siding. The roof is metal with a steep pitch. The attic and roofs were inaccessible at the time of this assessment.

This residence was reportedly the former customs office.

The residence was occupied at the time of this assessment.

Garages

Site Description: The two garages used by the residences, were built in 1979 (see Photographs 8 and 9 in Appendix IV). The garages are one storey structures with approximately 45 square metres of storage space each. The buildings are wood framed structures supported on concrete foundations. Interior finishes consist mainly of unfinished drywall, exposed wood framing and with concrete floors. The exterior is mainly metal siding, and the roof is metal.

The Office Garage was built in 1958 (see Photograph 10 in Appendix IV). The garage is a one storey structure with approximately 39 square metres of storage space. The building is a wood framed structure supported on a concrete foundation. Interior finishes consist mainly of unfinished drywall and exposed wood framing and the floors are concrete. The exterior consists mainly of vinyl siding, and the roof is metal.

Maintenance Building

Site Description: The Maintenance Building was built in 1982 (see Photograph 11 in Appendix IV). The building is a one storey structure with approximately 177 square metres of storage space. The building is a wood framed structure supported on concrete foundations. Interior finishes consist mainly of painted drywall walls and ceilings and the floor is concrete. The exterior is mainly vinyl siding and the roof is metal. The attic space was observed to contain fibreglass insulation.

The maintenance building was unoccupied at the time of the assessment.

Generator Building

Site Description: The Generator Building was built in 1970 (see Photograph 12 in Appendix IV). The building is a one storey structure with approximately 61 square metres of space. The building is a wood framed structure supported on concrete foundations. Interior finishes consist mainly of painted drywall and exposed fibreglass insulation and the floors are concrete. The exterior is mainly vinyl siding and the roof is metal.

The Generator Building was unoccupied at the time of the assessment.

Diesel Storage Building

Site Description: The Diesel Storage Building was built in 1999 (see Photograph 13 in Appendix IV). The building is a one storey structure with approximately 31 square metres of space. The building is a wood framed structure supported on concrete foundations. Interior finishes consist of mainly exposed wood framing. The building has a metal roof.

The Diesel Storage Building was unoccupied at the time of the assessment.

8.0 HAZARDOUS MATERIALS - INVESTIGATION RESULTS AND DISCUSSION

Based on the scope of work and limitations of this assessment, the following sub-sections provide the findings of the investigation for hazardous building materials, with appropriate discussion on a building by building basis. Results of asbestos bulk sample analysis are provided in Appendix II Results of paint sample analysis is provided in Appendix III. Drawings indicating the approximate sample point locations are provided on Figures 2 through 22. Representative photographs of ACMs are provided in Appendix IV.

Based on sampling results and the site observations, each identified ACM was assessed and evaluated according to the action matrix provided in the PGGSC OGGO document titled "*Evaluation and Recommendation Criteria for Control of Asbestos Containing Materials (ACM).*" A copy of the assessment, evaluations and recommended action for each identified ACM based on this criteria is provided in Appendix V.

The following materials were identified as suspected to contain asbestos but were unable to be sampled due to the limitations of the assessment.

- Fire door insulation.

8.1 Customs Office

8.1.1 Asbestos-Containing Materials

A total of twenty-one (21) suspect asbestos-containing building material samples were collected from the Customs Office. A summary of analytical sample results for the suspect ACMs are presented in Table 2. Drawings indicating the approximate sample point locations are provided on Figures 2 through 4.

TABLE 2: Results of Asbestos Bulk Sample Analysis – Customs Office

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
CO-A1	Green Sheet Flooring, Kitchen	None Detected
CO-A2	White, 0.3 m (1 ft) Ceiling Tile, Washroom	None Detected
CO-A3	Drywall Joint Compound, Office	None Detected
CO-A4	Black Baseboard, Washroom	None Detected
CO-A5	Drywall Joint Compound, Stairwell	None Detected
CO-A6	Black Stair Tread	None Detected
CO-A7	0.2 m (9 in.) Pink w/White Streaks Floor Tile, 2nd Floor	None Detected
CO-A8	Drywall Joint Compound, 2nd Floor	Yes, Chrysotile (2.4%)
CO-A9	Fabric Board, Crawlspace, 2nd Floor	None Detected
CO-A10	Drywall Joint Compound, 2nd Floor	None Detected
CO-A11	Drywall Joint Compound, 2nd Floor	None Detected
CO-A12	Fire Stop at Pipe Penetration, Basement	None Detected
CO-A13	Drywall Joint Compound, Basement	None Detected
CO-A14	White Mastic, Pipe Penetration, Basement	None Detected
CO-A15	Drywall Joint Compound, Stairwell, Basement	None Detected
CO-A16	Filler, Pipe Penetration	None Detected
CO-A17	Black Filler, Exterior	Yes, Chrysotile (25%)
CO-A18	White Window Sealant, Exterior	None Detected
CO-A19	White Window Sealant, Exterior	None Detected
CO-A20	Grey Penetration Compound, Exterior	Yes, Chrysotile (20%)
CO-A21	Grey Putty Around Utility Connection	None Detected

Seven (7) drywall joint compound samples were collected in the building. Samples CO-A3, CO-A5, CO-A10, CO-A11, CO-A13 and CO-A15 were all determined not to contain asbestos. However, Sample CO-A8 was determined to contain 2.4% chrysotile asbestos. Based on our findings, all drywall joint compound found within the Customs Office Building should be treated as asbestos containing until further investigation and additional sampling determines otherwise.

A black mastic was observed to be used to fill a penetration through the exterior siding of the building. A sample of this material was collected (Sample CO-A18) and was determined to contain 25% chrysotile asbestos.

A grey mastic was observed to be used to fill a penetration through the exterior siding of the building. A sample of this material was collected (Sample CO-A20) and was determined to contain 20% chrysotile asbestos.

Based on samples collected from the other Subject Buildings, all black mastics on the roof of the Customs Office, should be assumed to contain asbestos.

Based on the limitations of this assessment, no other ACMs were identified within the Customs Office.

8.1.2 Lead-Based Paint

A total of seventeen (17) paint samples were collected from typical finished interior and exterior surfaces of the Customs Office and were submitted for lead content analysis. A summary of the analytical results for the analysis is presented in Table 3. Drawings indicating the approximate sample point locations are provided on Figures 2 through 4.

TABLE 3: Results of Lead-Based Paint Sample Analysis – Customs Office

Sample ID	Location Description	Colour	Results (%)^1	Classified as Lead-Based Paint$^{(2)}$
CO-L1	Interior - Stairs	Varnish	0.01	No
CO-L2	Interior – Baseboard and Trim	Varnish	<0.01	No
CO-L3	Interior – Doors & Trim	White	0.04	No
CO-L4	Interior – Fire Equipment	Red	<0.01	No
CO-L5	Interior – Office Walls	Cream	0.08	No
CO-L6	Interior – Stairwell Walls	Cream	0.02	No
CO-L7	Interior – Back of Crawlspace Access	Cream	0.03	No
CO-L8	Interior – Stair Railing	Cream/Grey/Green	0.04	No
CO-L9	Interior – Window Trim	White	<0.01	No
CO-L10	Interior - Piping	Black	1.53	Yes
CO-L11	Interior Basement – Stair Railing	White	0.02	No
CO-L12	Interior Basement- Stairs	Grey	0.13	No
CO-L13	Interior Basement - Floor	Grey	0.01	No
CO-L14	Interior Basement - Wall	White	<0.01	No
CO-L15	Interior – Storage Tank	Grey	0.03	No
CO-L16	Exterior – Stair Railing	Black	<0.01	No
CO-L17	Exterior – Trim, Facia and Columns	Black	0.01	No

Notes: (1) % – percent by weight
(2) Paint with more than 0.5% by weight of lead is classified as lead-based paint

The black paint identified to be present on metal piping in the basement is considered to be lead-based.

If a colour of paint was determined to contain lead, all paints of a similar colour on similar substrates within the Customs Office should be assumed to contain lead. The lead-based paints identified were found to be in good condition at the time of this assessment.

Based on the limitations of this assessment, no other lead-based paints were identified within the Customs Office.

8.1.3 Ozone-Depleting Substances

Equipment suspected to contain ozone-depleting substances were identified within the Customs Office. A summary of the identified equipment is presented in Table 4, below. The type of refrigerant identified on labels of the equipment was noted and compared to the list of ozone-depleting substances in Schedule A of the BC Reg. 387/99 – Ozone-Depleting Substances and Other Halocarbons Regulation (Ozone Regulation), as amended by BC Reg. 321/2004.

According to the Ozone Regulation, a substance is considered to be ozone-depleting if it is listed as Class I or Class II in Schedule A of the regulation. Substances listed as Class III in Schedule A of the regulation are considered to be other halocarbons.

TABLE 4: Ozone-Depleting Substances – Customs Office

Equipment	Quantity	Location	Refrigerant Type	Class	Classified as Ozone-Depleting
Domestic Refrigerator	1	Kitchen	R12	I	Yes
Wall Mounted Air Conditioner	1	Front Office/ Reception	R12	I	Yes
Domestic Water Cooler	1	Kitchen	R134A	III	No

The refrigerant in the domestic refrigerator and the air conditioning unit were determined to contain ozone-depleting substances. The domestic waster cooler was determined not to contain ozone-depleting substances.

8.1.4 Mercury

Fluorescent lighting was observed within the Customs Office. Fluorescent lighting tubes are presumed to contain elemental mercury vapour. One mercury-containing thermostat were identified within the Customs Office.

8.1.5 Polychlorinated Biphenyls

Eleven (11) fluorescent light ballasts were identified within the Customs Office. Random ballasts were inspected to determine whether or not they contained PCBs. The serial numbers on the labels of the light ballasts were noted and compared to the publication entitled *"Identification of Lamp Ballasts Containing PCBs"* revised August 1991.

A summary of the ballasts identified is shown below in Table 5.

TABLE 5: Fluorescent Light Ballasts – Customs Office

Ballast Manufacturer	Serial Number	Date Stamp	PCB Content
Sola Select	570-302SX	C89	None

The light ballast Sola Select ballast inspected in the Customs Office was identified not to contain PCBs. However, due to the limitations of the survey, not all of the fluorescent light ballasts could be inspected.

8.1.6 Radioactive Materials

Four smoke detectors containing radioactive materials were identified within the Customs Office.

8.1.7 Hazardous Materials Storage

Heating Oil Tank

A 1,200 litre heating oil tank was located in the basement of the Customs Office. The tank was a single walled steel tank of unknown age. The tank was painted and free of observed pitting and perforations. A geomembrane was used to create secondary containment around the base of the tank with a capacity of about 130% of the tank. Minor fuel staining was observed around the fill pipe although the cause of the staining was not evident.

Other Hazardous Materials Storage

On the second floor of the building cleaning supplies were observed including detergents, floor wax, and bleach, paints and other small quantities of consumer commodities. In the basement, four 20 litre pails were observed to be marked only with "W-20".

8.2 Pump House

8.2.1 Asbestos-Containing Materials

A total of five (5) suspect asbestos-containing building material samples were collected from the Pump House. A summary of analytical sample results for the suspect ACMs are presented in Table 6. A drawing indicating the approximate sample point locations is provided on Figures 5.

TABLE 6: Results of Asbestos Bulk Sample Analysis – Pump House

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
PH-A1	Grey Weather Stripping, Garage Door	None Detected
PH-A2	Cloth Weather Stripping, Garage Door	None Detected
PH-A3	Exterior Window Putty	None Detected
PH-A4	Interior Window Putty	None Detected
PH-A5	Putty Around Door Frame	None Detected

Based on samples collected from the other Subject Buildings, all black mastics on the roof of the Pump House, should be assumed to contain asbestos.

8.2.2 Lead-Based Paint

A total of six (6) paint samples were collected from typical finished interior and exterior surfaces of the Pump House and were submitted for lead content analysis. A summary of the analytical results for the analysis is presented in Table 7. A drawing indicating the approximate sample point locations is provided on Figures 5.

TABLE 7: Results of Lead-Based Paint Sample Analysis – Pump House

Sample ID	Location Description	Colour	Results (%)^1	Classified as Lead-Based Paint$^{(2)}$
PH-L1	Pressure Tank	Blue	<0.01	No
PH-L2	Exterior	White	0.61	Yes
PH-L3	Pump	Green	2.20	Yes
PH-L4	Interior Walls and Floor	Grey	0.12	No
PH-L5	Interior Trim	White	0.57	Yes
PH-L6	Interior Walls	White	0.31	No

Notes: (1) % – percent by weight
(2) Paint with more than 0.5% by weight of lead is classified as lead-based paint

The white exterior and white interior trim paint was identified to be lead-based. The Green paint on the pumps was identified to be lead-based

If a colour of paint was determined to contain lead, all paints of a similar colour on similar substrates within the Pump House are assumed to contain lead. The lead-based paints identified were found to be in good condition at the time of this assessment.

Based on the limitations of this assessment, no other lead-based paints were identified within the Customs Office.

8.2.3 Ozone-Depleting Substances

Equipment suspected to contain ozone-depleting substances was not identified within the Pump House.

8.2.4 Mercury

Fluorescent lighting was not identified within the Pump House. No mercury-containing thermostats were identified in the Pump House.

8.2.5 Polychlorinated Biphenyls

No fluorescent light ballasts were identified within the Pump House.

8.2.6 Radioactive Materials

No smoke detectors containing radioactive materials were identified within the Pump House.

8.2.7 Hazardous Materials Storage

There were no hazardous materials observed stored in the pump house.

8.3 Residence – House #1

8.3.1 Asbestos-Containing Materials

A total of thirty-four (34) suspect asbestos-containing building material samples were collected from House #1. A summary of analytical sample results for the suspect ACMs are presented in Table 8. Drawings indicating the approximate sample point locations are provided on Figures 6 and 7.

TABLE 8: Results of Asbestos Bulk Sample Analysis – House #1

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
RES1-A1	Ceiling Texture Coat, Living Room	None Detected
RES1-A2	Drywall Joint Compound, Living Room	None Detected
RES1-A3	Drywall Joint Compound, Living Room	None Detected
RES1-A4	Ceiling Texture Coat, Kitchen	None Detected
RES1-A5	Drywall Joint Compound, Kitchen	None Detected
RES1-A6	Drywall Joint Compound, Hallway Closet	None Detected
RES1-A7	White/Blue Square Patter Sheet flooring, Bathroom	None Detected
RES1-A8	Concealed Beige Sheet flooring, Under (RES1-A7)	None Detected
RES1-A9	Ceiling Texture Coat, Bedroom	None Detected
RES1-A10	Drywall Joint Compound, Hallway Closet	None Detected
RES1-A11	Drywall Joint Compound, Bedroom Closet	None Detected
RES1-A12	Drywall Joint Compound, Ensuite Bathroom	None Detected
RES1-A13	Drywall Joint Compound, Bedroom Closet	None Detected
RES1-A14	Pipe Elbow Insulation	None Detected
RES1-A15	Pipe Run Insulation	None Detected
RES1-A16	Drywall Joint Compound, Basement	None Detected

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
RES1-A17	Drywall Joint Compound, Basement	None Detected
RES1-A18	Drywall Joint Compound, Basement	None Detected
RES1-A19	Drywall Joint Compound, Basement	None Detected
RES1-A20	30 cm (12 inch) Beige w/Brown & White Streaks Floor Tile, Basement	Yes, Chrysotile (2.1%)
RES1-A21	Pipe Elbow Insulation, Basement	None Detected
RES1-A22	Brown Duct Tape, Basement	None Detected
RES1-A23	Drywall Joint Compound, Basement	None Detected
RES1-A24	Black Flashing Mastic, Roof	Yes, Chrysotile (1.8%)
RES1-A25	Black Flashing Mastic, Roof	None Detected
RES1-A26	White Flashing Mastic, Roof	None Detected
RES1-A27	Black Flashing Mastic, Roof Vents	Yes, Chrysotile (4.4%)
RES1-A28	White Window Sealant, Exterior	None Detected
RES1-A29	White Mastic, Electrical Connection, Exterior	None Detected
RES1-A30	Grey Mastic, Electrical Connection, Exterior	Yes, Chrysotile (20%)
RES1-A31	White Mastic Around Vent, Exterior	None Detected
RES1-A32	White Mastic Around Pipe Penetrations, Exterior	None Detected
RES1-A33	Pipe Thread Sealant, Exterior	None Detected
RES1-A34	Black Tar Paper, Exterior	None Detected

Beige with brown and white streaks, 0.3 metres (12 inch) floor tiles were observed throughout the basement (see Photograph 14 in Appendix IV). A sample of this material was collected (Sample RES1-A20) and was identified to contain 2.1% chrysotile asbestos.

Black flashing mastic was observed around the perimeter of the roof between the roof and the exterior facia (see Photograph 15 in Appendix IV). A sample of this material was collected (Sample RES1-A24) and was identified to contain 1.8% chrysotile asbestos.

In various locations on the roof, previous vent opening were covered with an impermeable membrane (see Photograph 15 in Appendix IV). Around the perimeter of the membrane was a black mastic material. A sample of this material was collected (Sample RES1-A27) and was identified to contain 4.4% chrysotile asbestos.

Grey mastic was observed around an electrical services connection on the exterior of the building (see Photograph 16 in Appendix IV). A sample of this material was collected (Sample RES1-A30) and was identified to contain 20% chrysotile asbestos.

Based on the limitations of this assessment, no other ACMs were identified within House #1.

8.3.2 Lead-Based Paint

A total of fourteen (14) paint samples were collected from typical finished interior and exterior surfaces of House #1 and were submitted for lead content analysis. A summary of the analytical results for the analysis is presented in Table 9. Drawings indicating the approximate sample point locations are provided on Figures 6 and 7.

TABLE 9: Results of Lead-Based Paint Sample Analysis – House #1

Sample ID	Location Description	Colour	Results (%)[1]	Classified as Lead-Based Paint(2)
RES1-L1	Interior Walls	Cream	0.01	No
RES1-L2	Interior Walls	White	<0.01	No
RES1-L3	Interior Walls & Trim	Cream	<0.01	No
RES1-L4	Interior Wall, Bathroom	Cream	<0.01	No
RES1-L5	Window Trims	White	<0.01	No
RES1-L6	Interior Walls, Basement	White	<0.01	No
RES1-L7	Door and Trim Paint	Purple	0.16	No
RES1-L8	Fuel Tank	Grey	0.08	No
RES1-L9	Picnic Table, Basement	Varnish	<0.01	No
RES1-L10	Exterior, Stair/railing and Facia	Brown	0.44	No
RES1-L11	Exterior, Metal Panel by Back Door	Purple	<0.01	No
RES1-L12	Exterior, Aluminium Siding and Roof Paint	White	<0.01	No
RES1-L13	Exterior, Railing Paint	Black/Red	<0.01	No
RES1-L14	Exterior, Window Trim	Brown	0.11	No

Notes: (1) % – percent by weight
(2) Paint with more than 0.5% by weight of lead is classified as lead-based paint

Based on the limitations of this assessment, no lead-based paints were identified within House #1.

8.3.3 Ozone-Depleting Substances

Equipment suspected to contain ozone-depleting substances were identified within House #1. A summary of the identified equipment is presented in Table 10, below. The type of refrigerant identified on labels of the equipment was noted and compared to the list of ozone-depleting substances in Schedule A of the BC Reg. 387/99 – Ozone-Depleting Substances and Other Halocarbons Regulation (Ozone Regulation), as amended by BC Reg. 321/2004.

According to the Ozone Regulation, a substance is considered to be ozone-depleting if it is listed as Class I or Class II in Schedule A of the regulation. Substances listed as Class III in Schedule A of the regulation are considered to be other halocarbons.

TABLE 10: Ozone-Depleting Substances – House #1

Equipment	Quantity	Location	Refrigerant Type	Class	Classified as Ozone-Depleting
Domestic Refrigerator	1	Kitchen	R12	I	Yes
Domestic Freezer	2	Basement	Unknown	N/A	Suspect
Domestic Water Cooler	1	Kitchen	R134A	III	No

The refrigerant in the domestic refrigerator was determined to contain ozone-depleting substances. Due to limited access, the refrigerant in the two domestic freezers located in the basement could not be identified and are therefore suspected to contain ozone-depleting substances until further investigation proves otherwise. The domestic waster cooler was determined not to contain ozone-depleting substances.

8.3.4 Mercury

Fluorescent lighting was observed within House #1. Fluorescent lighting tubes are presumed to contain elemental mercury vapour. Two mercury-containing thermostats were identified within House #1.

8.3.5 Polychlorinated Biphenyls

Two (2) fluorescent light ballasts were identified within House #1. Random ballasts were inspected to determine whether or not they contained PCBs. The serial numbers on the labels of the light ballasts were noted and compared to the publication entitled *"Identification of Lamp Ballasts Containing PCBs"* revised August 1991.

A summary of the ballasts inspected is shown below in Table 11.

TABLE 11: Fluorescent Light Ballasts – House #1

Ballast Manufacturer	Serial Number	Date Stamp	PCB Content
Phillips	MB 2X40/120RS	Labelled No PCBs	None

The Phillips light ballast inspected was identified not to contain PCBs. However, due to the limitations of the survey, all fluorescent light ballasts could not be inspected.

8.3.6 Radioactive Materials

Five (5) smoke detectors containing radioactive materials were identified within House #1.

8.3.7 Hazardous Materials Storage

Heating Oil Tank

A 1,360 litre heating oil tank is located in the basement of House #1. The tank was a single walled steel tank installed in 1979. The tank was partially painted and some corrosion is evident where paint is missing. A geomembrane was used to create secondary containment around the base of the tank with a capacity of about 110% of the tank. The tank is filled from the large diesel storage tank and has an automatic fill shut-off at 7/8 full. Fuel staining was noted around the fill pipe and may be associated with imperfect fitting seals. There was no fuel observed in the secondary containment at the base of the tank.

Other Hazardous Materials Storage

There were no other hazardous materials observed in storage at House #1 although it is expected that typical cleaning supplies are used by the residents.

8.4 Residence – House #2

8.4.1 Asbestos-Containing Materials

A total of thirty (30) suspect asbestos-containing building material samples were collected from House #2. A summary of analytical sample results for the suspect ACMs are presented in Table 12. Drawings indicating the approximate sample point locations are provided on Figures 8 and 9.

TABLE 12: Results of Asbestos Bulk Sample Analysis – House #2

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
RES2-A1	Drywall Joint Compound, Living Room	None Detected
RES2-A2	Ceiling Texture Coat, Kitchen	None Detected
RES2-A3	Drywall Joint Compound, Hallway Closet	None Detected
RES2-A4	Ceiling Texture Coat, Bathroom	None Detected
RES2-A5	Drywall Joint Compound, Bedroom Closet	None Detected
RES2-A6	Drywall Joint Compound, Bedroom Closet	None Detected
RES2-A7	Drywall Joint Compound, Bedroom Closet	None Detected
RES2-A8	White/Blue Square Pattern Sheet Flooring, Bathroom	None Detected
RES2-A9	Concealed Beige Sheet Flooring, Bathroom, Under (Sample RES2-A8)	None Detected
RES2-A10	Brown Stone Pattern Sheet Flooring, Stair Landing	Yes, Chrysotile (20%)
RES2-A11	Concealed Beige Sheet flooring, Ensuite	None Detected
RES2-A12	30 cm (12”) Beige w/Brown & White Streaks Floor Tile, Basement	Yes, Chrysotile (3.8%)
RES2-A13	Pipe Elbow Insulation, Basement	None Detected
RES2-A14	Pipe Elbow Insulation, Basement	None Detected
RES2-A15	Splash Guard, Behind Freezer, Basement	None Detected
RES2-A16	Drywall Joint Compound, Basement	None Detected
RES2-A17	Drywall Joint Compound, Basement	None Detected
RES2-A18	Drywall Joint Compound, Basement	None Detected
RES2-A19	Drywall Joint Compound, Basement	None Detected
RES2-A20	Drywall Joint Compound, Basement	None Detected
RES2-A21	Black Mastic, Roof Perimeter	Yes, Chrysotile (1.6%)

Sample ID	**Location Description / Material Description**	**Asbestos Detected, Type, (%)**
RES2-A22	Black Mastic, Peak & Repaired Areas	None Detected
RES2-A23	White Roof Mastic	None Detected
RES2-A24	White Window Sealant, Exterior	None Detected
RES2-A25	Dark Grey Mastic, Utility Box, Exterior	Yes, Chrysotile (55%)
RES2-A26	White Mastic, Utility Box, Exterior	None Detected
RES2-A27	Black Tar Paper, Exterior	None Detected
RES2-A28	White Mastic Around Vents, Exterior	None Detected
RES2-A29	White Mastic, Pipe Penetrations, Exterior	None Detected
RES2-A30	Pipe Thread Sealant, Exterior	None Detected

Brown, stone patterned, sheet flooring was observed on the stair landing (see Photograph 17 in Appendix IV). A sample of this material was collected (Sample RES2-A10) and was identified to contain 20% chrysotile asbestos.

Beige with brown and white streaks, 0.3 metre (12 inch) floor tiles were observed throughout the basement (see Photograph 14 in Appendix IV). A sample of this material was collected (Sample RES2-A12) and was identified to contain 3.8% chrysotile asbestos.

Black flashing mastic was observed around the perimeter of the roof between the roof and the exterior facia (see Photograph 15 in Appendix IV). A sample of this material was collected (Sample RES2-A21) and was identified to contain 1.6% chrysotile asbestos. Therefore all black mastics on the roof should be assumed to contain asbestos.

Dark grey mastic was observed around a utility box on the exterior of the building. A sample of this material was collected (Sample RES2-A25) and was identified to contain 20% chrysotile asbestos.

8.4.2 Lead-Based Paint

A total of eight (8) paint samples were collected from typical finished interior and exterior surfaces of the Subject Building and were submitted for lead content analysis. A summary of the analytical results for the analysis is presented in Table 13. Drawings indicating the approximate sample point locations are provided on Figures 8 and 9.

TABLE 13: Results of Lead-Based Paint Sample Analysis – House #2

Sample ID	Location Description	Colour	Results (ppm)[1]	Classified as Lead-Based Paint(2)
RES2-L1	Interior Walls	Cream/White	0.02	No
RES2-L2	Interior Trim	White	0.03	No
RES2-L3	Interior Doors and Frames, Basement	Orange	0.14	No
RES2-L4	Interior Walls	White	<0.01	No
RES2-L5	Exterior, Railing/Stairs and Facia	Brown	0.23	No
RES2-L6	Exterior Siding	White	<0.01	No
RES2-L7	Exterior, Metal Panel By Back Door	Orange	<0.01	No
RES2-L8	Exterior, Railing	Black/Red	0.07	No

Notes: (1) % – percent by weight
(2) Paint with more than 0.5% by weight of lead is classified as lead-based paint

Based on the limitations of this assessment, no lead-based paints were identified within House #2.

8.4.3 Ozone-Depleting Substances

Equipment suspected to contain ozone-depleting substances were identified within House #2. A summary of the identified equipment is presented in Table 14, below. The type of refrigerant identified on labels of the equipment was noted and compared to the list of ozone-depleting substances in Schedule A of the BC Reg. 387/99 – Ozone-Depleting Substances and Other Halocarbons Regulation (Ozone Regulation), as amended by BC Reg. 321/2004.

According to the Ozone Regulation, a substance is considered to be ozone-depleting if it is listed as Class I or Class II in Schedule A of the regulation. Substances listed as Class III in Schedule A of the regulation are considered to be other halocarbons.

TABLE 14: Ozone-Depleting Substances – House #2

Equipment	Quantity	Location	Refrigerant Type	Class	Classified as Ozone-Depleting
Domestic Refrigerator	1	Kitchen	R12	I	Yes
Domestic Freezer	2	Basement	R12	I	Yes
Domestic Water Cooler	1	Kitchen	R134A	III	No

The refrigerant in the domestic refrigerator and freezers were determined to contain ozone-depleting substances. The domestic waster cooler was determined not to contain ozone-depleting substances.

8.4.4 Mercury

Fluorescent lighting was observed within House #2. Fluorescent lighting tubes are presumed to contain elemental mercury vapour. Two (2) mercury-containing thermostats were also identified.

8.4.5 Polychlorinated Biphenyls

Twelve (12) Fluorescent light ballasts were identified within House #2. However, due to the limitations of the survey, all fluorescent light ballasts could not be inspected. Golder was informed that all fluorescent lamp ballasts were recently replaced or installed by the occupants. Therefore, no PCB-containing fluorescent light ballasts are anticipated to be present within House #2.

8.4.6 Radioactive Materials

Five (5) smoke detectors containing radioactive materials were identified within House #2.

8.4.7 Hazardous Materials Storage

Heating Oil Tank

A 1,360 litre heating oil tank is located in the basement of House #2. The tank was a single walled steel tank installed in 1979. The tank was mostly painted and some corrosion was evident where paint was missing, particularly on the end where a fitting weld was not painted. A geomembrane was used to create secondary containment around the base of the tank with a capacity of about 110% of the tank. The tank is filled from the large diesel storage tank and has an automatic fill shut-off at 7/8 full. Fuel staining was observed around the fill pipe and may be associated with imperfect fitting seals. There was no fuel observed in the secondary containment at the base of the tank.

Other Hazardous Materials Storage

There were no other hazardous materials observed in storage at House #2 although it is expected that typical cleaning supplies are used by the residents.

8.5 Residence – House #3

8.5.1 Asbestos-Containing Materials

A total of thirty-four (34) suspect asbestos-containing building material samples were collected from House #3. A summary of analytical sample results for the suspect ACMs are presented in Table 15. Drawings indicating the approximate sample point locations are provided on Figures 10 and 11.

TABLE 15: Results of Asbestos Bulk Sample Analysis – House #3

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
RES3-A1	Drywall Joint Compound, Bedroom Closet	Yes, Crysotile (0.75%)
RES3-A2	Ceiling Texture Coat, Kitchen	None Detected
RES3-A3	Ceiling Texture Coat, Ensuite	None Detected
RES3-A4	Drywall Joint Compound, Bedroom Closet	None Detected
RES3-A5	Drywall Joint Compound, Bedroom Closet	None Detected
RES3-A6	Drywall Joint Compound, Hallway Closet	None Detected
RES3-A7	Drywall Joint Compound, Living Room	None Detected
RES3-A8	Beige Sheet Flooring, Bathroom, Under RES3-A9	None Detected
RES3-A9	White & Blue Square Pattern Sheet Flooring, Bathroom	None Detected
RES3-A10	Drywall Joint Compound, Bathroom	None Detected
RES3-A11	Bathtub Sealant, Bathroom	None Detected
RES3-A12	Drywall Joint Compound, Hallway Closet	None Detected
RES3-A13	Brown Stone Pattern Sheet flooring, Stair Landing	Yes, Chrysotile (20%)

Sample ID	**Location Description / Material Description**	**Asbestos Detected, Type, (%)**
RES3-A14	Pipe Elbow Insulation, Basement	None Detected
RES3-A15	Pipe Elbow Insulation, Basement	None Detected
RES3-A16	Debris, Stair Landing Wall Cavity	None Detected
RES3-A17	Green Duct Tape	None Detected
RES3-A18	Pipe Run Insulation	None Detected
RES3-A19	Drywall Joint Compound, Basement	None Detected
RES3-A20	Drywall Joint Compound, Basement	None Detected
RES3-A21	Drywall Joint Compound, Basement	None Detected
RES3-A22	Drywall Joint Compound, Basement	None Detected
RES3-A23	Blue w/White Specks 30 cm (12”) Floor Tile, Basement	None Detected
RES3-A24	Masitic Around Sump Pump Opening, Basement	None Detected
RES3-A25	Black Tar Paper, Exterior	None Detected
RES3-A26	Window Sealant, Exterior	None Detected
RES3-A27	Grey Mastic, Electrical Connection, Exterior	Yes, Chrysotile (20%)
RES3-A28	Gasket, Electrical Connection Housing, Exterior	None Detected
RES3-A29	White Mastic Around Vent, Exterior	None Detected
RES3-A30	Pipe Thread Sealant, Exterior	None Detected
RES3-A31	Black Chimney Mastic, Roof	None Detected
RES3-A32	Black Mastic, Flashing & Vents, Roof	Yes, Chrysotile (10%)
RES3-A33	Silicone on Flashing, Roof	None Detected
RES3-A34	Black Mastic, Roof Perimeter	Yes, Chrysotile (1.4%)

Eleven (11) drywall joint compound samples were collected in the building. Samples RES3-A4, RES3-A5, RES3-A6, RES3-A7, RES3-A10, RES3-A12, RES3-A19, RES3-A20, RES3-A21 and RES3-A22 were all determined not to contain asbestos. However, Sample RES3-A1 was determined to contain 0.75% chrysotile asbestos. Based on our findings, all drywall joint compound found within the building should be treated as asbestos containing until further investigation and additional sampling determines otherwise.

Brown, stone patterned, sheet flooring was observed on the stair landing (see Photograph 17 in Appendix IV). A sample of this material was collected (Sample RES3-A13) and was identified to contain 20% chrysotile asbestos.

Grey mastic was observed around an electrical services connection on the exterior of the building (see Photograph 16 in Appendix IV). A sample of this material was collected (Sample RES3-A27) and was identified to contain 20% chrysotile asbestos.

Black mastic was observed on the flashing along the peak of the roof, vents and around the previous vent openings. (see Photograph 15 in Appendix IV). A sample of this material was collected (Sample RES3-A32) and was identified to contain 10% chrysotile asbestos.

Black flashing mastic was observed around the perimeter of the roof between the roof and the exterior facia (see Photograph 15 in Appendix IV). A sample of this material was collected (Sample RES3-A34) and was identified to contain 1.4% chrysotile asbestos.

Based on the limitations of this assessment, no other ACMs were identified in House #3.

8.5.2 Lead-Based Paint

A total of seventeen (17) paint samples were collected from typical finished interior and exterior surfaces of House #3 and were submitted for lead content analysis. A summary of the analytical results for the analysis is presented in Table 16. Drawings indicating the approximate sample point locations are provided on Figures 10 and 11.

TABLE 16: Results of Lead-Based Paint Sample Analysis – House #3

Sample ID	Location Description	Colour	Results (%)[1]	Classified as Lead-Based Paint(2)
RES3-L1	Interior, Basement, Door & Frame	Olive Green	0.19	No
RES3-L2	Interior, Basement, Walls	White	<0.01	No
RES3-L3	Interior, Basement, Mural	Blue	<0.01	No
RES3-L4	Interior, Basement, Chalkboard Paint	Black	<0.01	No
RES3-L5	Interior, Basement, Window Trim	White	0.04	No
RES3-L6	Interior, Basement, Mural	Green	<0.01	No
RES3-L7	Interior, Walls	White	<0.01	No
RES3-L8	Interior, Trim	White	<0.01	No
RES3-L9	Interior Wall, Bathroom	White	<0.01	No
RES3-L10	Exterior, Railing	Brown/Red	0.19	No
RES3-L11	Exterior, Siding	White	0.01	No
RES3-L12	Exterior, Metal Panel By Back Door	Turquoise	<0.01	No
RES3-L13	Exterior, Wood Planks (Window Covers)	Black/White	<0.01	No
RES3-L14	Exterior, Railings	Black/Red	0.12	No
RES3-L15	Exterior, Window Trim	Brown	<0.01	No
RES3-L16	Interior, Oil Tank	Grey	0.10	No
RES3-L17	Exterior, Garden Hose Fixture	Orange/Red	13.5	Yes

Notes: (1) % – percent by weight
(2) Paint with more than 0.5% by weight of lead is classified as lead-based paint

The orange and red paint identified on the metal garden hose holder located on the exterior House #3 was determined to be lead-based. This paint was observed to be in good condition at the time of the assessment.

If a colour of paint was determined to contain lead, all paints of a similar colour on similar substrates within House #3 are assumed to contain lead. All lead-based paints identified were found to be in good condition at the time of this assessment.

Based on the limitations of this assessment, no other lead-based paints were identified within the Customs Office.

8.5.3 Ozone-Depleting Substances

Equipment suspected to contain ozone-depleting substances were identified within House #3. A summary of the identified equipment is presented in Table 17, below. The type of refrigerant identified on labels of the equipment was noted and compared to the list of ozone-depleting substances in Schedule A of the BC Reg. 387/99 – Ozone-Depleting Substances and Other Halocarbons Regulation (Ozone Regulation), as amended by BC Reg. 321/2004.

According to the Ozone Regulation, a substance is considered to be ozone-depleting if it is listed as Class I or Class II in Schedule A of the regulation. Substances listed as Class III in Schedule A of the regulation are considered to be other halocarbons.

TABLE 17: Ozone-Depleting Substances – House #3

Equipment	Quantity	Location	Refrigerant Type	Class	Classified as Ozone-Depleting
Domestic Refrigerator	1	Kitchen	R12	I	Yes
Domestic Freezer	1	Basement	R12	I	Yes
Domestic Water Cooler	1	Kitchen	R134A	III	No

The refrigerant in the domestic refrigerator and freezers were determined to contain ozone-depleting substances. The domestic waster cooler was determined not to contain ozone-depleting substances.

8.5.4 Mercury

Fluorescent lighting was not observed within House #3. Two mercury-containing thermostats were identified within House #3.

8.5.5 Polychlorinated Biphenyls

Fluorescent light ballasts were not identified within House #3.

8.5.6 Radioactive Materials

Five (5) smoke detectors containing radioactive materials were identified within House #3.

8.5.7 Air Samples

Golder collected and analysed air samples in the house to evaluate fibre levels based on the requirements of the Canadian Labour Code "*Part X, Hazardous Substances*" and WorkSafeBC. The air sampling was conducted in the house based on a request from PWGSC OGGO due to the presence of damaged floor tiles. The collection and analysis of air samples was conducted in accordance with the National Institute for Occupational Safety and Health (NIOSH) Analytical Method 7400 – "Asbestos and Other Fibres in Air". Copies of the analytical results are provided in Appendix VI.

Analysis results of the ambient air samples, collected from within House #3, were below 50 percent of the Canadian Labour Code Occupational Health and Safety Regulation exposure limit for asbestos (1.0 f/mL) and the WorkSafeBC 8-hour time weighted average (TWA) exposure limit for asbestos (0.1 f/mL).

It should be noted, that while some fibres were identified, this method does not distinguish between fibre types. Therefore many of the fibres identified could be from other household sources such as animal hair, clothing and carpeting.

8.5.8 Hazardous Materials Storage

Heating Oil Tank

A 1,360 litre heating oil tank is located in the basement of House #3. The tank was a single walled steel tank installed in 1979. The tank was mostly painted and some corrosion is evident where paint is missing, particularly on the top where a fitting weld was not painted. A geomembrane was used to create secondary containment around the base of the tank with a capacity of about 110% of the tank. The tank is filled from the large diesel storage tank and has an automatic fill shut-off at 7/8 full. A 0.15 metre diameter fuel stain was observed around the fill pipe and may be associated with imperfect fitting seals. There was no fuel observed in the secondary containment at the base of the tank.

Other Hazardous Materials Storage

There were no other hazardous materials observed in storage at House #3 although it is expected that typical cleaning supplies are used by the residents.

8.6 Residence – House #4

8.6.1 Asbestos-Containing Materials

A total of twenty-eight (28) suspect asbestos-containing building material samples were collected from House #4. A summary of analytical sample results for the suspect ACMs are presented in Table 18. Drawings indicating the approximate sample point locations are provided on Figures 12 and 13.

TABLE 18: Results of Asbestos Bulk Sample Analysis – House #4

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
RES4-A1	Ceiling Texture Coat, Dining Room	None Detected
RES4-A2	Drywall Joint Compound, Dining Room	None Detected
RES4-A3	White/Blue Square Pattern Sheet Flooring, Bathroom	None Detected
RES4-A4	Concealed Beige Sheet flooring, Bathroom, Under Sample RES4-A3	None Detected
RES4-A5	Drywall Joint Compound, Bedroom Closet	None Detected
RES4-A6	Drywall Joint Compound, Bedroom Closet	None Detected
RES4-A7	Drywall Joint Compound, Bedroom Closet	None Detected
RES4-A8	Drywall Joint Compound, Bathroom	None Detected
RES4-A9	Ceiling Texture Coat, Bathroom	None Detected
RES4-A10	Ceiling Texture Coat, Stairwell	None Detected
RES4-A11	Drywall Joint Compound, Hallway Closet	None Detected
RES4-A12	30 cm (12”) Beige w/Brown & White Streaks Floor Tile, Basement	Yes, Chrysotile (2.6%)
RES4-A13	Pipe Elbow Insulation, Basement	None Detected
RES4-A14	Pipe Run Insulation, Basement	None Detected
RES4-A15	Drywall Joint Compound, Basement	None Detected
RES4-A16	Drywall Joint Compound, Basement	None Detected
RES4-A17	Drywall Joint Compound, Basement	None Detected
RES4-A18	Drywall Joint Compound, Basement	None Detected
RES4-A19	Brown Stone Patterned Sheet Flooring, Stair Landing	Yes, Chrysotile (20%)
RES4-A20	Black Mastic, Perimeter Roof/Flashing	Yes, Chrysotile (1.2%)
RES4-A21	Black Mastic, Roof Peak	None Detected

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
RES4-A22	Grey/Black Vent Mastic, Roof	Yes, Chrysotile (1.4%)
RES4-A23	White Mastic, Roof	None Detected
RES4-A24	White Window Sealant, Exterior	None Detected
RES4-A25	Lt Grey Mastic Around Utility Box, Exterior	None Detected
RES4-A26	White Mastic Around Pipe Penetrations, Exterior	None Detected
RES4-A27	White Pipe Thread Sealant, Exterior	None Detected
RES4-A28	Black Tar Paper, Exterior	None Detected

Beige with brown and white streaks, 0.3 metre (12 inch) floor tiles were observed throughout the basement (see Photograph 14 in Appendix IV). A sample of this material was collected (Sample RES4-A12) and was identified to contain 3.8% chrysotile asbestos.

Brown, stone patterned, sheet flooring was observed on the stair landing (see Photograph 17 in Appendix IV). A sample of this material was collected (Sample RES4-A19) and was identified to contain 20% chrysotile asbestos.

Black mastic was observed on the flashing along the peak of the roof, vents and around the previous vent opening covered with an impermeable membrane (see Photograph 15 in Appendix IV). A sample of this material was collected (Sample RES4-A22) and was identified to contain 1.4% chrysotile asbestos.

Black flashing mastic was observed around the perimeter of the roof between the roof and the exterior facia (see Photograph 15 in Appendix IV). A sample of this material was collected (Sample RES4-A20) and was identified to contain 1.2% chrysotile asbestos.

Based on the limitations of this assessment, no other ACMs were identified within House #4.

8.6.2 Lead-Based Paint

A total of ten (10) paint samples were collected from typical finished interior and exterior surfaces of House #4 and were submitted for lead content analysis. A summary of the analytical results for the analysis is presented in Table 19. Drawings indicating the approximate sample point locations are provided on Figures 12 and 13.

TABLE 19: Results of Lead-Based Paint Sample Analysis – House #4

Sample ID	Location Description	Colour	Results (ppm)[1]	Classified as Lead-Based Paint(2)
RES4-L1	Interior, Walls	White	<0.01	No
RES4-L2	Interior, Bathroom Walls	Light Blue	<0.01	No
RES4-L3	Interior, Doors and Frames	Turquoise	0.14	No
RES4-L4	Interior, Trim	White	0.06	No
RES4-L5	Interior, Oil Tank	Grey	0.02	No
RES4-L6	Interior, Walls	White	<0.01	No
RES4-L7	Exterior, Siding	White	<0.01	No
RES4-L8	Exterior, Railing	Black/Red	0.18	No
RES4-L9	Exterior, Metal Panel By Back Door	Green	<0.01	No
RES4-L10	Exterior, Railing	Brown	0.15	No

Notes: (1) ppm – parts per million
(2) Paint with more than 5,000 ppm of lead is classified as lead-based paint

Based on the limitations of this assessment, no lead-based paints were identified within House #4

8.6.3 Ozone-Depleting Substances

Equipment suspected to contain ozone-depleting substances were identified within House #4. A summary of the identified equipment is presented in Table 20, below. The type of refrigerant identified on labels of the equipment was noted and compared to the list of ozone-depleting substances in Schedule A of the BC Reg. 387/99 – Ozone-Depleting Substances and Other Halocarbons Regulation (Ozone Regulation), as amended by BC Reg. 321/2004.

According to the Ozone Regulation, a substance is considered to be ozone-depleting if it is listed as Class I or Class II in Schedule A of the regulation. Substances listed as Class III in Schedule A of the regulation are considered to be other halocarbons.

TABLE 20: Ozone-Depleting Substances – House #4

Equipment	Quantity	Location	Refrigerant Type	Class	Classified as Ozone-Depleting
Domestic Refrigerator	1	Kitchen	R12	I	Yes
Domestic Deep Freezer	1	Basement	R12	I	Yes
Domestic Stand up Freezer	1	Basement	Unknown	N/A	Suspect
Domestic Water Cooler	1	Kitchen	R134A	III	No

The refrigerant in the domestic refrigerator and deep freezer were determined to contain ozone-depleting substances. Due to limited access, the refrigerant in the domestic stand up freezer located in the basement could not be identified and is therefore suspected to contain ozone-depleting substances until further investigation proves otherwise. The domestic waster cooler was determined not to contain ozone-depleting substances.

8.6.4 Mercury

Fluorescent light bulbs suspected to contain mercury vapour were identified within House #4.

Three (3) mercury-containing thermostats were identified within House #4.

8.6.5 Polychlorinated Biphenyls

Two (2) fluorescent light ballasts were identified within House #4. Random ballasts were inspected to determine whether or not they contained PCBs. The serial numbers on the labels of the light ballasts were noted and compared to the publication entitled *“Identification of Lamp Ballasts Containing PCBs”* revised August 1991.

A summary of the ballasts identified is shown below in Table 21.

TABLE 21: Fluorescent Light Ballasts – House #4

Ballast Manufacturer	Serial Number	Date Stamp	PCB Content
Thomas	STB-240-120	Labelled No PCBs	None

The Thomas light ballast inspected was determined not to contain PCBs. However, due to the limitations of the survey, all fluorescent light ballasts could not be inspected.

8.6.6 Radioactive Materials

Four (4) smoke detectors containing radioactive materials were identified within House #4.

8.6.7 Hazardous Materials Storage

Heating Oil Tank

A 1,360 litre heating oil tank is located in the basement of House #4. The tank was a single walled steel tank installed in 1979. The tank was mostly painted and some corrosion was evident where paint was missing, particularly on the end where a fitting weld was not painted and on the sides. A geomembrane was used to create secondary containment around the base of the tank with a capacity of about 110% of the tank. The tank is filled from the large diesel storage tank and has an automatic fill shut-off at 7/8 full. There was no staining observed on the tank or in the secondary containment at the base of the tank.

Other Hazardous Materials Storage

A number of small containers of paint and stain for recreational woodworking were on a shelf in the basement although not in a quantity or condition warranting consideration.

8.7 Residence – House #5

8.7.1 Asbestos-Containing Materials

A total of twenty-three (23) suspect asbestos-containing building material samples were collected from House #5. A summary of analytical sample results for the suspect ACMs are presented in Table 22. Drawings indicating the approximate sample point locations are provided on Figures 14 through 16.

TABLE 22: Results of Asbestos Bulk Sample Analysis – House #5

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
RES5-A1	Brown Octagonal Sheet Flooring, Mud Room	Yes, Chrysotile (20%)
RES5-A2	Plaster, Living Room	None Detected
RES5-A3	Plaster, Mudroom Closet	None Detected
RES5-A4	Plaster, Bedroom Closet	None Detected
RES5-A5	Plaster, Bedroom Closet	None Detected
RES5-A6	Plaster, Mudroom	None Detected
RES5-A7	Plaster, Stairwell Ceiling	None Detected
RES5-A8	9" Gold Swirl Pattern Floor Tile, Bedroom	None Detected
RES5-A9	9" Lt. Brown Swirl Pattern Floor Tile, Hallway	None Detected
RES5-A10	Black Base Board, Stairwell	None Detected
RES5-A11	9" Yellow w/Green & Red Streaks Floor Tile, Bedroom	None Detected
RES5-A12	9" Dark Yellow w/Green & Read Streaks Floor Tile, Bedroom	None Detected
RES5-A13	Plaster, Bedroom	None Detected
RES5-A14	Plaster, Bedroom	None Detected
RES5-A15	White Window Sealant, Interior	None Detected
RES5-A16	Filler, Duct Penetration, Basement	None Detected
RES5-A17	Black Insulation Around Pipe Penetration, Basement	None Detected
RES5-A18	Grey Baseboard, Bathroom	None Detected
RES5-A19	Dark Grey Mastic at Pipe Penetration, Exterior	Yes, Chrysotile (45%)
RES5-A20	White Mastic, Pipe Penetration, Exterior	None Detected
RES5-A21	White and Grey Mastic , Service Box, Exterior	Yes, Chrysotile (25%) in Grey Layer
RES5-A22	Window Putty, Exterior	None Detected
RES5-A23	White Mastic, Metal Cladding, Exterior	None Detected

Brown, octagonal patterned, sheet flooring was observed in the kitchen, bathroom and front and rear mudrooms on the main floor of the building (see Photograph 18 in Appendix IV). A sample of this material was collected (Sample RES5-A1) and was identified to contain 20% chrysotile asbestos.

A dark grey mastic was observed around a pipe penetration on the exterior of the building (see Photograph 19 in Appendix IV). A sample of this material was collected (Sample RES3-A19) and was identified to contain 45% chrysotile asbestos.

A white and grey mastic was observed around a service box on the exterior of the building. A sample of this material was collected (Sample RES3-A21) and was identified to contain 25% chrysotile asbestos in the grey layer.

Based on samples collected from the other Subject Buildings, all black mastics on the roof of House #5, should be assumed to contain asbestos.

Based on the limitations of this assessment, no other ACMs were identified within House #5.

8.7.2 Lead-Based Paint

A total of nineteen (19) paint samples were collected from typical finished interior and exterior surfaces of House #5 and were submitted for lead content analysis. A summary of the analytical results for the analysis is presented in Table 23. Drawings indicating the approximate sample point locations are provided on Figures 14 through 16.

TABLE 23: Results of Lead-Based Paint Sample Analysis – House #5

Sample ID	**Location Description**	**Colour**	**Results (%)**[1]	**Classified as Lead-Based Paint**(2)
RES5-L1	Interior, Trim	White	<0.01	No
RES5-L2	Interior, Stair Railing	White	0.18	No
RES5-L3	Interior, Door and Trim	Cream	0.04	No
RES5-L4	Interior, Wall and Door Paint	White	0.29	No
RES5-L5	Interior, Floors	Varnish	0.13	No
RES5-L6	Interior, Floors and Baseboard	Varnish	<0.01	No
RES5-L7	Interior, Walls	White	0.02	No
RES5-L8	Interior, Trim	White	<0.01	No
RES5-L9	Interior, Basement - Floors, Ductwork, Walls	Cream	0.02	No
RES5-L10	Interior, Basement – Walls and Shelving	White	<0.01	No

Sample ID	Location Description	Colour	Results (%)^1	Classified as Lead-Based Paint$^{(2)}$
RES5-L11	Interior, Stairs and Door Sill	Grey	1.96	Yes
RES5-L12	Interior & Exterior, Concrete Floors	Grey	0.11	No
RES5-L13	Interior, Basement - Trim	White	0.04	No
RES5-L14	Interior – Window Blind	Green	<0.01	No
RES5-L15	Exterior – Trim, Facia, Columns	Black	0.12	No
RES5-L16	Exterior - Porch	White	0.58	Yes
RES5-L17	Exterior - Stairs	Grey	<0.01	No
RES5-L18	Interior – Piping	Black	0.07	No
RES5-L19	Interior – Oil Tank	Grey	0.03	No

Notes: (1) % – percent by weight
(2) Paint with more than 5,000 ppm of lead is classified as lead-based paint

The interior grey paint identified on the interior stairs and door sills was determined to be lead-based. The exterior white paint identified on the porch was determined to be lead-based.

If a colour of paint was determined to contain lead, all paints of a similar colour on similar substrates within House #5 are assumed to contain lead. All lead-based paints identified were found to be in good condition at the time of this assessment.

Based on the limitations of this assessment, no other lead-based paints were identified within House #5.

8.7.3 Ozone-Depleting Substances

Equipment suspected to contain ozone-depleting substances were identified within House #5. A summary of the identified equipment is presented in Table 24, below. The type of refrigerant identified on labels of the equipment was noted and compared to the list of ozone-depleting substances in Schedule A of the BC Reg. 387/99 – Ozone-Depleting Substances and Other Halocarbons Regulation (Ozone Regulation), as amended by BC Reg. 321/2004.

According to the Ozone Regulation, a substance is considered to be ozone-depleting if it is listed as Class I or Class II in Schedule A of the regulation. Substances listed as Class III in Schedule A of the regulation are considered to be other halocarbons.

TABLE 24: Ozone-Depleting Substances – House #5

Equipment	Quantity	Location	Refrigerant Type	Class	Classified as Ozone-Depleting
Domestic Refrigerator	1	Kitchen	R134A	III	No
Domestic Freezer	1	Basement	R12	I	Yes
Domestic Water Cooler	1	Kitchen	R134A	III	No

The refrigerant in the domestic freezer in the basement was determined to contain ozone-depleting substances. The domestic refrigerator and waster cooler were determined not to contain ozone-depleting substances.

8.7.4 Mercury

Fluorescent light bulbs suspected to contain mercury vapour were identified within House #5.

Three (3) mercury-containing thermostats were identified within House #5.

8.7.5 Polychlorinated Biphenyls

Two (2) fluorescent light ballasts were identified within House #5. Random ballasts were inspected to determine whether or not they contained PCBs. The serial numbers on the labels of the light ballasts were noted and compared to the publication entitled *"Identification of Lamp Ballasts Containing PCBs"* revised August 1991.

A summary of the ballasts inspected is shown below in Table 25.

TABLE 25: Fluorescent Light Ballasts – House #5

Ballast Manufacturer	Serial Number	Date Stamp	PCB Content
Sola Select	570-302SX	A86	None
Sylvania	R-2S40-TPMKIII	Labelled No PCBs	None

The Sola Select and Sylvania light ballasts inspected were determined not to contain PCBs. However, due to the limitations of the survey, all fluorescent light ballasts could not be inspected.

8.7.6 Radioactive Materials

Three (3) smoke detectors containing radioactive materials were identified within House #5. However, one additional smoke detector missing the cover containing the sensor was observed.

8.7.7 Hazardous Materials Storage

Heating Oil Tank

A 1,230 litre heating oil tank is located in the basement of House #5. The tank was a single walled steel tank of unknown age. The tank was painted with minor indications of corrosion at some seams. A geomembrane was used to create secondary containment around the base of the tank with a capacity of about 115% of the tank. The tank does not have automatic shutoff or overfill protection. A fuel stain was noted around the fill pipe and may be associated with imperfect fitting seals. There was no fuel observed in the secondary containment at the base of the tank.

Other Hazardous Materials Storage

There were no other hazardous materials observed in storage at House #5 although it is expected that typical cleaning supplies are used by the residents.

8.8 Garage, House #1 and #2

8.8.1 Asbestos-Containing Materials

A total of three (3) suspect asbestos-containing building material samples were collected from the Garage for House #1 and #2. A summary of analytical sample results for the suspect ACMs are presented in Table 26. A drawing indicating the approximate sample point locations is provided on Figure 17.

TABLE 26: Results of Asbestos Bulk Sample Analysis – Garage, House #1 and #2

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
GAR12-A1	Black Tar Paper, Exterior	None Detected
GAR12-A2	Grey Mastic, Roof	None Detected
GAR12-A3	Black Mastic, Roof	Yes, Chrysotile, (10%)

Black mastic was observed on the flashing along the peak of the roof and around roof repair patches. A sample of this material was collected (Sample GAR12-A3) and was identified to contain 10% chrysotile asbestos.

Based on the limitations for this assessment, no other ACMs were identified within the Garage for House #1 and 2.

8.8.2 Lead-Based Paint

A total of eight (8) paint samples were collected from typical finished interior and exterior surfaces of the Garage for House #1 and 2 and were submitted for lead content analysis. A summary of the analytical results for the analysis is presented in Table 27. A drawing indicating the approximate sample point locations is provided on Figure 17.

TABLE 27: Results of Lead-Based Paint Sample Analysis – Garage, House #1 and #2

Sample ID	Location Description	Colour	Results (%)[1]	Classified as Lead-Based Paint(2)
GAR12-L1	Exterior - Door	Dark/Light Pink	0.28	No
GAR12-L2	Exterior – Door Trim	White	<0.01	No
GAR12-L3	Exterior – Wood Posts	Brown	<0.01	No
GAR12-L4	Exterior – Fire Hose Box	Red	2.46	Yes
GAR12-L5	Exterior - Door	Orange	0.36	No
GAR12-L6	Exterior - Siding	White	<0.01	No
GAR12-L7	Interior - Walls	Turquoise	0.12	No
GAR12-L8	Exterior – Garage Door and Facia	Brown	0.34	No

Notes: (1) % – percent by weight
(2) Paint with more than 0.5% by weight of lead is classified as lead-based paint

The red paint identified on the exterior fire hose box was determined to be lead-based.

If a colour of paint was determined to contain lead, all paints of a similar colour on similar substrates within the Garage for House #1 and #2 are assumed to contain lead. All lead-based paints identified were found to be in good condition at the time of this assessment.

Based on the limitations of this assessment, no other lead-based paints were identified within the Garage for House #1 and #2.

8.8.3 Ozone-Depleting Substances

Based on the limitations of this assessment, equipment suspected to contain ozone-depleting substances were not identified within the Garage for House # 1 and #2.

8.8.4 Mercury

Fluorescent lighting was observed within the Garage for House #1 and #2. Fluorescent lighting tubes are presumed to contain elemental mercury vapour. Mercury-containing thermostats were not identified within the Garage for House #1 and #2.

8.8.5 Polychlorinated Biphenyls

One (1) fluorescent light ballasts was identified within the Garage for House #1 and #2. However, due to the limitations of the survey, the fluorescent light ballasts could not be inspected. Therefore, the fluorescent light ballast should be suspected to contain PCBs until further investigation proves otherwise.

8.8.6 Radioactive Materials

Smoke detectors containing radioactive materials were not identified within Garage for House #1 and #2.

8.9 Garage – House #3 and #4

8.9.1 Asbestos-Containing Materials

A total of three (3) suspect asbestos-containing building material samples were collected and analysed from the Garage for House #1 and #2. A summary of analytical sample results for the suspect ACMs are presented in Table 28. A drawing indicating the approximate sample point locations is provided on Figure 18.

TABLE 28: Results of Asbestos Bulk Sample Analysis – Garage, House #3 and #4

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
GAR34-A1	Black Tar Paper, Exterior	None Detected
GAR34-A2	White/Clear Mastic, Roof	None Detected
GAR34-A3	Black Mastic, Roof	None Detected

Asbestos was not detected in the samples analysed. However, based on samples collected from the other Subject Buildings, all black mastics on the roof of the Garage for House #3 and #4, should be assumed to contain asbestos.

8.9.2 Lead-Based Paint

A total of five (5) paint samples were collected from typical finished interior and exterior surfaces of the Garage for House #3 and #4 and were submitted for lead content analysis. A summary of the analytical results for the analysis is presented in Table 29. A drawing indicating the approximate sample point locations is provided on Figure 18.

TABLE 29: Results of Lead-Based Paint Sample Analysis – Garage, House #3 and 4

Sample ID	Location Description	Colour	Results (%)[1]	Classified as Lead-Based Paint(2)
GAR34-L1	Exterior – Siding & Doors	White	0.02	No
GAR34-L2	Exterior - Door	Green	0.18	No
GAR34-L3	Exterior - Door	Turquoise	0.28	No
GAR34-L4	Exterior – Garage Door	Brown	0.26	No
GAR34-L5	Exterior – Fire Hose Box	Red	0.20	No

Notes: (1) % – Percent by weight
(2) Paint with more than 0.5% of lead is classified as lead-based paint

Based on the limitations of this assessment, no lead-based paints were identified within the Garage for House #3 and #4.

8.9.3 Ozone-Depleting Substances

Equipment suspected to contain ozone-depleting substances were not identified within the Garage for House # 3 and #4.

8.9.4 Mercury

Fluorescent lighting was observed within the Garage for House #3 and #4. Fluorescent lighting tubes are presumed to contain elemental mercury vapour. Mercury-containing thermostats were not identified within the Garage for House #3 and #4.

8.9.5 Polychlorinated Biphenyls

One (1) fluorescent light ballasts was identified within the Garage for House #3 and #4. The ballast was inspected to determine whether or not it contained PCBs. The serial numbers on the labels of the light ballasts were noted and compared to the publication entitled *"Identification of Lamp Ballasts Containing PCBs"* revised August 1991.

A summary of the ballasts inspected is shown below in Table 30.

TABLE 30: Fluorescent Light Ballasts – Garage, House #3 and #4

Ballast Manufacturer	Serial Number	Date Stamp	PCB Content
General Electric	17A240T1	N/A	Suspect

Because of limited access, the date stamp on the fluorescent light ballast could not be inspected. Therefore, the General Electric light ballast should be assumed to contain PCBs until further investigation proves otherwise.

8.9.6 Radioactive Materials

Smoke detectors containing radioactive materials were not identified within Garage for House #3 and #4.

8.10 Garage – Customs Office

8.10.1 Asbestos-Containing Materials

A total of three (2) suspect asbestos-containing building material samples were collected from the Customs Office Garage. A summary of analytical sample results for the suspect

ACMs are presented in Table 31. A drawing indicating the approximate sample point locations is provided on Figure 19.

TABLE 31: Results of Asbestos Bulk Sample Analysis – Garage, Customs Office

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
OG-A1	Black Weather Stripping, Garage Door	None Detected
OG-A2	Grey Weather Stripping, Garage Door	None Detected
OG-A3	Window Putty, Exterior	None Detected

Asbestos was not detected in all samples collected. However, based on samples collected from the other Subject Buildings, all black mastics on the roof of the Garage for the Customs Office, should be assumed to contain asbestos.

8.10.2 Lead-Based Paint

A total of five paint samples were collected from typical finished interior and exterior surfaces of the Subject Building and were submitted for lead content analysis. A summary of the analytical results for the analysis is presented in Table 32. A drawing indicating the approximate sample point locations is provided on Figure 19.

TABLE 32: Results of Lead-Based Paint Sample Analysis – Garage, Customs Office

Sample ID	Location Description	Colour	Results (%)[1]	Classified as Lead-Based Paint(2)
OG-L1	Interior – Stored Wooden Hangers	White	<0.01	No
OG-L2	Exterior – Doors and Window Trim	Black	0.86	Yes
OG-L3	Interior – Stored Road Paint Stencil	White	0.01	No
OG-L4	Interior - Walls	Light Blue	<0.01	No
OG-L5	Interior - Ceiling	White	<0.01	No
OG-L6	Interior – Walls	Red	0.01	No
OG-L7	Interior - Walls	Green	<0.01	No
OG-L8	Exterior – Garage Door	Black	2.66	Yes
OG-L9	Exterior – Garage Door	Black/White	<0.01	No

Notes: (1) % – percent by weight
(2) Paint with more than 0.5% of lead is classified as lead-based paint

The black paint identified on exterior door, window trim and garage door was determined to be lead-based.

If a colour of paint was determined to contain lead, all paints of a similar colour on similar substrates within the Customs Office are assumed to contain lead. All lead-based paints identified were found to be in good condition at the time of this assessment.

Based on the limitations of this assessment, no other lead-based paints were identified within the Office Garage.

8.10.3 Ozone-Depleting Substances

Equipment suspected to contain ozone-depleting substances were not identified within the Customs Office Garage.

8.10.4 Mercury

Fluorescent lighting was observed within the Customs Office Garage. Fluorescent lighting tubes are presumed to contain elemental mercury vapour. Mercury-containing thermostats were not identified within the Customs Office Garage.

8.10.5 Polychlorinated Biphenyls

No fluorescent light ballasts were identified within the Customs Office Garage.

8.10.6 Radioactive Materials

Smoke detectors containing radioactive materials were not identified within the Customs Office Garage.

8.11 Maintenance Building

8.11.1 Asbestos-Containing Materials

A total of eight (8) suspect asbestos-containing building material samples were collected from the Maintenance Building. A summary of analytical sample results for the suspect ACMs are presented in Table 33. A drawing indicating the approximate sample point locations is provided on Figure 20.

TABLE 33: Results of Asbestos Bulk Sample Analysis – Maintenance Building

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
SHOP-A1	Drywall Joint Compound	None Detected
SHOP-A2	Drywall Joint Compound	None Detected
SHOP-A3	Drywall Joint Compound	None Detected
SHOP-A4	Drywall Joint Compound	None Detected
SHOP-A5	Drywall Joint Compound	None Detected
SHOP-A6	Drywall Joint Compound	None Detected
SHOP-A7	Drywall Joint Compound	None Detected
SHOP-A8	White Mastic at Penetrations, Exterior	None Detected

Asbestos was not detected in the samples analysed. However, based on samples collected from the other Subject Buildings, all black mastics on the roof of the Maintenance Building, should be assumed to contain asbestos.

8.11.2 Lead-Based Paint

A total of ten (10) paint samples were collected from typical finished interior and exterior surfaces of the Subject Building and were submitted for lead content analysis. A summary of the analytical results for the analysis is presented in Table 34. A drawing indicating the approximate sample point locations is provided on Figure 20.

TABLE 34: Results of Lead-Based Paint Sample Analysis – Maintenance Building

Sample ID	Location Description	Colour	Results (%)[1]	Classified as Lead-Based Paint(2)
SHOP-L1	Exterior & Interior – Door and Frame	White	<0.01	No
SHOP-L2	Interior – Wall	Grey	<0.01	No
SHOP-L3	Interior - Wall	Grey	<0.01	No
SHOP-L4	Interior - Wall	Grey	<0.01	No
SHOP-L5	Exterior – Garage Door	Black	<0.01	No
SHOP-L6	Interior – Work Bench	White	0.16	No
SHOP-L7	Interior – Bench Top	Stain	<0.01	No
SHOP-L8	Interior – Storage Tank	Grey	0.07	No
SHOP-L9	Interior – Ceiling Mounted Heater	Green	10.1	Yes
SHOP-L10	Interior – Fire Hose Box	Red	21.3	Yes

Notes: (1) % – percent by weight
(2) Paint with more than 0.5% of lead is classified as lead-based paint

The interior green paint identified on the ceiling mounted heating unit was determined to be lead-based. The interior red paint identified on the fire hose box was determined to be lead-based.

If a colour of paint was determined to contain lead, all paints of a similar colour on similar substrates within the Maintenance Building are assumed to contain lead. All lead-based paints identified were found to be in good condition at the time of this assessment.

Based on the limitations of this assessment, no other lead-based paints were identified within the Maintenance Building.

8.11.3 Ozone-Depleting Substances

Equipment suspected to contain ozone-depleting substances was not identified within the Maintenance Building.

8.11.4 Mercury

Fluorescent lighting was identified within the Maintenance Building. Fluorescent lighting tubes are presumed to contain elemental mercury vapour. Two mercury-containing thermostats were identified in the Maintenance Building.

8.11.5 Polychlorinated Biphenyls

Thirteen (13) fluorescent light ballasts were identified within the Maintenance Building. Random ballasts were inspected to determine whether or not they contained PCBs. The serial numbers on the labels of the light ballasts were noted and compared to the publication entitled *"Identification of Lamp Ballasts Containing PCBs"* revised August 1991.

A summary of the ballasts inspected is shown below in Table 35.

TABLE 35: Fluorescent Light Ballasts – Maintenance Building

Ballast Manufacturer	Serial Number	Date Stamp	PCB Content
Phillips	SM-2E75-S-TPC	Labelled No PCBs	None
Phillips	RQM-2S40-TPC	Labelled No PCBs	None

Due to the limitations of the survey, all fluorescent light ballasts could not be inspected. However, based on the date of construction of the building, no PCB-containing equipment is anticipated present within the Maintenance Building.

8.11.6 Radioactive Materials

Two smoke detectors containing radioactive materials were identified within the Maintenance Building.

8.11.7 Hazardous Materials Storage

Heating Oil Tank

A 1,275 litre heating oil tank is located in the Maintenance Building. The tank was a single walled steel tank installed in 1999. The tank was painted with no observed corrosion. A geomembrane was used to create secondary containment around the base of the tank with a capacity of about 115% of the tank. The tank has an electrical fill pump with automatic overfill protection. There was no fuel stains observed on the tank or fuel apparent in the secondary containment at the base of the tank.

Other Hazardous Materials Storage

A number of hazardous materials are stored in the maintenance building. The majority of the materials are in small consumer sizes and in limited quantity. A summary of the materials in quantities of 25 litres or more includes:

Antifreeze	25 L
Paint	220 L
Light hydrocarbons (*e.g.,* gasoline, brake fluid)	80 L
Motor oil	800 L

Because of the small quantities, there are limited restrictions on the storage methods, apart from good housekeeping practices. There were some issues noted with the storage of materials in the maintenance building as indicated in the following points.

1. Six lead-acid batteries were observed on a workbench shelf. The weight of the batteries is bending the shelf and the wood appears to be damaged and stained. At least one of the batteries appears to have leaked and there was no secondary containment for the batteries.

2. Staining was noted on the concrete floor near the east wall where three 20-litre pails of oil were stored. Although not labelled, the containers appeared to contain used oil. At this location was also a 20 litre pail that appeared to be about 1/8 full of waste oil but did not have any lid.

3. Staining was noted on the concrete floor near the northeast wall where five 20-litre pails of hydraulic and motor oil were stored.

4. A 205-litre drum with an “Attention PCB” sticker on it, had no lid. A bag of grass seed appeared to be stored in the drum, on top of what may be absorbent used for packing PCB ballasts.

5. A 20-litre container was lightly marked “Anti Freeze” over a hypochlorite (bleach) label.

6. A five-litre plastic container marked “Mix Gas” was on a shelf in the north end of the shop. The container did not appear to be a ULC approved fuel container.

A spill kit was not observed in the Maintenance Building and absorbent was not present on the floor in areas where oil staining was apparent.

8.12 Generator Building

8.12.1 Asbestos-Containing Materials

A total of eight suspect asbestos-containing building material samples were collected from the Generator Building. A summary of analytical sample results for the suspect ACMs are presented in Table 36. A drawing indicating the approximate sample point locations is provided on Figure 21.

TABLE 36: Results of Asbestos Bulk Sample Analysis – Generator Building

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
GB-A1	Gasket, Service Utility	None Detected
GB-A2	Cream Mastic on Fibreglass	None Detected
GB-A3	Black Mastic on Fibreglass	None Detected
GB-A4	Grey Gasket, Generator	Yes, Chrysotile (65%)
GB-A5	Brown Gasket, Generator	None Detected
GB-A6	Grey Gasket, Generator	Yes, Chrysotile (70%)
GB-A7	Vent Damper	None Detected

Three (3) samples of gasket materials were collected from the generators (Samples GB-A4, GB-A5 and GB-A6). Two samples of the grey coloured gasket (GB A5 and GB-A6) were identified to contain 65% and 70% chrysotile asbestos respectively. Due to the equipment being operational at the time of the assessment, not all gaskets could be sampled. Therefore, all gaskets on the generators and pumps within the building should be treated as asbestos-containing until further investigation and additional sampling determines otherwise.

Based on samples collected from the other Subject Buildings, all black mastics on the roof of the Generator Building, should be assumed to contain asbestos.

8.12.2 Lead-Based Paint

A total of 20 paint samples were collected from typical finished interior and exterior surfaces of the Subject Building and were submitted for lead content analysis. A summary of the analytical results for the analysis is presented in Table 37. A drawing indicating the approximate sample point locations is provided on Figure 22.

TABLE 37: Results of Lead-Based Paint Sample Analysis – Generator Building

Sample ID	Location Description	Colour	Results (%)[1]	Classified as Lead-Based Paint(2)
GB-L1	Exterior	Black	0.14	No
GB-L2	Exterior	White	0.15	No
GB-L3	Exterior - Vents	White/Red	<0.01	No
GB-L4	Exterior – Double Doors	White/Red/Silver	0.18	No
GB-L5	Interior - Generator	Orange	14.0	Yes
GB-L6	Interior - Generator	Red	0.02	No
GB-L7	Interior – Generator	Turquoise	0.20	No
GB-L8	Interior - Pipe	Silver	0.12	No
GB-L9	Interior - Generator	Dark Green/Red	3.70	Yes
GB-L10	Interior - Generator	Green	1.31	Yes
GB-L11	Interior - Generator	Blue	0.12	No
GB-L12	Interior - Floor	Grey	0.09	No
GB-L13	Interior – Ducting	White	0.24	No
GB-L14	Interior – Pressure Tanks	Red	<0.01	No
GB-L15	Interior - Generator	Light Grey	<0.01	No
GB-L16	Interior - Generator	Red	0.96	Yes
GB-L17	Interior - Generator	Blue/Turquoise	0.06	No
GB-L18	Interior – Pump	Orange	15.8	Yes
GB-L19	Interior – Stairs & Railings	Black	0.10	No
GB-L20	Interior – Fuel Tank	Grey	<0.01	No

Notes: (1) % – percent by weight
(2) Paint with more than 0.5% of lead is classified as lead-based paint

The interior orange, dark green, green and red paints identified on the generators and pumps was determined to be lead-based.

If a colour of paint was determined to contain lead, all paints of a similar colour on similar substrates within the Generator Building are assumed to be lead-based. All lead-based paints identified were found to be in good condition at the time of this assessment.

Based on the limitations of this assessment, no other lead-based paints were identified within the Customs Office.

8.12.3 Ozone-Depleting Substances

Equipment suspected to contain ozone-depleting substances was not identified within the Maintenance Building.

8.12.4 Mercury

Fluorescent lighting was identified within the Maintenance Building. Fluorescent lighting tubes are presumed to contain elemental mercury vapour. Two mercury-containing thermostats were identified in the Maintenance Building.

8.12.5 Polychlorinated Biphenyls

Two (2) fluorescent light ballasts were identified within the Generator Building. Random ballasts were inspected to determine whether or not they contained PCBs. The serial numbers on the labels of the light ballasts were noted and compared to the publication entitled *"Identification of Lamp Ballasts Containing PCBs"* revised August 1991.

A summary of the ballasts inspected is shown below in Tables 38.

TABLE 38: Fluorescent Light Ballasts – Generator Building

Ballast Manufacturer	Serial Number	Date Stamp	PCB Content
Phillips	SM-2E75-S-TPC	Labelled No PCBs	None
Phillips	RQM-2S40-TPC	Labelled No PCBs	None

The Phillips light ballasts inspected were determined not to contain PCBs. However, due to the limitations of the survey, not all fluorescent light ballasts could be inspected.

8.12.6 Radioactive Materials

Two (2) smoke detectors containing radioactive materials were identified within the Pump House.

8.12.7 Hazardous Materials Storage

Heating Oil Tank

A 1,275 litre heating oil tank was located in the Generator Building. The tank was a single walled steel tank of unknown age. The tank was painted with no observed corrosion. A geomembrane was used to create secondary containment around the base of the tank with a capacity of about 110% of the tank. The tank is elevated about 0.9 metres above the floor and 0.35 metres above the top of the secondary containment. Contrary to the Fire Code, other materials (antifreeze and oil) are stored within the secondary containment. The tank does not have automatic shutoff or overfill protection. It was not clear if the tank was sufficiently restrained to resist earthquake forces. A fuel stain was observed around the fill pipe and may be associated with imperfect fitting seals. Some fuel was observed in the secondary containment in the area near the pumps at one end of the tank. The leak was apparently from a fuel filter.

Other Hazardous Materials Storage

There were four 20-litre pails of motor oil stored in the building and smaller quantities of other maintenance fluids for the generator. Six lead-acid batteries were also in storage and did not have secondary containment.

8.13 Diesel Storage Building

8.13.1 Asbestos-Containing Materials

A total of one (1) suspect asbestos-containing building material sample was collected from the Diesel Storage Building. A summary of analytical sample results for the suspect ACM is presented in Table 39. A drawing indicating the approximate sample point locations is provided on Figure 22.

TABLE 39: Results of Asbestos Bulk Sample Analysis – Diesel Storage Building

Sample ID	Location Description / Material Description	Asbestos Detected, Type, (%)
DSS-A1	Vent Mastic, Roof	None Detected

Based on the date of construction of the building, no other ACMs are anticipated to be present within the Diesel Storage Building.

8.13.2 Lead-Based Paint

A total of three (3) paint samples were collected from typical finished interior and exterior surfaces of the Subject Building and were submitted for lead content analysis. A summary of the analytical results for the analysis is presented in Table 40. A drawing indicating the approximate sample point locations is provided on Figure 22.

TABLE 40: Results of Lead-Based Paint Sample Analysis – Diesel Storage Building

Sample ID	Location Description	Colour	Results (%)[1]	Classified as Lead-Based Paint(2)
DSS-L1	Exterior - Roof	Black	0.03	No
DSS-L2	Exterior	White	<0.01	No
DSS-L3	Interior – Storage Tank	Grey	0.07	No

Notes: (1) ppm – parts per million
(2) Paint with more than 5,000 ppm of lead is classified as lead-based paint

Based on the limitations of this assessment, no other lead-based paints were identified within the Customs Office.

8.13.3 Ozone-Depleting Substances

Equipment suspected to contain ozone-depleting substances was not identified within the Diesel Storage Building.

8.13.4 Mercury

Fluorescent lighting was not identified within the Diesel Storage Building. Mercury-containing thermostats were not identified in the Diesel Storage Building.

8.13.5 Polychlorinated Biphenyls

Fluorescent light ballasts were not identified within the Maintenance Building.

8.13.6 Radioactive Materials

Smoke detectors containing radioactive materials were not identified within the Diesel Storage Shed.

8.13.7 Hazardous Materials Storage

Heating Oil Storage Tank

A 22,730 litre heating oil storage tank was present in the Diesel Storage Shed. The tank was a single walled steel tank of unknown age. The tank was painted and appeared free of pitting and perforations. A geomembrane was used to create secondary containment around the base of the tank with a capacity of about 128% of the tank. The tank did not have automatic shutoff or overfill protection. A small pool of fuel was observed near the valves at the base of one end of the tank although no source of the fuel was evident. Access along the sides of the tank was restricted and does not likely meet the Fire Code requirements.

Other Hazardous Materials Storage

There were no other hazardous materials observed in storage at the Diesel Storage shed.

9.0 CONCLUSIONS

Based on the above stated limitations, findings and discussion, the following hazardous building materials were identified in the Subject Buildings:

9.1 Asbestos-Containing Materials

Asbestos-containing materials were identified as described below:

- Drywall joint compound in the Customs Office and House #3;
- Floor tiles in the basement of House #1, House #2 and House #4;
- Brown, stone patterned sheet flooring on the stair landing of House #2, House #3 and House #4;
- Brown, octagonal patterned sheet flooring in the kitchen, bathroom and front and rear mudrooms on the main floor of House #5;
- Grey mastic around utility service boxes and electrical connections on the exterior of House #1 through 4;
- Grey and white mastic around pipe penetrations on the exterior of House #5;

- Black mastics on the roofs of House #1 through 4 and the Garage for House #1 and 2;

- Black and grey mastic used to fill penetrations on the exterior of the Customs Office; and,

- Grey gasket material on the generators in the Generator Building.

With the exception of the Diesel Storage Building, all black mastics on the roofs of the Subject Buildings should be assumed to contain asbestos.

Fire door insulation was not able to be sampled during this assessment because sampling would cause damage to the fire doors. Therefore, all fire doors should be treated as asbestos-containing until additional sampling proves otherwise.

9.2 Lead-Based Paint

Lead-based paints were identified as described below:

- The black paint identified to be present on metal piping in the basement of the Customs Office;

- The white exterior and white interior trim paint in the Pump House;

- The green paint on the pumps in the Pump House;

- The orange and red paint identified on the metal garden house holder located on the exterior of House #3;

- The interior grey paint identified on the interior stairs and door sills, and the exterior white paint identified on the porch of House #5;

- The red paint identified on the exterior fire hose box of the Garage for House #1 and 2;

- The exterior black paint identified on the exterior door, window trim and garage door of the Garage for Customs Office;

- The interior green paint identified on the ceiling mounted heating unit and the interior red paint identified on the fire house box in the Maintenance Building; and,

- The interior orange, dark green, green and red paints identified on the generators and pumps in the Generator Building.

If a colour of paint was determined to contain lead, all paints of a similar colour on similar substrates within a Subject Buildings is assumed to be lead-based.

9.3 Ozone-Depleting Substances

Equipment containing ozone-depleting substances were identified or suspected to contain ODS as follows:

- The domestic refrigerators in the kitchens of House #1 through 4 and the Customs Office;

- The domestic freezers in the basements of House #1 through 4 and Customs Office; and,

- A wall mounted air conditioning unit in Customs Office.

9.4 Mercury

Fluorescent light bulbs suspected to contain mercury vapour were identified throughout the Subject Buildings.

Seventeen (17) mercury-containing thermostats were identified in the Subject Buildings.

9.5 Polychlorinated Biphenyls

Two (2) fluorescent light ballast suspected to contain polychlorinated biphenyls were identified within the Subject Buildings. However, due to the limitations of the survey, not all fluorescent light ballasts could be inspected.

9.6 Radioactive Materials

Twenty-four (24) smoke detectors containing radioactive materials were identified in the Subject Buildings.

9.7 Hazardous Materials in Storage

9.7.1 Heating Oil Tanks

The heating oil storage tanks were generally observed to be free of pitting and perforations but some rust was observed. There were areas of corrosion noted on the tanks, particularly near the recent welds. Staining around the filler pipes was noted on many of the tanks.

The secondary containment systems observed appears to be adequate for the tanks. At the generator building, the volume of the secondary containment is compromised by storage of other materials within the containment.

9.7.2 Other Hazardous Materials Storage

The only building where significant quantities of hazardous materials were stored was the Maintenance Building. A number of containers used were not clearly labelled or the previous labels were not removed or obliterated in accordance with WHMIS and TDG requirements.

Batteries were stored without secondary containment on a overloaded shelf in the maintenance building and without secondary containment in the generator building.

A spill kit was not observed in the Maintenance Building or the Generator Building but should be readily available.

10.0 RECOMMENDATIONS

10.1 Asbestos-Containing Materials

Based on the above-stated conclusions, recommendations regarding the management of identified asbestos-containing materials are summarized in the tables provided in Appendix V.

Based on the criteria established by Public Works and Government Services Canada – Office of Greening Government Operations in the document titled "*Evaluation and Recommendation Criteria for Control of Asbestos Containing Materials (ACM)*," Action 7 - Routine Surveillance, should be instituted regarding the management of identified ACMs.

Prior to any renovation or demolition work, all identified ACM that may be impacted must be removed or protected from impact in accordance with the requirements of the Canada Labour Code and the Workers' Compensation Board of British Columbia. If suspect asbestos-containing materials are encountered, that were not identified in this assessment, they should be sampled to determine conclusively if the are asbestos-containing or not.

Asbestos-containing wastes should be disposed of in accordance with the requirements of the British Columbia Ministry of Environment and transported in accordance with the requirements of the federal Transportation of Dangerous Good Act and Regulations.

10.2 Lead-Based Paints

Lead-based paints that will be impacted through demolition activities in a manner likely to cause airborne lead-containing dust, (*i.e.,* through welding, torch cutting, grinding, sanding or sandblasting) should be controlled through the development and implementation of an Exposure Control Plan (ECP). The requirements for such a plan are provided in Part 5 of British Columbia Occupational Health and Safety Regulation 296/97, as amended by BC Reg. 312/2003, current to the date of the work.

Waste materials containing lead-based paint should be tested for lead leachate potential to assist in disposing of lead-containing waste materials in accordance with the requirements of the Ministry of Environment and the Federal Transportation of Dangerous Good Act and Regulations, current to the date of the work.

10.3 Ozone-Depleting Substances

Disposal of equipment containing ozone-depleting substances should be conducted in accordance with the British Columbia Regulation 387/99 – Ozone-Depleting Substances and Other Halocarbons Regulation, as amended by BC Regulation 321/2004, respecting the appropriate management of ozone-depleting substances within the province of British Columbia. Wastes containing ozone-depleting substances should be transported in accordance with the requirements of the Federal Transportation of Dangerous Goods Act.

10.4 Polychlorinated Biphenyls

When taken out of service, if ballasts are removed that have serial number identifiers that are not identified in this document, the serial number and date stamp on the ballast should be recorded and compared with Environment Canada's Report EPS 2/CC/2 (revised) August 1991, *Identification of Lamp Ballasts Containing PCBs* to assess their likelihood of containing polychlorinated biphenyls.

If identified to be PCB-containing, ballasts should be handled, stored, and disposed of in accordance with the requirements of the British Columbia Occupational Health and Safety Regulation 296/97, as amended by BC Reg. 312/2003, the Ministry of Environment and the Federal Transportation of Dangerous Good Act and Regulations, current to the date of the work.

10.5 Mercury

When taken out of service, mercury-containing equipment should be disposed of in accordance with the requirements of the British Columbia Ministry of Environment and transported in accordance with the requirements of the federal Transportation of Dangerous Goods Act and Regulations.

10.6 Radioactive Materials

When taken out of service, the radioactive materials should be removed in accordance with the requirements of the Atomic Energy Control Act (Atomic Energy Control Regulations), Workers' Compensation Board of British Columbia and the Canada Labour Code.

Radioactive waste should be disposed of in accordance with the requirements of the British Columbia Ministry of Environment and transported in accordance with the requirements of the federal Transportation of Dangerous Goods Act and Regulations.

10.7 Hazardous Materials in Storage

10.7.1 Heating Oil Tanks

Where corrosion is apparent on the heating oil tanks, particularly near the recent welds, painting with corrosion resistant paint should be considered.

Staining around the filler pipes was noted on many of the tanks and the tightness of the fittings should be inspected.

At the Generator Building, the additional materials stored inside the secondary containment should be removed to ensure the 110% capacity is maintained.

10.7.2 Other Hazardous Materials Storage

The operations need to follow the requirements of WHMIS and TDG with respect to labelling. Provision of labels and instruction in WHMIS labelling will likely be the most effective solution.

All batteries should be stored where they are not subject to falling from shelves and be stored within a drip tray to capture any spilled battery acid. Neutralizing agent (*e.g.,* baking soda) should be readily available to neutralize any spills.

A universal spill kit should be present and readily available in the Maintenance Building and a hydrocarbon spill kit should be present in the Generator Building.

11.0 LIMITATIONS

This report has been prepared for the sole benefit of. The report may not be relied upon by any other person or entity without the express written consent of Golder Associates Ltd. and Public Works and Government Services Canada.

Any use that a third party makes of this report, or any reliance on decisions made based on it, are the responsibility of such third parties. Golder accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

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The conclusions presented in this report represent the judgement of the assessor based on current environmental and health and safety standards, and on site conditions on the date(s) cited in this report. Due to the nature of the investigation and the limited data available, the assessor cannot warrant against undiscovered environmental liabilities.

Should additional information become available, Golder requests that this information be brought to our attention so that we may re-assess the conclusions presented herein.

Golder will not be responsible for any real or perceived decrease in a property value, its saleability or ability to gain financing through the reporting of information in this report.

12.0 CLOSURE

If you have any questions or require any further information, please feel free to contact us (604) 296-4200. Thank you for the opportunity to be of service. We look forward to working with you again.

GOLDER ASSOCIATES LTD.

Stephen Hone, B.Sc.
Project Coordinator

Tim Whalen, M.A.Sc., P.Eng.
Associate

SH/EA/TFW/jc
Attachments

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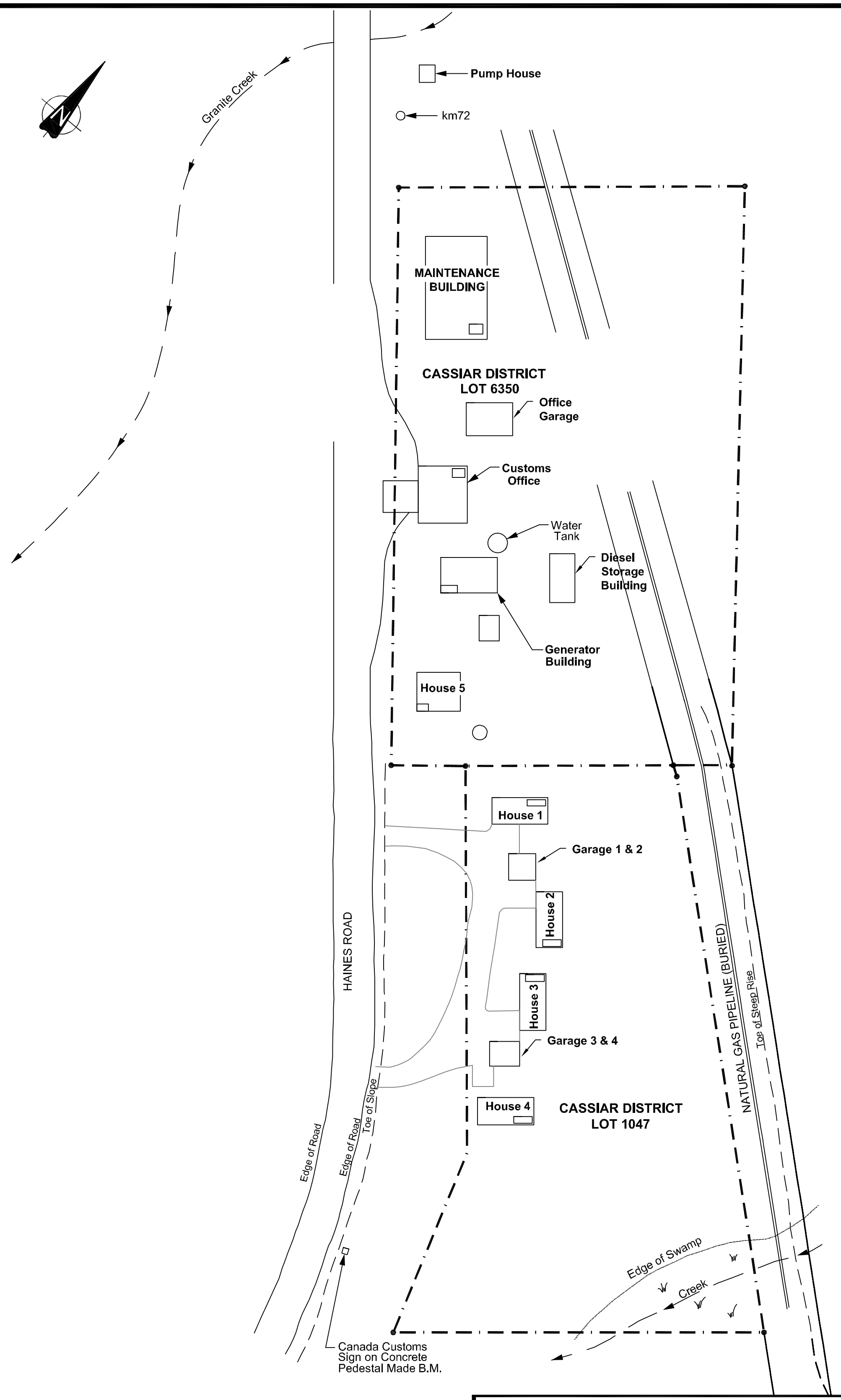

LEGEND

— — · — Site Boundary

REFERENCE
PWGSC Image File, "SD006455.tif" and
miscellaneous PWGSC plans and documents.

Schematic Only
Not to Scale

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE

SITE PLAN

Golder Associates

PROJECT No.	06-1437-024	
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FILE No.

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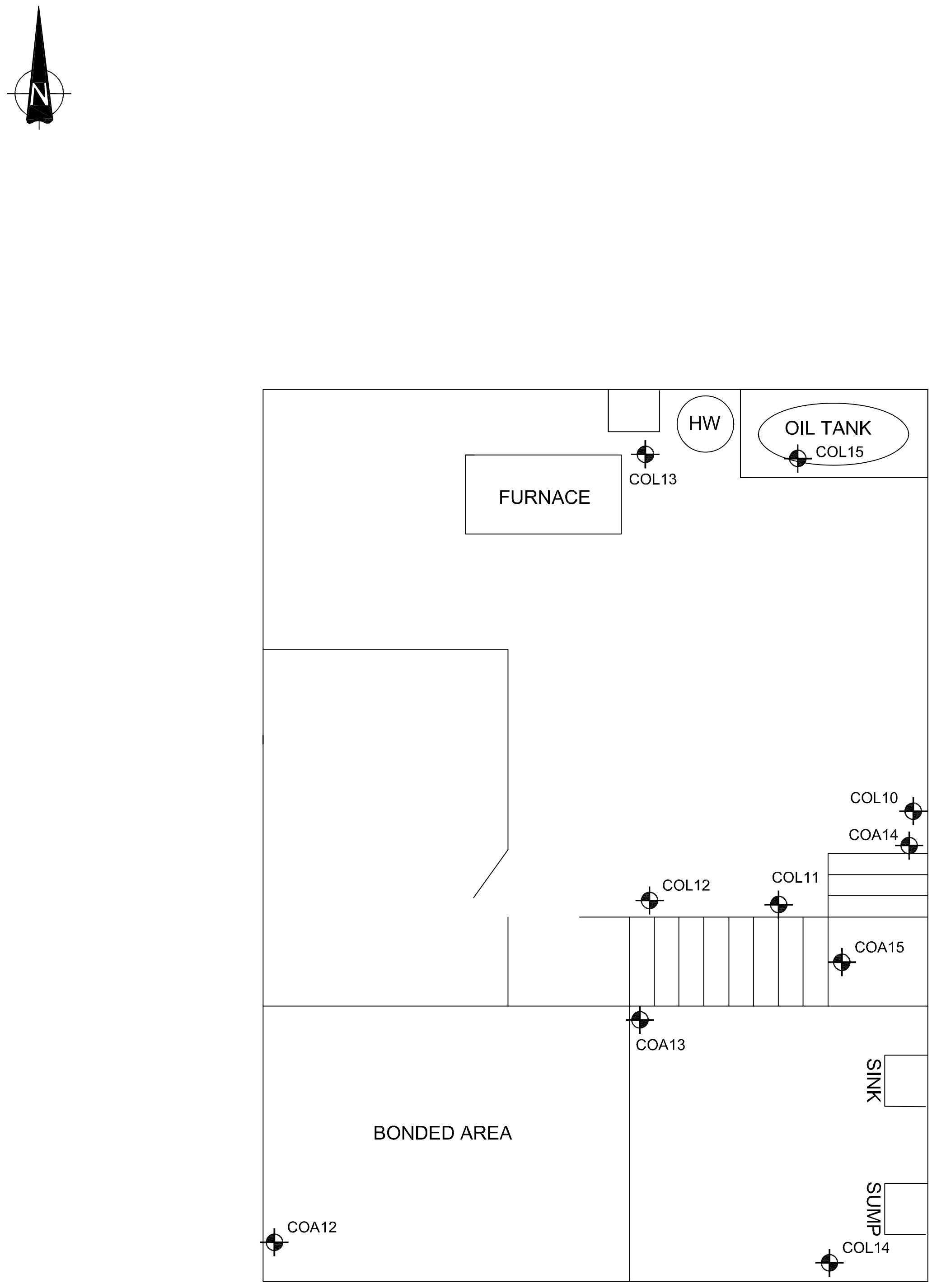
FIGURE 1



LEGEND

⌖ SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE

CUSTOMS OFFICE - BASEMENT

Golder Associates

PROJECT No. 06–1437–024			FILE No.
DESIGN	SP	6OCT06	SCALE NTS REV. –
CADD	NV	6OCT06	**FIGURE 2**
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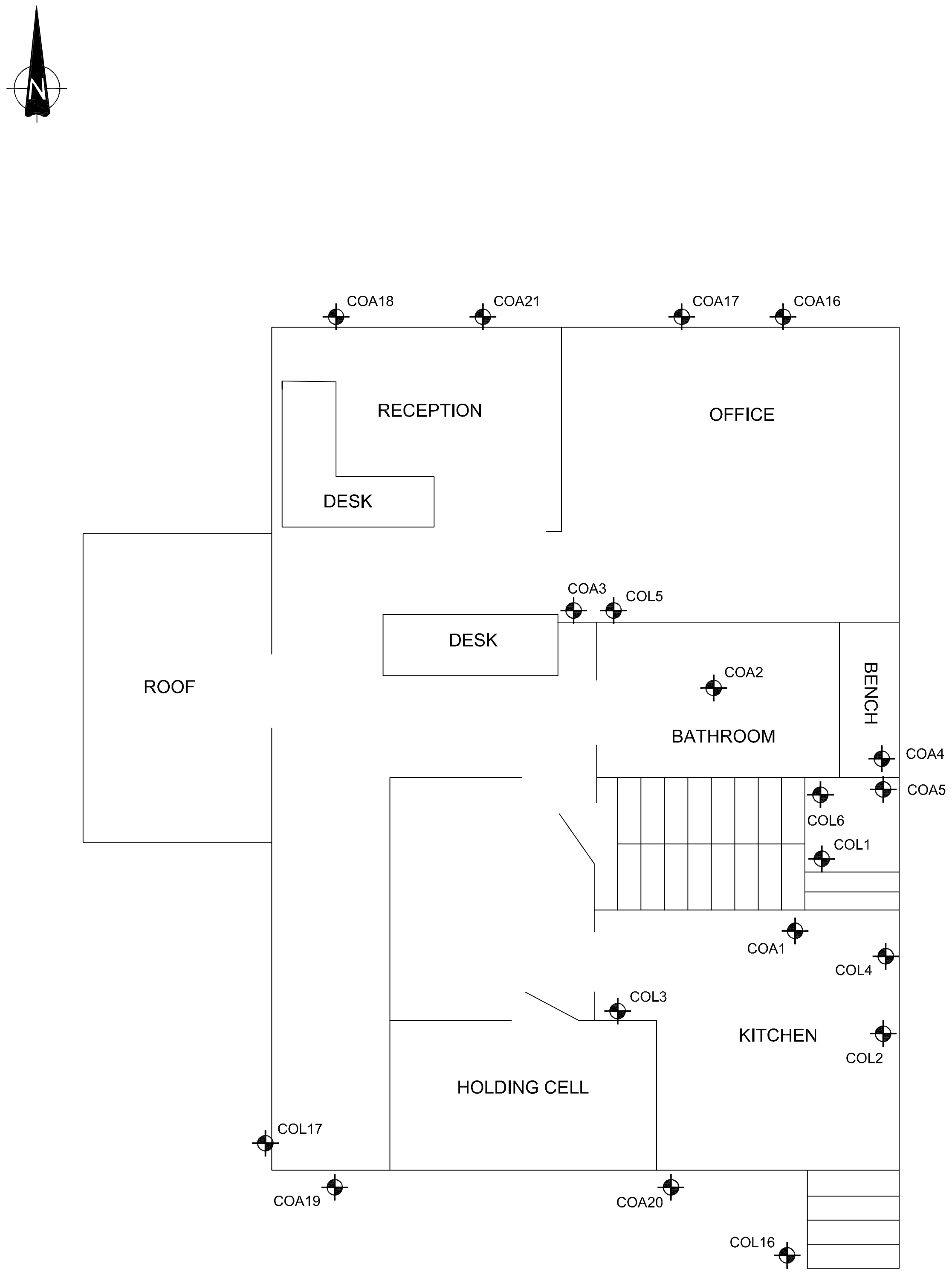

LEGEND

⊕ SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE

CUSTOMS OFFICE - MAIN FLOOR

Golder Associates

PROJECT No.	06-1437-024	
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FILE No.

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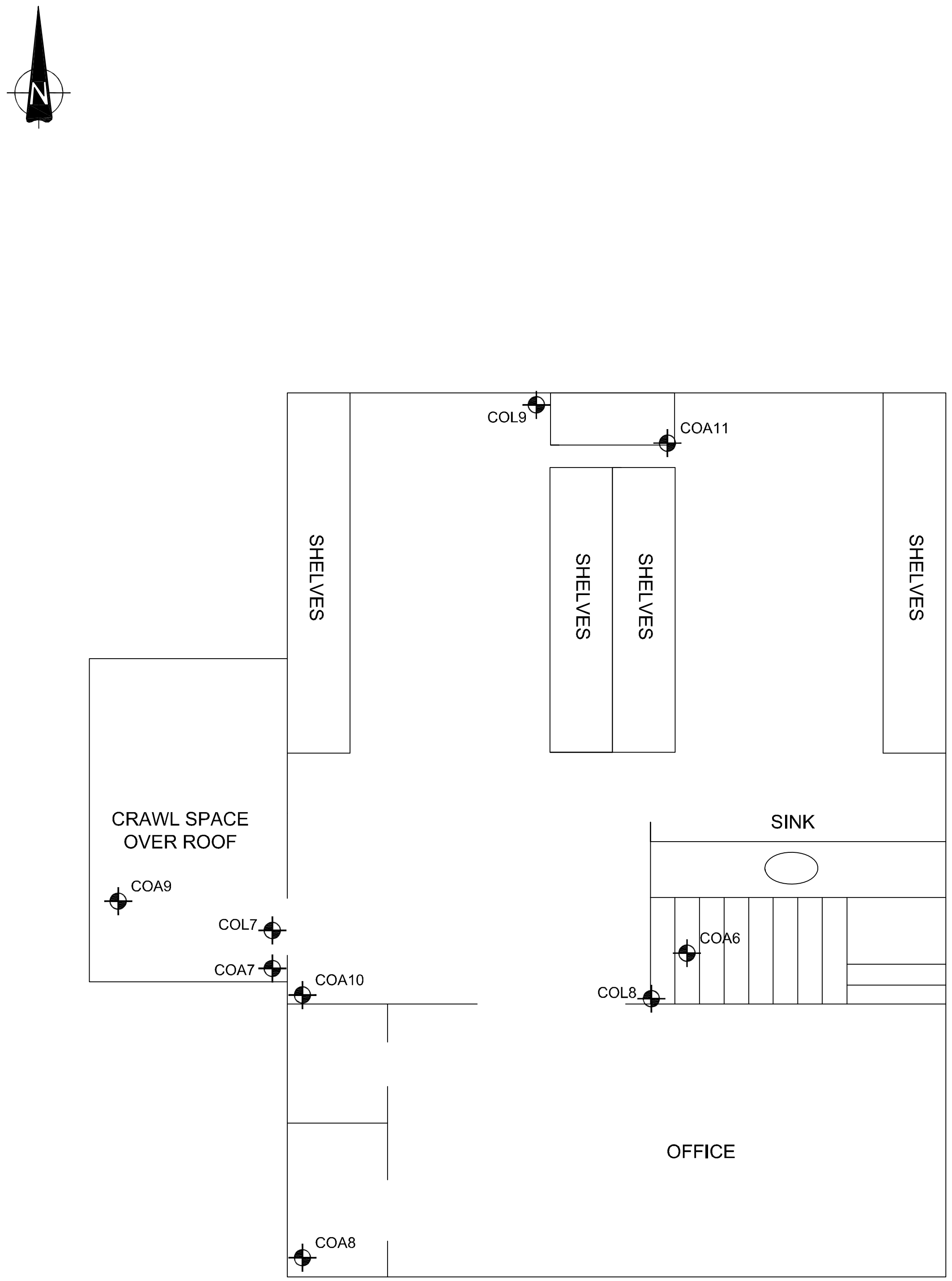
FIGURE 3



LEGEND

⌖ SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE

CUSTOMS OFFICE - SECOND FLOOR

Golder Associates

PROJECT No. 06–1437–024			FILE No.	
DESIGN	SP	6OCT06	SCALE NTS	REV. –
CADD	NV	6OCT06	**FIGURE 4**	
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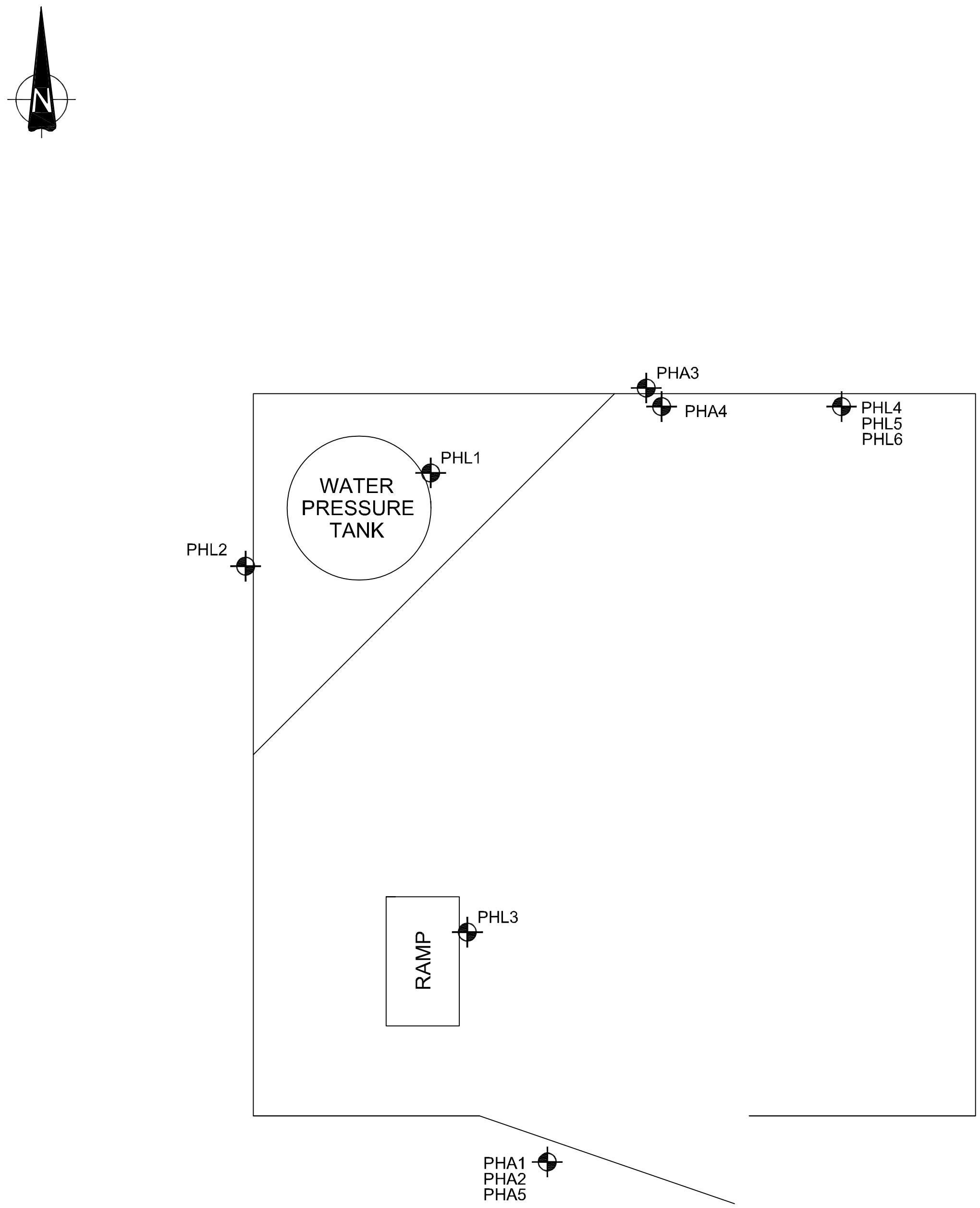

LEGEND

⌖ SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE

PUMP HOUSE

Golder Associates

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FIGURE 5

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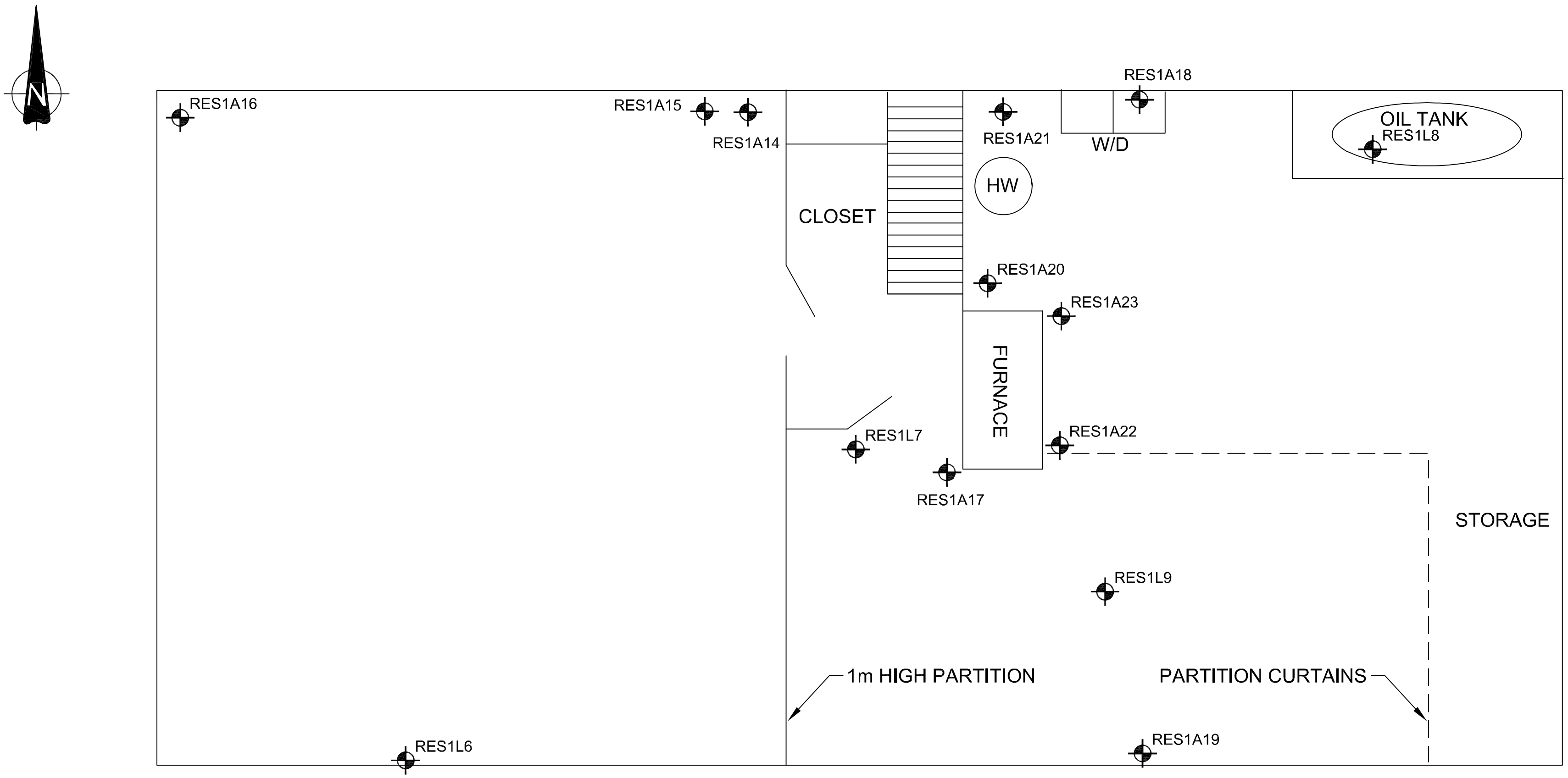

LEGEND

- SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE

HOUSE #1 - BASEMENT

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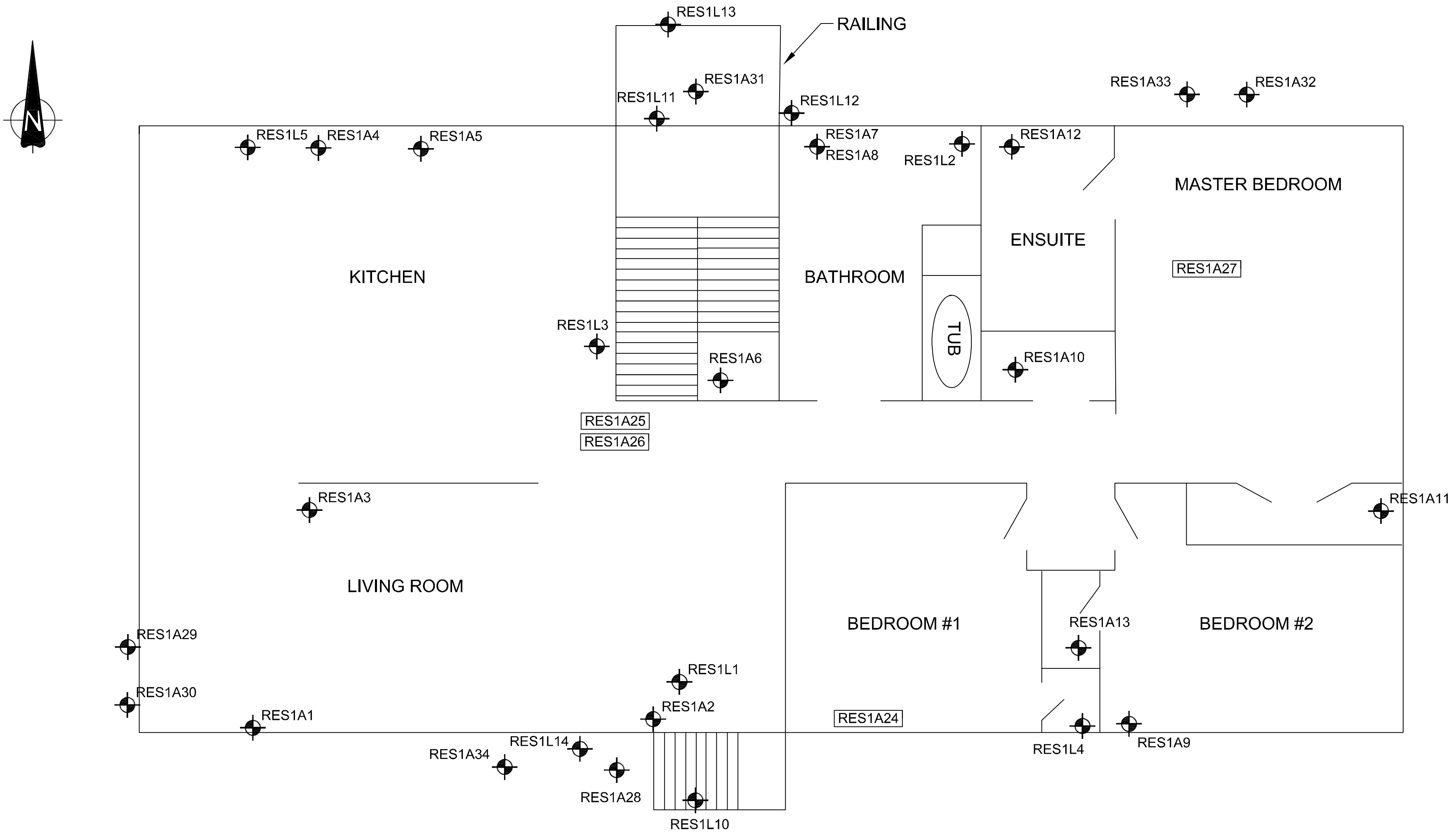
FIGURE 6



LEGEND

⊕ SAMPLE LOCATION

RES1A24 ROOF SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE

HOUSE #1 - MAIN FLOOR

Golder Associates

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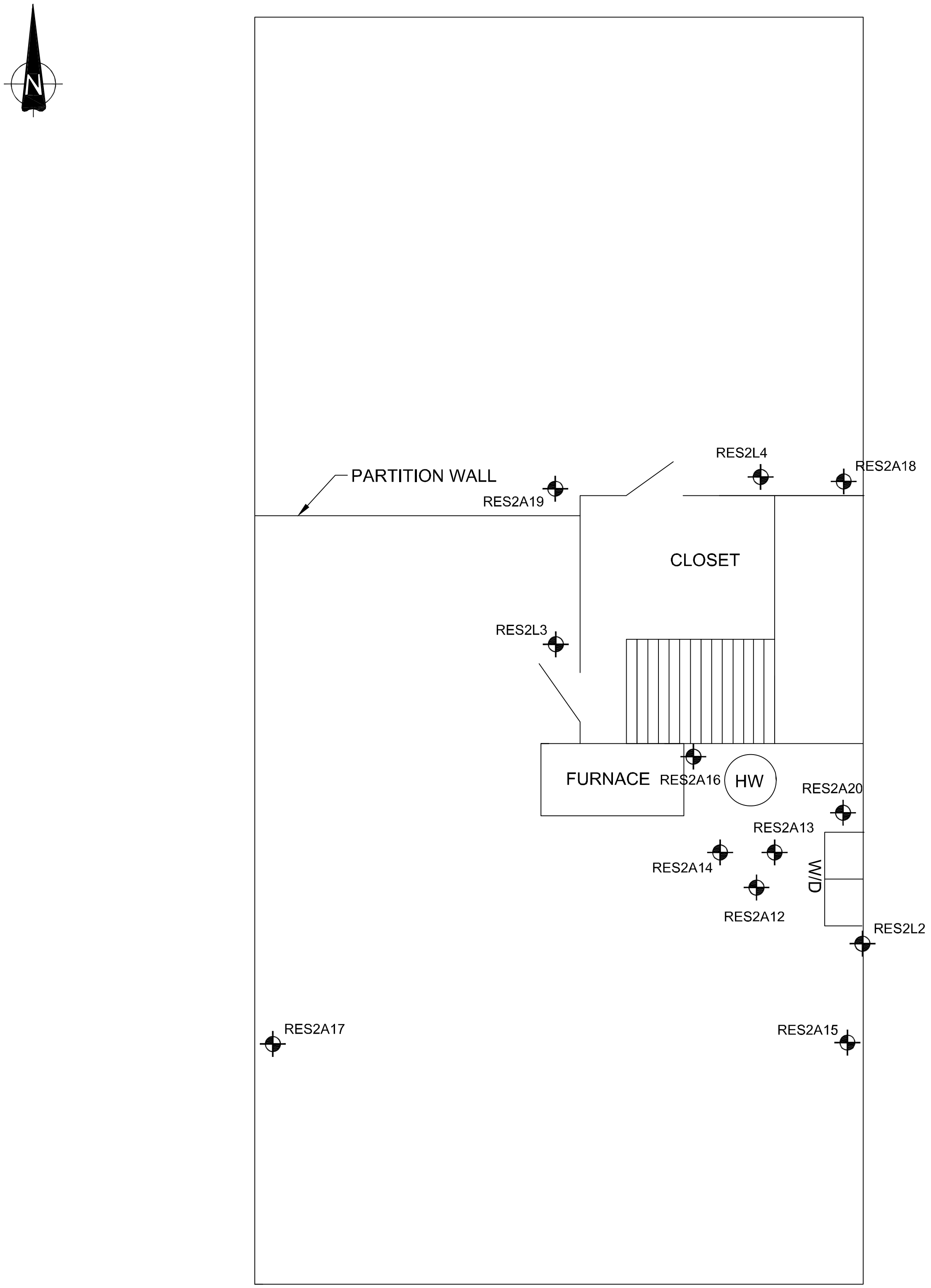
FIGURE 7



LEGEND

⊕ SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES
LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE
HOUSE #2 - BASEMENT

Golder Associates

PROJECT No.	06-1437-024		FILE No.	
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CADD	NV	6OCT06	**FIGURE 8**	
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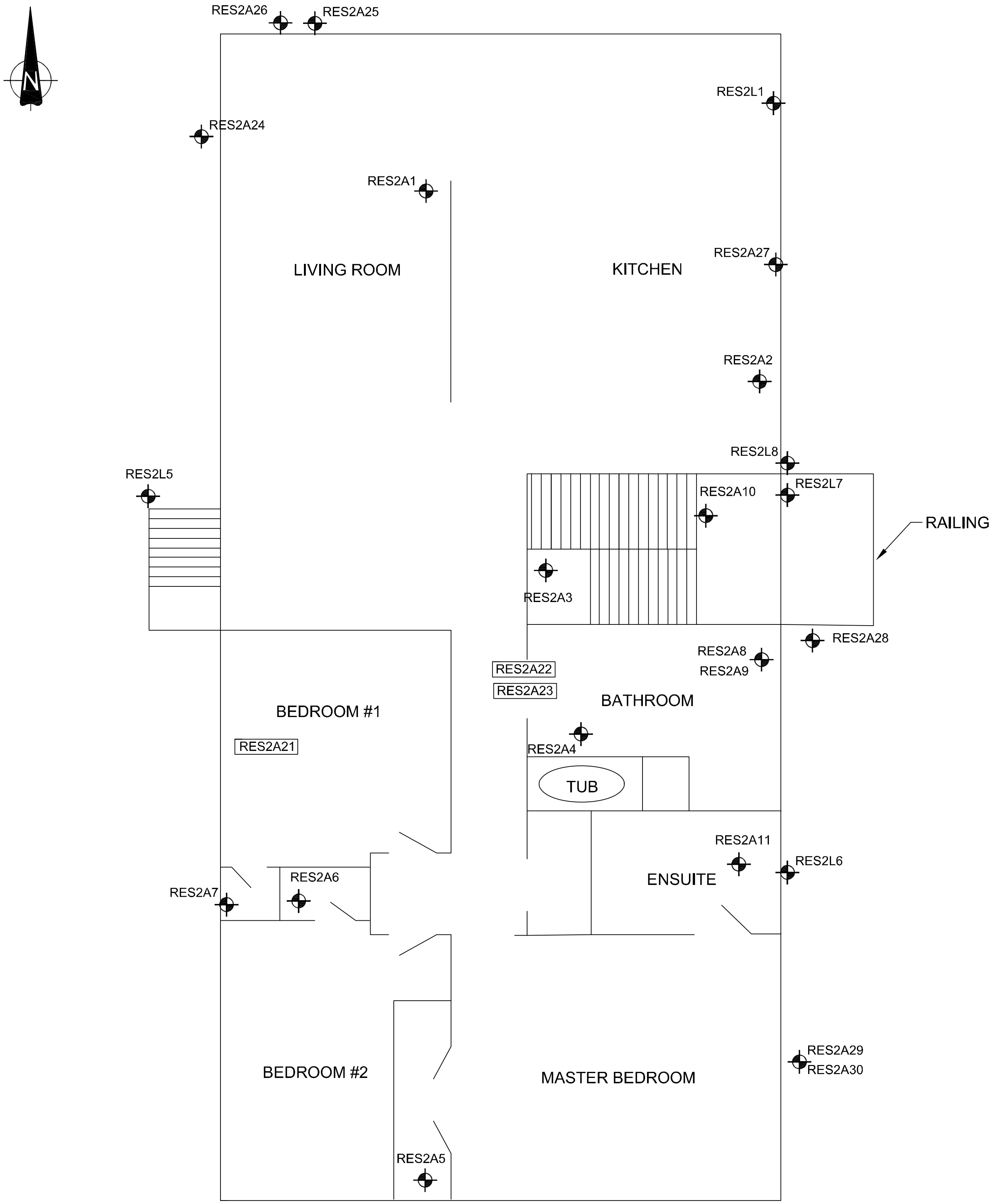

LEGEND

⊕	SAMPLE LOCATION
RES2A21	ROOF SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE

HOUSE #2 - MAIN FLOOR

Golder Associates

PROJECT No. 06-1437-024			FILE No.
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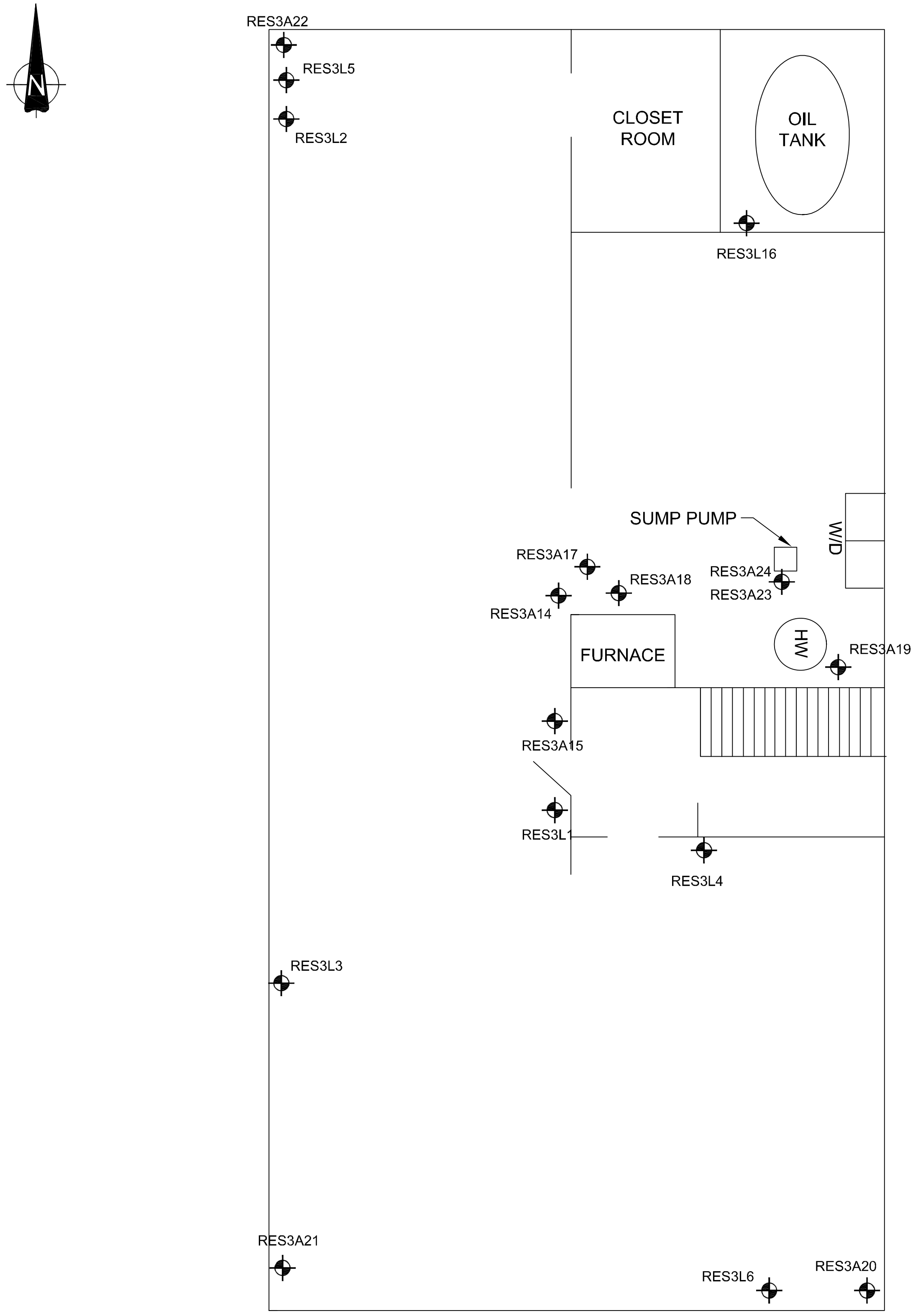

LEGEND

⊕ SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES
LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE

HOUSE #3 - BASEMENT

Golder Associates

PROJECT No.	06-1437-024		FILE No.			
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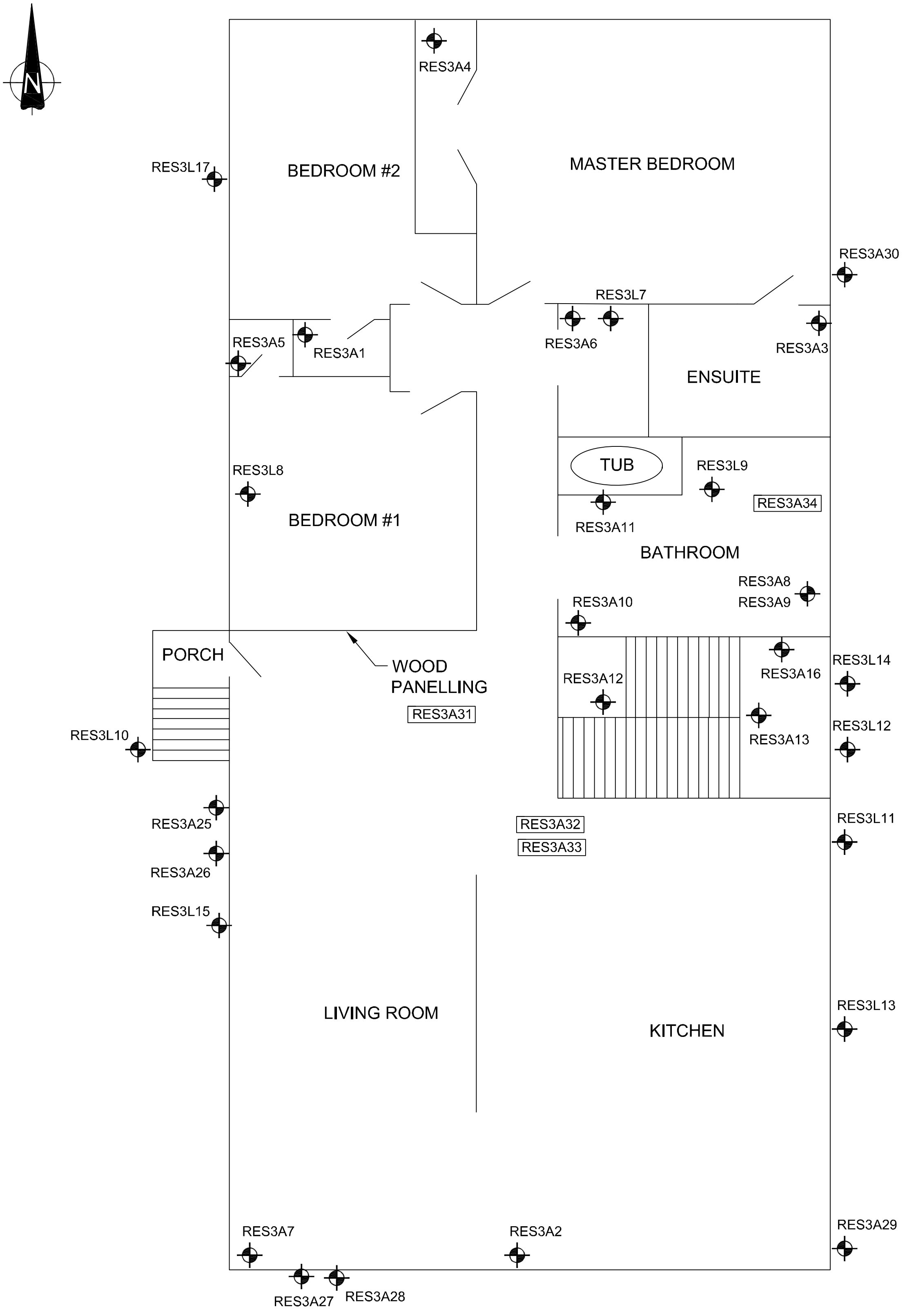

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LEGEND

⊕	SAMPLE LOCATION
RES3A32	ROOF SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE

HOUSE #3 - MAIN FLOOR

Golder Associates

PROJECT No.	06-1437-024	
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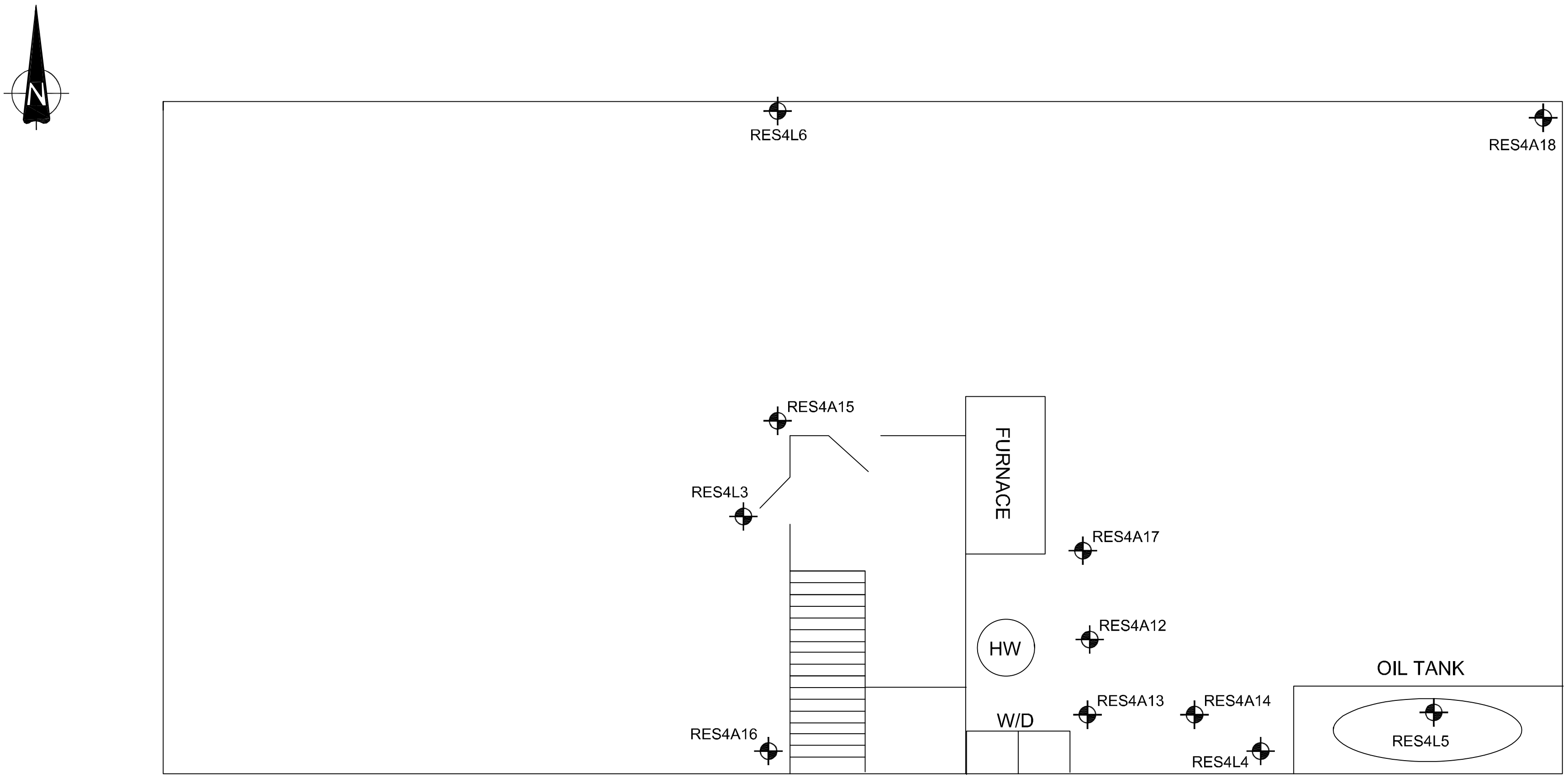
CADD	NV	6OCT06
CHECK		
REVIEW		

FILE No.

SCALE NTS REV. –

FIGURE 11

REVISION DATE: 06/10/13 09:17AM By: NVeloso CADD FILE: N:\Bur-Graphics\Projects\2006\1437\06-1437-024\Drafting\1000\061437024-1000-A-002-021.dwg



LEGEND

⊕ SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE

HOUSE #4 - BASEMENT

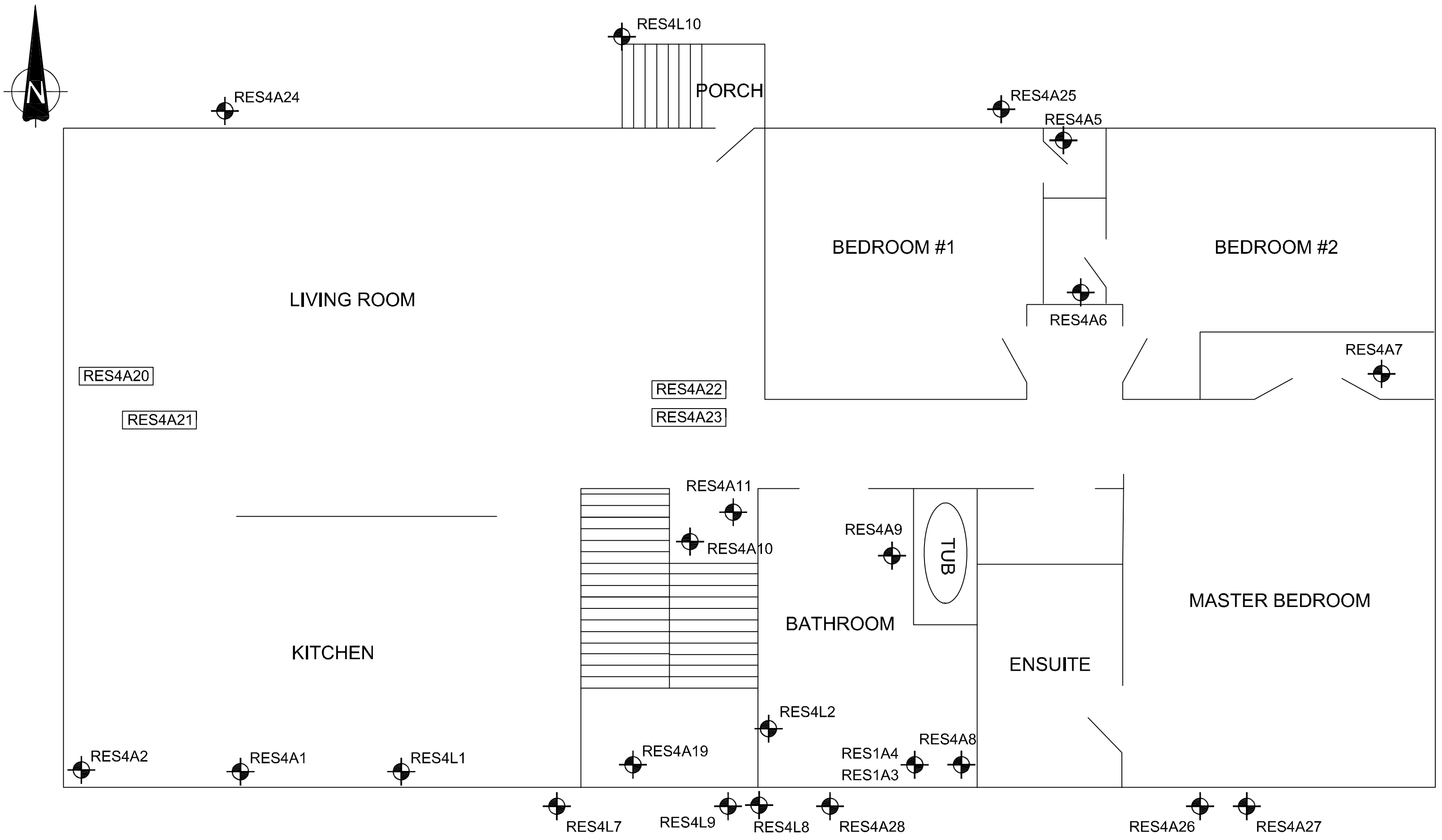
Golder Associates

PROJECT No.	06-1437-024	
DESIGN	SP	6OCT06
CADD	NV	6OCT06
CHECK		
REVIEW		

FILE No.
SCALE NTS REV. A

FIGURE 12

REVISION DATE: 06/10/13 09:17AM By: NVeloso CADD FILE: N:\Bur-Graphics\Projects\2006\1437\06-1437-024\Drafting\1000\061437024-1000-A-002-021.dwg



LEGEND

- ⊕ SAMPLE LOCATION
- RES4A20 ROOF SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

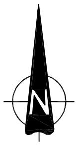
TITLE

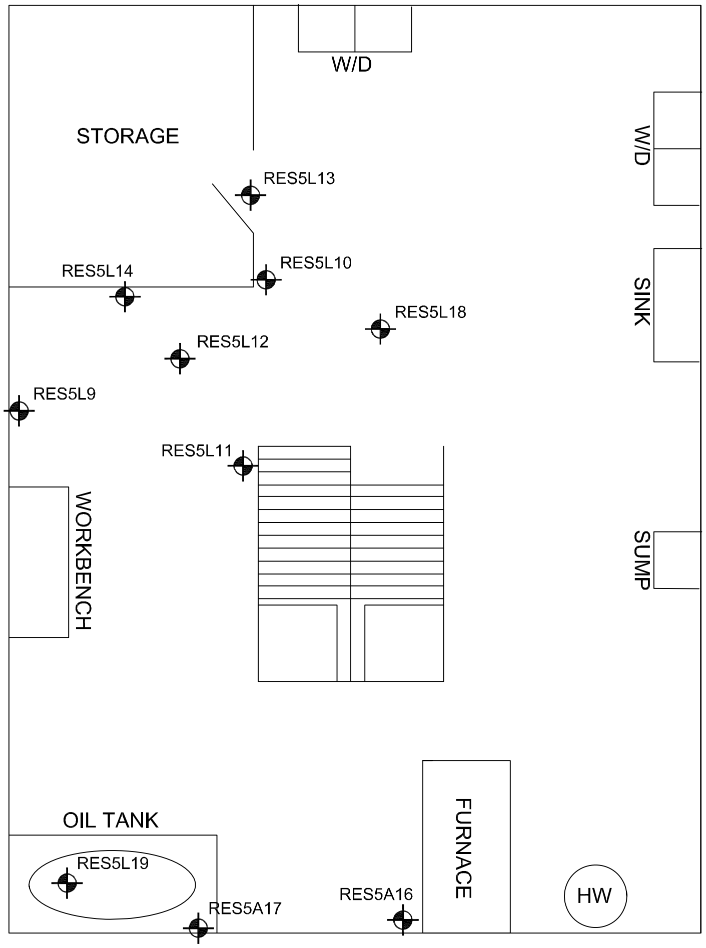
HOUSE #4 - MAIN FLOOR

Golder Associates

PROJECT No.	06-1437-024		FILE No.	
DESIGN	SP	6OCT06	SCALE NTS	REV. A
CADD	NV	6OCT06		
CHECK				
REVIEW				

FIGURE 13





REVISION DATE: 06/10/13 09:17AM By: NVeloso CADD FILE: N:\Bur-Graphics\Projects\2006\1437\06-1437-024\Drafting\1000\061437024-1000-A-002-021.dwg

LEGEND

⌖ SAMPLE LOCATION

NOTES

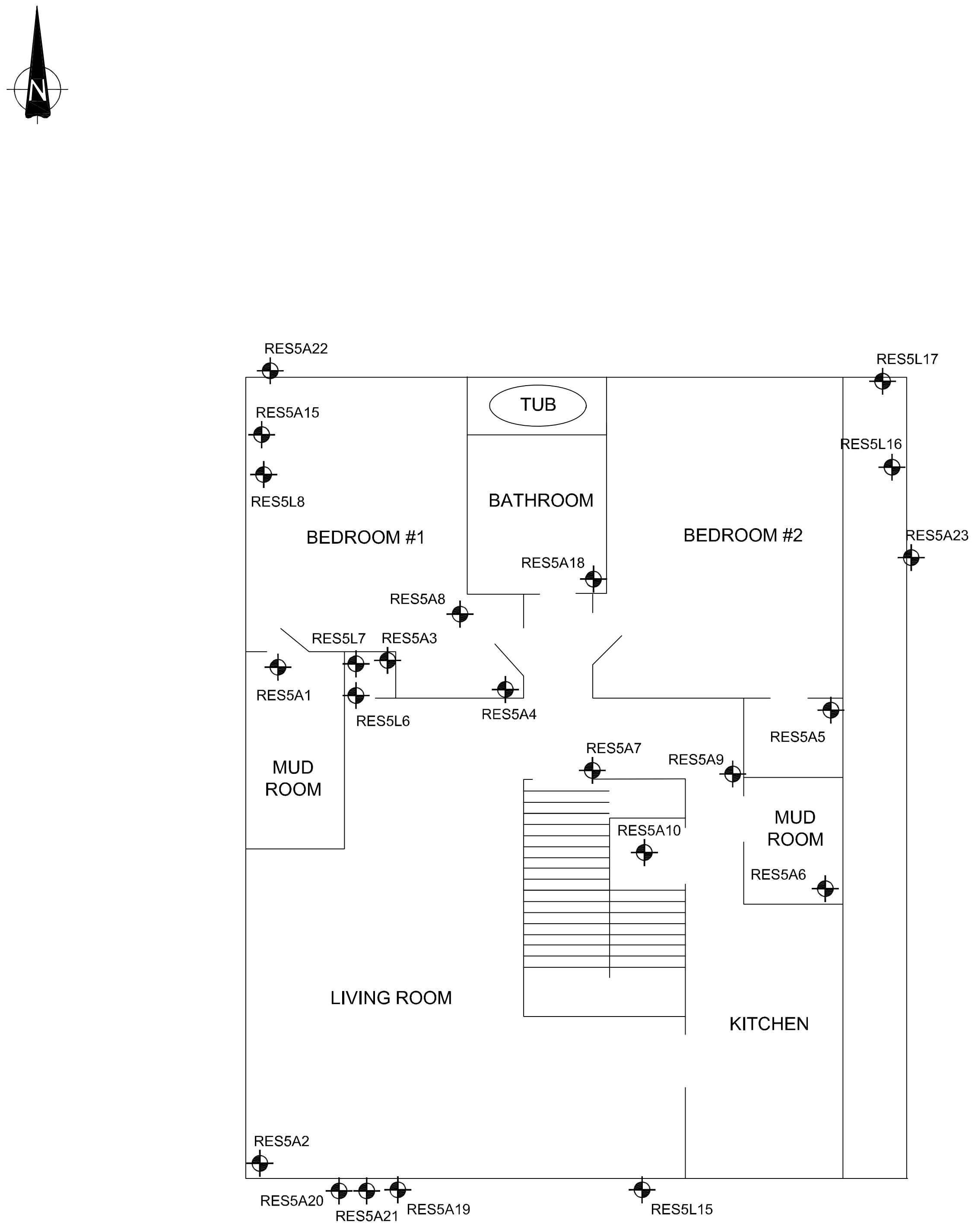
1) BUILDING DIMENSIONS AND SAMPLES
LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE
HOUSE #5 - BASEMENT

Golder Associates

PROJECT No.	06-1437-024		FILE No.
DESIGN	SP	6OCT06	SCALE NTS REV. –
CADD	NV	6OCT06	**FIGURE 14**
CHECK			
REVIEW			



LEGEND

⊕ SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

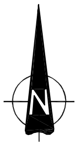
TITLE

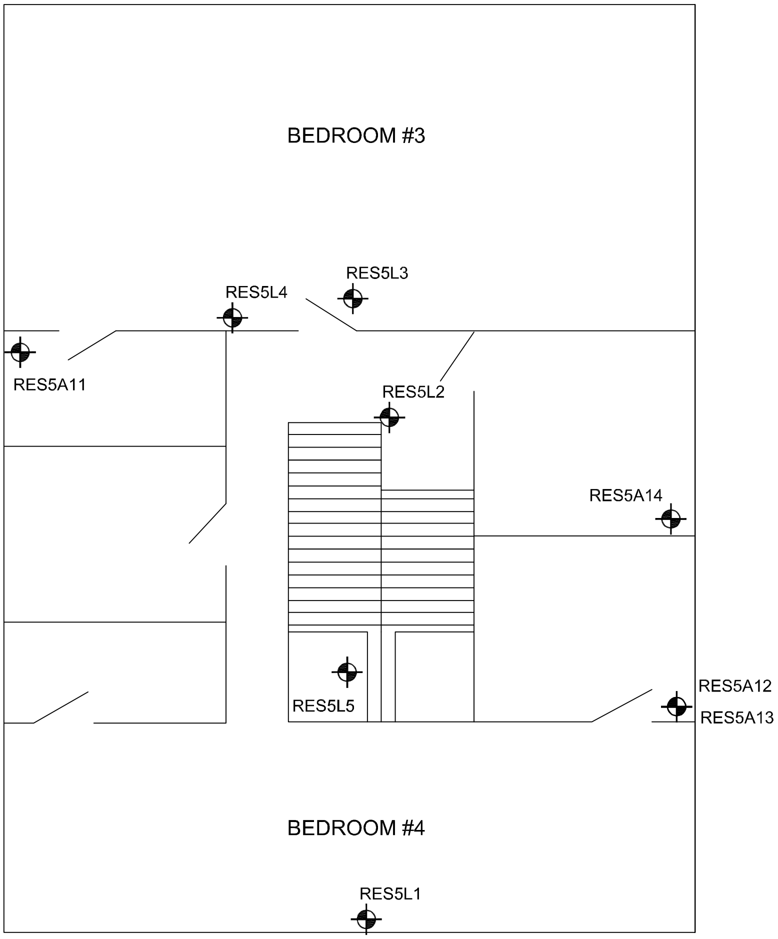
HOUSE #5 - MAIN FLOOR

Golder Associates

PROJECT No.	06-1437-024		FILE No.
DESIGN	SP	6OCT06	SCALE NTS REV. –
CADD	NV	6OCT06	
CHECK			**FIGURE 15**
REVIEW			

REVISION DATE: 06/10/13 09:17AM By: NVeloso CADD FILE: N:\Bur-Graphics\Projects\2006\1437\06-1437-024\Drafting\1000\061437024-1000-A-002-021.dwg





LEGEND

⌖ SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

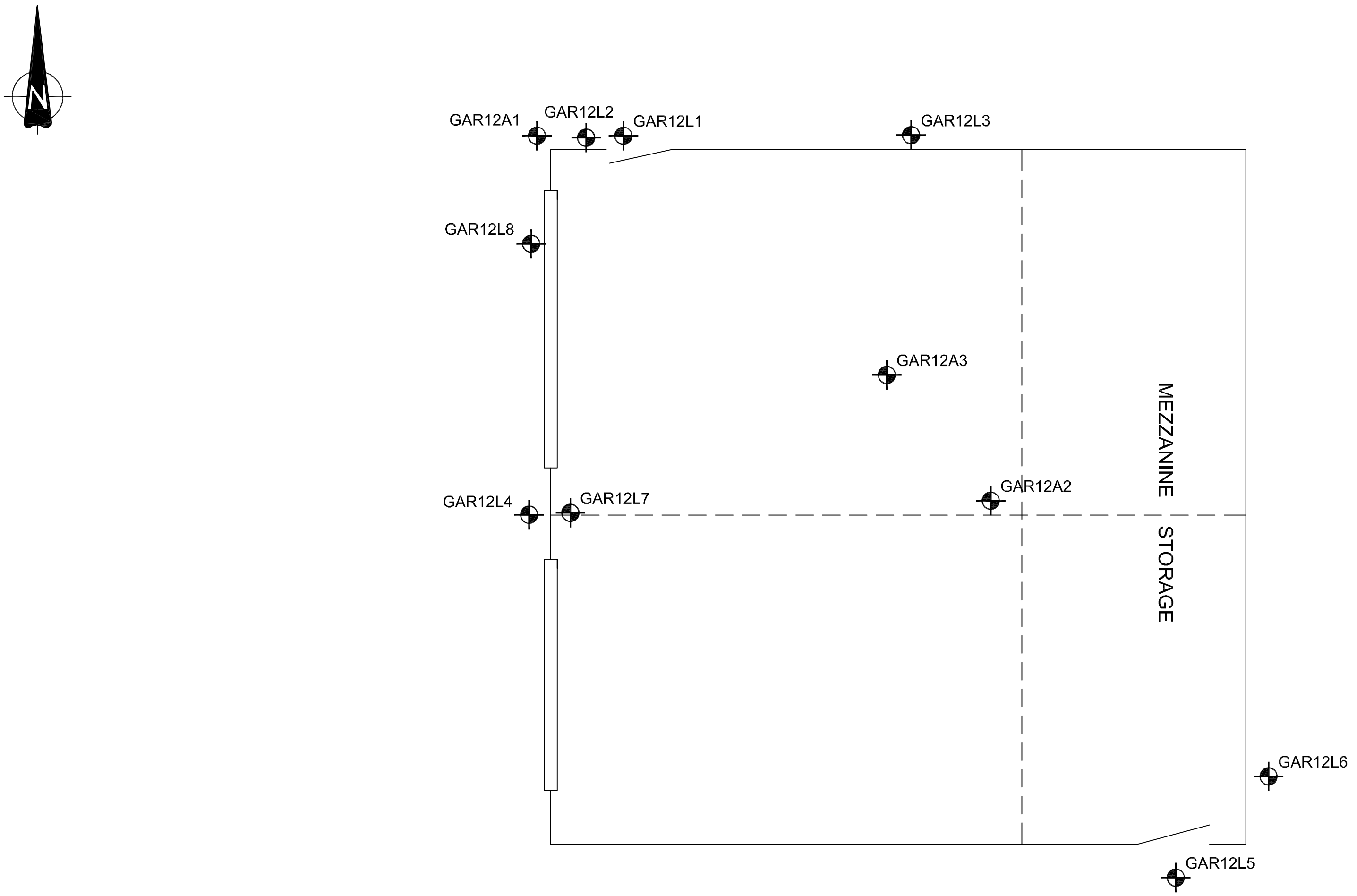
TITLE

HOUSE #5 - SECOND FLOOR

Golder Associates

PROJECT No.	06-1437-024		FILE No.
DESIGN	SP	6OCT06	SCALE NTS REV. -
CADD	NV	6OCT06	**FIGURE 16**
CHECK			
REVIEW			

REVISION DATE: 06/10/13 09:17AM By: NVeloso CADD FILE: N:\Bur-Graphics\Projects\2006\1437\06-1437-024\Drafting\1000\061437024-1000-A-002-021.dwg



LEGEND

⌖	SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

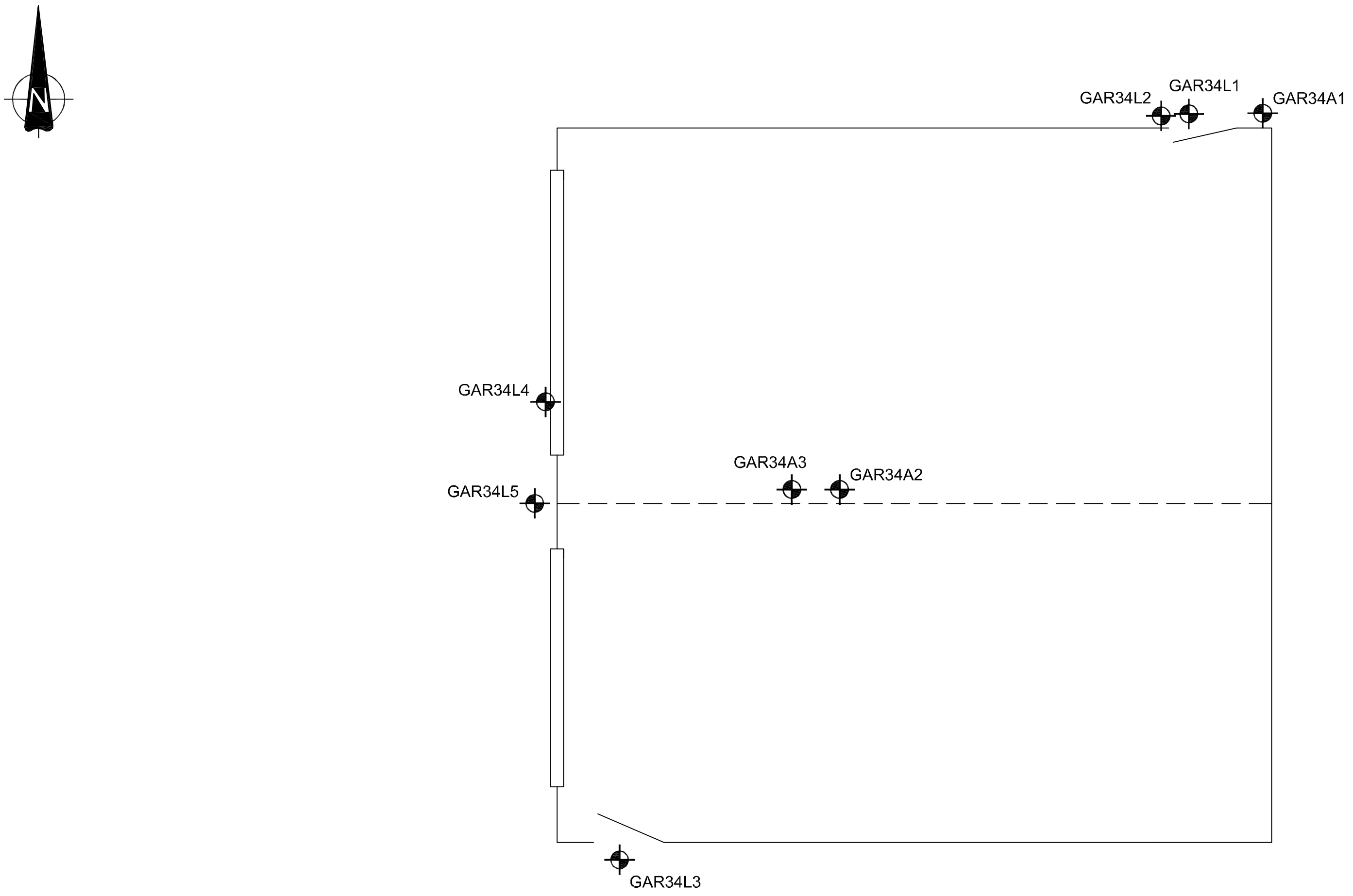
TITLE

GARAGE HOUSE #1 AND #2

Golder Associates

PROJECT No. 06-1437-024			FILE No.
DESIGN	SP	6OCT06	SCALE NTS REV. A
CADD	NV	6OCT06	FIGURE 17
CHECK			
REVIEW			

REVISION DATE: 06/10/13 09:17AM By: NVeloso CADD FILE: N:\Bur-Graphics\Projects\2006\1437\06-1437-024\Drafting\1000\061437024-1000-A-002-021.dwg



LEGEND

⊕ SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

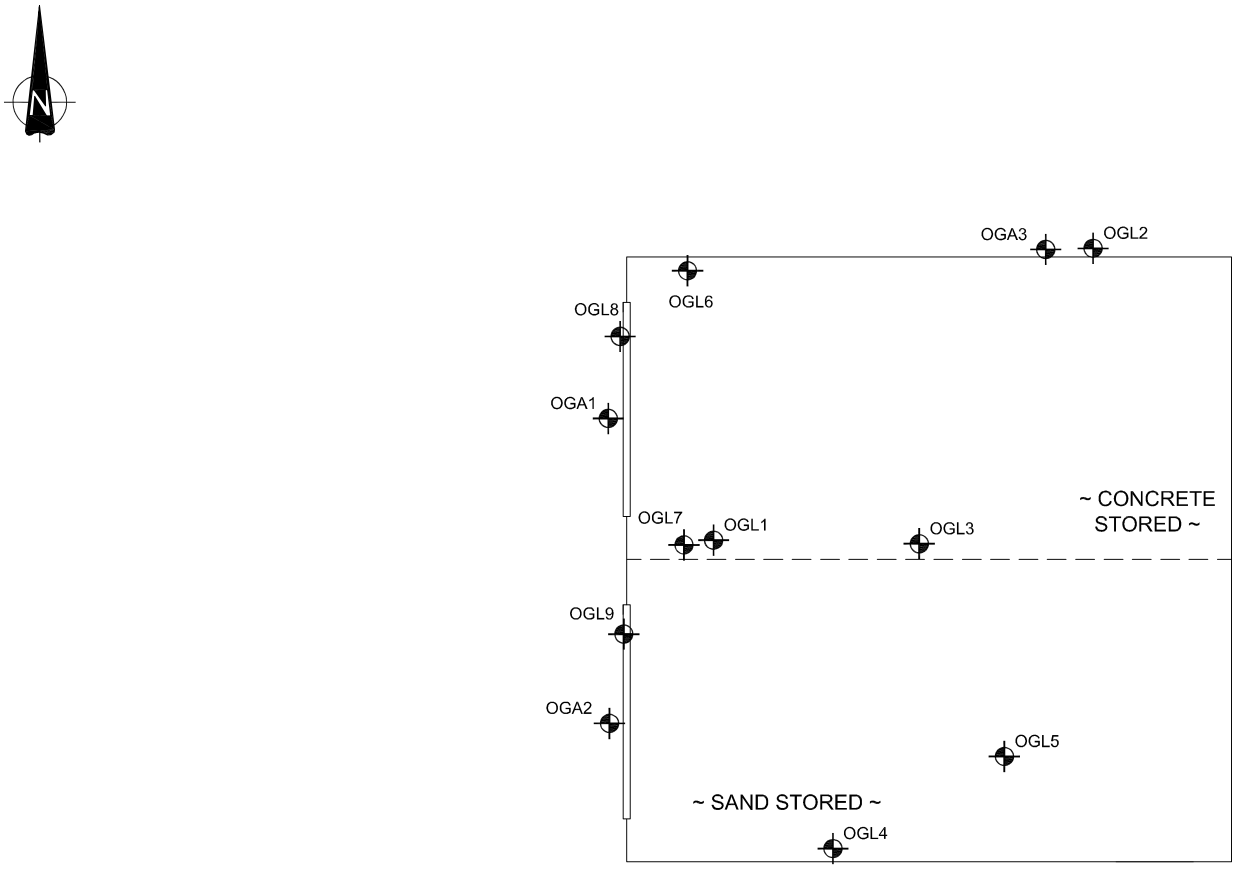
TITLE

GARAGE HOUSE #3 AND #4

Golder Associates

PROJECT No.	06-1437-024		FILE No.	
DESIGN	SP	6OCT06	SCALE NTS	REV. A
CADD	NV	6OCT06	**FIGURE 18**	
CHECK				
REVIEW				

REVISION DATE: 06/10/13 09:17AM By: NVeloso CADD FILE: N:\Bur-Graphics\Projects\2006\1437\06-1437-024\Drafting\1000\061437024-1000-A-002-021.dwg



LEGEND

⊕ SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE

OFFICE GARAGE

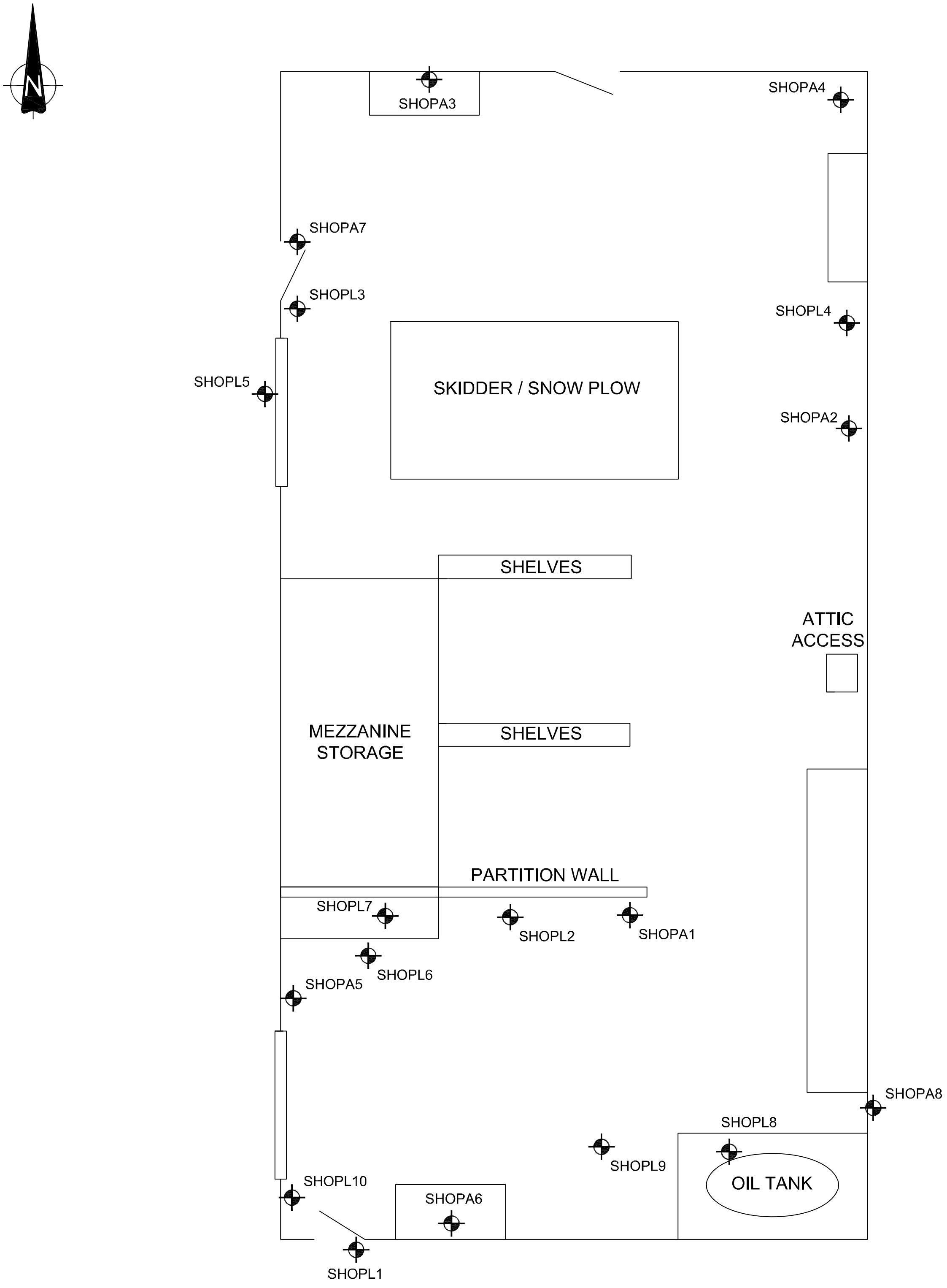
Golder Associates

PROJECT No.	06-1437-024	
DESIGN	SP	6OCT06
CADD	NV	6OCT06
CHECK		
REVIEW		

FILE No.

SCALE NTS REV. A

FIGURE 19



LEGEND

⌖ SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE

MAINTENANCE BUILDING

Golder Associates

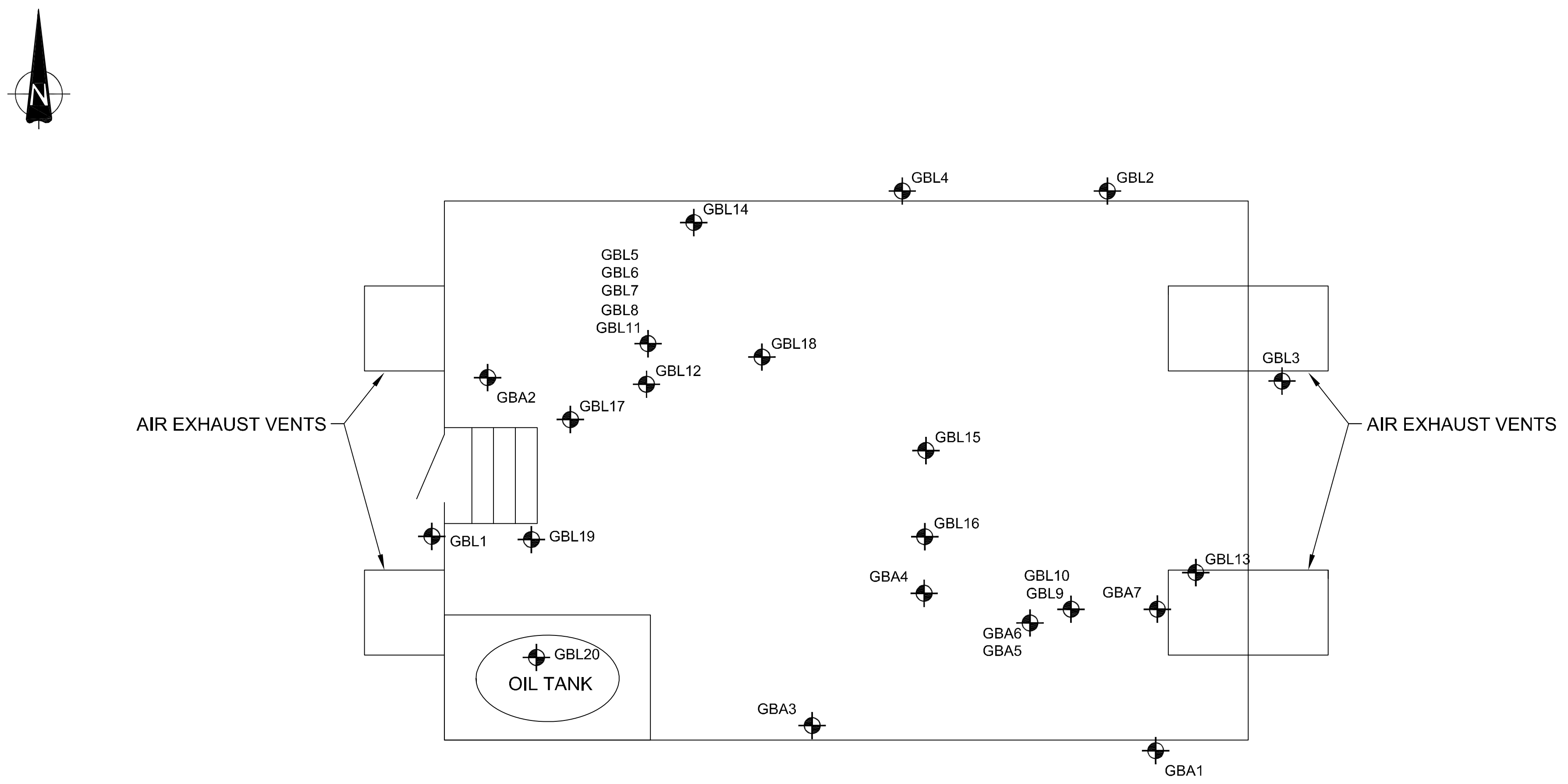
PROJECT No.	06–1437–024	
DESIGN	SP	6OCT06
CADD	NV	6OCT06
CHECK		
REVIEW		

FILE No.
SCALE NTS REV. –

FIGURE 20

REVISION DATE: 06/10/13 09:17AM By: NVeloso CADD FILE: N:\Bur-Graphics\Projects\2006\1437\06-1437-024\Drafting\1000\061437024-1000-A-002-021.dwg

REVISION DATE: 06/10/13 09:17AM By: NVeloso CADD FILE: N:\Bur-Graphics\Projects\2006\1437\06-1437-024\Drafting\1000\061437024-1000-A-002-021.dwg



LEGEND

⊕ SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

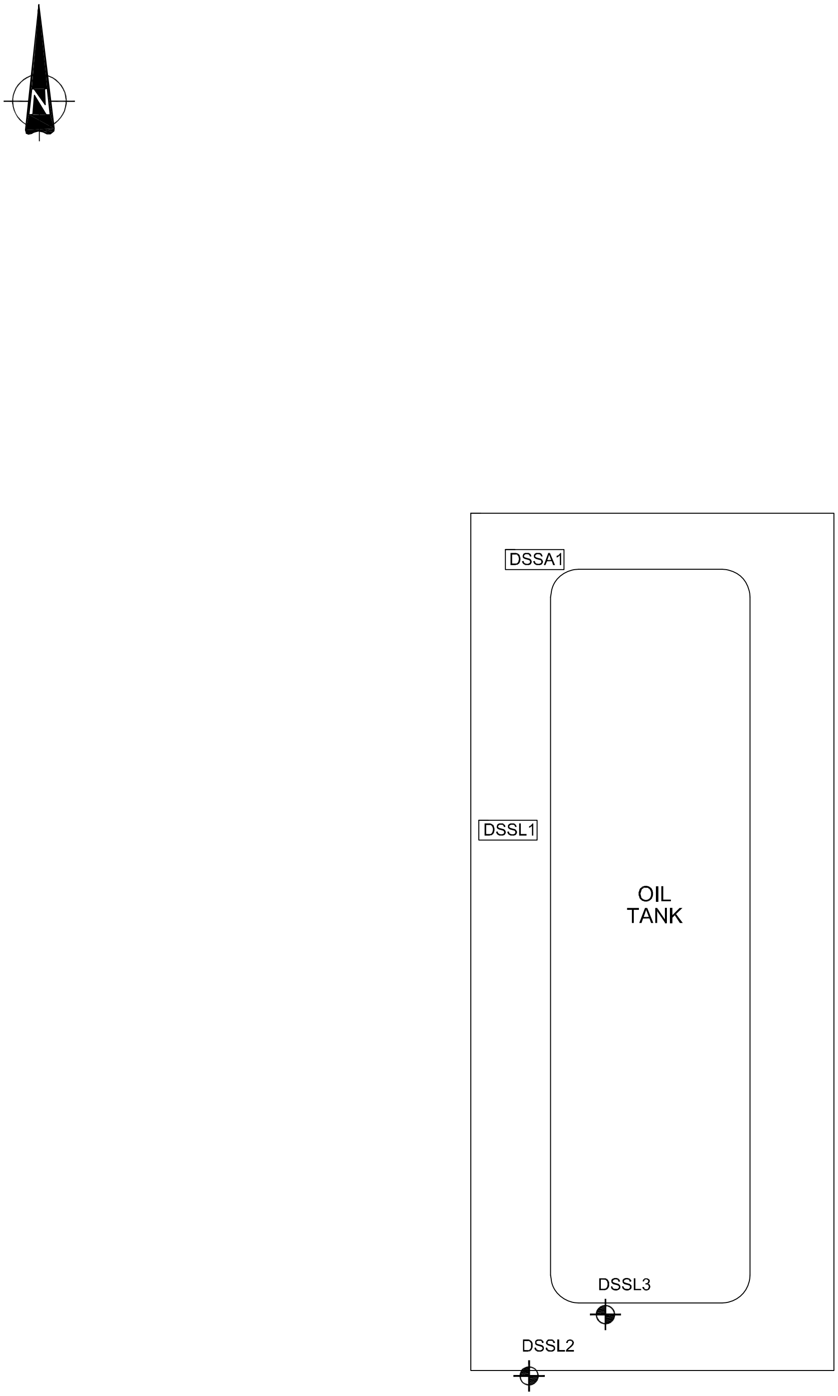
PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE
GENERATOR BUILDING

Golder Associates

PROJECT No.	06-1437-024		FILE No.
DESIGN	SP	6OCT06	SCALE NTS REV. A
CADD	NV	6OCT06	
CHECK			**FIGURE 21**
REVIEW			

REVISION DATE: 06/10/13 09:17AM By: NVeloso CADD FILE: N:\Bur-Graphics\Projects\2006\1437\06-1437-024\Drafting\1000\061437024-1000-A-002-021.dwg



LEGEND

⊕	SAMPLE LOCATION
DSSA1	ROOF SAMPLE LOCATION

NOTES

1) BUILDING DIMENSIONS AND SAMPLES LOCATIONS ARE APPROXIMATE.

PROJECT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
HAZARDOUS BUILDING MATERIALS ASSESSMENT
PLEASANT CAMP PORT OF ENTRY, PLEASANT CAMP, B.C.

TITLE
DIESEL STORAGE BUILDING

Golder Associates

PROJECT No.	06-1437-024		FILE No.		
DESIGN	SP	6OCT06	SCALE	NTS	REV. –
CADD	NV	6OCT06	**FIGURE 22**		
CHECK					
REVIEW					

APPENDIX I

EVALUATION AND RECOMMENDATION CRITERIA FOR CONTROL OF ASBESTOS CONTAINING MATERIALS (ACM)

EVALUATION AND RECOMMENDATION CRITERIA
FOR
CONTROL OF ASBESTOS CONTAINING MATERIALS
(ACM)

1 ASSESSMENT OF CONDITION

A. Spray Applied Fireproofing, Insulation and Texture Finishes

To evaluate the condition of ACM spray applied as fireproofing, thermal insulation, or texture, decorative or acoustic finishes, the following criteria are applied:

GOOD

Surface of material shows no significant signs of damage, deterioration or delamination. Up to 1 percent visible damage to surface is allowed within range of **GOOD**. Evaluation of sprayed fireproofing requires the surveyor to be familiar with the irregular surface texture typical of sprayed asbestos products. **GOOD** condition includes unencapsulated or unpainted fireproofing or texture finishes, where no delamination or damage is observed, and encapsulated fireproofing or texture finishes where the encapsulation has been applied after the damage or fallout occurred.

POOR

Sprayed materials show signs of damage, delamination or deterioration. More than 1 percent damage to surface of ACM spray.

In observation areas where damage exists in isolated locations, both **GOOD** and **POOR** condition may be reported. The extent or percentage of each condition will be recorded on the survey or re-assessment form. **FAIR** condition is not utilized in the evaluation of the sprayed fireproofing, sprayed insulation, or texture coat finishes.

The evaluation of ACM spray applied as fireproofing, non-mechanical thermal insulation, or texture, decorative or acoustic finishes which are present above ceilings, may be limited by the number of observations made, and by building components such as ducts or full height walls that obstruct the above ceiling observations. Persons entering the ceiling are advised to be watchful for ACM **DEBRIS** prior to accessing or working above ceilings in areas of buildings with ACM regardless of the reported condition.

B. Mechanical Insulation

The evaluation of the condition of mechanical insulation (on boilers, breaching, ductwork, piping, tanks, equipment etc.) utilizes the following criteria:

GOOD

Insulation is completely covered in jacketing and exhibits no evidence of damage or deterioration. No insulation is exposed. Includes conditions where the jacketing has minor surface damage (i.e., scuffs or stains), but the jacketing is not penetrated.

FAIR
Minor penetrating damage to jacketed insulation (cuts, tears, nicks, deterioration or delamination) or undamaged insulation that has never been jacketed. Insulation is exposed but not showing surface disintegration. The extent of missing insulation ranges should be minor to none.

POOR
Original insulation jacket is missing, damaged, deteriorated or delaminated. Insulation is exposed and significant areas have been dislodged. Damage cannot be readily repaired.

The evaluation of mechanical insulation may be limited by the number of observations made and building components such as ducts or full height walls that obstruct observations. It is not possible to observe each foot of mechanical insulation from all angles.

C. Non-friable and Potentially Friable Materials

Non-friable materials generally have little potential to release airborne fibres, even when damaged by mechanical breakage. However, some non-friable materials, i.e., exterior asbestos cement products, may have deteriorated so that the binder no longer effectively contains the asbestos fibres. In such cases of significantly deteriorated non-friable material, the material should be treated as a friable product.

2 EVALUATION OF ACCESSIBILITY

The accessibility of building materials known or suspected of being ACM is rated according to the following criteria:

ACCESS (A)
Areas of the building within reach (from floor level) of all building users. Includes areas such as gymnasiums, workshops, and storage areas where activities of the building users may result in disturbance of ACM not normally within reach from floor level.

ACCESS (B)
Frequently entered maintenance areas within reach of maintenance staff, without the need for a ladder. Includes:

{ areas within reach from a fixed ladder or catwalk, i.e., tops of equipment, mezzanines.

{ frequently entered pipe chases, tunnels and service areas.

ACCESS (C) EXPOSED

Areas of the building above 8'-0" where use of a ladder is required to reach the ACM. Only refers to ACM that is exposed to view, from the floor or ladder, without the removal or opening of other building components such as ceiling tiles, or service access door or hatch. Does not include infrequently accessed service areas of the building.

ACCESS (C) CONCEALED

Areas of the building which require the removal of a building component, including lay-in ceilings and access panels into solid ceiling systems. Includes rarely entered crawl spaces, attic spaces, etc. Observations will be limited to the extent visible from the access points.

ACCESS (D)

Areas of the building behind inaccessible solid ceiling systems, walls or mechanical equipment, etc. where demolition of the ceiling, wall or equipment, etc. is required to reach the ACM. Evaluation of condition and extent of ACM is limited or impossible, depending on the surveyor's ability to visually examine materials in ACCESS D.

3 ACM DEBRIS

3.1 **DEBRIS** from Friable ACM

The presence of fallen ACM is noted separately from the presumed friable ACM source (sprayed fireproofing, thermal insulation, texture, decorative or acoustic finishes or mechanical insulation) and is referred to as **DEBRIS**.

3.2 **DEBRIS** from Damaged Non-Friable ACM

The presence of fallen ACM from damaged non-friable ACM is also reported separately from the non-friable ACM source. Only fallen non-friable ACM that has become friable is reported as **DEBRIS**.

The identification of the exact location or presence of **DEBRIS** on the top of ceiling tiles is limited by the number of observations made and the presence of building components such as ducts or full height walls that obstruct observations. Workers are advised to be watchful for the presence of **DEBRIS** prior to accessing or working in proximity to mechanical insulation or above ceilings in areas of buildings with ACM regardless of the reported presence or absence of **DEBRIS**.

4. ACTION MATRIX AND DEFINITIONS

The Asbestos Management Plan requires the following responses:

- Immediately clean-up **DEBRIS** that is likely to be disturbed.
- Remove, repair or enclose friable ACM in **POOR** or **FAIR** condition whose continued deterioration will result in **DEBRIS** that is likely to be disturbed.

The following factors are also considered in making site-specific recommendations for compliance with the regulation and the practical implementation of the Asbestos Management Plan:

i) ACM in **POOR** condition is not routinely repairable.

If an abatement action is necessary, removal is the recommended action (enclosure is a viable option in unusual circumstances).

ii) Mechanical insulation in **FAIR** condition can be repaired or removed based on the following general recommendations applied on a case by case basis (Note: Either repair or removal are legally acceptable options for the treatment of ACM found in **FAIR** condition):

- Repair ACM mechanical insulation found in **FAIR** condition in **ACCESS (B)** or **ACCESS (C EXPOSED)** areas.
- Remove ACM mechanical insulation found in **FAIR** condition in **ACCESS (B)** and **ACCESS (C EXPOSED)** areas, where future damage to the ACM is likely to occur.
- Remove ACM mechanical insulation found in **FAIR** condition with **ACCESS (A)** to eliminate the potential for re-damaging ACM by all building users.

iii) ACM in **GOOD** condition present in **ACCESS (A)** can be managed by surveillance, as long as it is not disturbed by future renovation, maintenance or demolition. However, pro-active removal of the ACM in **ACCESS (A)** should be considered where damage is possible by ongoing occupant activity (accidental or intentional).

iv) Non-friable or manufactured products are considered in the action matrix as follows:

Non-friable or manufactured products reported in **POOR** condition or friable **DEBRIS** resulting from the deterioration of non-friable ACM are treated as friable materials and the appropriate Action, depending on accessibility, is determined from the Action Matrix for friable ACM.

For non-friable or manufactured products reported in **GOOD** condition, Action 7 (surveillance) is recommended regardless of Accessibility.

v) Remove all ACM from a particular area where small quantities of asbestos are present and removal will negate the need for the use of the Asbestos Management Plan in that area.

With these principles in mind the following Action Matrix Tables establish the recommended asbestos control action. Note that factors not included in the above discussion, such as an owner's policy decision to remove material, knowledge of upcoming maintenance, etc., may result in a recommendation that differs from this table. The **ACTIONS** are described in full following the tables.

4.1 Action Matrix Tables

FRIABLE ACM

	CONDITION			
ACCESS	**GOOD**	**FAIR**	**POOR**	**DEBRIS**
(A)	ACTION 5/7[1]	ACTION 5/6[2]	ACTION 3	ACTION 1
(B)	ACTION 7	ACTION 6/5[3]	ACTION 3	ACTION 1
(C) EXPOSED	ACTION 7	ACTION 6	ACTION 4	ACTION 2
(C) CONCEALED	ACTION 7	ACTION 7	ACTION 4	ACTION 2
(D)	ACTION 7	ACTION 7	ACTION 7	ACTION 7

[1] If material in **ACCESS (A)/GOOD** condition is not removed **ACTION 7** is required.

[2] If material in **ACCESS(A)/FAIR** condition is not removed **ACTION 6** is required.

[3] Remove ACM in **ACCESS (B)/FAIR** condition if ACM is likely to be disturbed.

4.2 Action Definitions

ACTION 1 - Immediate Clean-Up of DEBRIS that is Likely to Be Disturbed

Restrict access that is likely to cause a disturbance of the ACM **DEBRIS** and clean up ACM **DEBRIS** immediately. Utilize correct asbestos procedures. This action is required for compliance with regulatory requirements. The surveyor should immediately notify the Asbestos Coordinator of this condition.

ACTION 2 - Type 2 Precautions for Entry into Areas with ACM DEBRIS

At locations where ACM **DEBRIS** can be isolated in lieu of removal or cleaned up, use appropriate means to limit entry to the area. Restrict access to the area to persons utilizing Type 2 asbestos precautions. The precautions will be required until the ACM **DEBRIS** has been cleaned up, and the source of the **DEBRIS** has been stabilized or removed.

ACTION 3 - ACM Removal Required for Compliance

Remove ACM for compliance with regulatory requirements. Utilize asbestos procedures appropriate to the scope of the removal work.

ACTION 4 - Type 2 Precautions for Access into Areas Where ACM is Present and Likely to be Disturbed by Access

Use Type 2 asbestos precautions when entry or access into an area is likely to disturb the ACM. **ACTION 4** must be used until the ACM is removed (Use ACTION 1 or 2 if **DEBRIS** is present).

ACTION 5 - Proactive ACM Removal

Remove ACM in lieu of repair, or at locations where the presence of asbestos in **GOOD** condition is not desirable.

ACTION 6 - ACM Repair

Repair ACM found in **FAIR** condition, and not likely to be damaged again or disturbed by normal use of the area or room. Upon completion of the repair work treat ACM as material in **GOOD** condition and implement **ACTION 7**. If ACM is likely to be damaged or disturbed, during normal use of the area or room, implement **ACTION 5**.

ACTION 7 - Routine Surveillance

Institute routine surveillance of the ACM. Trained workers or contractors must use appropriate asbestos precautions (Type 1, Type 2 or Type 3) during disturbance of the remaining ACM.

APPENDIX II

ASBESTOS BULK SAMPLE LABORATORY REPORTS

IATL International Asbestos Testing Laboratories

16000 Horizon Way Unit 100 Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Golder Associates Ltd.
4260 Still Creek Ave
Burnaby BC V5C 6C6

Report Date: 10/4/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719033
Client No.: CO-A1
Description / Location: Green Vinyl Sheet Flooring
Kitchen

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719034
Client No.: CO-A2
Description / Location: Tan Ceiling Tile; 1"
Washroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Cellulose	15
		55	Mineral Wool	

Lab No.: 2719035
Client No.: CO-A3
Description / Location: White Joint Compound
Office

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any agency of the U.S. government
This report shall not be reproduced except in full, without written approval of the laboratory.

Analysis Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix. Quantification at <0.25% by volume is possible with this method. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed.

Analysis Performed By: S. Robb

Approved By: ____________________
Frank E. Ehrenfeld, III
Laboratory Director

Date: 10/4/2006

IATL International Asbestos Testing Laboratories

16000 Horizon Way Unit 100 Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Golder Associates Ltd.
4260 Still Creek Ave
Burnaby BC V5C 6C6

Report Date: 10/4/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719036
Client No.: CO-A4
Description / Location: Black Rubber Baseboard
Washroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719036
Client No.: CO-A4
Description / Location: Tan Mastic
Washroom
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719037
Client No.: CO-A5
Description / Location: White Joint Compound
Stairwell

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any agency of the U.S. government
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Analysis Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix. Quantification at <0.25% by volume is possible with this method. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed.

Analysis Performed By: S. Robb

Date: 10/4/2006

IATL International Asbestos Testing Laboratories

16000 Horizon Way Unit 100 Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Golder Associates Ltd.
4260 Still Creek Ave
Burnaby BC V5C 6C6

Report Date: 10/4/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719038
Client No.: CO-A6
Description / Location: Black Rubber Stair Tread

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719038
Client No.: CO-A6
Description / Location: Black Mastic
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719039
Client No.: CO-A7
Description / Location: Brown Vinyl Sheet Flooring, 9"
2nd Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	20	Cellulose	80

Lab No.: 2719039
Client No.: CO-A7
Description / Location: Off-White Mastic
2nd Floor
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Method: EPA 600/R-93/116

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Analysis Performed By: S. Robb

Date: 10/4/2006

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719040 **Description / Location:** Tan Joint Compound
Client No.: CO-A8 2nd Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 2.4	Chrysotile	None Detected	None Detected	PC 97.6

Lab No.: 2719041 **Description / Location:** Brown Fibrous
Client No.: CO-A9 Crawl Space, 2nd Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	99	Cellulose	1

Lab No.: 2719041 **Description / Location:** Off-White Fibrous **Layer No.:** 2
Client No.: CO-A9 Crawl Space, 2nd Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Cellulose	70

Lab No.: 2719041 **Description / Location:** Tan Mastic **Layer No.:** 3
Client No.: CO-A9 Crawl Space, 2nd Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719042
Client No.: CO-A10
Description / Location: White Joint Compound
2nd Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719043
Client No.: CO-A11
Description / Location: Off-White Joint Compound
2nd Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719044
Client No.: CO-A12
Description / Location: White Plaster
Firestop At Pipe Penetration, Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719045
Client No.: CO-A13
Description / Location: White Joint Compound
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719046
Client No.: CO-A14
Description / Location: White Caulk
Sealant, Pipe Penetration, Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719047
Client No.: CO-A15
Description / Location: White Joint Compound
Stairwell, Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719048
Client No.: CO-A16
Description / Location: Grey Plaster
Filler, Pipe Penetration

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719049
Client No.: CO-A17
Description / Location: Black Putty
Filler, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
25	Chrysotile	None Detected	None Detected	75

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719050
Client No.: CO-A18
Description / Location: Grey Caulk
Window Sealant, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719051
Client No.: CO-A19
Description / Location: White Caulk
Window Sealant, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719052
Client No.: CO-A20
Description / Location: Grey Putty
Penetration, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
20	Chrysotile	None Detected	None Detected	80

Lab No.: 2719053
Client No.: CO-A21
Description / Location: Lt.Grey Putty
Around Utility Connection

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	2	Cellulose	98

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719368 **Description / Location:** Grey Rubber
Client No.: PH-A1 Weather Stripping, Garage Door

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719369 **Description / Location:** Grey Fibrous
Client No.: PH-A2 Cloth Weather Stripping, Garage Door

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	25	Cellulose	75

Lab No.: 2719370 **Description / Location:** White Caulk
Client No.: PH-A3 Exterior Window

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719371 **Description / Location:** White Caulk
Client No.: PH-A4 Interior Window

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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Analysis Performed By: S. Robb

Approved By:

Frank E. Ehrenfeld, III
Laboratory Director

Date: 10/6/2006

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719372
Client No.: PH-A5

Description / Location: White Caulk Around Door Frame

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719300
Client No.: RES1-A1
Description / Location: White Ceiling Texture
Living Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719301
Client No.: RES1-A2
Description / Location: White Joint Compound
Living Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719302
Client No.: RES1-A3
Description / Location: White Joint Compound
Living Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719303
Client No.: RES1-A4
Description / Location: White Ceiling Texture
Kitchen

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719304
Client No.: RES1-A5
Description / Location: White Joint Compound
Kitchen

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719305
Client No.: RES1-A6
Description / Location: White Joint Compound
Hallway Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719306
Client No.: RES1-A7
Description / Location: Blue/White Vinyl Sheet Flooring
Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	15	Cellulose	84
		1	Fibrous Glass	

Note: Insufficient mastic provided for QC reanalysis.

Lab No.: 2719306
Client No.: RES1-A7
Description / Location: Tan Mastic
Bathroom
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Note: Insufficient mastic provided for QC reanalysis.

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719307
Client No.: RES1-A8
Description / Location: Grey Vinyl Sheet Flooring
Under (RES1-A7)

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719307
Client No.: RES1-A8
Description / Location: Tan Mastic
Under (RES1-A7)
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719308
Client No.: RES1-A9
Description / Location: White Ceiling Texture
Bedroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719309
Client No.: RES1-A10
Description / Location: White Joint Compound
Hallway Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719310
Client No.: RES1-A11
Description / Location: White Joint Compound
Bedroom Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719311
Client No.: RES1-A12
Description / Location: White Joint Compound
Ensuite Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719312
Client No.: RES1-A13
Description / Location: White Joint Compound
Bedroom Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719313
Client No.: RES1-A14
Description / Location: Off-White Pipe Elbow Insulation

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Fibrous Glass	70

Lab No.: 2719313
Client No.: RES1-A14
Description / Location: White/Tan/Grey Pipe Elbow Insulation
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	75	Cellulose	20
		5	Fibrous Glass	

Lab No.: 2719314
Client No.: RES1-A15
Description / Location: White/Tan/Grey Pipe Run Insulation

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	65	Cellulose	25
		10	Fibrous Glass	

Lab No.: 2719315
Client No.: RES1-A16
Description / Location: White Joint Compound
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719316
Client No.: RES1-A17
Description / Location: White Joint Compound
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719317
Client No.: RES1-A18
Description / Location: White/Tan Sheetrock
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	65	Cellulose	35

Lab No.: 2719317
Client No.: RES1-A18
Description / Location: White Joint Compound
Basement
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719318
Client No.: RES1-A19
Description / Location: White Joint Compound
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Method: EPA 600/R-93/116

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Analysis Performed By: S. Robb

Date: 10/5/2006

IATL International Asbestos Testing Laboratories

16000 Horizon Way Unit 100 Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Golder Associates Ltd.
4260 Still Creek Ave
Burnaby BC V5C 6C6

Report Date: 10/5/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719319
Client No.: RES1-A20
Description / Location: Grey Floor Tile; 12" Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 2.1	Chrysotile	None Detected	None Detected	PC 97.9

Lab No.: 2719319
Client No.: RES1-A20
Description / Location: Black Mastic Basement
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719320
Client No.: RES1-A21
Description / Location: Tan Pipe Elbow Insulation Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Fibrous Glass	70

Lab No.: 2719321
Client No.: RES1-A22
Description / Location: Brown Fibrous Duct Tape, Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	25	Cellulose	75

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Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719322
Client No.: RES1-A23
Description / Location: White Joint Compound
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719323
Client No.: RES1-A24
Description / Location: Black Putty
Flashing Sealant, Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.8	Chrysotile	None Detected	None Detected	PC 98.2

Lab No.: 2719324
Client No.: RES1-A25
Description / Location: Black Tar
Flashing, Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	Trace	Cellulose	100
		Trace	Fibrous Glass	

Lab No.: 2719325
Client No.: RES1-A26
Description / Location: White Caulk
Flashing Sealant, Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719326
Client No.: RES1-A27
Description / Location: Black Tar
Flashing Sealant, Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 4.4	Chrysotile	None Detected	None Detected	PC 95.6

Lab No.: 2719327
Client No.: RES1-A28
Description / Location: White Caulk
Window Sealant, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719328
Client No.: RES1-A29
Description / Location: White Caulk
Sealant, Electrical Connection, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719329
Client No.: RES1-A30
Description / Location: Grey Putty
Electrical Connection, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
20	Chrysotile	None Detected	None Detected	80

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Date: 10/5/2006

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719330
Client No.: RES1-A31
Description / Location: White Caulk
Sealant Around Vent, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719331
Client No.: RES1-A32
Description / Location: White Caulk
SealantAroundPipePenetrations,Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719332
Client No.: RES1-A33
Description / Location: White Caulk
Pipe Thread Sealant, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719333
Client No.: RES1-A34
Description / Location: Black/Brown Tar Paper
Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	85	Cellulose	15

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Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719114 **Description / Location:** White Joint Compound
Client No.: RES2-A1 Living Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719115 **Description / Location:** White Ceiling Texture
Client No.: RES2-A2 Kitchen

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	15	Cellulose	85

Lab No.: 2719116 **Description / Location:** White Joint Compound
Client No.: RES2-A3 Hallway Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719117 **Description / Location:** White Ceiling Texture
Client No.: RES2-A4 Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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Analysis Performed By: S. Robb

Approved By:

Frank E. Ehrenfeld, III
Laboratory Director

Date: 10/5/2006

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719118 **Description / Location:** White Joint Compound
Client No.: RES2-A5 Bedroom Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719119 **Description / Location:** White Joint Compound
Client No.: RES2-A6 Bedroom Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719120 **Description / Location:** White Joint Compound
Client No.: RES2-A7 Bedroom Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719121
Client No.: RES2-A8
Description / Location: White/Blue Vinyl Sheet Flooring
Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719121
Client No.: RES2-A8
Description / Location: Tan Mastic
Bathroom
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719122
Client No.: RES2-A9
Description / Location: Grey Vinyl Sheet Flooring
Bathroom, Under (RES2-A8)

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719122
Client No.: RES2-A9
Description / Location: Tan Mastic
Bathroom, Under (RES2-A8)
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719123
Client No.: RES2-A10
Description / Location: Brown Vinyl Sheet Flooring
Stair Landing

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
20	Chrysotile	1	Cellulose	79

Lab No.: 2719124
Client No.: RES2-A11
Description / Location: Grey Vinyl Sheet Flooring
Ensuite

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719124
Client No.: RES2-A11
Description / Location: Tan Mastic
Ensuite
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719125
Client No.: RES2-A12
Description / Location: Tan/Brown Floor Tile; 12" Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 3.8	Chrysotile	None Detected	None Detected	PC 96.2

Lab No.: 2719125
Client No.: RES2-A12
Description / Location: Black Mastic Basement
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719126
Client No.: RES2-A13
Description / Location: Tan/Off-White Wrap Pipe Elbow, Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	35	Fibrous Glass	65

Lab No.: 2719126
Client No.: RES2-A13
Description / Location: Tan Insulation Pipe Elbow, Basement
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	99	Mineral Wool	1

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719127
Client No.: RES2-A14
Description / Location: Grey/Tan Wrap
Pipe Elbow, Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	65	Cellulose	20
		15	Fibrous Glass	

Lab No.: 2719127
Client No.: RES2-A14
Description / Location: Yellow Insulation
Pipe Elbow, Basement
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	99	Mineral Wool	1

Lab No.: 2719128
Client No.: RES2-A15
Description / Location: Off-White/Brown Fibrous
Splash Guard, Behind Freezer, Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	85	Cellulose	15

Lab No.: 2719129
Client No.: RES2-A16
Description / Location: White Joint Compound
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719130 **Description / Location:** White Joint Compound
Client No.: RES2-A17 Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719131 **Description / Location:** White Joint Compound
Client No.: RES2-A18 Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719132 **Description / Location:** White Joint Compound
Client No.: RES2-A19 Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719133 **Description / Location:** White Joint Compound
Client No.: RES2-A20 Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719134
Client No.: RES2-A21
Description / Location: Black Putty
Perimeter Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.6	Chrysotile	None Detected	None Detected	PC 98.4

Lab No.: 2719135
Client No.: RES2-A22
Description / Location: Black Tar
Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719136
Client No.: RES2-A23
Description / Location: White Caulk
Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719137
Client No.: RES2-A24
Description / Location: White Caulk
Window Sealant, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Performed By: S. Robb

Date: 10/5/2006

IATL International Asbestos Testing Laboratories

16000 Horizon Way Unit 100 Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Golder Associates Ltd.
4260 Still Creek Ave
Burnaby BC V5C 6C6

Report Date: 10/5/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719138
Client No.: RES2-A25
Description / Location: Grey Putty
Utility Box, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
55	Chrysotile	None Detected	None Detected	45

Lab No.: 2719139
Client No.: RES2-A26
Description / Location: White Caulk
Sealant, Utility Box, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719140
Client No.: RES2-A27
Description / Location: Black/Brown Tar Paper
Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	80	Cellulose	20

Lab No.: 2719141
Client No.: RES2-A28
Description / Location: White Caulk
Sealant Around Vents, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719142
Client No.: RES2-A29
Description / Location: White Caulk
Sealant, Pipe Penetrations, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719143
Client No.: RES2-A30
Description / Location: White Caulk
Pipe Thread Sealant, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719334
Client No.: RES3-A1
Description / Location: Off-White Joint Compound
Bedroom Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 0.75	Chrysotile	None Detected	None Detected	PC 99.25

Lab No.: 2719335
Client No.: RES3-A2
Description / Location: White Ceiling Texture
Kitchen

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719336
Client No.: RES3-A3
Description / Location: White Ceiling Texture
Ensuite

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719337
Client No.: RES3-A4
Description / Location: White Joint Compound
Bedroom Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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Analysis Performed By: S. Robb

Date: 10/4/2006

Approved By:

Frank E. Ehrenfeld, III
Laboratory Director

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719338
Client No.: RES3-A5
Description / Location: White Joint Compound
Bedroom Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719339
Client No.: RES3-A6
Description / Location: White Joint Compound
Hallway Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719340
Client No.: RES3-A7
Description / Location: White Joint Compound
Living Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719341
Client No.: RES3-A8
Description / Location: Grey Vinyl Sheet Flooring
Bathroom, Under RES3-A9

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719341
Client No.: RES3-A8
Description / Location: Tan Mastic
Bathroom, Under RES3-A9
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719342
Client No.: RES3-A10
Description / Location: White Joint Compound
Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719343
Client No.: RES3-A11
Description / Location: White Caulk
Bathtub Sealant, Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719344
Client No.: RES3-A12
Description / Location: White Joint Compound
Hallway Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719345
Client No.: RES3-A13
Description / Location: Brown Vinyl Sheet Flooring
Stair Landing

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
20	Chrysotile	1	Cellulose	79

Lab No.: 2719346
Client No.: RES3-A14
Description / Location: Grey/Tan Insulation
Pipe Elbow, Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	55	Cellulose	25
		20	Fibrous Glass	

Lab No.: 2719347
Client No.: RES3-A15
Description / Location: Grey/Tan Insulation
Pipe Elbow, Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Fibrous Glass	70

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719348 **Description / Location:** Tan Fibrous/Debris
Client No.: RES3-A16 Stair Landing Wall Cavity

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	10	Mineral Wool	10
		80	Cellulose	

Note: Not building material. 1% threshold may not apply.

Lab No.: 2719349 **Description / Location:** Grey/Green Fibrous
Client No.: RES3-A17 Duct Tape

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	20	Cellulose	80

Lab No.: 2719350 **Description / Location:** Grey/Tan Insulation
Client No.: RES3-A18 Pipe Run

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	55	Cellulose	25
		20	Fibrous Glass	

Lab No.: 2719350 **Description / Location:** Yellow Insulation **Layer No.:** 2
Client No.: RES3-A18 Pipe Run

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	98	Mineral Wool	2

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719351
Client No.: RES3-A19
Description / Location: White Joint Compound
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719352
Client No.: RES3-A20
Description / Location: White Joint Compound
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719353
Client No.: RES3-A21
Description / Location: White Joint Compound
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719354
Client No.: RES3-A22
Description / Location: White Joint Compound
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719355
Client No.: RES3-A23
Description / Location: Grey/Blue Floor Tile
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719355
Client No.: RES3-A23
Description / Location: Tan/Black Mastic
Basement
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719356
Client No.: RES3-A24
Description / Location: Black Mastic
Around Sump Pump Opening, Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	Trace	Cellulose	100

Lab No.: 2719357
Client No.: RES3-A25
Description / Location: Tan/Black Fibrous
Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	99	Cellulose	1

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719358
Client No.: RES3-A26
Description / Location: White Caulk
Window Sealant, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719359
Client No.: RES3-A27
Description / Location: Grey Putty
Electrical Connection, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
20	Chrysotile	None Detected	None Detected	80

Lab No.: 2719360
Client No.: RES3-A28
Description / Location: Brown Rubber; Gasket
Electrical Connection Housing, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719361
Client No.: RES3-A29
Description / Location: White Caulk
Sealant Around Vent, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719362
Client No.: RES3-A30
Description / Location: Off-White Caulk
Pipe Thread Sealant, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719363
Client No.: RES3-A31
Description / Location: Black Tar
Chimney, Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	10	Cellulose	90

Lab No.: 2719364
Client No.: RES3-A32
Description / Location: Black Tar
Flashing & Vents, Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
10	Chrysotile	None Detected	None Detected	90

Lab No.: 2719365
Client No.: RES3-A33
Description / Location: White Caulk
On Flashing, Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719366
Client No.: RES3-A34
Description / Location: Black Putty
Roof Perimeter

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.4	Chrysotile	None Detected	None Detected	PC 98.6

Lab No.: 2719367
Client No.: RES3-A9
Description / Location: Blue Vinyl Sheet Flooring
Additional Sample Received

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	15	Cellulose	84
		1	Fibrous Glass	

Lab No.: 2719367
Client No.: RES3-A9
Description / Location: Tan Mastic
Additional Sample Received
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

Analysis Method: EPA 600/R-93/116

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Analysis Performed By: S. Robb

Date: 10/5/2006

IATL **International Asbestos Testing Laboratories**

16000 Horizon Way Unit 100 Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Golder Associates Ltd.
4260 Still Creek Ave
Burnaby BC V5C 6C6

Report Date: 10/6/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719224
Client No.: RES4-A1
Description / Location: White Ceiling Texture
Dining Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719225
Client No.: RES4-A2
Description / Location: White Joint Compound
Dining Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719226
Client No.: RES4-A3
Description / Location: White Vinyl Sheet Flooring
Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	15	Cellulose	84
		1	Fibrous Glass	

Lab No.: 2719226
Client No.: RES4-A3
Description / Location: Tan Mastic
Bathroom
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Performed By: S. Robb

Approved By:

Frank E. Ehrenfeld, III
Laboratory Director

Date: 10/6/2006

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719227
Client No.: RES4-A4
Description / Location: Grey Vinyl Sheet Flooring
Bathroom, Under RES4-A3

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719227
Client No.: RES4-A4
Description / Location: Tan Mastic
Bathroom, Under RES4-A3
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719228
Client No.: RES4-A5
Description / Location: White Joint Compound
Bedroom Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719229
Client No.: RES4-A6
Description / Location: White Joint Compound
Bedroom Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719230
Client No.: RES4-A7
Description / Location: White Joint Compound
Bedroom Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719231
Client No.: RES4-A8
Description / Location: White Joint Compound
Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719232
Client No.: RES4-A9
Description / Location: White Ceiling Texture
Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719233
Client No.: RES4-A10
Description / Location: White Ceiling Texture
Stairwell

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719234 **Description / Location:** White Joint Compound
Client No.: RES4-A11 Hallway Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719235 **Description / Location:** Grey Floor Tile, 12"
Client No.: RES4-A12 Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 2.6	Chrysotile	None Detected	None Detected	PC 97.4

Lab No.: 2719235 **Description / Location:** Black Mastic **Layer No.:** 2
Client No.: RES4-A12 Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719235 **Description / Location:** Grey Floor Filler **Layer No.:** 3
Client No.: RES4-A12 Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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Date: 10/6/2006

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Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719236
Client No.: RES4-A13
Description / Location: Grey Wrap
Pipe Elbow, Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	25	Fibrous Glass	75

Lab No.: 2719236
Client No.: RES4-A13
Description / Location: Yellow Insulation
Pipe Elbow, Basement
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	98	Mineral Wool	2

Lab No.: 2719237
Client No.: RES4-A14
Description / Location: Grey/Tan Insulation
Pipe Run, Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	65	Cellulose	20
		15	Fibrous Glass	

Lab No.: 2719238
Client No.: RES4-A15
Description / Location: White Joint Compound
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719239
Client No.: RES4-A16
Description / Location: White Joint Compound
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719240
Client No.: RES4-A17
Description / Location: White Joint Compound
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719241
Client No.: RES4-A18
Description / Location: White Joint Compound
Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719242
Client No.: RES4-A19
Description / Location: Brown Vinyl Sheet Flooring
Stair Landing

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
20	Chrysotile	1	Cellulose	79

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CERTIFICATE OF ANALYSIS

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Burnaby BC V5C 6C6

Report Date: 10/6/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719243
Client No.: RES4-A20
Description / Location: Black Caulk
Perimeter Roof/Flashing

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.2	Chrysotile	None Detected	None Detected	PC 98.8

Lab No.: 2719244
Client No.: RES4-A21
Description / Location: Black Tar
Roof Peak

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	15	Cellulose	85

Lab No.: 2719245
Client No.: RES4-A22
Description / Location: Black/Grey Caulk
Vent Sealant, Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
PC 1.4	Chrysotile	None Detected	None Detected	PC 98.6

Lab No.: 2719246
Client No.: RES4-A23
Description / Location: White Caulk
Sealant, Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Burnaby BC V5C 6C6

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719247
Client No.: RES4-A24
Description / Location: White Caulk
Window Sealant, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719248
Client No.: RES4-A25
Description / Location: Grey Caulk
Sealant Around Utility Box, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719249
Client No.: RES4-A26
Description / Location: White Caulk
SealantAroundPipePenetrations,Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719250
Client No.: RES4-A27
Description / Location: Off-White Caulk
Pipe Thread Sealant, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719251
Client No.: RES4-A28

Description / Location: Brown/Black Tar Paper
Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	75	Cellulose	25

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719198
Client No.: RES5-A1
Description / Location: Tan/Brown Vinyl Sheet Flooring
Mud Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
20	Chrysotile	1	Cellulose	79

Lab No.: 2719199
Client No.: RES5-A2
Description / Location: White Plaster
Living Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719200
Client No.: RES5-A3
Description / Location: White Plaster
Mud Room Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719201
Client No.: RES5-A4
Description / Location: White Plaster
Bedroom Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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Date: 10/5/2006

Approved By:

Frank E. Ehrenfeld, III
Laboratory Director

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719202
Client No.: RES5-A5
Description / Location: White Plaster
Bedroom Closet

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719203
Client No.: RES5-A6
Description / Location: White Plaster
Mud Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719204
Client No.: RES5-A7
Description / Location: White Plaster
Stairwell Ceiling

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719205
Client No.: RES5-A8
Description / Location: Tan/Brown Floor Tile; 9" Bedroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	15	Cellulose	85

Lab No.: 2719205
Client No.: RES5-A8
Description / Location: Black Mastic/Mat Bedroom
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	55	Cellulose	45

Lab No.: 2719206
Client No.: RES5-A9
Description / Location: Tan/Brown Floor Tile; 9" Hallway

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	15	Cellulose	85

Lab No.: 2719206
Client No.: RES5-A9
Description / Location: Black Mastic/Mat Hallway
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	55	Cellulose	45

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Analysis Performed By: S. Robb

Date: 10/5/2006

CERTIFICATE OF ANALYSIS

Client: Golder Associates Ltd.
4260 Still Creek Ave
Burnaby BC V5C 6C6

Report Date: 10/6/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719207
Client No.: RES5-A10
Description / Location: Black Rubber Base Board
Stairwell

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719208
Client No.: RES5-A11
Description / Location: Tan/Brown Floor Tile; 9"
Bedroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	15	Cellulose	85

Lab No.: 2719208
Client No.: RES5-A11
Description / Location: Black Mastic/Mat
Bedroom
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	55	Cellulose	45

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Performed By: S. Robb

Date: 10/5/2006

IATL **International Asbestos Testing Laboratories**

16000 Horizon Way Unit 100 Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Golder Associates Ltd.
4260 Still Creek Ave
Burnaby BC V5C 6C6

Report Date: 10/6/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719209
Client No.: RES5-A12
Description / Location: Tan/Red Floor Tile; 9"
Bedroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	15	Cellulose	85

Lab No.: 2719209
Client No.: RES5-A12
Description / Location: Black Mastic/Mat
Bedroom
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	55	Cellulose	45

Lab No.: 2719210
Client No.: RES5-A13
Description / Location: White Plaster
Bedroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719211
Client No.: RES5-A14
Description / Location: White Plaster
Bedroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Date: 10/5/2006

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Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client:	Golder Associates Ltd. 4260 Still Creek Ave Burnaby BC V5C 6C6			
		Report Date:	10/6/2006	
		Project:	Pleasant Camp	
		Project No.:	06-1437-024	

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719212
Client No.: RES5-A15
Description / Location: White Caulk
Window Sealant, Interior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719213
Client No.: RES5-A16
Description / Location: Grey Plaster
Filler, Duct Penetration, Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	20	Wollastonite	80

Lab No.: 2719214
Client No.: RES5-A17
Description / Location: Black/Grey Insulation
Around Pipe Penetration, Basement

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	98	Mineral Wool	2

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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4260 Still Creek Ave
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Report Date: 10/6/2006
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Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719215
Client No.: RES5-A18
Description / Location: Grey Rubber Baseboard
Bathroom

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719215
Client No.: RES5-A18
Description / Location: Tan Mastic
Bathroom
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719216
Client No.: RES5-A19
Description / Location: Grey Putty
At Pipe Penetration, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
45	Chrysotile	None Detected	None Detected	55

Lab No.: 2719217
Client No.: RES5-A20
Description / Location: White Caulk
Sealant, Pipe Penetration, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Burnaby BC V5C 6C6

Report Date: 10/6/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719218
Client No.: RES5-A21
Description / Location: White Caulk
Sealant, Service Box, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719218
Client No.: RES5-A21 ✓
Description / Location: Grey Putty
Sealant, Service Box, Exterior
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
25	Chrysotile	None Detected	None Detected	75

Lab No.: 2719219
Client No.: RES5-A22
Description / Location: Lt.Grey Putty
Window, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected ✓	None Detected	None Detected	100

Lab No.: 2719220
Client No.: RES5-A23
Description / Location: White Caulk
Sealant, Metal Cladding, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected ✓	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Report Date: 10/6/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719297
Client No.: GAR12-A1
Description / Location: Black Tar Paper Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	55	Cellulose	45

Lab No.: 2719298
Client No.: GAR12-A2
Description / Location: Grey Mastic Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719299
Client No.: GAR12-A3
Description / Location: Black Tar Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
10	Chrysotile	None Detected	None Detected	90

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Performed By: S. Robb

Date: 10/6/2006

Approved By:

Frank E. Ehrenfeld, III
Laboratory Director

IATL **International Asbestos Testing Laboratories**

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CERTIFICATE OF ANALYSIS

Client: Golder Associates Ltd.
4260 Still Creek Ave
Burnaby BC V5C 6C6

Report Date: 10/4/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719221
Client No.: GAR34-A1
Description / Location: Black Tar Paper
Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	55	Cellulose	45

Lab No.: 2719222
Client No.: GAR34-A2
Description / Location: White Caulk
Roofing Sealant

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719223
Client No.: GAR34-A3
Description / Location: Grey Caulk
Roofing

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719223
Client No.: GAR34-A3
Description / Location: Black Tar
Roofing
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Approved By:

Frank E. Ehrenfeld, III
Laboratory Director

Date: 10/4/2006

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4260 Still Creek Ave
Burnaby BC V5C 6C6

Report Date: 10/6/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719188
Client No.: OG-A1
Description / Location: Black Rubber
Weather Stripping, Garage Door

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719189
Client No.: OG-A2
Description / Location: Grey Rubber
Weather Stripping, Garage Door

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719190
Client No.: OG-A3
Description / Location: Off-White Glazing
Window, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Date: 10/6/2006

Approved By:

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Laboratory Director

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CERTIFICATE OF ANALYSIS

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4260 Still Creek Ave
Burnaby BC V5C 6C6

Report Date: 10/4/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719106 **Description / Location:** White Joint Compound
Client No.: SHOP-A1

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719107 **Description / Location:** Off-White Joint Compound
Client No.: SHOP-A2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719108 **Description / Location:** White Joint Compound
Client No.: SHOP-A3

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719109 **Description / Location:** White Joint Compound
Client No.: SHOP-A4

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

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Analysis Performed By: S. Robb

Approved By: ______________________

Frank E. Ehrenfeld, III
Laboratory Director

Date: 10/4/2006

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4260 Still Creek Ave
Burnaby BC V5C 6C6

Report Date: 10/4/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719110
Client No.: SHOP-A5
Description / Location: White Joint Compound

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719111
Client No.: SHOP-A6
Description / Location: White Joint Compound

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719112
Client No.: SHOP-A7
Description / Location: White Joint Compound

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719113
Client No.: SHOP-A8
Description / Location: White Caulk
Sealant At Penetrations, Exterior

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

Analysis Method: EPA 600/R-93/116

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Date: 10/4/2006

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Burnaby BC V5C 6C6

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719191
Client No.: GB-A1
Description / Location: Tan Caulk
Gasket, Service Utility

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719192
Client No.: GB-A2
Description / Location: Off-White Mastic

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719192
Client No.: GB-A2
Description / Location: Yellow Insulation
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	99	Mineral Wool	1

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Approved By: ____________

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Laboratory Director

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4260 Still Creek Ave
Burnaby BC V5C 6C6

Report Date: 10/4/2006
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Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719193
Client No.: GB-A3
Description / Location: Black Mastic

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 2719193
Client No.: GB-A3
Description / Location: Yellow Insulation
Layer No.: 2

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	99	Mineral Wool	1

Lab No.: 2719194
Client No.: GB-A4
Description / Location: Grey Gasket
Generator

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
65	Chrysotile	None Detected	None Detected	35

Lab No.: 2719195
Client No.: GB-A5
Description / Location: Brown Gasket
Generator

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

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BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2719196
Client No.: GB-A6
Description / Location: Grey Gasket Generator

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
70	Chrysotile	None Detected	None Detected	30

Lab No.: 2719197
Client No.: GB-A7
Description / Location: Black Fibrous Vent Damper

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	30	Fibrous Glass	70

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any agency of the U.S. government
This report shall not be reproduced except in full, without written approval of the laboratory.

Analysis Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix. Quantification at <0.25% by volume is possible with this method. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed.

Analysis Performed By: S. Robb

Date: 10/4/2006

IATL **International Asbestos Testing Laboratories**

16000 Horizon Way Unit 100 Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: Golder Associates Ltd.
4260 Still Creek Ave
Burnaby BC V5C 6C6

Report Date: 10/4/2006
Project: Pleasant Camp
Project No.: 06-1437-024

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 2716631
Client No.: DSS-A1
Description / Location: Black Tar Vent, Roof

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	5	Cellulose	95

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any agency of the U.S. government
This report shall not be reproduced except in full, without written approval of the laboratory.

Analysis Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix. Quantification at <0.25% by volume is possible with this method. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed.

Analysis Performed By: S. Robb

Date: 10/4/2006

Approved By:

Frank E. Ehrenfeld, III
Laboratory Director

APPENDIX III

LEAD-BASED PAINT SAMPLE LABORATORY REPORTS

AGAT® Laboratories

Certificate of Analysis

AGAT WORK ORDER: 06T189150
PROJECT NO: 06-1437-024

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: Evan Alvernaz

Lead in Paint

DATE SAMPLED: September 19 2006 **DATE RECEIVED:** September 28 2006 **DATE REPORTED:** October 06 2006 **SAMPLE TYPE:** paint

	Unit	G / S	M.D.L.	RESI-L1 585586	RESI-L2 585587	RESI-L3 585588	RESI-L4 585589	RESI-L5 585590	RESI-L6 585591	RESI-L7 585592	RESI-L8 585593
Lead	% weight		0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.16	0.08
	Unit	**G / S**	**M.D.L.**	**RESI-L9 585594**	**RESI-L10 585595**	**RESI-L11 585596**	**RESI-L12 585597**	**RESI-L13 585598**	**RESI-L14 585599**	**RES2-L1 585600**	**RES2-L2 585601**
Lead	% weight		0.01	<0.01	0.44	<0.01	<0.01	<0.01	0.11	0.02	0.03
	Unit	**G / S**	**M.D.L.**	**RES2-L3 585602**	**RES2-L4 585603**	**RES2-L5 585604**	**RES2-L6 585605**	**RES2-L7 585606**	**RES2-L8 585607**	**RES3-L1 585608**	**RES3-L2 585609**
Lead	% weight		0.01	0.14	<0.01	0.23	<0.01	<0.01	0.07	0.19	<0.01
	Unit	**G / S**	**M.D.L.**	**RES3-L3 585611**	**RES3-L4 585612**	**RES3-L5 585613**	**RES3-L6 585614**	**RES3-L7 585615**	**RES3-L8 585616**	**RES3-L9 585617**	**RES3-L10 585618**
Lead	% weight		0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	0.19
	Unit	**G / S**	**M.D.L.**	**RES3-L11 585619**	**RES3-L12 585620**	**RES3-L13 585621**	**RES3-L14 585623**	**RES3-L15 585624**	**RES3-L16 585625**	**RES3-L17 585626**	**RES4-L1 585627**
Lead	% weight		0.01	0.01	<0.01	<0.01	0.12	<0.01	0.10	13.5	<0.01
	Unit	**G / S**	**M.D.L.**	**RES4-L2 585628**	**RES4-L3 585629**	**RES4-L4 585630**	**RES4-L5 585631**	**RES4-L6 585632**	**RES4-L7 585633**	**RES4-L8 585634**	**RES4-L9 585635**
Lead	% weight		0.01	<0.01	0.14	0.06	0.02	<0.01	<0.01	0.18	<0.01
	Unit	**G / S**	**M.D.L.**	**RES4-L10 585636**	**RES5-L1 585637**	**RES5-L2 585638**	**RES5-L3 585639**	**RES5-L4 585641**	**RES5-L5 585642**	**RES5-L6 585643**	**RES5-L7 585644**
Lead	% weight		0.01	0.15	<0.01	0.18	0.04	0.29	0.13	<0.01	0.02
	Unit	**G / S**	**M.D.L.**	**RES5-L8 585645**	**RES5-L9 585646**	**RES5-L10 585647**	**RES5-L11 585648**	**RES5-L12 585649**	**RES5-L13 585650**	**RES5-L14 585652**	**RES5-L15 585653**
Lead	% weight		0.01	<0.01	0.02	<0.01	1.96	0.11	0.04	<0.01	0.12
	Unit	**G / S**	**M.D.L.**	**RES5-L16 585654**	**RES5-L17 585655**	**RES5-L18 585656**	**CO-L1 585657**	**CO-L2 585659**	**CO-L3 585660**	**CO-L4 585661**	**CO-L5 585662**
Lead	% weight		0.01	0.58	<0.01	0.07	0.01	<0.01	0.04	<0.01	0.08

Certified By: Jody Takeuchi

AGAT® Laboratories

Certificate of Analysis

AGAT WORK ORDER: 06T189150

PROJECT NO: 06-1437-024

CLIENT NAME: **GOLDER ASSOCIATES** **ATTENTION TO:** **Evan Alvernaz**

Lead in Paint

DATE SAMPLED: September 19 2006 **DATE RECEIVED:** September 28 2006 **DATE REPORTED:** October 06 2006 **SAMPLE TYPE:** paint

	Unit	G / S	M.D.L.	CO-L6 585663	CO-L7 585664	CO-L8 585665	CO-L9 585666	CO-L10 585667	CO-L11 585668	CO-L12 585669	CO-L13 585670
Lead	% weight		0.01	0.02	0.03	0.04	<0.01	1.53	0.02	0.13	0.01
	Unit	**G / S**	**M.D.L.**	**CO-L14 585671**	**CO-L15 585672**	**CO-L16 585674**	**CO-L17 585675**	**PH-L1 585676**	**PH-L2 585677**	**PH-L3 585678**	**PH-L4 585679**
Lead	% weight		0.01	<0.01	0.03	<0.01	0.01	<0.01	0.61	2.20	0.12
	Unit	**G / S**	**M.D.L.**	**PH-L5 585680**	**PH-L6 585681**	**GAR12-L1 585682**	**GAR12-L2 585683**	**GAR12-L3 585685**	**GAR12-L4 585686**	**GAR12-L5 585687**	**GAR12-L6 585688**
Lead	% weight		0.01	0.57	0.31	0.28	<0.01	<0.01	2.46	0.36	<0.01
	Unit	**G / S**	**M.D.L.**	**GAR12-L7 585689**	**GAR12-L8 585691**	**GAR34-L1 585692**	**GAR34-L2 585694**	**GAR34-L3 585695**	**GAR34-L4 585696**	**GAR34-L5 585697**	**SHOP-L1 585698**
Lead	% weight		0.01	0.12	0.34	0.02	0.18	0.28	0.26	0.20	<0.01
	Unit	**G / S**	**M.D.L.**	**SHOP-L2 585699**	**SHOP-L3 585701**	**SHOP-L4 585702**	**SHOP-L5 585703**	**SHOP-L6 585704**	**SHOP-L7 585705**	**SHOP-L8 585706**	**SHOP-L9 585707**
Lead	% weight		0.01	<0.01	<0.01	<0.01	<0.01	0.16	<0.01	0.07	10.1
	Unit	**G / S**	**M.D.L.**	**SHOP-L10 585708**	**OG-L1 585709**	**OG-L2 585710**	**OG-L3 585711**	**OG-L4 585712**	**OG-L5 585713**	**OG-L6 585714**	**OG-L7 585715**
Lead	% weight		0.01	21.3	<0.01	0.86	0.01	<0.01	<0.01	0.01	<0.01
	Unit	**G / S**	**M.D.L.**	**OG-L8 585716**	**OG-L9 585717**	**DSS-L1 585718**	**DSS-L2 585719**	**DSS-L3 585720**	**GB-L1 585721**	**GB-L2 585722**	**GB-L3 585723**
Lead	% weight		0.01	2.66	<0.01	0.03	<0.01	0.07	0.14	0.15	<0.01
	Unit	**G / S**	**M.D.L.**	**GB-L4 585724**	**GB-L5 585725**	**GB-L6 585726**	**GB-L7 585727**	**GB-L8 585728**	**GB-L9 585729**	**GB-L10 585730**	**GB-L11 585731**
Lead	% weight		0.01	0.18	14.0	0.02	0.20	0.12	3.70	1.31	0.12
	Unit	**G / S**	**M.D.L.**	**GB-L12 585732**	**GB-L13 585733**	**GB-L14 585734**	**GB-L15 585735**	**GB-L16 585736**	**GB-L17 585737**	**GB-L18 585738**	**RES5-L19 585808**
Lead	% weight		0.01	0.09	0.24	<0.01	<0.01	0.96	0.06	15.8	0.03

Certified By: Jody Takeuchi

Certificate of Analysis

AGAT WORK ORDER: 06T189150
PROJECT NO: 06-1437-024

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: Evan Alvernaz

Lead in Paint

DATE SAMPLED: September 19 2006 **DATE RECEIVED:** September 28 2006 **DATE REPORTED:** October 06 2006 **SAMPLE TYPE:** paint

	Unit	G / S	M.D.L.	GB-L19 585818	GB-L20 585819
Lead	% weight		0.01	0.10	<0.01

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: Jody Takeuchi

APPENDIX IV

PHOTOGRAPHS

PHOTOGRAPH 1

Customs Office, looking north east.

PHOTOGRAPH 2

Pump House, looking north east.

PHOTOGRAPH 3

House #1, looking north east.

PHOTOGRAPH 4

House #2, looking east.

PHOTOGRAPH 5

House #3, looking east.

PHOTOGRAPH 6

House #4, looking south east.

PHOTOGRAPH 7

House #5, looking north east.

PHOTOGRAPH 8

Garage for House #1 and #2, looking east.

PHOTOGRAPH 9

Garage for House #3 and #4, looking south east.

PHOTOGRAPH 10

Office Garage, looking east.

PHOTOGRAPH 11

Maintenance Building, looking south east.

PHOTOGRAPH 12

Generator Building, looking east.

PHOTOGRAPH 13

Diesel Storage Building, looking north east.

PHOTOGRAPH 14

Asbestos-containing 30 cm (12 inch), beige with brown and white streaks floor tiles.

PHOTOGRAPH 15

Asbestos-containing black mastics on the roof.

PHOTOGRAPH 16

Asbestos-containing grey mastic around exterior utility service boxes and electrical connections.

PHOTOGRAPH 17

Asbestos-containing brown, stone patterned sheet flooring.

PHOTOGRAPH 18

Asbestos-containing brown, octagonal patterned sheet flooring.

PHOTOGRAPH 19

Asbestos-containing grey mastic around exterior pipe penetrations.

APPENDIX V

ASSESSMENT, EVALUATION AND ACTION RECOMMENDATIONS FOR IDENTIFIED ACMS

Appendix V
Assessment, Evaluation and Action Recommendations for Identifies ACMs

Appendix V
Assessment, Evaluation and Action Recommendations for Identifies ACMs

TABLE V - 1: Asbestos-Containing Materials Risk Assessment – Customs Office

Asbestos-Containing Material	Friability	General Location	Access(1)	Condition(1)	Debris	Action(1)
Drywall Joint Compound	Friable	All Walls & Ceilings in Building	A	Good	No	7
Black Mastic	Non-Friable	One Penetration on Exterior of Building	A	Good	No	7
Grey Mastic	Non-Friable	One Penetration on Exterior of Building	A	Good	No	7
Black Mastic (Suspected to Be Present)	Non-Friable	Roof	C (Exposed and Concealed)	Unknown	Unknown	7

Note: ACMs were assessed based on the criteria established by PWGSC OGGO in the document titled "*Evaluation and Recommendation Criteria for Control of Asbestos Containing Materials (ACM).*" A copy of this document is provided in Appendix I.

TABLE V - 2: Asbestos-Containing Materials Risk Assessment – Pump House

Asbestos-Containing Material	Friability	General Location	Access(1)	Condition(1)	Debris	Action(1)
Black Mastic (Suspected to Be Present)	Non-Friable	Roof	C (Exposed & Concealed)	Unknown	Unknown	7

Note: ACMs were assessed based on the criteria established by PWGSC OGGO in the document titled "*Evaluation and Recommendation Criteria for Control of Asbestos Containing Materials (ACM).*" A copy of this document is provided in Appendix I.

Appendix V
Assessment, Evaluation and Action Recommendations for Identifies ACMs

Table V - 3: Asbestos-Containing Materials Risk Assessment – House #1

Asbestos-Containing Material	Friability	General Location	Access[1]	Condition[1]	Debris	Action[1]
30 cm (12") Beige with brown and white streaks floor tile	Non-Friable	Throughout basement	A	Good	No	7
Black Mastic	Non-Friable	Around perimeter of roof between roof and facia	C (Exposed)	Good	No	7
Black Mastic	Non-Friable	Around previous vent openings covered with an impermeable membrane	A	Good	No	7
Grey Mastic	Non-Friable	Around one electrical services connection on the exterior of the building.	A	Good	No	7

Note: ACMs were assessed based on the criteria established by PWGSC OGGO in the document titled "*Evaluation and Recommendation Criteria for Control of Asbestos Containing Materials (ACM).*" A copy of this document is provided in Appendix I.

Appendix V
Assessment, Evaluation and Action Recommendations for Identifies ACMs

TABLE V - 4: Asbestos-Containing Materials Risk Assessment – House #2

Asbestos-Containing Material	Friability	General Location	Access[(1)]	Condition[(1)]	Debris	Action[(1)]
30 cm (12”) Beige with white streaks floor tile	Non-Friable	Throughout basement	A	Good	No	7
Brown, stone patterned sheet flooring	Friable	Stair Landing	A	Good	No	7
Black Mastic	Non-Friable	Around perimeter of roof between roof and facia	C (Exposed)	Good	No	7
Grey Mastic	Non-Friable	Around one electrical services connection on the exterior of the building.	A	Good	No	7

Note: ACMs were assessed based on the criteria established by PWGSC OGGO in the document titled “*Evaluation and Recommendation Criteria for Control of Asbestos Containing Materials (ACM).*” A copy of this document is provided in Appendix I.

Appendix V
Assessment, Evaluation and Action Recommendations for Identifies ACMs

TABLE V - 5: Asbestos-Containing Materials Risk Assessment – House #3

Asbestos-Containing Material	Friability	General Location	Access(1)	Condition(1)	Debris	Action(1)
Drywall Joint Compound	Friable	Throughout building	A	Good	No	7
12" Beige with white streaks floor tile	Non-Friable	Throughout basement	A	Good	No	7
Brown, stone patterned sheet flooring	Friable	Stair Landing	A	Good	No	7
Black Mastic	Non-Friable	Around one electrical services connection on the exterior of the building.	A	Good	No	7
Black Mastic	Non-Friable	Flashing on peak of the roof, vents and around the previous vent openings covered with an impermeable membrane.	C (exposed)	Good	No	7
Black Mastic	Non-Friable	Around perimeter of roof between roof and facia	C (Exposed)	Good	No	7

Note: ACMs were assessed based on the criteria established by PWGSC OGGO in the document titled "*Evaluation and Recommendation Criteria for Control of Asbestos Containing Materials (ACM).*" A copy of this document is provided in Appendix I.

Appendix V
Assessment, Evaluation and Action Recommendations for Identifies ACMs

TABLE V - 6: Asbestos-Containing Materials Risk Assessment – House #4

Asbestos-Containing Material	Friability	General Location	Access(1)	Condition(1)	Debris	Action(1)
12" Beige with white streaks floor tile	Non-Friable	Throughout basement	A	Good	No	7
Brown, stone patterned sheet flooring	Friable	Stair Landing	A	Good	No	7
Black Mastic	Non-Friable	Flashing on peak of the roof, vents and around the previous vent openings covered with an impermeable membrane.	C (Exposed)	Good	No	7
Black Mastic	Non-Friable	Around perimeter of roof between roof and facia	C (Exposed)	Good	No	7

Note: ACMs were assessed based on the criteria established by PWGSC OGGO in the document titled "*Evaluation and Recommendation Criteria for Control of Asbestos Containing Materials (ACM).*" A copy of this document is provided in Appendix I.

Appendix V
Assessment, Evaluation and Action Recommendations for Identifies ACMs

TABLE V - 7: Asbestos-Containing Materials Risk Assessment – House #5

Asbestos-Containing Material	Friability	General Location	Access(1)	Condition(1)	Debris	Action(1)
Brown, octagonal patterned sheet flooring	Friable	Main Floor - kitchen, bathroom, front and rear mudrooms	A	Good	No	7
Dark Grey Mastic	Non-Friable	Exterior of building, Around one pipe penetration	A	Good	No	7
Grey Mastic	Non-Friable	Exterior of building around one service box	A	Good	No	7
Black Mastic	Non-Friable	Roof	C (Exposed and Concealed)	Unknown	Unknown	7

Note: ACMs were assessed based on the criteria established by PWGSC OGGO in the document titled "*Evaluation and Recommendation Criteria for Control of Asbestos Containing Materials (ACM).*" A copy of this document is provided in Appendix I.

TABLE V - 8: Asbestos-Containing Materials Risk Assessment – Garage for House #3 and #4

Asbestos-Containing Material	Friability	General Location	Access(1)	Condition(1)	Debris	Action(1)
Black Mastic	Non-Friable	Roof Peak and Fastening Screws	C (Exposed)	Good	No	7

Note: ACMs were assessed based on the criteria established by PWGSC OGGO in the document titled "*Evaluation and Recommendation Criteria for Control of Asbestos Containing Materials (ACM).*" A copy of this document is provided in Appendix I.

Appendix V
Assessment, Evaluation and Action Recommendations for Identifies ACMs

TABLE V - 9: Asbestos-Containing Materials Risk Assessment – Garage for House #1 and #2

Asbestos-Containing Material	Friability	General Location	Access[1]	Condition[1]	Debris	Action[1]
Black Mastic (Suspected to be Present)	Non-Friable	Roof	C (Exposed and Concealed)	Good	No	7

Note: ACMs were assessed based on the criteria established by PWGSC OGGO in the document titled "*Evaluation and Recommendation Criteria for Control of Asbestos Containing Materials (ACM).*" A copy of this document is provided in Appendix I.

TABLE V - 10: Asbestos-Containing Materials Risk Assessment – Generator Building

Asbestos-Containing Material	Friability	General Location	Access[1]	Condition[1]	Debris	Action[1]
Grey Gaskets	Non-Friable	Generators & Pumps	B	Good	No	7

Note: ACMs were assessed based on the criteria established by PWGSC OGGO in the document titled "*Evaluation and Recommendation Criteria for Control of Asbestos Containing Materials (ACM).*" A copy of this document is provided in Appendix I.

APPENDIX VI

AIR SAMPLE ANALYTICAL RESULTS

FIBRE AIR MONITORING - NIOSH METHOD 7400

Golder Associates
Unit B - 12330 - 88th Avenue, Surrey, BC
Tel: (604) 591-6616, Fax: (604) 591-6608
www.golder.com

CLIENT: PWGSC
SITE: Pleasant Camp

Project #: 06-1437-024

Analyzed By: Siny John

Date Analyzed: 27-Sep-06

Golder #	Sample No.	Sample Date ON	Sample Date OFF	Time ON	Time OFF	Sample Type^7	Location	Time (Min)	Flow (L/Min)	Volume (L)	Fibre Count	# of Fields	Graticule Area (mm^2)	Filter Load^8	Fibres Per Field	Density (fibre/mm^2)	Fibre Level (fibres/mL)
1278	Sa-1	09-19-06	09-19-06	10:00	10:00	FB	House # 3, Main Floor Kitchen	0	0.00	0	5.0	100	0.007390	Min	0.050	6.77	—
1279	Sa-2	09-19-06	09-19-06	10:10	18:08	Amb	House # 3, Main Floor Kitchen	478	2.10	1004	49.0	100	0.007390	Mod	0.490	66.31	0.025
1280	Sa-3	09-19-06	09-19-06	10:16	18:06	Amb	House # 3, Main Floor Hallway	470	2.20	1034	38.0	100	0.007390	Mod	0.380	51.42	0.019
1281	Sa-4	09-20-06	09-20-06	09:46	18:35	Amb	House # 3, Basement	529	2.05	1084	8.5	100	0.007390	Min-M	0.085	11.50	0.004
1282	Sa-5	09-20-06	09-20-06	18:36	18:36	FB	House # 3, Basement	0	0.00	0	1.5	100	0.007390	Min	0.015	2.03	----

Analyst: Siny John
Siny John, B.Eng.

Reviewed By:
Evan Alvernaz, B.Sc., CIH, R.P.Bio

Notes:

1) Samples analysed in accordance with NIOSH Analytical Method 7400 "Asbestos & Other Fibres by PCM".
2) Limit of Detection (LOD) 7 Fibres/mm^2.
3) Limit of Quantitation (LOQ) 100 Fibres/mm^2.
4) Samples will be retained for a period of 30 days after receipt and will be disposed of unless notified in writing.
5) Golder Associates Ltd. is a member of the Canadian Association for Environmental Analytical Laboratories (CAEAL), Lab number 3377
6) Golder Associates Ltd. has been evaluated and deemed proficient for asbestos fibre analysis by Phase Contrast Microscopy
7) Sample Type: CR - Clean Room, Occ - Occupational, Amb - Ambient, AC - Air Clearance, FB - Field Blank, PreA - Pre-Abatement, PstA - Post Abatement
8) Filter Load: Min - Minimum, Min-M - Minimum to Moderate, Mod - Moderate, M-H - Moderate to Heavy, Heavy - Heavy, OV - Overload

APPENDIX D – OWNER SUPPLIED EQUIPMENT – FUEL OIL TANK

INVOICE NO: 17667

Regal Tanks Ltd.

Manufactured by Tidy Steel-Fab Ltd
12195 Musqueam Drive, Surrey B.C. V3V-3T2
Phone (604) 580-9733 **Fax (604) 580-1889**

DATE: February 21, 2008

To: SNC Lavalin – Attn; Dave Bridger
C/O Morrow Engineering
1409 Bewicke Avenue
North Vancouver, B.C.
V7M 3C7

Ship To: Same
For: Quantum Murray Border Crossing
Pleasant Camp, YT
Attn: Glen Rutherford
250 212-0013

YOUR ORDER NUMBER	S.S TAX NO.	SHIPPED VIA	GST NO.
PJ-37-121	Extra	Lantrax Logistics - collect	**104449376**

QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT
1	22,700 Litre **Regal"Enviro-Safe"®** Aboveground Horizontal Tank to ULC S601 Double Wall Vacuum Monitored (visual) c/w saddles and bands, openings as per shop drawing **Tank # 3571**		20,950.00
1	Sandblast exterior, apply one coat of Carbozinc 859, Carboguard 8922 & Carbothane 133HB polyurethane (Spring Green # J343)		2,750.00
1	access stair and platform c/w bolts	Incl	
1	3" dia vent pipe x 6'-0 TOE	Incl	
1	3" v-vent	Incl	
~~1~~	~~3" Morrison Overfill Prevention Valve~~	~~Incl~~	
~~1~~	~~3" dia bottom loading piping~~	~~Incl~~	
~~1~~	~~side mount Simplx containment box~~	~~Incl~~	
~~2~~	~~FE Petro STP33-VL2 submerged turbine pumps~~	~~Incl~~	
~~4~~	~~Hilti HSL M20/30 anchors~~	~~Incl~~	
1	6" dia. emergency vent extension c/w bolts	Incl	
1	¾ drop pipe c/w ¼" hole	Incl	
1	1" dia. water draw off	Incl	
~~2~~	~~Cans touch up paint (Polyurethane - Spring Green # J343)~~	~~Incl~~	
1	Dipstick and chart	Incl	
~~1~~	~~Installation/Overfill Valve Instructions~~	~~Incl~~	

Page 1 of 3

SUB TOTAL	23,700.00
FREIGHT	
TOTAL	
5 % GST	
7 % PST	
TOTAL AMOUNT THIS INVOICE	

Terms: Net 30 Days from Date of Invoice.
Interest Charged at 24% per annum on Overdue Accounts.

INVOICE NO: 17667

Regal Tanks Ltd.

Manufactured by Tidy Steel-Fab Ltd
12195 Musqueam Drive, Surrey B.C. V3V-3T2
Phone (604) 580-9733 **Fax (604) 580-1889**

DATE: February 21, 2008

To: SNC Lavalin – Attn: Dave Bridger
C/O Morrow Engineering
1409 Bewicke Avenue
North Vancouver, B.C.
V7M 3C7

Ship To: Same
For: Quantum Murray Border Crossing
Pleasant Camp, YT
Attn: Glen Rutherford
250 212-0013

YOUR ORDER NUMBER	S.S TAX NO.	SHIPPED VIA	GST NO.
PJ-37-121	Extra	Lantrax Logistics - collect	**104449376**

QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT
	Balance forward		23,700.00
7	~~250 gallon (1136 L) Obround Tanks to ULC S602 c/w special openings as per Regal drawing 23 REV B, inside drip tray, saddles and bands, two coats of white self-priming industrial Enamel~~		11,585.00
7	~~At A Glance gauges x 50”~~	Incl	
7	~~2” dia. vent caps~~	Incl	
7	~~½ dia. sch 40 pipe x 46” c/w 2 x ½” double tap bushings~~	Incl	
7	~~3/4 dia. sch 40 pipe x 46” c/w 2 x 3/4” double tap bushings~~	Incl	
7	~~2” dia. lockable caps, collars and close nipples~~	Incl	
7	~~Siesmic flat bar straps~~	Incl	
28	~~Hilti HSL M12/25 anchors~~	Incl	
7	~~Installation Instructions~~	Incl	
	~~**Tanks # 3573, 3574, 3575, 3576, 3577, 3578, 3579**~~		

SUB TOTAL	35,285.00
FREIGHT	
TOTAL	
5 % GST	
7 % PST	
TOTAL AMOUNT THIS INVOICE	

Terms: **Net 30 Days from Date of Invoice.**
Interest Charged at 24% per annum on Overdue Accounts.

INVOICE NO: 17667

Regal Tanks Ltd.

Manufactured by Tidy Steel-Fab Ltd
12195 Musqueam Drive, Surrey B.C. V3V-3T2
Phone (604) 580-9733 **Fax (604) 580-1889**

DATE: February 21, 2008

To: SNC Lavalin – Attn: Dave Bridger
C/O Morrow Engineering
1409 Bewicke Avenue
North Vancouver, B.C.
V7M 3C7

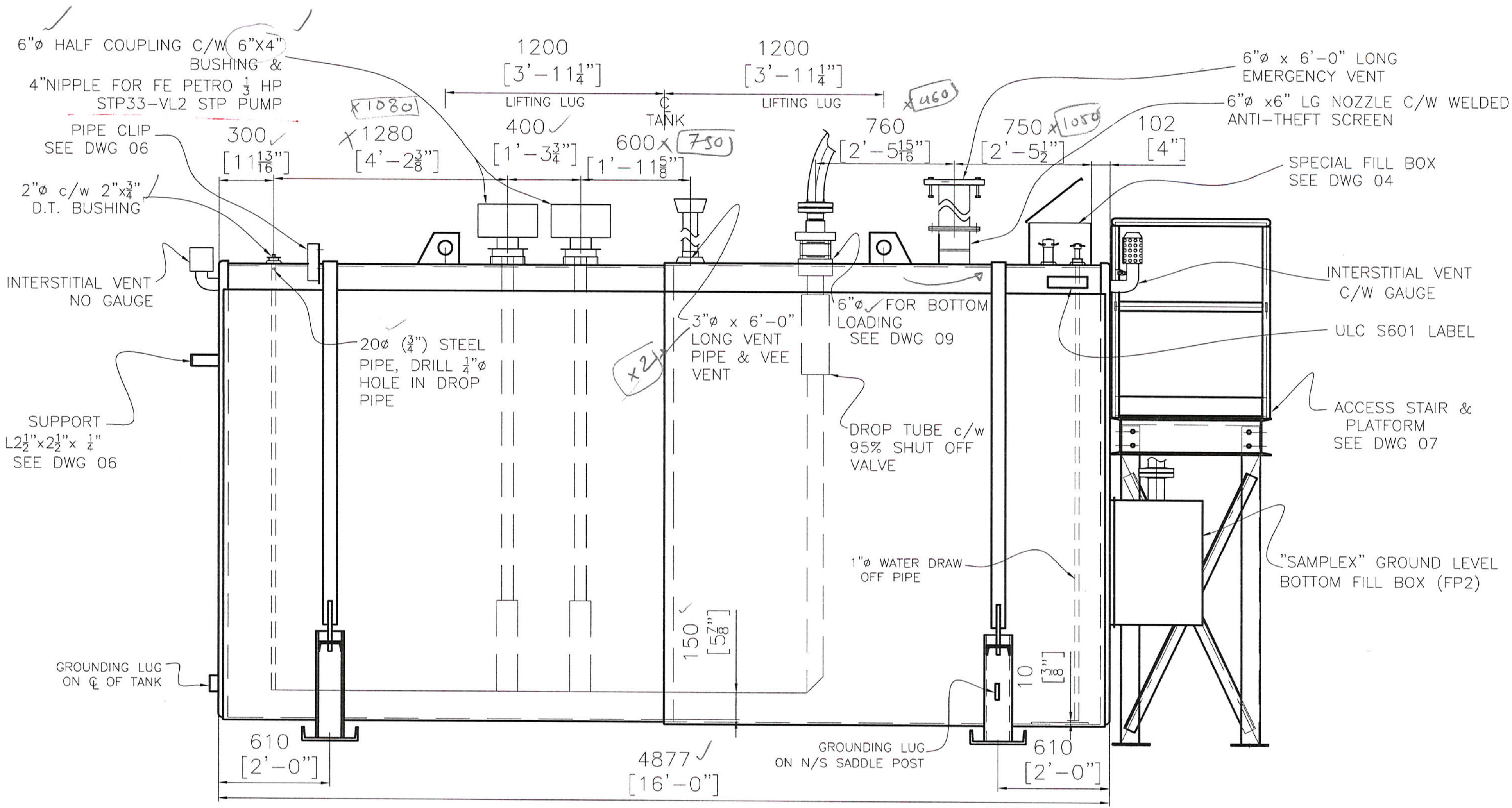
Ship To: Same
For: Quantum Murray Border Crossing
Pleasant Camp, YT
Attn: Glen Rutherford
250 212-0013

YOUR ORDER NUMBER	S.S TAX NO.	SHIPPED VIA	GST NO.
PJ-37-121	Extra	Lantrax Logistics - collect	**104449376**

QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT
	Balance forward		35,285.00
1	~~250 gallon (1136 L) Obround Tanks to ULC S602 c/w special openings as per Regal drawing 21 REV B, inside drip tray, saddles and bands, two coats of white self-priming industrial Enamel~~		1,655.00
1	~~At A Glance gauge x 50”~~	Incl	
1	~~2” dia. vent cap~~	Incl	
4	~~½ dia. sch 40 pipe x 46” c/w 2 x ½” double tap bushing~~	Incl	
2	~~1” dia. sch 40 pipe x 46” c/w 2 x 1” double tap bushing~~	Incl	
1	~~1” dia. sch 40 water draw off pipe c/w ball valve, camlock & dustplug~~	Incl	
1	~~2” dia. lockable cap, collar and close nipple~~	Incl	
1	~~Siesmic flat bar strap~~	Incl	
4	~~Hilti HSL M12/25 anchors~~	Incl	
1	~~Installation Instruction~~	Incl	
	~~**Tank # 3572**~~		

SUB TOTAL	36,940.00
FREIGHT	
TOTAL	36,940.00
5 % GST	1,847.00
7 % PST	2,585.80
TOTAL AMOUNT THIS INVOICE	**$41,372.80**

Terms: Net 30 Days from Date of Invoice.
Interest Charged at 24% per annum on Overdue Accounts.



PAINT NOTES

SANDBLAST EXTERIOR TO SSPC SP6 & APPLY 1 COAT 2 -3 MILS DFT OF ORGANIC ZINC (0300 GREEN), 1 COAT 2 -4 MILLS DFT EPOXY (0700 GREY), 1 COAT 3 -5 MILLS DFT POLYURETHANE (PALE GREEN)

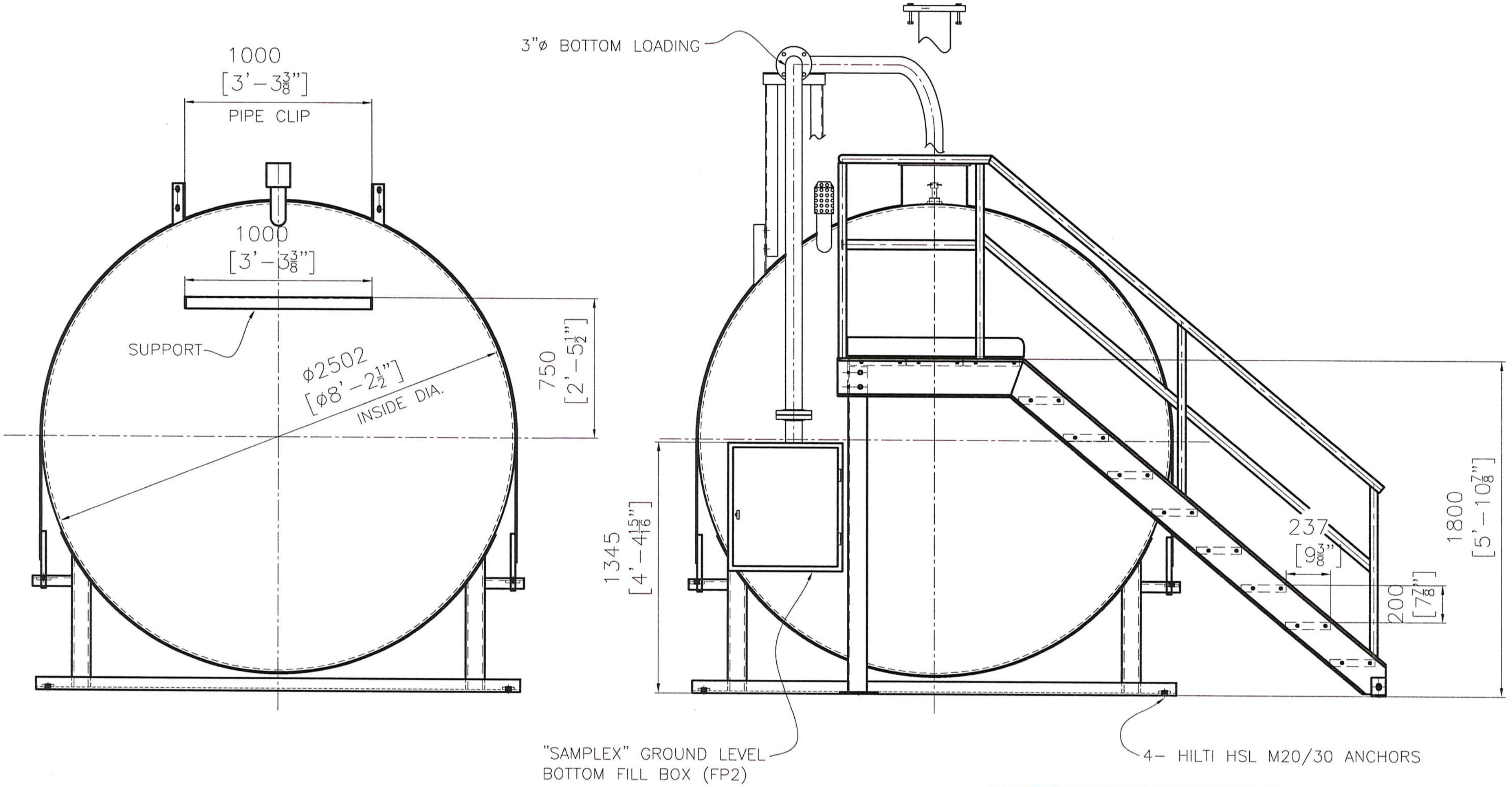
TANK O.D. = 8'-3 5/8" (2530mm)
I.D. = 8'-2 1/2" (2502mm)

ø 2464

CUSTOMER: MORROW ENGINEERING
TANK # 3571
TITLE: 22700 LITRES DOUBLE WALL VACUUM MONITORED TANK
FOR: PLEASANT CAMP BORDER CROSSING
FILE: 3571 5KG DWVM MORROW
JAN. 11, 08
SCALE: 1 : 25
DWG# 01
REV 0

"ENVIRO-SAFE"

REGAL TANKS LTD.
MFG. BY TIDY STEEL-FAB LTD.
PHONE (604) 580-9733 FAX (604) 580-1889



CUSTOMER: MORROW ENGINEERING
TANK # 3571

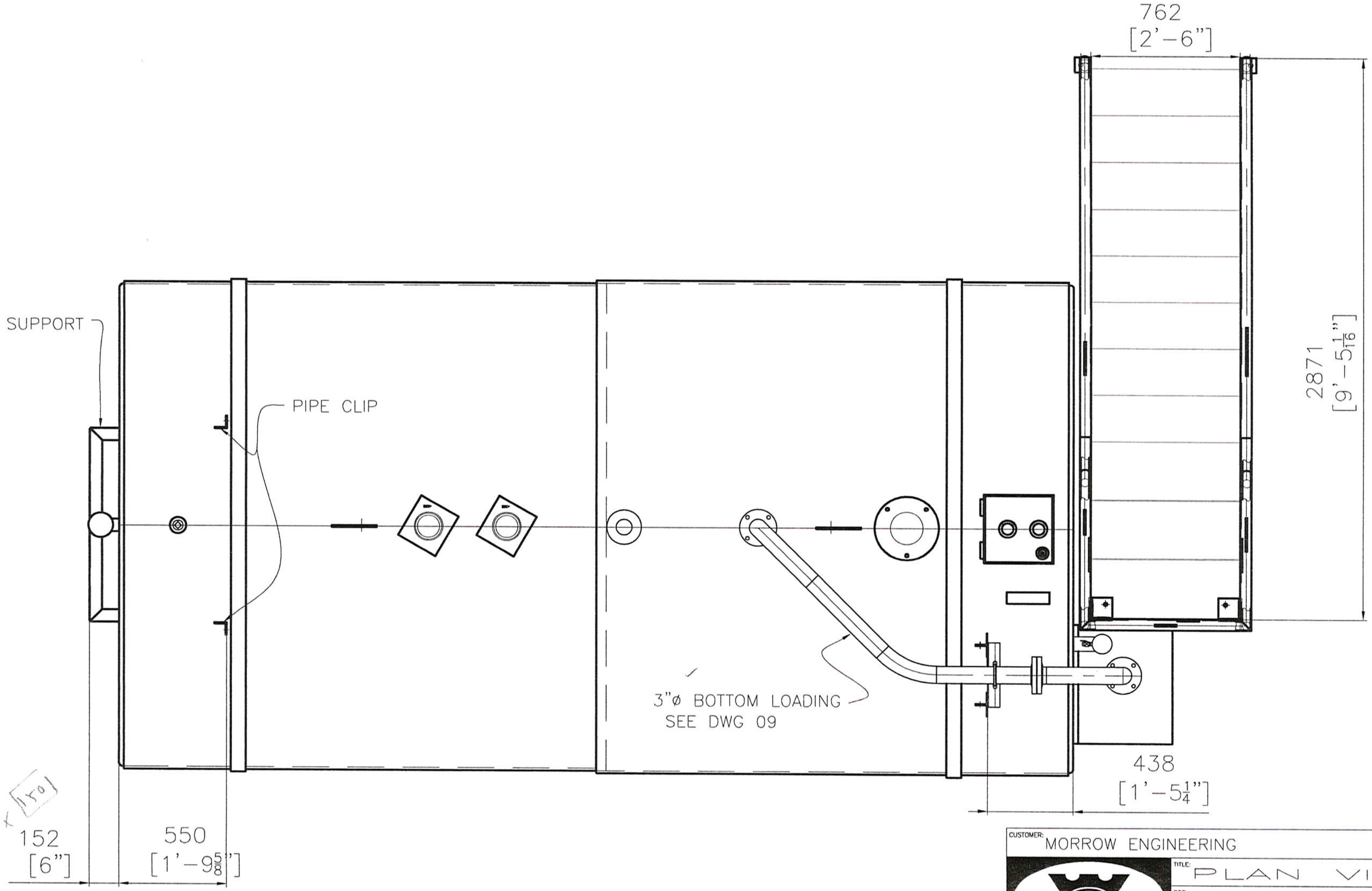
"ENVIRO-SAFE"

TITLE: ENDS VIEW

FOR: 22700 LITRES DOUBLE WALL VACUUM MONITORED TANK

FILE:		SCALE:	DWG#	REV
3571 5KG DWVM MORROW	JAN. 23, 08	1 : 25	03	A

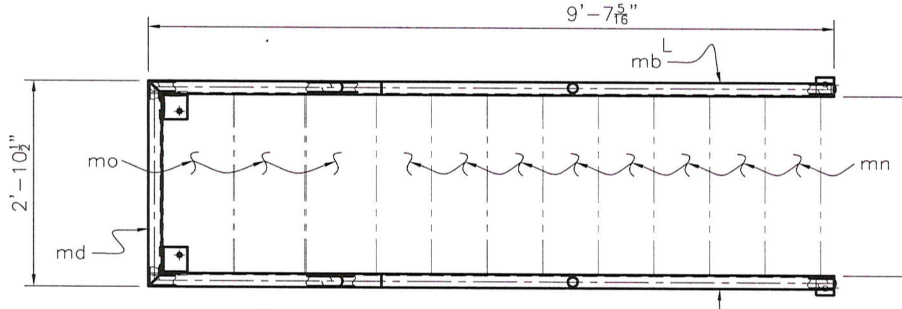
REGAL TANKS LTD.
MFG. BY TIDY STEEL-FAB LTD.
PHONE (604) 580-9733 FAX (604) 580-1889



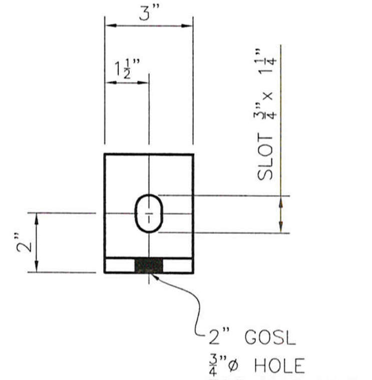
CUSTOMER: MORROW ENGINEERING			TANK #	3571
TITLE: PLAN VIEW				
FOR: 22700 LITRES DOUBLE WALL VACUUM MONITORED TANK				
FILE: 3571 5KG DWVM MORROW	JAN. 11, 08	SCALE: 1 : 25	DWG# 02	REV 0

REGAL
"ENVIRO-SAFE"

REGAL TANKS LTD.
MFG. BY TIDY STEEL-FAB LTD.
PHONE (604) 580-9733 FAX (604) 580-1889



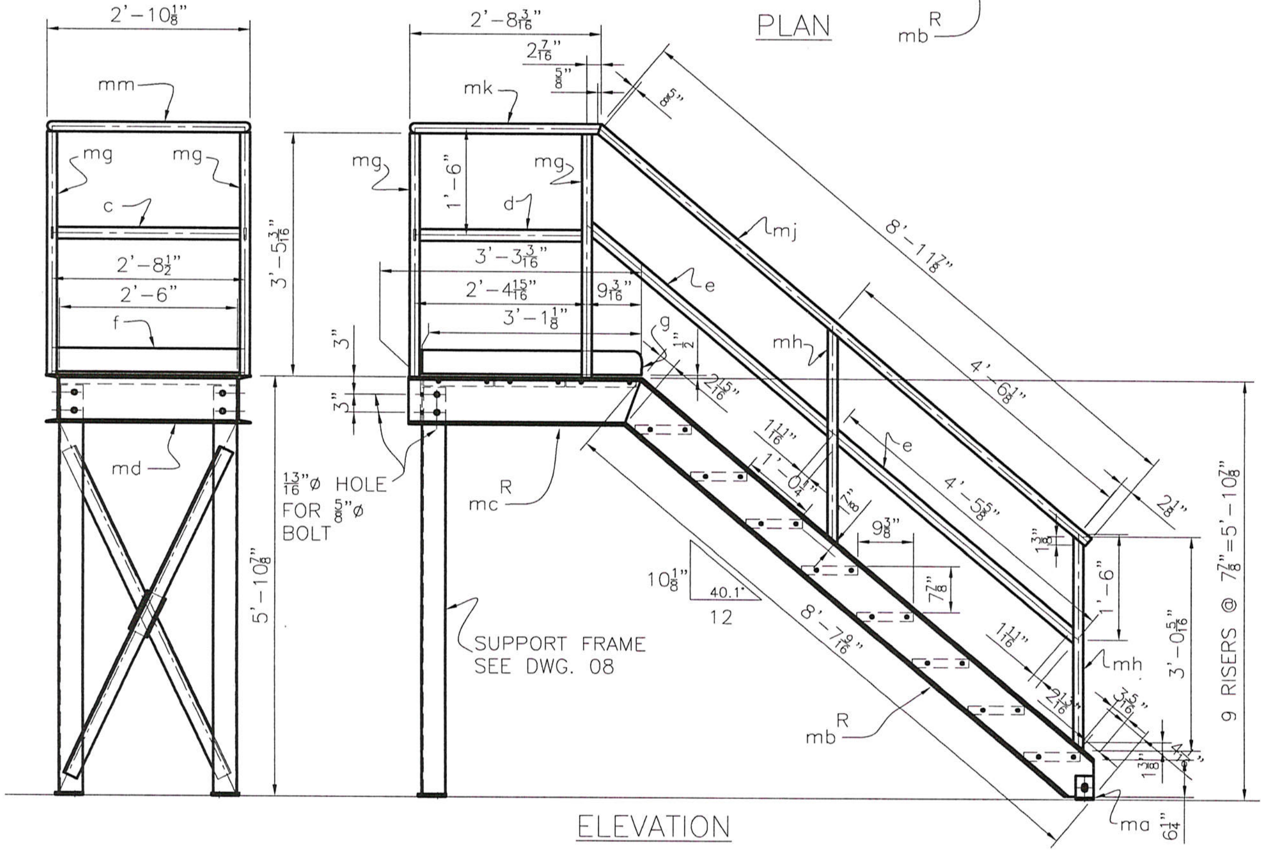
PLAN



DETAIL OF "ma"

SHIP LOOSE:

4– M16 HILTI KWIK BOLTS



ELEVATION

B.O.M. SEE DWG. 08

CUSTOMER: MORROW ENGINEERING				TANK # 3571	
"ENVIRO-SAFE"	TITLE: STAIR & PLATFORM				
	FOR: 22700 LITRES DOUBLE WALL VACUUM MONITORED TANK				
	FILE: 3571 5KG DWVM MORROW	JAN. 23, 08	SCALE: 1 : 25	DWG# 07	REV A

REGAL TANKS LTD.
MFG. BY TIDY STEEL-FAB LTD.
PHONE (604) 580-9733 FAX (604) 580-1889

FUEL TANK INSPECTION **TANK # C-851049 (22,700L)** **(TANK ONLY)**
SEPTEMBER 2014 **TEMPORARY STORAGE |** 100-419 RANGE RD.WHITEHORSE, YUKON **TANK 1 OF 1**
COMPLETE

1. OWNER Property __ Tank __	Name		Address		
2. SITE ADDRESS	*Temporary Storage* (100-419 Range Rd, Whse YT) Site Address				
3. WHO REQUESTED TEST AND WHEN	Lee Fleming Name		Stantec Company or Affiliation		Sept 8 2014 Date
	Whitehorse Address				867-633-2400 Telephone
4. REASON FOR INSPECTION (Explain fully)	Tank was purchased and not in use for 5-6 years (2008 manufactured). Tank is being considered for relocation and put into operation. Pre installation inspection was requested to ensure tank current condition.				
5. LOCATION	Identify by Direction Behind "Canada" Bldg. adjacent trees/bush 100-419 Range Rd. Whse YT	Location Exterior. Not installed	Type Horizontal Cylinder Double wall steel	Coating Material manufacturer applied paint	Access no internal man way access
6. TANK DATA	Capacity 22,700 L	Approximate Age 2008	Product Never used	Interior Coating None	Design Type S601
7. INTERIOR CONDITION	Tank is clean and free of fuel, sediment or water.				
8. CONTRACTOR, MECHANICS	Groundtrax Environmental Services Inc. P.O. Box 10180 Whitehorse YT Tel 867.667.2515				
9. OTHER TEST INFORMATION OR REMARKS	Tank Vacuum monitor reading = -70 kPa (Excellent - pass) Tank saddle equipped and ready for seismic restraint. Exterior tank coating complete and no failures observed. Tank interior is dry and clean. No interior coating. (Non aviation use)				
10. RESULTS	**Inspection was conducted on the above tank system using Groundtrax (Petroleum Tank Management Contractor) approved methodologies for petroleum product storage systems.** **TANK #C-851049 22,700 L** **STORED AT 100-419 RANGE RD. WHITEHORSE, YT** **AS DESCRIBED ABOVE WAS INSPECTED AND REPORTED** **CLEAN AND VACUUM MONITORED SEPTEMBER 8, 2014.**				
11. AUTHORIZATION Groundtrax Environmental Services Inc. by: Adam Greetham Petroleum Mechanic/ Tank Management Contractor, Environmental Site Assessor/ Engineering Technologist	**This is to certify that the above noted tank system was inspected on the date(s) shown.** **Groundtrax Environmental Services Inc.** **Inspection Contractor** **S. A. Greetham A-0819B** Petroleum Tank Management Contractor and Certification Number Tel. (867) 667-2515 **P.O. Box 10180 Whitehorse, Yukon Y1A 7A1** Mailing Address				

FUEL TANK INSPECTION
SEPTEMBER 2014
COMPLETE

TANK # C-851049 (22,700L)
TEMPORARY STORAGE | WHITEHORSE, YUKON

(TANK ONLY)
TANK 1 OF 1

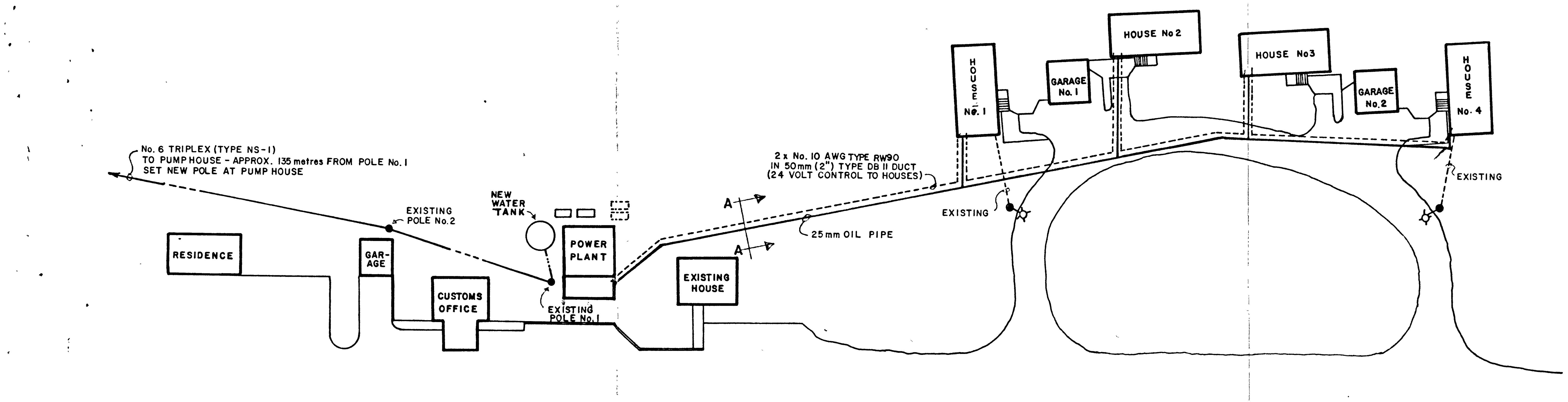
PHOTOS

Subject Tank

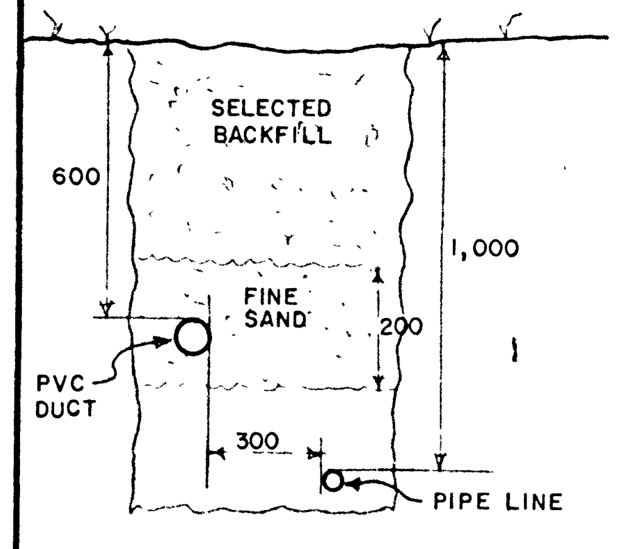
Tank interior is in very good condition. Interior is clean, no water, no sediment, minimal corrosion observed on tank ceiling from atmospheric moisture. Note: non-coated (non aviation use only) Vacuum monitor of double wall containment working and reading tight.

Tank cradel foundation ready for seismic restraint. Tank exterior coating in very good condition.

APPENDIX E – DRAWINGS - EXISTING BUILDINGS



SITE PLAN SCALE 1:500



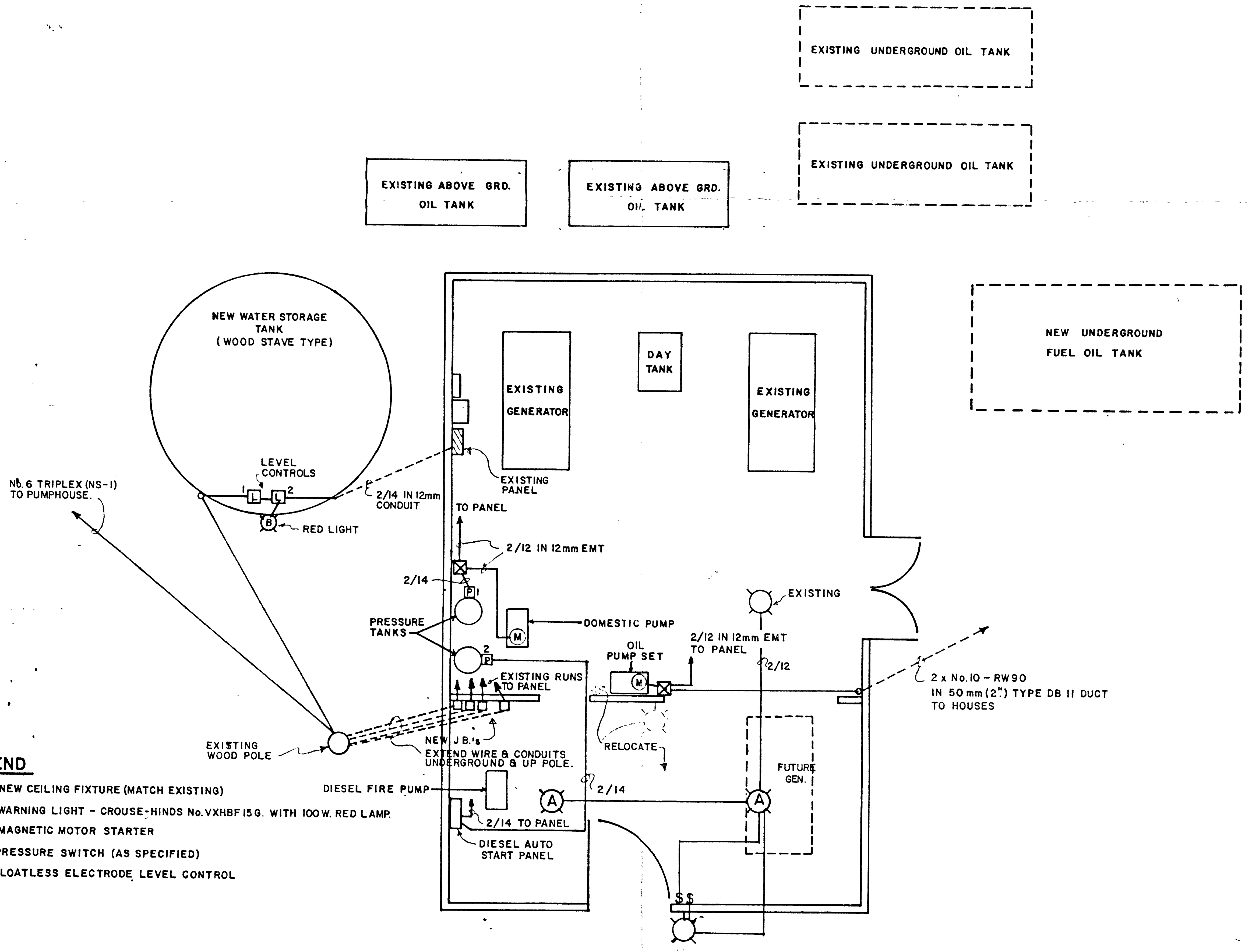
TRENCH & BACKFILL SECTION A-A N.T.S.

NOTES

A INSTALL ALL WIRING, CONDUIT & DEVICES FOR AUTOMATIC REMOTE STARTING OF THE DIESEL FIRE PUMP AS PER MANUFACTURER'S INSTRUCTIONS.

B. FLOATLESS ELECTRODE CONTROLS TO BE WARRICK CONTROL CO. OR EQUAL.
UNIT No. 1 - PUMP UP OPERATION - CAT. No. 1D1D4 with 3 ELECTRODES.
UNIT No. 2 - ALARM OPERATION - CAT. No. 1D1D4 with 2 ELECTRODES.
PUMP TO STOP AT 27275 litres (6000 gal.) LEVEL
PUMP TO START AT 22730 litres (5000 gal.) LEVEL
ALARM TO INDICATE AT 18185 litres (4000 gal.) LEVEL

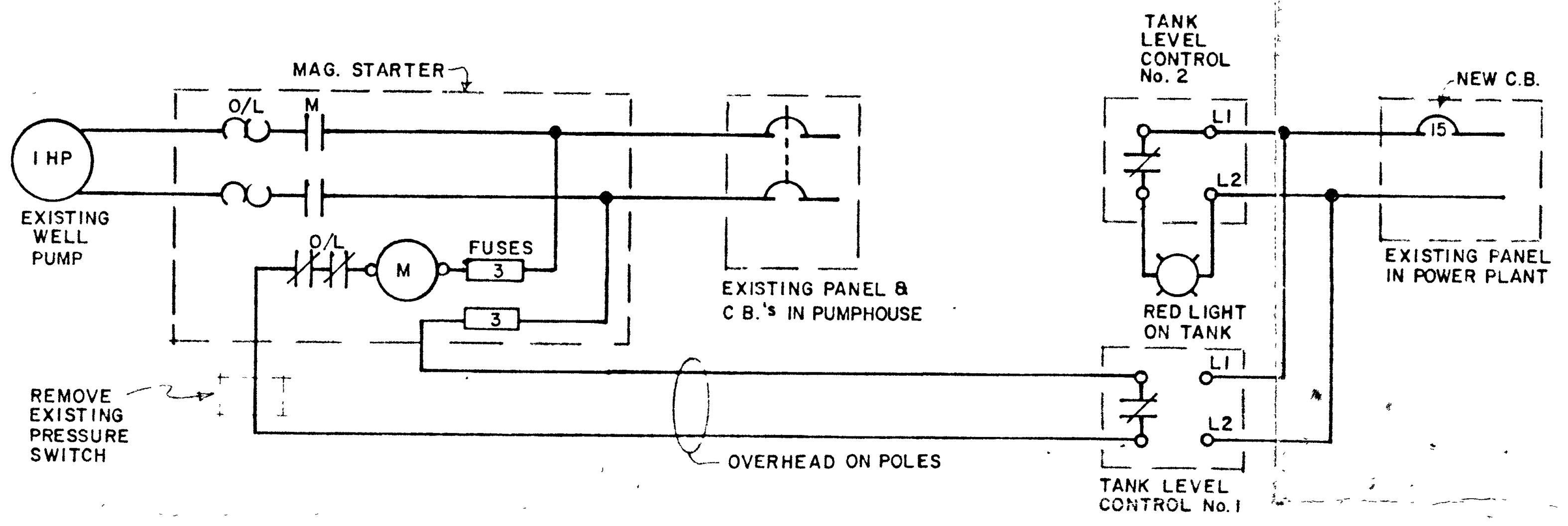
C. ALL STARTERS, CONTROLS & DEVICES SHOWN ON WIRING DIAGRAMS ARE TO BE NEW UNLESS NOTED OTHERWISE.



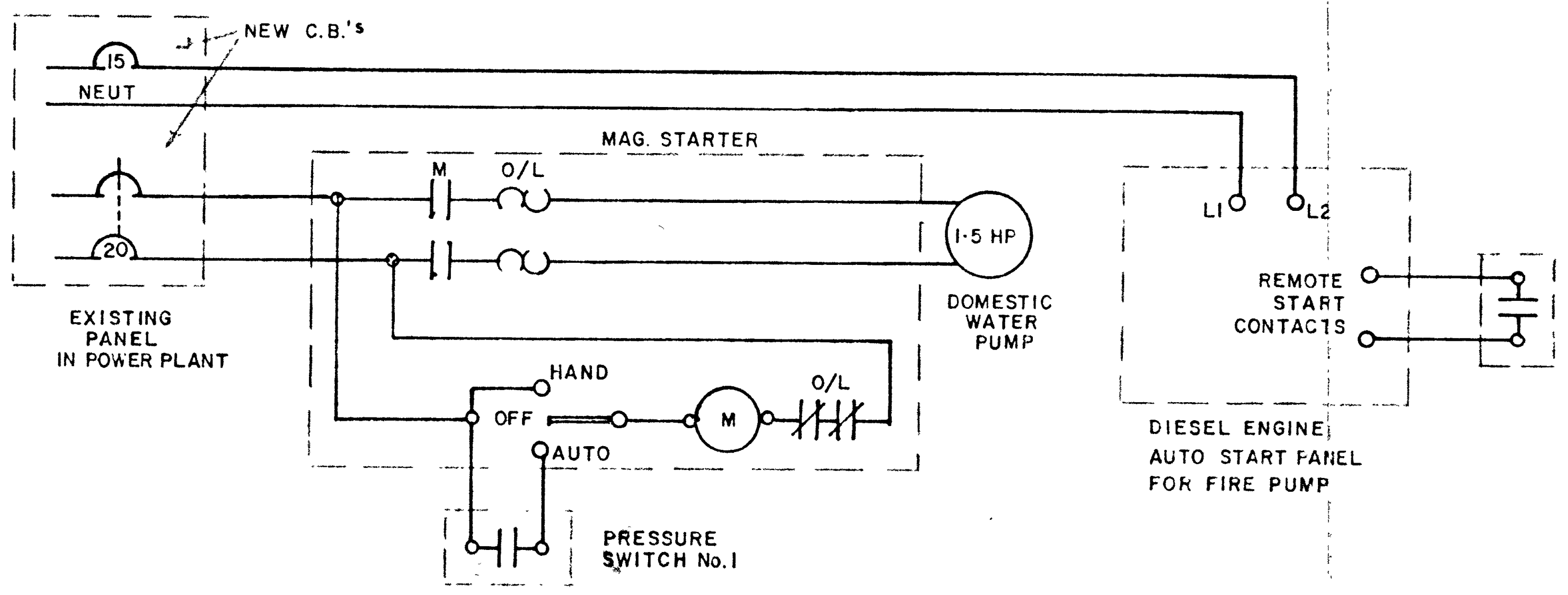
LEGEND

- Ⓐ - NEW CEILING FIXTURE (MATCH EXISTING)
- Ⓑ - WARNING LIGHT - CROUSE-HINDS No. VXHBF 15 G. WITH 100 W. RED LAMP.
- ☒ - MAGNETIC MOTOR STARTER
- P - PRESSURE SWITCH (AS SPECIFIED)
- L - FLOATLESS ELECTRODE LEVEL CONTROL

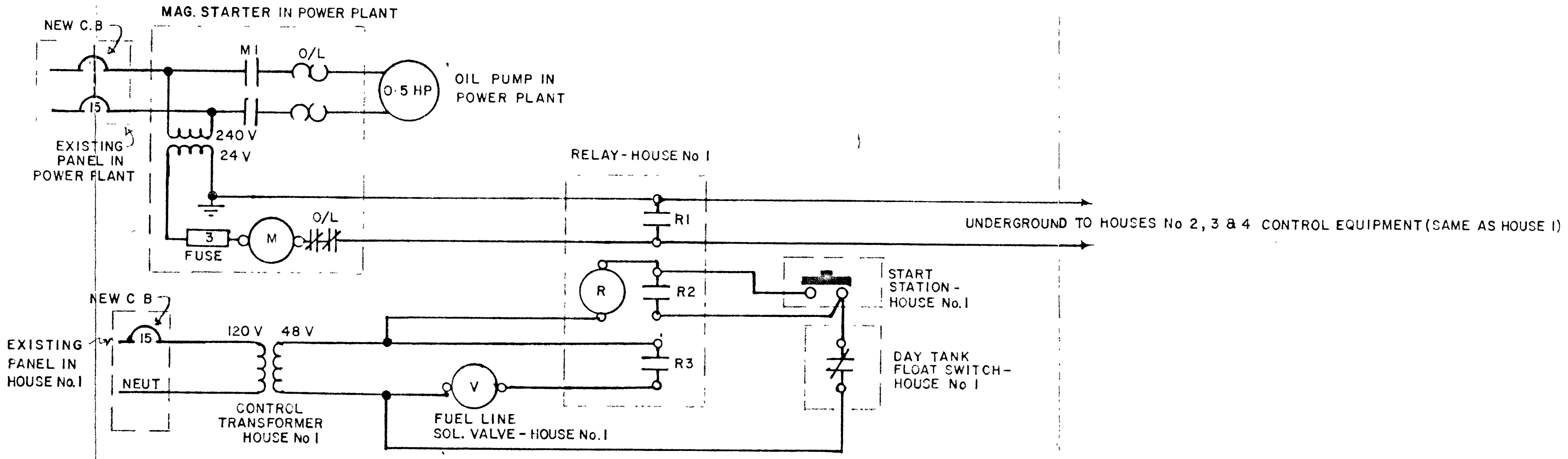
PLAN - POWER PLANT SCALE 1:50



WELL PUMP CONTROL WIRING DIAGRAM - 1 N. T. S.



DOMESTIC & FIRE PUMP CONTROL WIRING DIAGRAM - 2 N. T. S.



OIL PUMP CONTROL WIRING DIAGRAM - 3 N. T. S.

Public Works Canada
Travaux publics Canada

PACIFIC REGION

A detail no. détail no.
B location drawing no sur dessin no.
C drawing no dessin no.

revisions date

project title titre du projet
PLEASANT CAMP, B. C.
OIL & WATER STORAGE
& DISTRIBUTION SYSTEM

drawing title titre du dessin
ELECTRICAL LAYOUT

designed by concu par
J A GUERTIN, C. E. T.
date JULY 1980

drawn by dessine par
J. A. G.
date

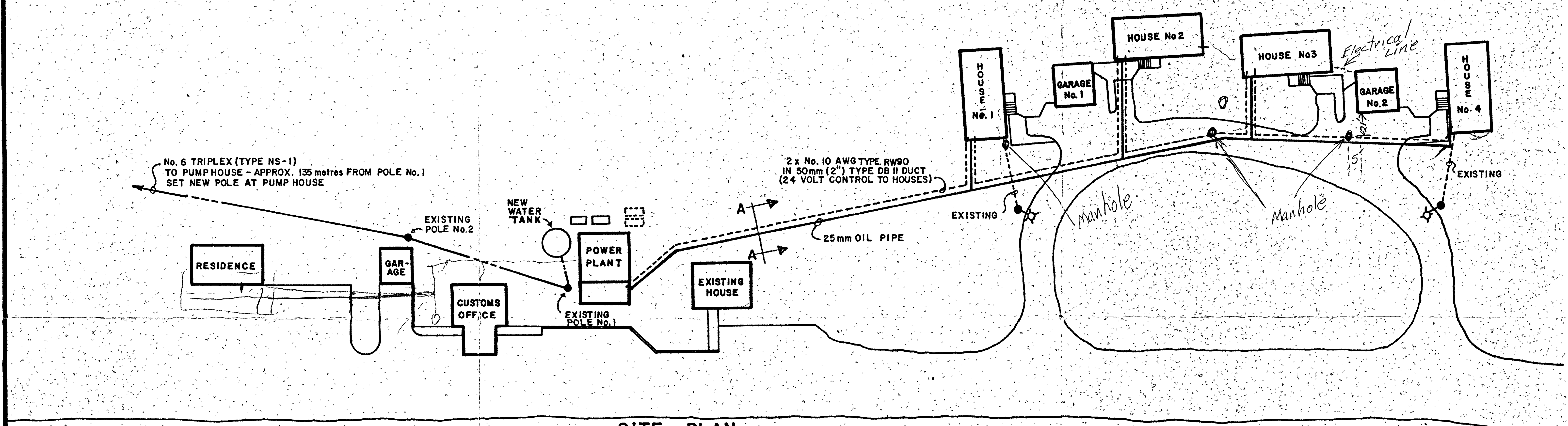
reviewed by examine par
date

approved by approuvé par
date

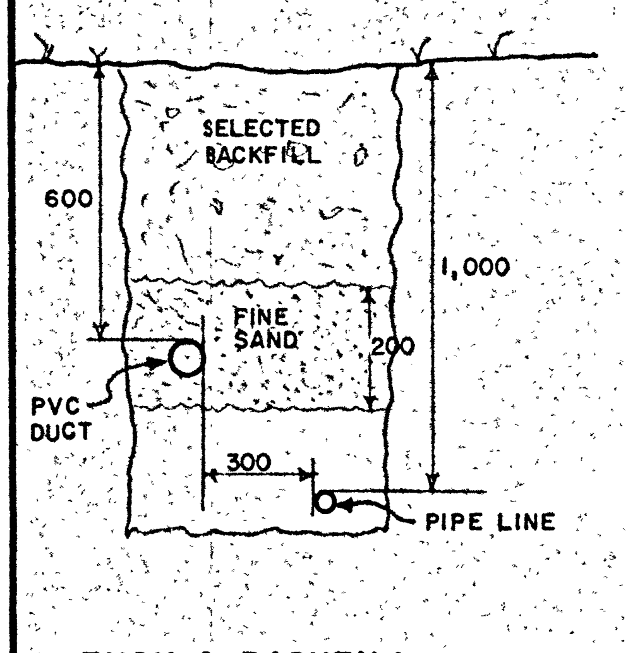
Tender Soumission
D P W Project Manager Administrateur de projets M T P.

project number no du projet
E - 1 of 1

drawing no. dessin no.
014468



SITE PLAN SCALE 1:500



TRENCH & BACKFILL SECTION A-A N.T.S.

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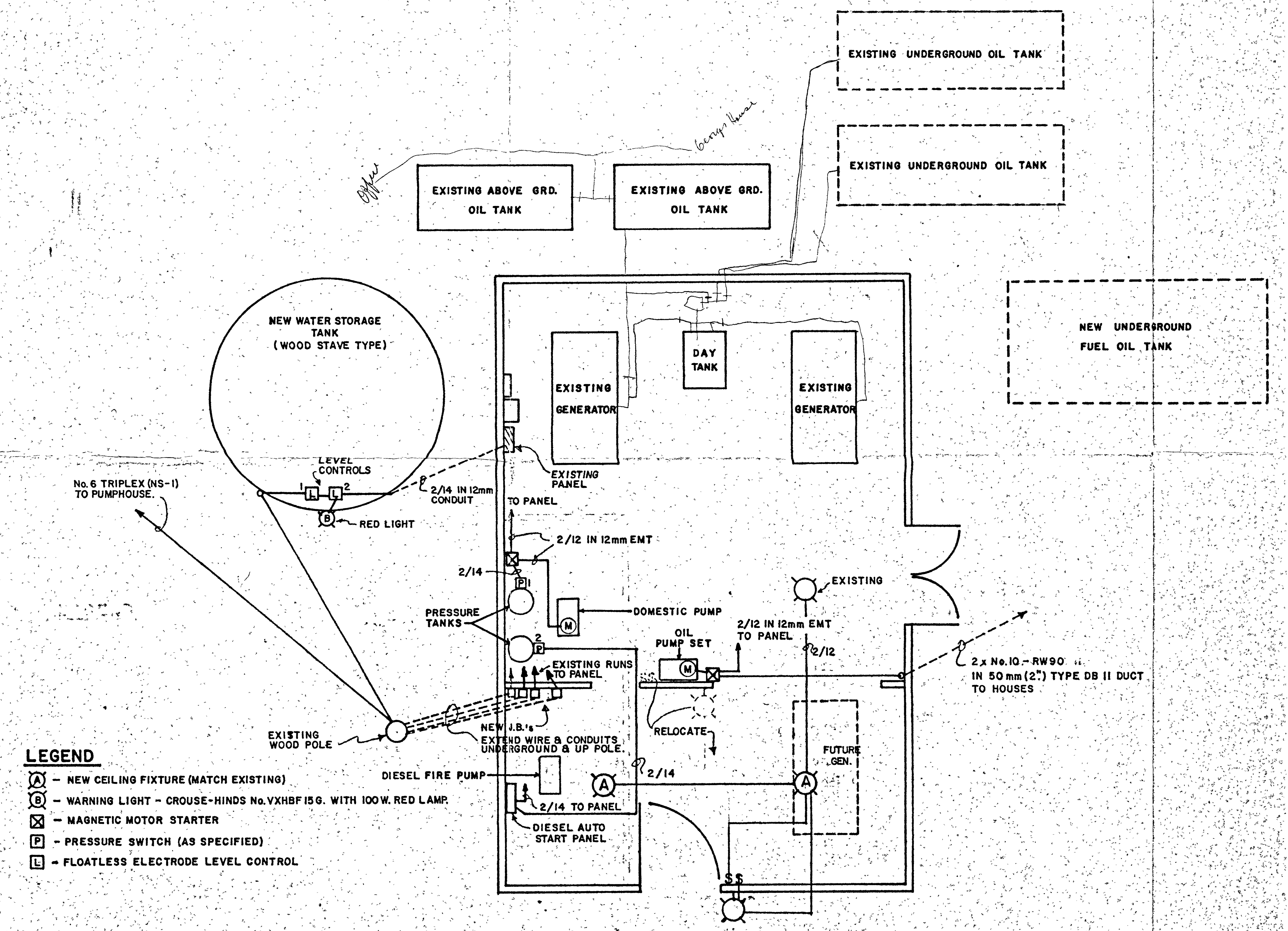
Public Works Canada Travaux publics Canada

PACIFIC REGION



LEGEND

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- Ⓑ - WARNING LIGHT - CROUSE-HINDS No. VXHBF15G. WITH 100W. RED LAMP.
- ☒ - MAGNETIC MOTOR STARTER
- P - PRESSURE SWITCH (AS SPECIFIED)
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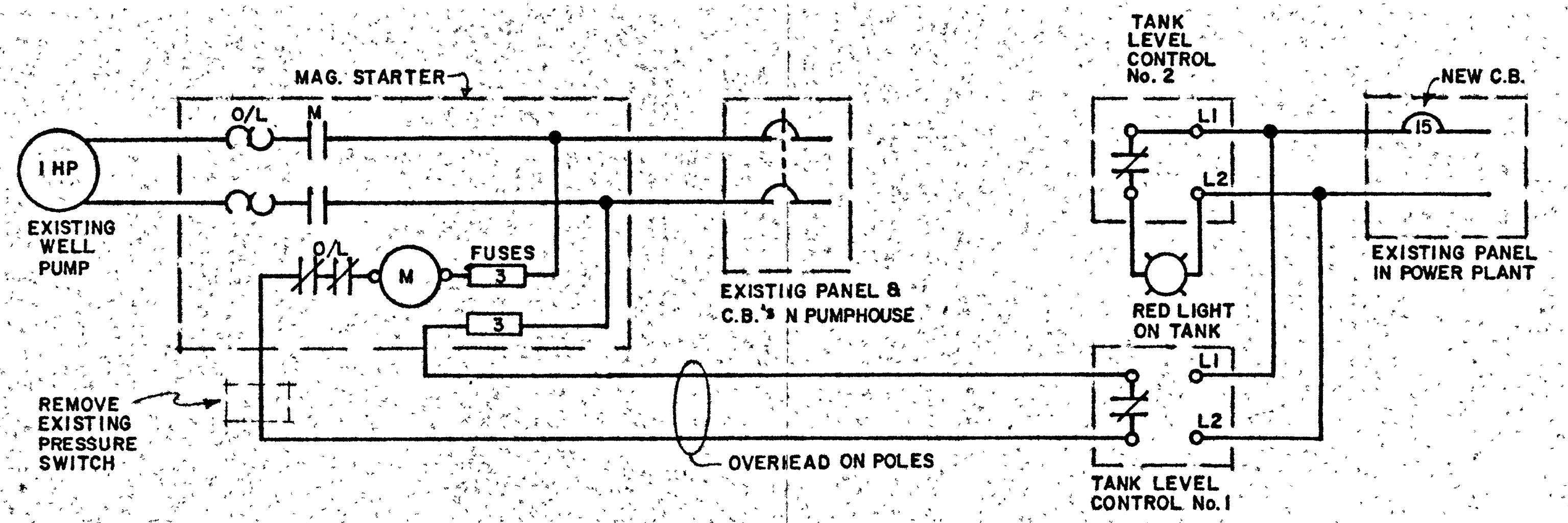
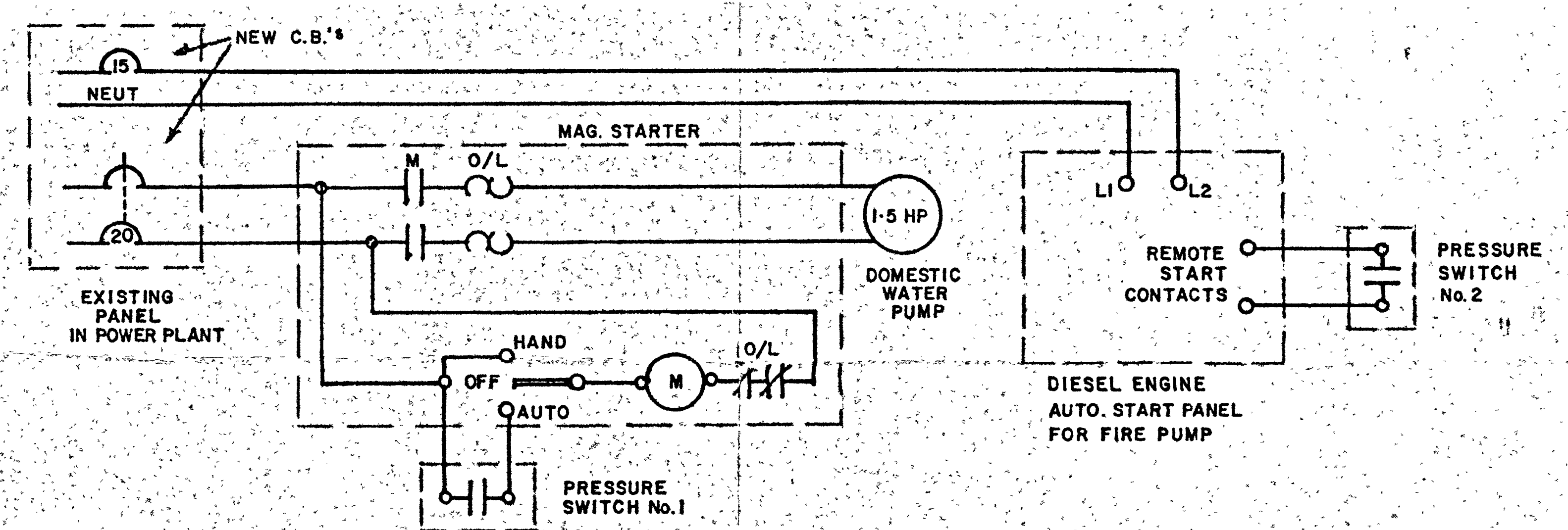
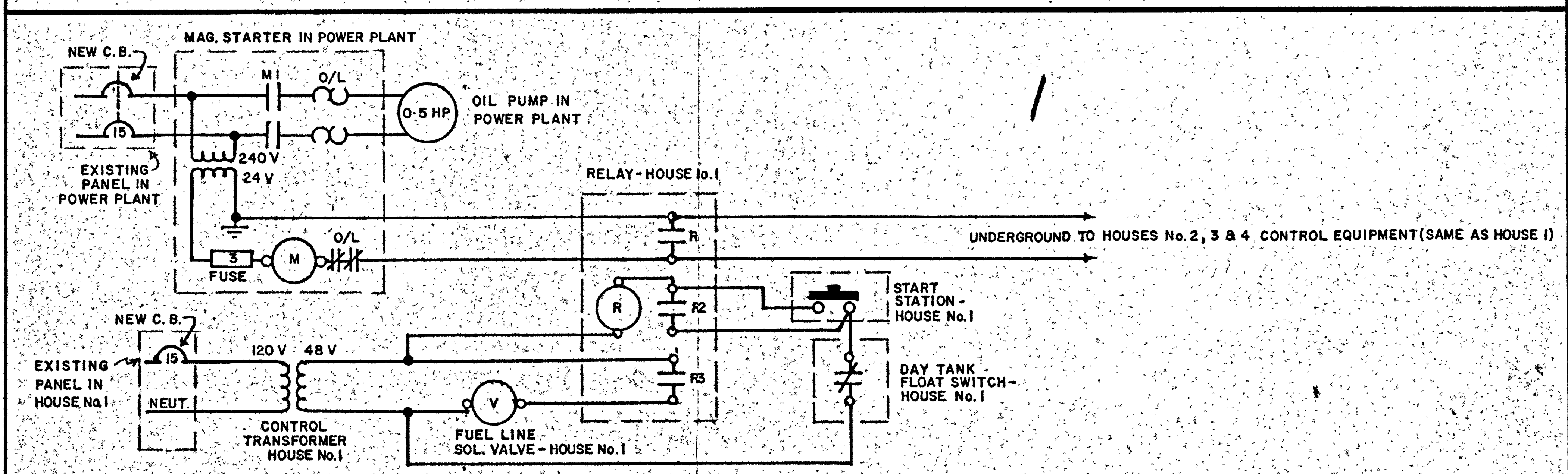
PLAN - POWER PLANT SCALE 1:50



WELL PUMP CONTROL WIRING DIAGRAM - 1 N.T.S.



DOMESTIC & FIRE PUMP CONTROL WIRING DIAGRAM - 2 N.T.S.



OIL PUMP CONTROL WIRING DIAGRAM - 3 N.T.S.

A detail no. détail no.
B location drawing no. sur dessin no.
C drawing no. dessin no.

revisions date

project title titre du projet
PLEASANT CAMP, B. C.
OIL & WATER STORAGE
& DISTRIBUTION SYSTEM

drawing title titre du dessin
ELECTRICAL LAYOUT

designed by conçu par
J. A. GUERTIN, C. E. T.
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date

reviewed by examiné par
date

approved by approuvé par
date

Tender Soumission
H. J. LAMBERT
D.P.W. Project Manager Administrateur de projets M.T.P.

project number no. du projet
E - 1 of 1

drawing no. dessin no.
014468

DPW 700 D

cut here
couper ici

international A1 594 x 841 mm

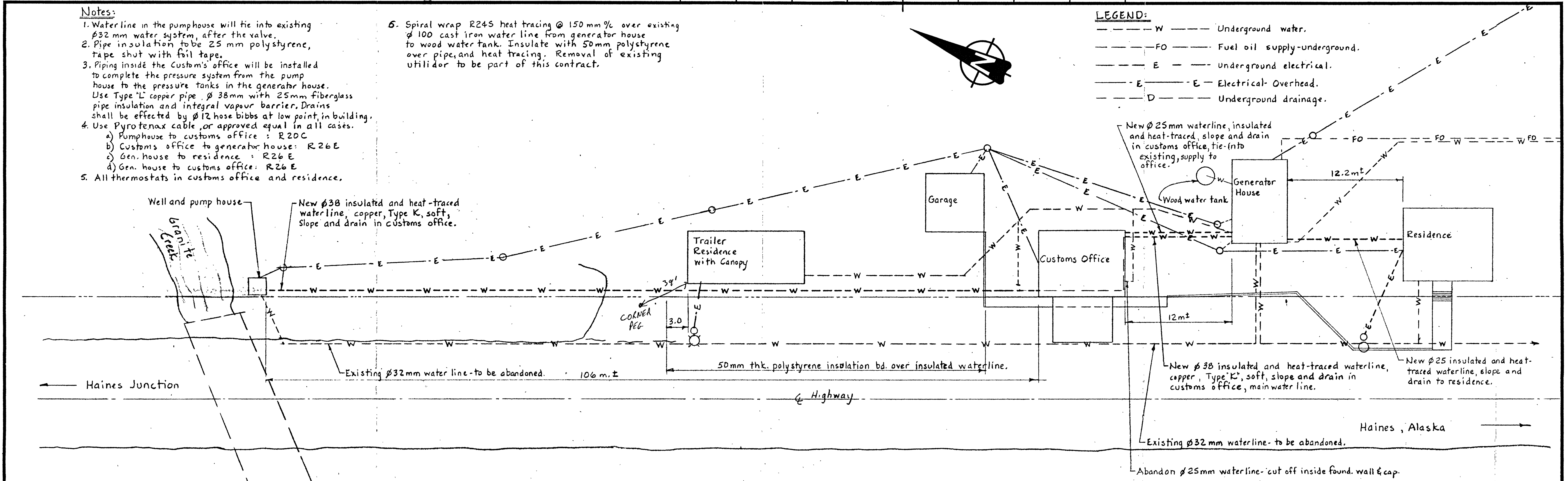
inches 0 1 2 3 4 5 6 7 8 pouces

Notes:

1. Water line in the pumphouse will tie into existing ø32 mm water system, after the valve.
2. Pipe insulation to be 25 mm polystyrene, tape shut with foil tape.
3. Piping inside the Custom's office will be installed to complete the pressure system from the pump house to the pressure tanks in the generator house. Use Type "L" copper pipe, ø 38mm with 25mm fiberglass pipe insulation and integral vapour barrier. Drains shall be effected by ø 12 hose bibbs at low point, in building.
4. Use Pyrotenax cable, or approved equal in all cases.
    a) Pumphouse to customs office : R20C
    b) Customs office to generator house: R26E
    c) Gen. house to residence : R26 E
    d) Gen. house to customs office: R26 E
5. All thermostats in customs office and residence.
6. Spiral wrap R245 heat tracing @ 150 mm %c over existing ø 100 cast iron water line from generator house to wood water tank. Insulate with 50mm polystyrene over pipe, and heat tracing. Removal of existing utilidor to be part of this contract.

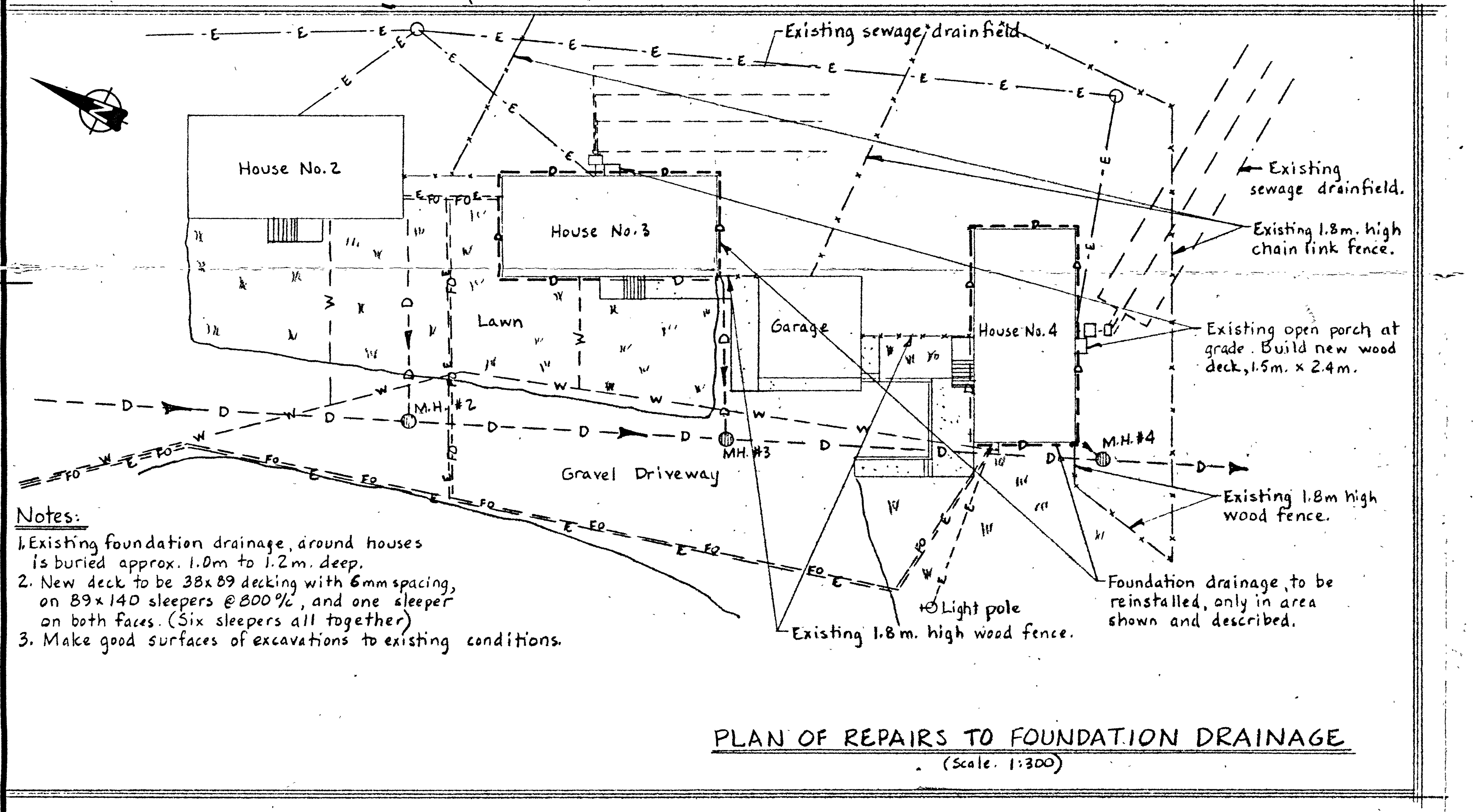
LEGEND:

- — — W — — Underground water.
- — — FO — — Fuel oil supply-underground.
- — — E — — Underground electrical.
- —— E —— E — Electrical- Overhead.
- — — D — — Underground drainage.



SITE PLAN- WATERWORKS

(Scale: 1:300)

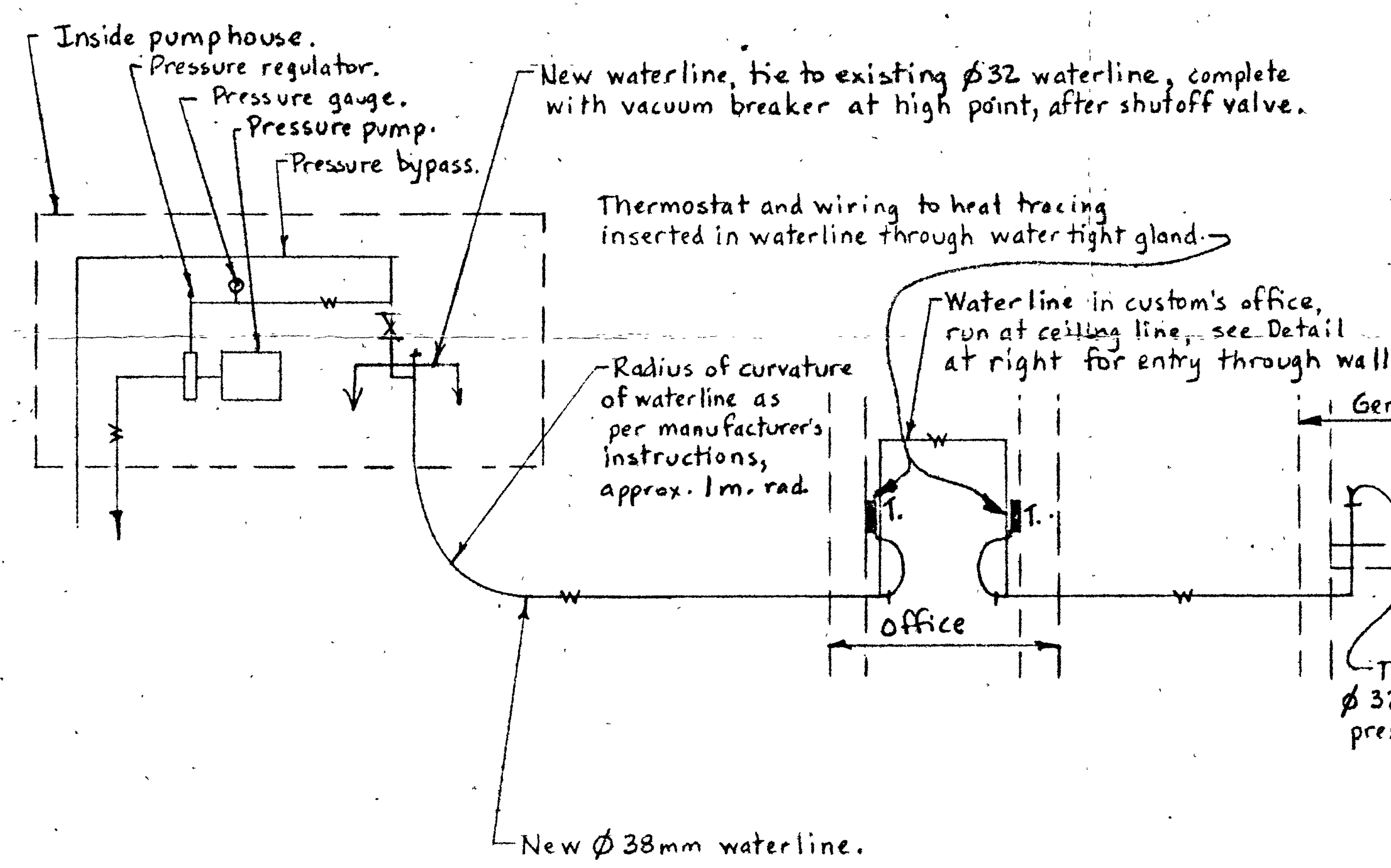


Notes:

1. Existing foundation drainage, around houses is buried approx. 1.0m to 1.2m. deep.
2. New deck to be 38x89 decking with 6mm spacing, on 89x140 sleepers @800 %c, and one sleeper on both faces. (Six sleepers all together)
3. Make good surfaces of excavations to existing conditions.

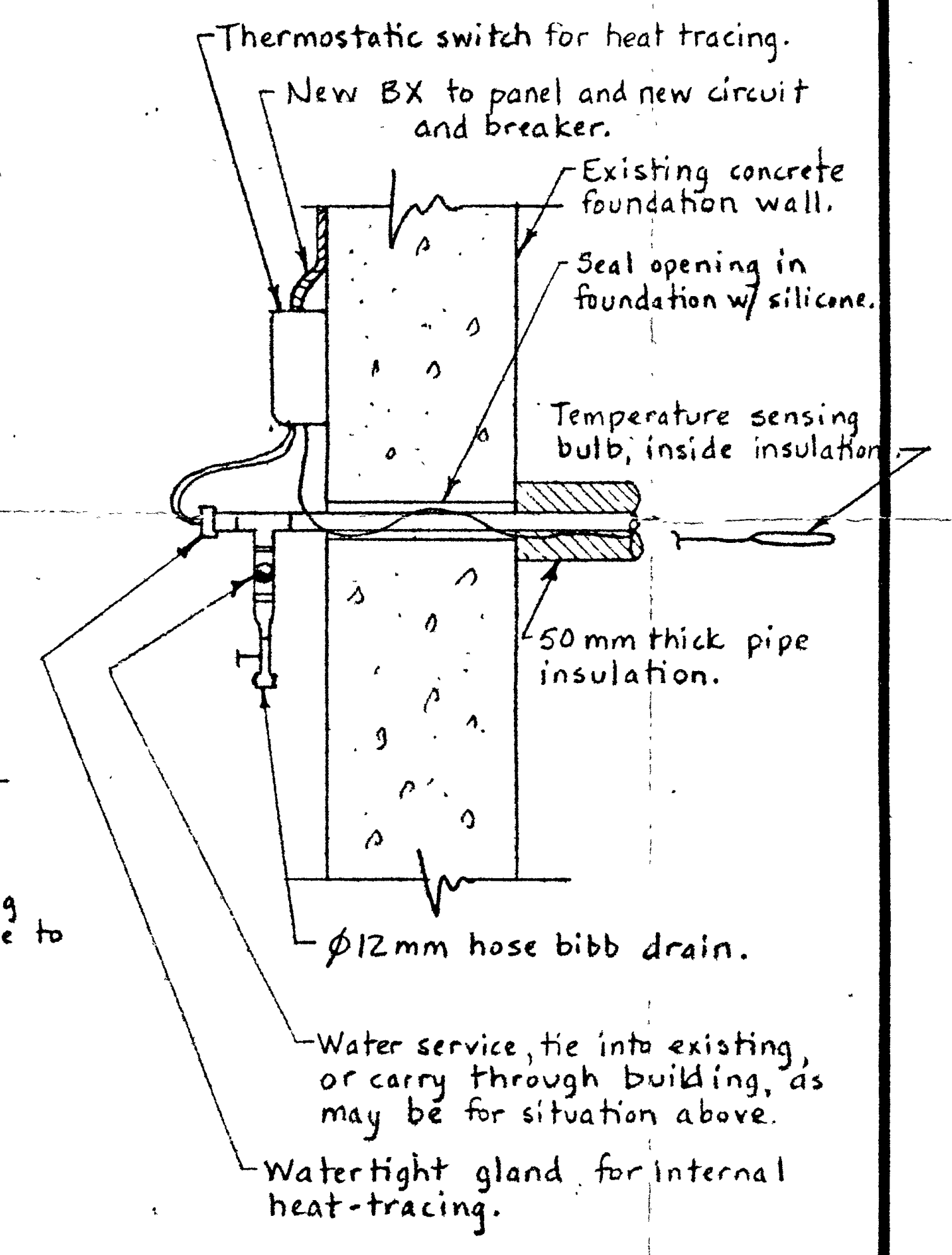
PLAN OF REPAIRS TO FOUNDATION DRAINAGE

(Scale. 1:300)



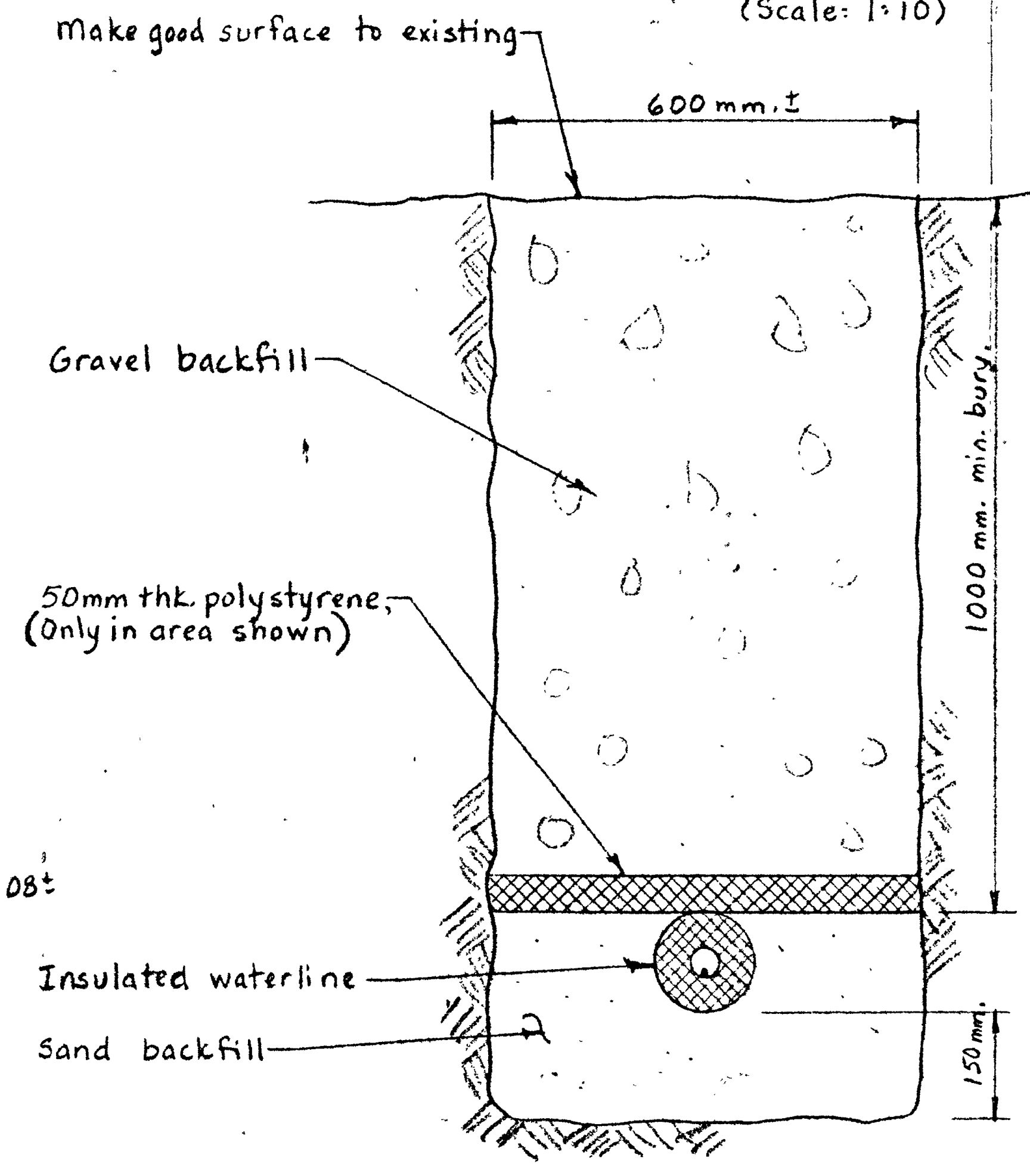
SCHEMATIC DETAIL OF NEW MAIN WATERLINE FROM PUMP HOUSE TO GENERATOR HOUSE

N.T.S.



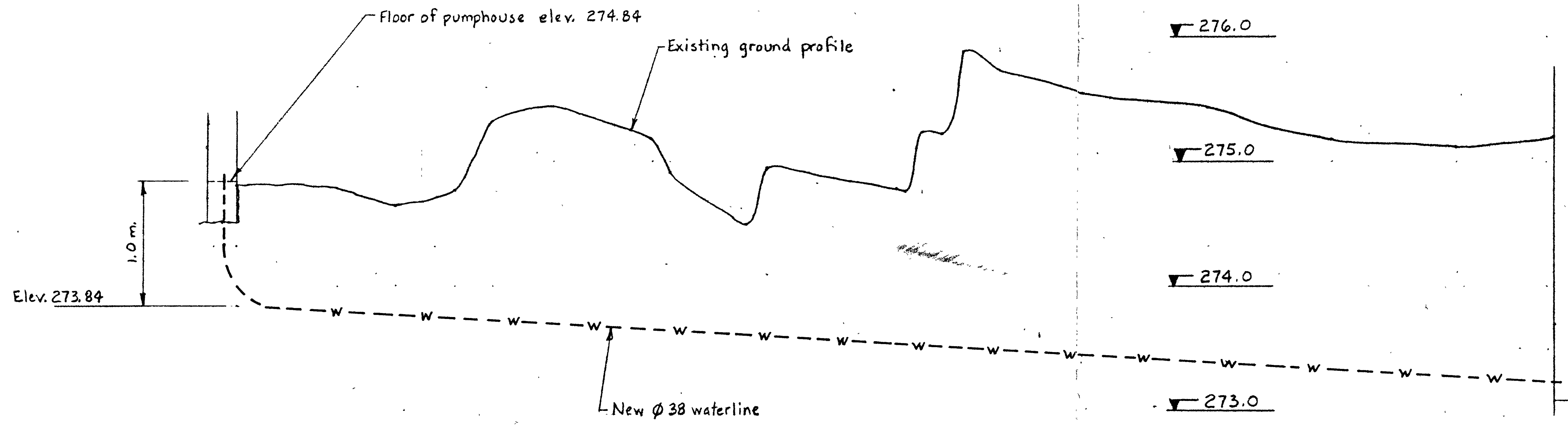
DETAIL "A"

(Scale: 1:10)



TRENCH DETAIL

(Scale: 1:10)



PROFILE OF WATERLINE

(Scales: 1:300 Horiz. - 1:30 Vert.)

DPW A1

centimetres 0 2 4 6 8 10 12 14 16 18 20 centimètres

Public Works Canada
Travaux publics Canada

office
bureau
WHITEHORSE, YUKON

consultant
expert-conseil

seal
sceau

designed by
conçu par

drawn by
dessiné par
R. Ayotte
82·07·06

approved by
approuvé par
date

scale
échelle

A detail no. / no. du détail
B sheet no. – where detail required / no. de la feuille – où détail exigé
C sheet no. – where detailed / no. de la feuille – où détaillé

revisions
révisions

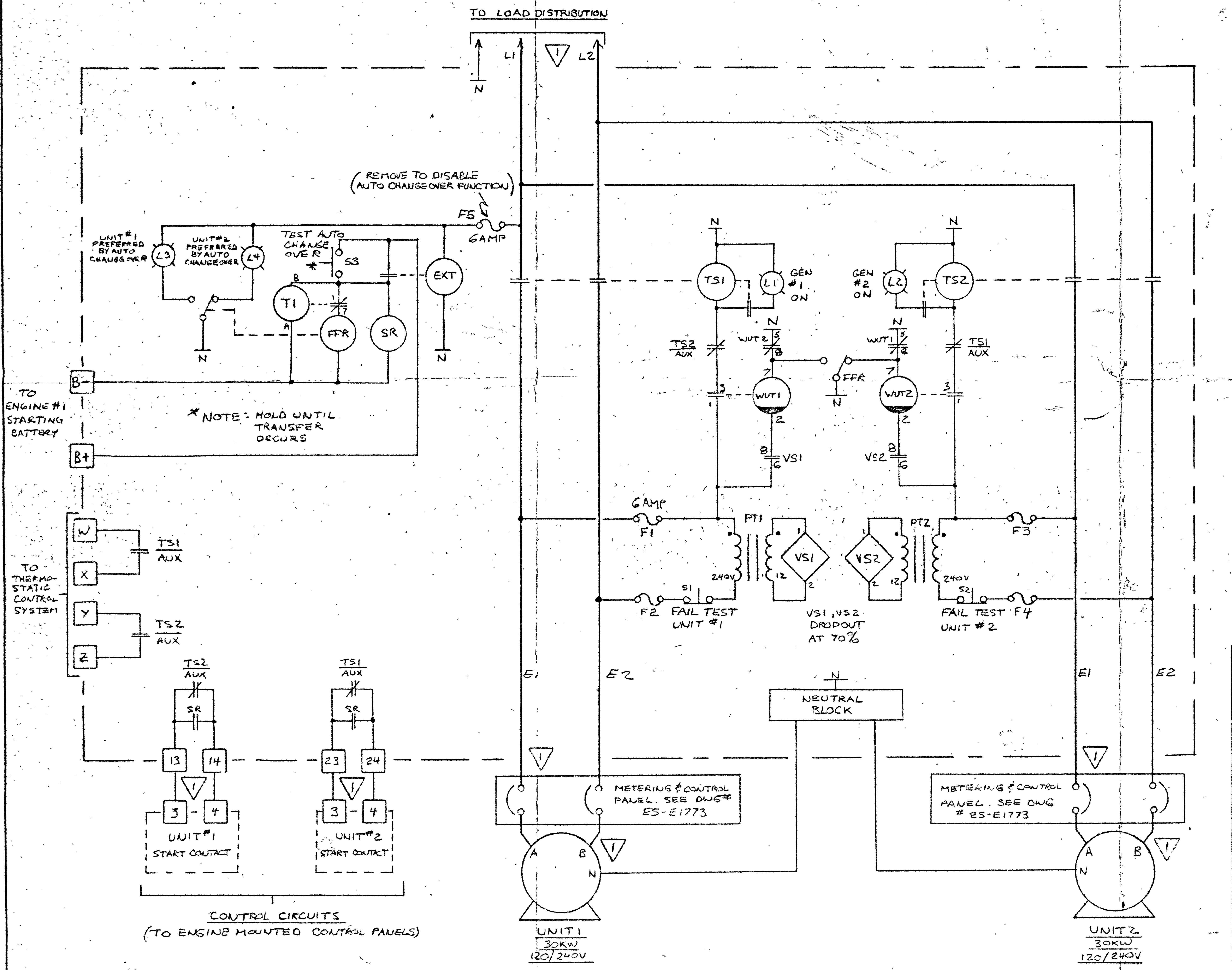
project
projet
PLEASANT CAMP, B.C.
REVENUE CAN.-CUSTOMS STA.
REPAIRS TO FOUNDATION DRAINAGE & REPLACEMENT OF MAIN WATERLINE

drawing
dessin
PLANS & DETAILS

project No. du projet
014468

sheet No. de la feuille
1 of 1

A 1500- 4-1



DESIG.	DESCRIPTION	MODEL - MFG	
EXT	EXERCISE TIMER RELAY	T-1975	INTERMATIC
F1-4	CONTROL FUSE	BAF-6	
F5	CONTROL FUSE	BAF-6	
FFR	FLIP-FLOP RELAY	PC11A	P&B
L1-2	INDICATOR LAMPS	6S6 -145V	
L3-4	INDICATOR LAMPS	6S6 -145V	
PT1-2	POTENTIAL TRANSFORMER 240/12	HD4EA	HAMMOND
R1	RESISTOR (PINS 2&5 ON T1)	27KOHM	½ WATT.
S1-2	FAIL TEST PUSHBUTTON SWITCH	SB22INC	ARMACO
S3	TEST AUTO CHANGEOVER P.B. SWITCH	SB22INO	ARMACO
SR	ENGINE START RELAY	KRP14ON	P&B
T1	TIMER	CLH-41-30010	P&B
TS1-2	TRANSFER SWITCH CONTACTOR	CA-1-250	S/S
VS1-2	VOLTAGE SENSOR	VSR310	S-TEC
WUT1-2	WARM-UP TIMER	CHB38-70052	P&B

NO.	NOTES	DWG. NO.	REFERENCE DRAWINGS
1	CONNECTIONS BY INSTALLERS		

NO.	REVISIONS	APP'D	BY
B	POST PRODUCTION	OCT 31/77	
C	CHANGE +/- TO B+/B-	JAN 2/78	

SCALE N.T.S.

DRAWN BY JER

CHECKED

250 AMP, 120/240 VOLT, 1Ø
DUAL GENERATOR TRANSFER SWITCH
SCHEMATIC

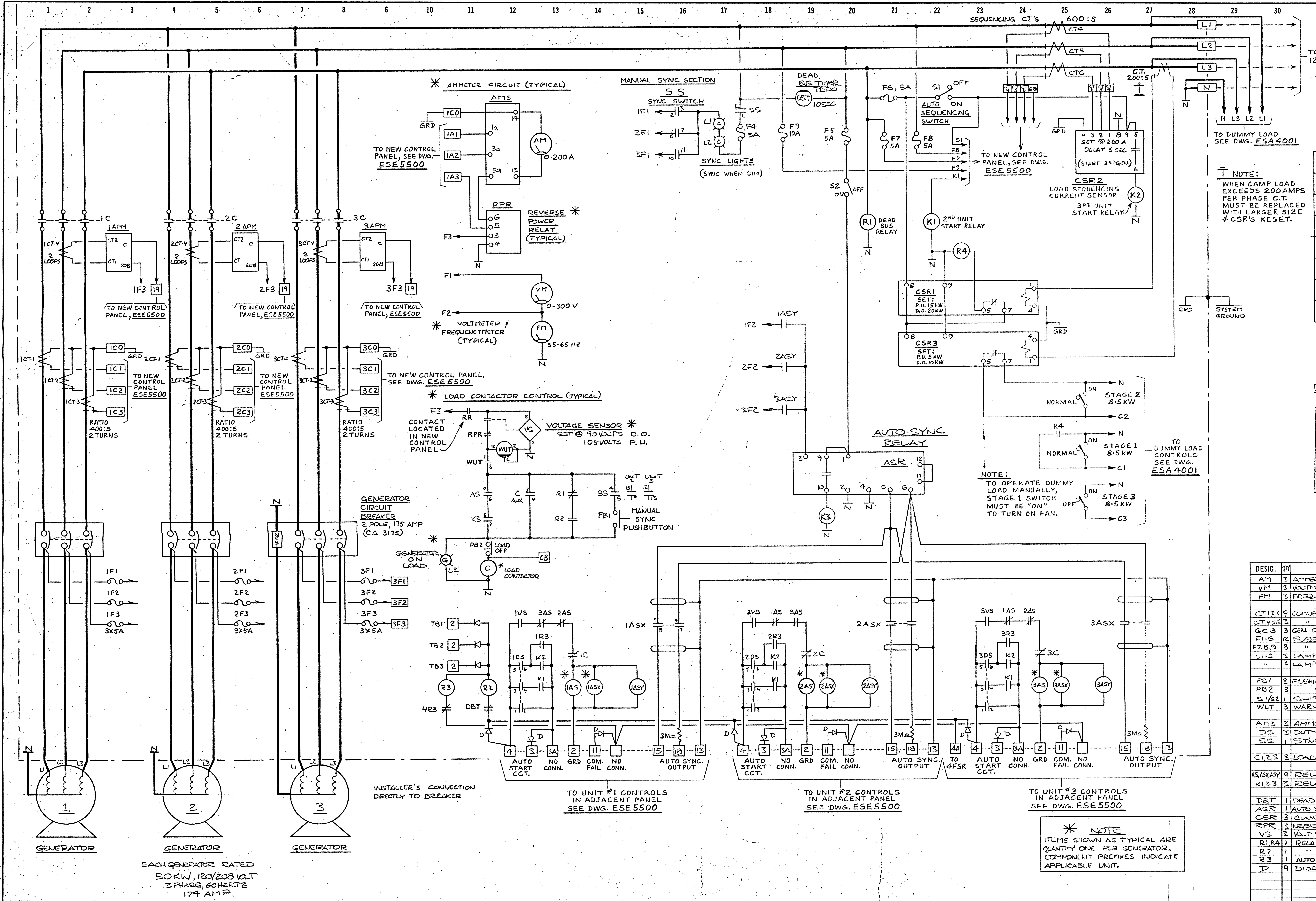
M&R MECHANICAL CONTRACTORS

SCHMIDTEC POWER SYSTEMS LTD.
BURNABY, B.C.

DATE OCT 7/77

DWG. NO. ES-C1953C

FTC 7473



* NOTE
ITEMS SHOWN AS TYPICAL ARE QUANTITY ONE PER GENERATOR. COMPONENT PREFIXES INDICATE APPLICABLE UNIT.

† NOTE:
WHEN CAMP LOAD EXCEEDS 200 AMPS PER PHASE C.T. MUST BE REPLACED WITH LARGER SIZE & CSR'S RESET.

EACH GENERATOR RATED
50KW, 120/208 VOLT
3 PHASE, 60HERTZ
174 AMP

SS
SYNC SWITCH

	OFF	1	2	3
2-3		☒		
6-7			☒	
10-11				☒
L-1		☒	☒	☒
4-5		☒		
8-9			☒	
12-13				☒

DS
DUTY SWITCHES

	OFF	3	2	1
1-2				☒
3-4			☒	
5-6		☒		

DESIG.	QTY	DESCRIPTION	MODEL - MFG.
AM	3	AMMETER 0-300A	3PB AAC 200 MOD
VM	3	VOLTMETER 0-300V	3PBAVC 300 "
FM	3	FREQUENCY METER 55-65HZ	3PB FRQ 60/120 "
CT123	9	CURRENT TRANSFORMER 400/5	805-340 CROMPTON
CT456	3	" " 600/5	806-940 "
GCB	3	GEN. CIRCUIT BREAKER	CA 3175 WEST.
F1-6	12	FUSE 5AMP	BAF5 BUSS
F7,8,9	3	" "	" "
L1-3	3	LAMP HOLDER 1"	80-3101-05-301 DIALCO
"	3	LAMP BULB 145V	S6 SPECTRO
PB1	3	PUSHBUTTON N/O	BA2-BZ101 TE
PB2	3	" N/C	BA2-BZ102 TE
S1/S2	1	SWITCH ON-OFF	BJ2-BZ101 TE
WUT	3	WARM UP TIMER	H3BA OMRON
AMS	3	AMMETER SELECTOR	T1-3-136/eZ KM
DS	3	DUTY SELECTOR	T1-2-16/eZ KM
SS	1	SYNC. SWITCH	T1-4-15823/eZ KM
C1,2,3	3	LOAD CONTACTOR (2AUX) 120VAC	CA1-150 S/S
AS,ASX,ASY	9	RELAY, DC	157-23C,24V. MIDTEX
K123	3	RELAY, AC	68 INA120VAC GUARDIAN
DBT	1	DEAD BUS TIMER	700NT400A20 A/B
ASR	1	AUTO SYNC. RELAY	CRM60C KONELL
CSR	3	CURRENT SENSOR	CSR1500 SCHMIDTEC
RPR	3	REVERSE POWER RELAY	710X WILMAR
VS	3	VOLT SENSOR	CSJ 38-70010 P&B
R1,R4	1	RELAY AC	68 INA 120VAC GDN
R2	1	" DC	157,23C,24V MIDTEX
R3	1	AUTO STANDBY RELAY DC	24V MECHRON
D	9	DIODE	1N5404 MOTO

NO.	NOTES
⚠1	ALL GENERATORS ARE EQUIPPED WITH UNIT MOUNTED AUTO-START CONTROL PANELS. REF DWG. ES-C 1947
⚠2	ALL BATTERY NEGATIVES TO BE PARALLELED WITH # 4 AWG

DWG. NO.	REFERENCE DRAWINGS
ES-C1947	UNIT MOUNTED CONTROL PANELS
ESE 5500	KW METERING, LOAD SHARING & SEQUENCING
ESA 4001	LOAD BANK

NO.	REVISIONS	APP'D	BY
G	ON SITE MOD'S. (W.O. #5500 UPGRADE)	85 10 01	RG
F	AS BUILT, UPGRADE PER W.O. #5500	85 09 17	RG
E	ADD APM 100 & CT-4	82-09-09	CB
D	ADD RELAY R3	82-08-10	CB
C	AS BUILT	82-08-04	CB
B	PER APPROVAL	JUNE 1/82	CB

SCALE N.T.S.
DRAWN BY CB
CHECKED

CUSTOMER REVENUE CANADA
DIESEL GENERATOR
SYNCHRONIZING SCHEMATIC
LOCATION PLEASANT CAMP

SCHMIDTEC POWER SYSTEMS LTD.
BURNABY 2 B.C.

DATE MAY 27/82
DWG. NO. ESE-4001
REV G

FTC 7473

THE INFORMATION ON THIS DRAWING IS THE PROPERTY OF SCHMIDTEC POWER SYSTEMS LTD. IT IS NOT TO BE USED DETRIMENTALLY TO OUR INTERESTS.

W.O. 5500 FOR REV. F & ONWARD

NOTES:

1.) 10 SPARE WIRES TO DOOR
2) ALL CONTROL WIRING #18 GREY TEW
3) C.T. WIRING #14 GREY TEW

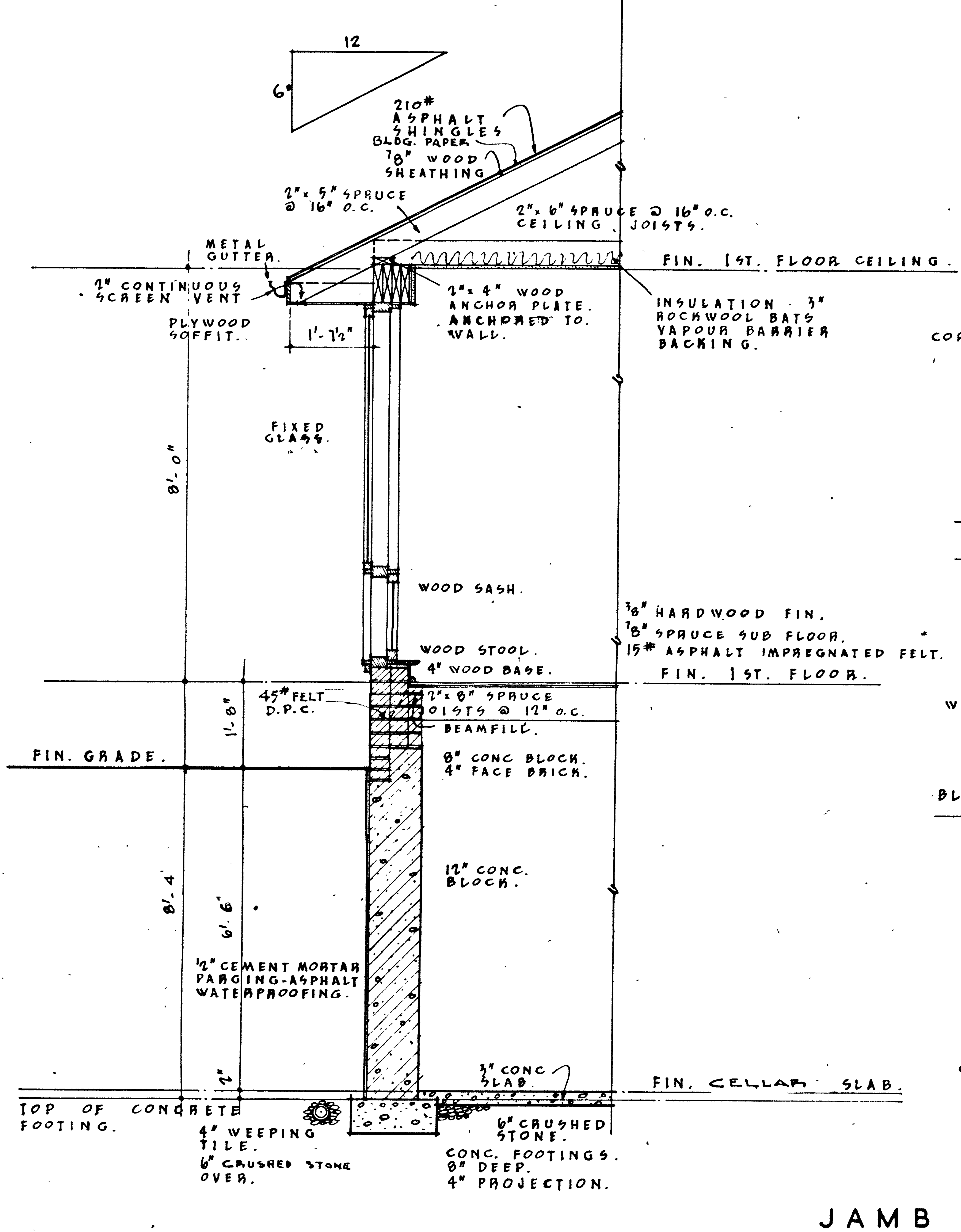
DWG. NO.	REFERENCE DRAWINGS
PLA-5500	PARTS LIST
ESA4001	LOAD BANK
ESC 1947	UCS PANELS
ESE 4001	SYNC. SCHEMATIC

NO.	REVISIONS	DATE	BY
C	ON SITE MOD'S.	85 09 30	RG
B	AS BUILT	85 09 17	RG

schmidtec POWER SYSTEMS LTD

K.W. METERING, LOAD SHARING & SEQUENCING
& D.C. ENGINE CONTROL
ADDER TO SYNC. CONTROL PANEL

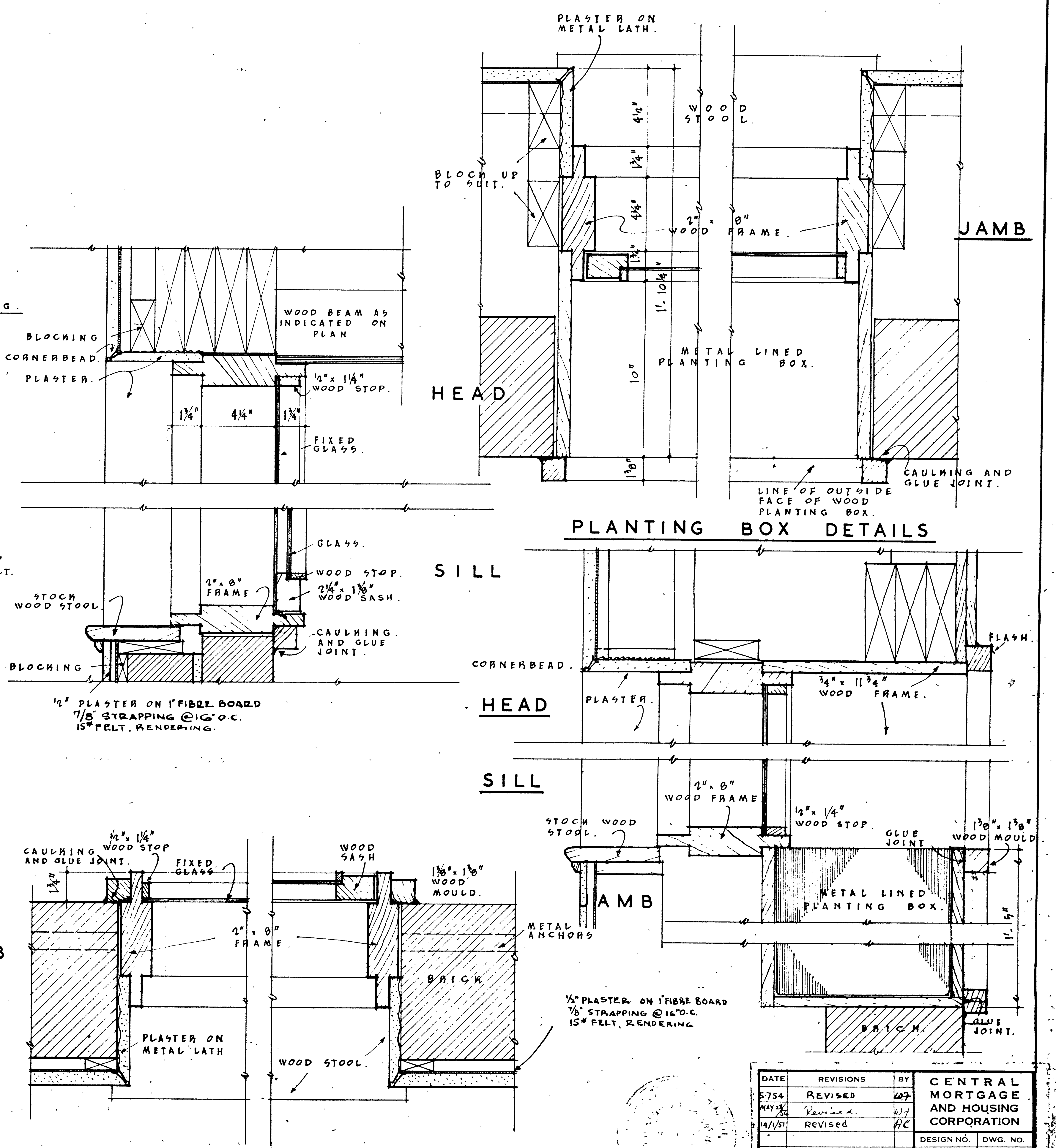
CUSTOMER REVENUE CANADA
DATE 85 08 16
BY RG
DWG. No. ESE 5500
REV. C
SHEET



WALL SECTION

FRONT ELEVATION

SCALE: 1/2" = 1'-0"



TYPICAL WINDOW DETAILS

SCALE: 3" = 1'-0"

PLANTING BOX DETAILS

DATE	REVISIONS	BY
5.754	REVISED	WJ
MAY 24/56	Revised.	WJ
14/1/57	Revised	AC

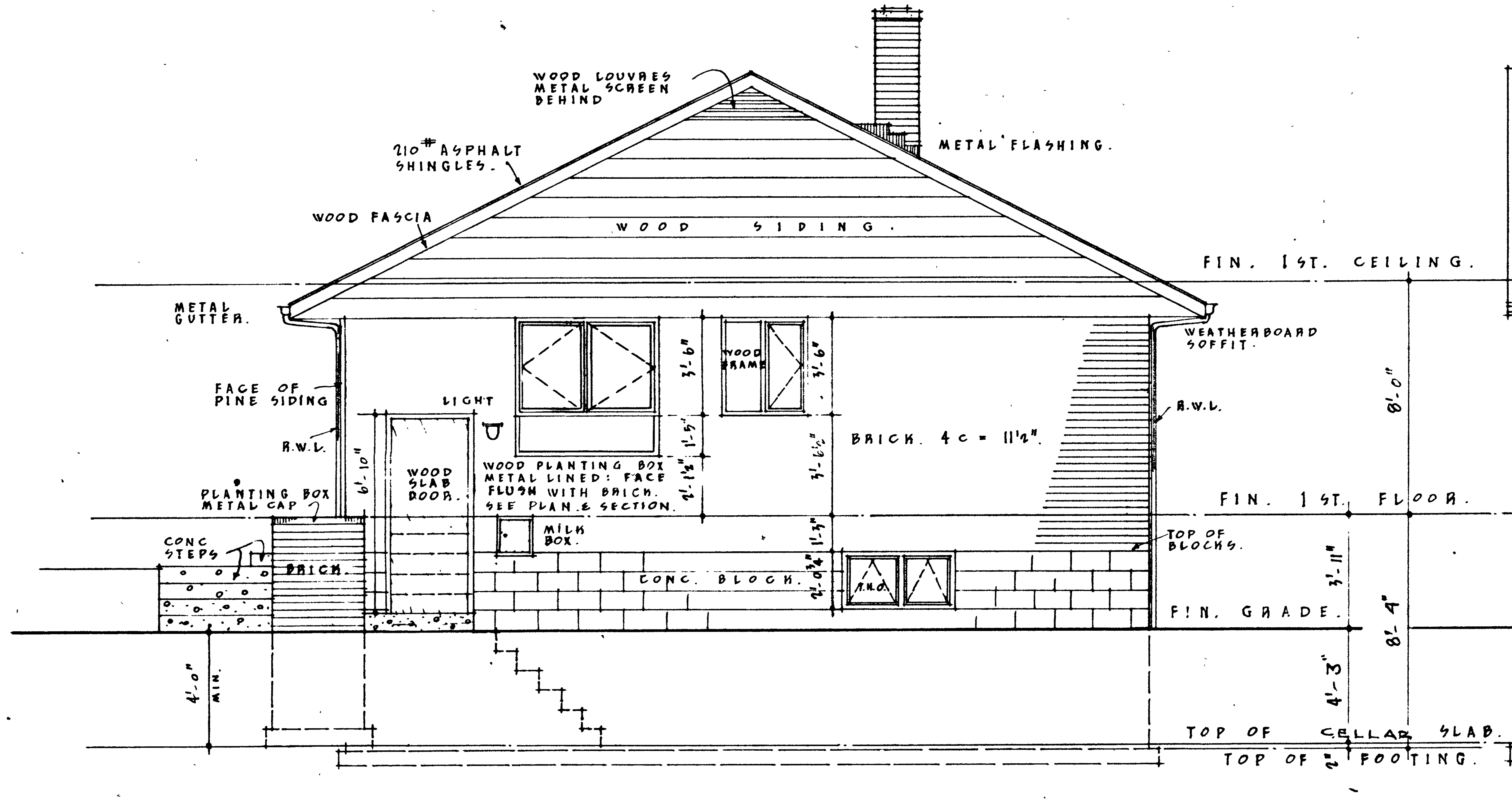
CENTRAL
MORTGAGE
AND HOUSING
CORPORATION

DESIGN NO.	DWG. NO.
242	2 OF 5

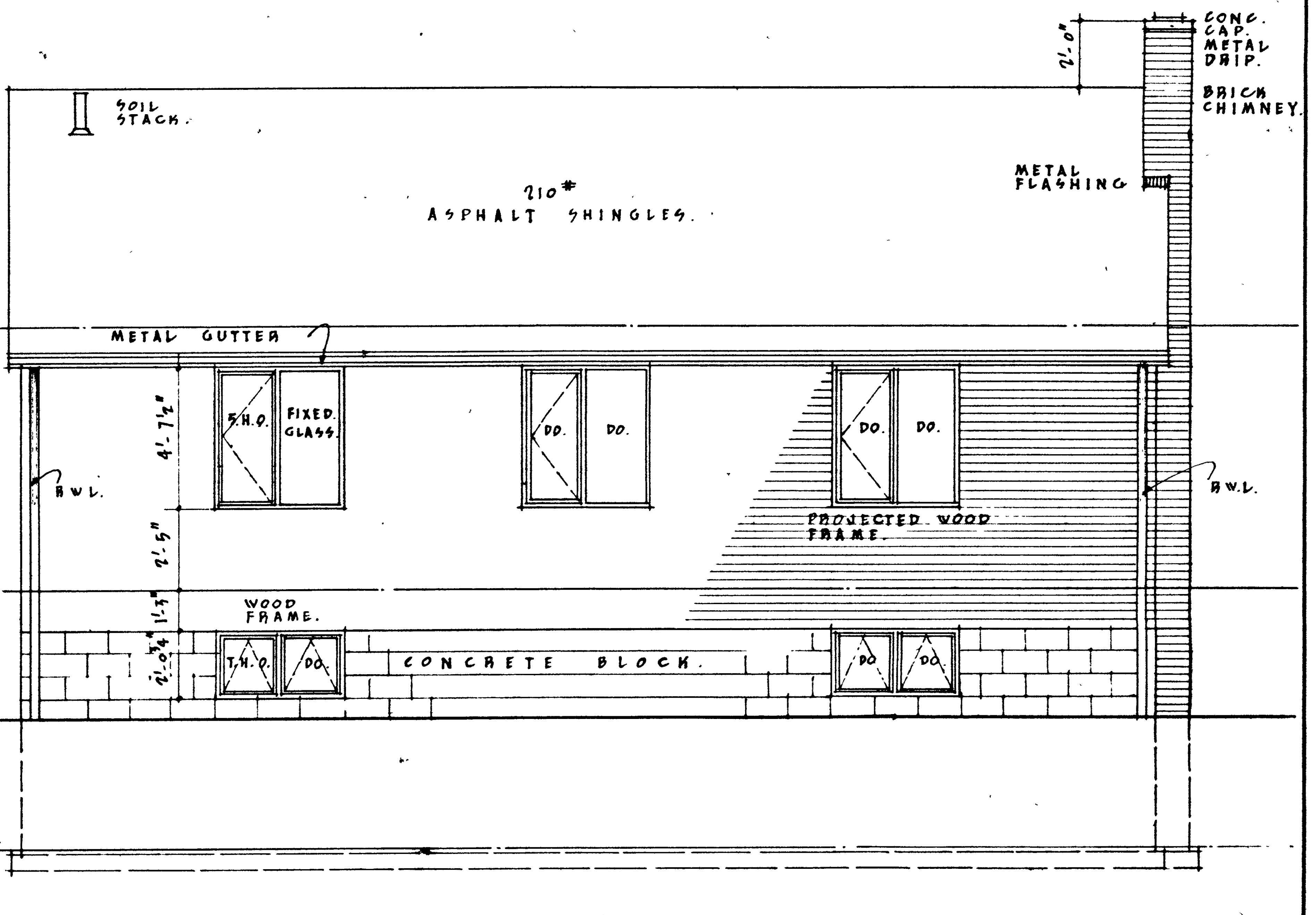
ARCH. VENCHIARUTTI & VENCHIARUTTI

DATE 1954 (APRIL)

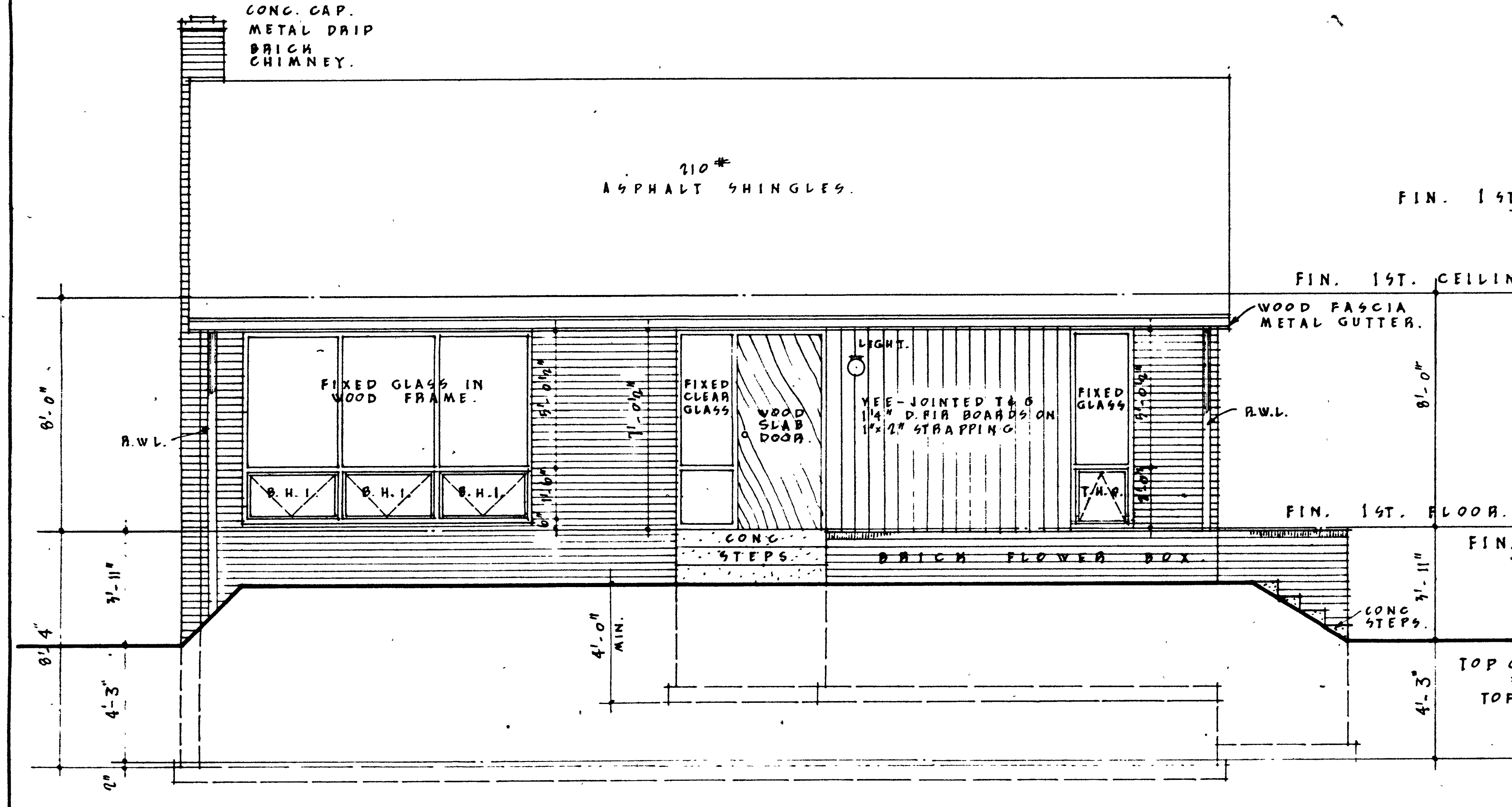
SCALE 1/2" & 3" = 1'-0"



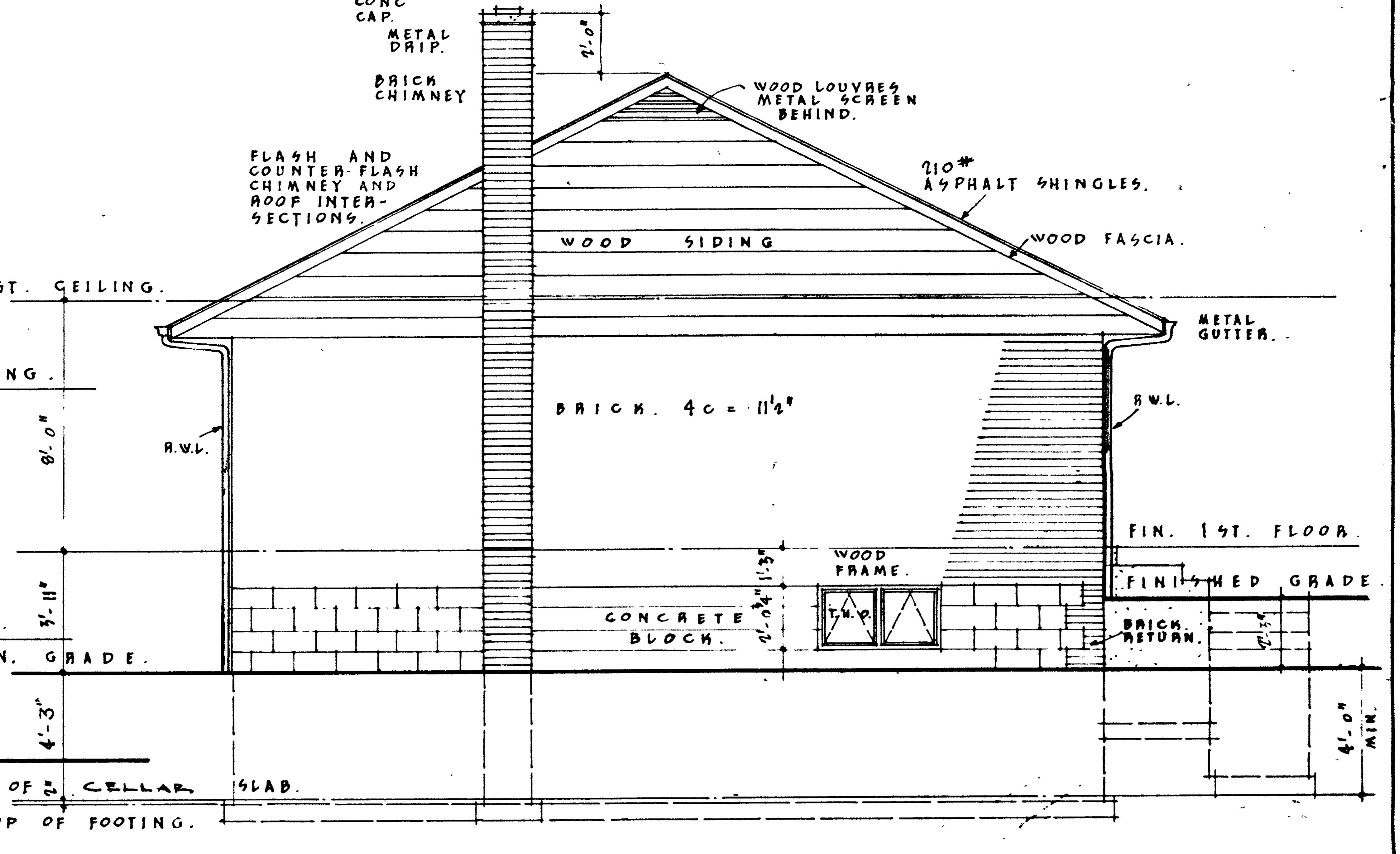
SIDE ELEVATION



REAR ELEVATION



FRONT ELEVATION



SIDE ELEVATION

NOTE 1. DEPTH AND DIMENSIONS OF THE FOOTINGS AND FOUNDATIONS MUST BE DESIGNED TO SUIT LOCAL CONDITIONS.

NOTE 2. ANY MATERIALS ACCEPTABLE TO THE BUILDING STANDARD ISSUED UNDER THE NATIONAL HOUSING ACT. 1954 MAY BE SUBSTITUTED FOR THOSE INDICATED. CHANGE TO BE NOTED ON DWGS.

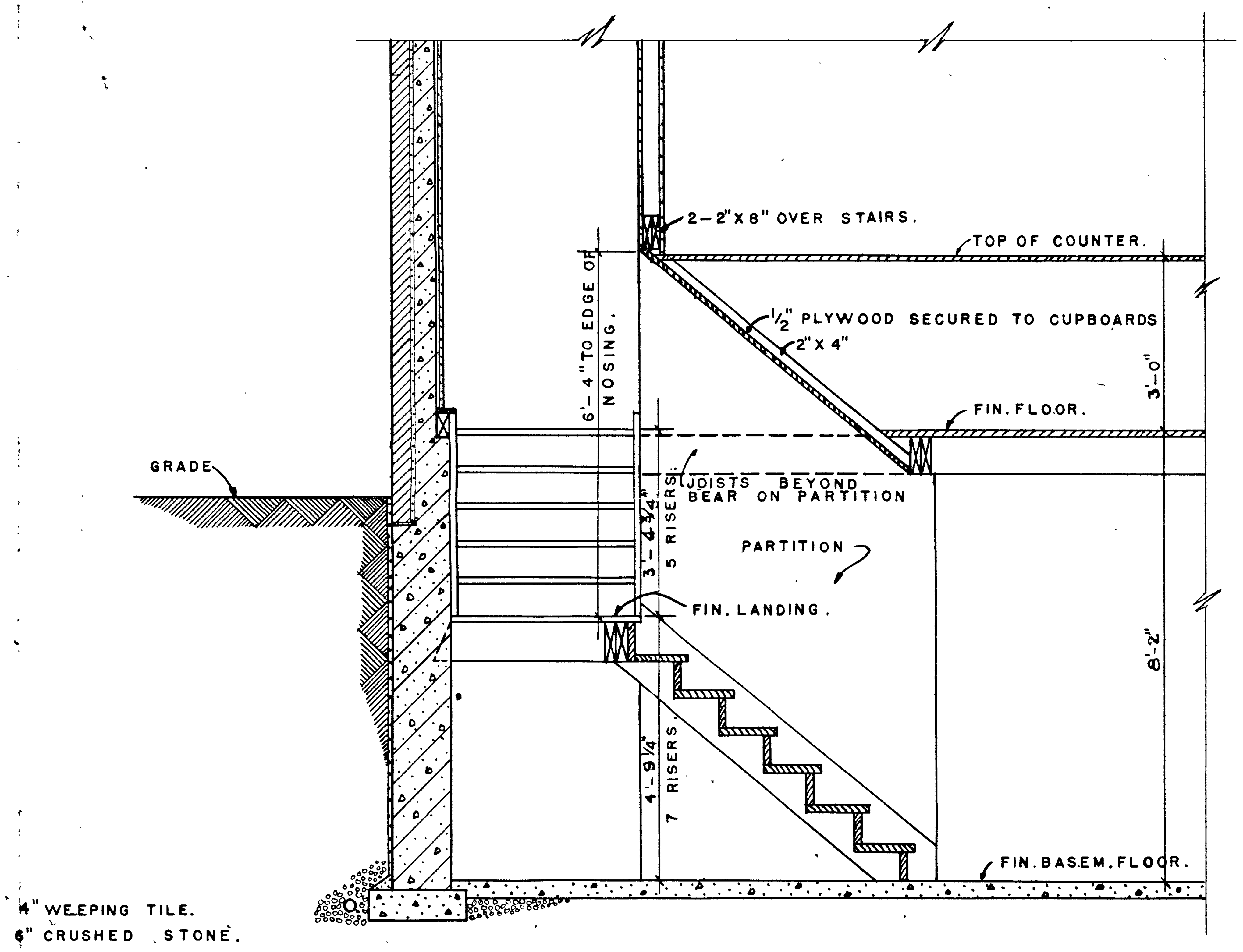
DATE	REVISIONS	BY
5 7 54	REVISED	W.J.
MAY 22/56	Revised	W.J.
14/1/57	Revised	AC.

CENTRAL
MORTGAGE
AND HOUSING
CORPORATION

DESIGN NO. 242
DWG. NO. 3 OF 5

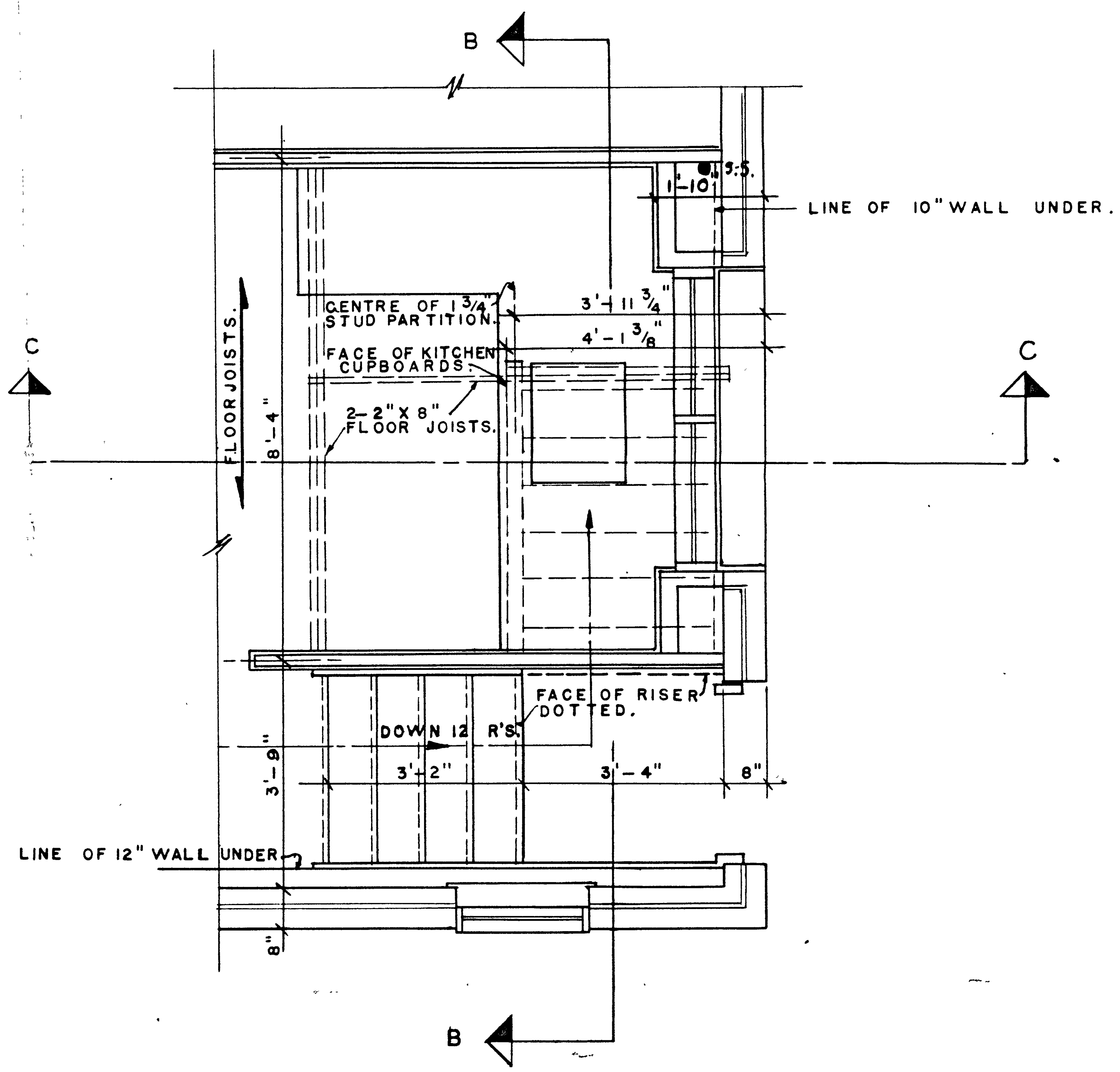
ARCH. VENCHIARUTTI & VENCHIARUTTI

DATE 1954 (APRIL)
SCALE 1/4" = 1'-0"



SECTION B"-B" THROUGH BASEMENT STAIRS.

SCALE 1/2" = 1'-0".



DETAIL PLAN OF STAIRS.

SCALE 1/2" = 1'-0".

DATE	REVISIONS	BY
14/1/57	Revised	R.C.

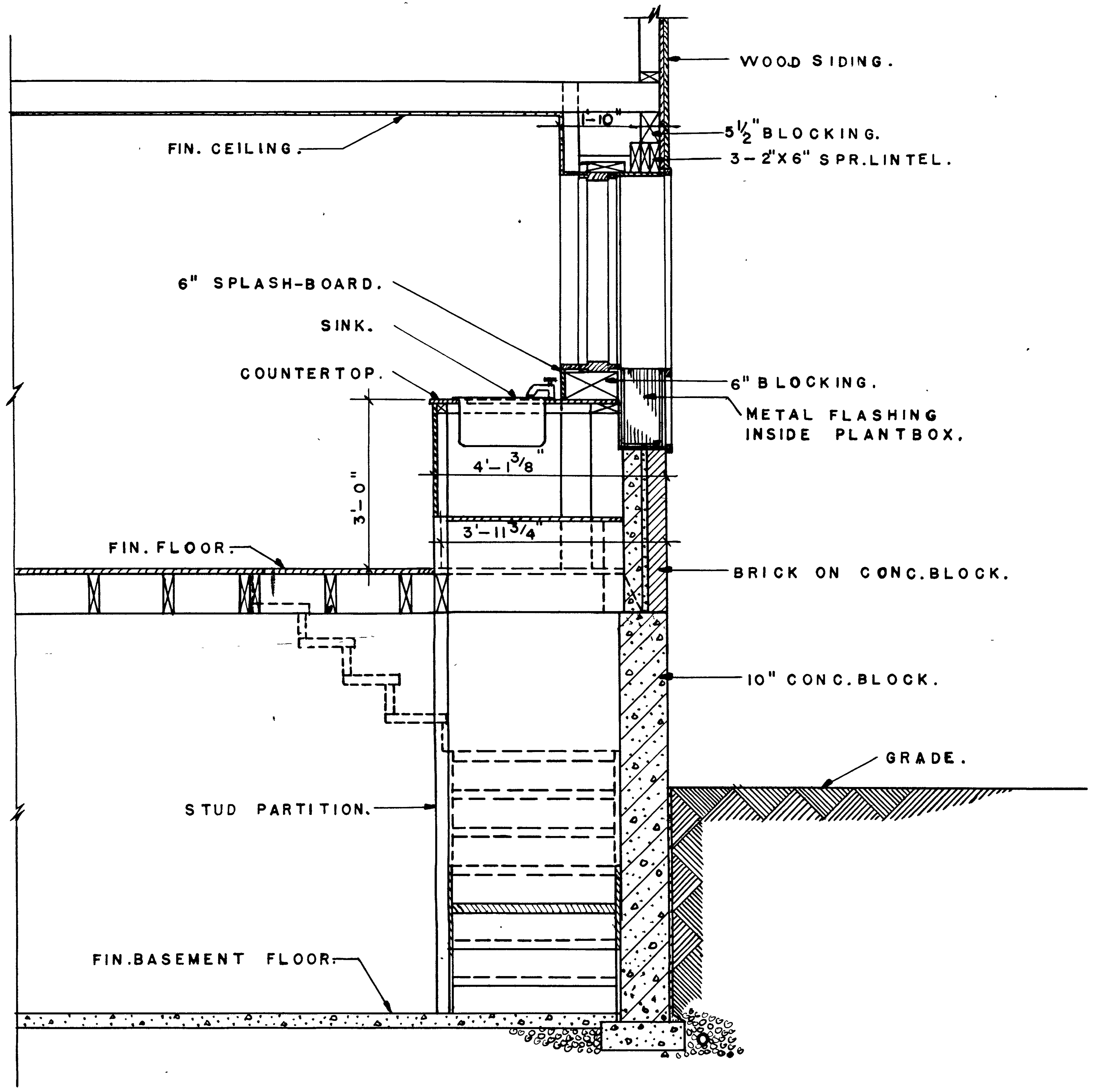
ARCH. VENCHIARUTTI & VENCHIARUTTI

CENTRAL
MORTGAGE
AND HOUSING
CORPORATION

DESIGN NO.	DWG. NO.
242	4 OF 5

DATE MAY 1956

SCALE 1/2" = 1'-0"



"C-C" – SECTION THROUGH KITCHEN WINDOW.

SCALE = 1/2" = 1'-0".

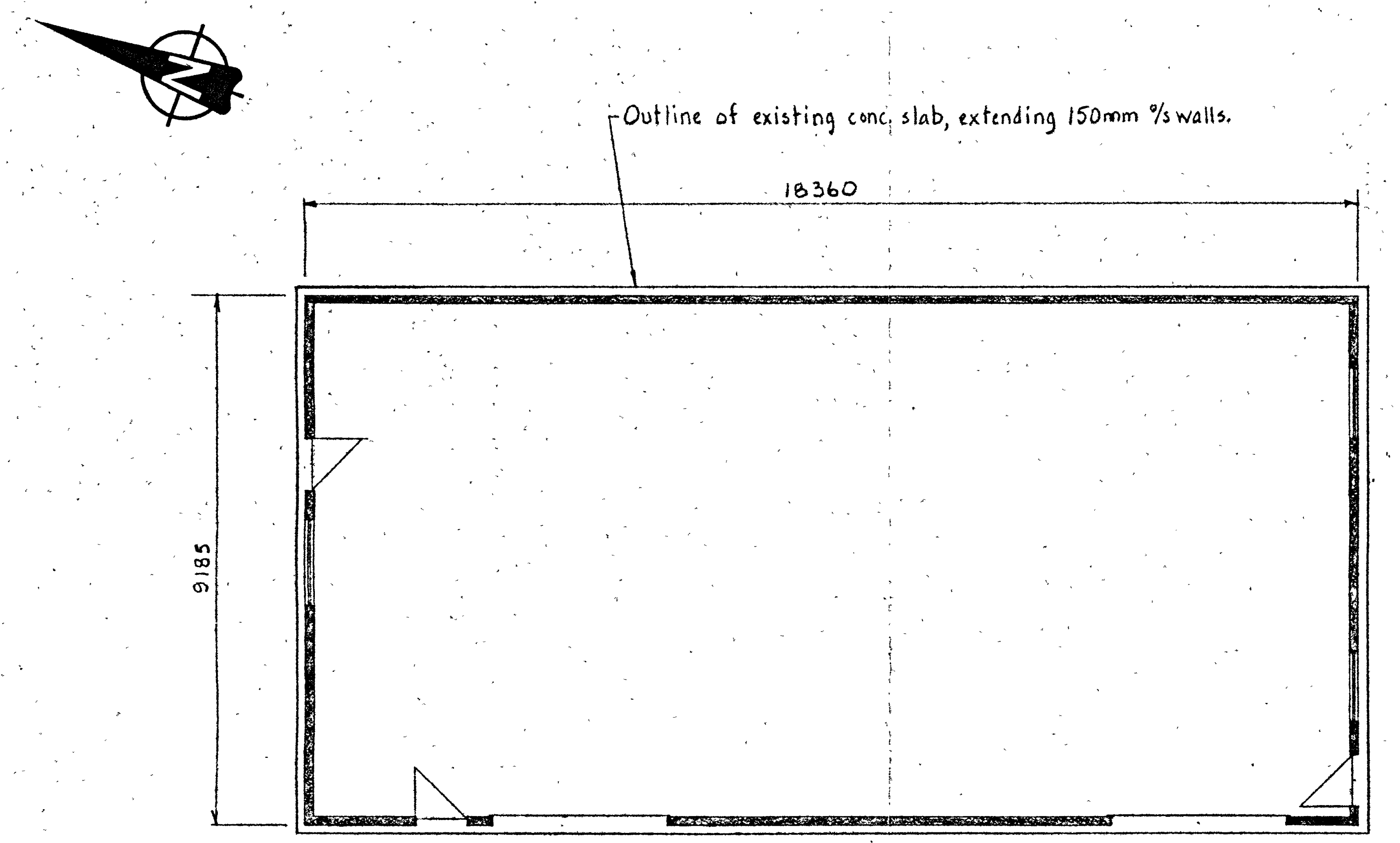
DATE	REVISIONS	BY

ARCH. VENCHIARUTTI & VENCHIARUTTI

CENTRAL
MORTGAGE
AND HOUSING
CORPORATION

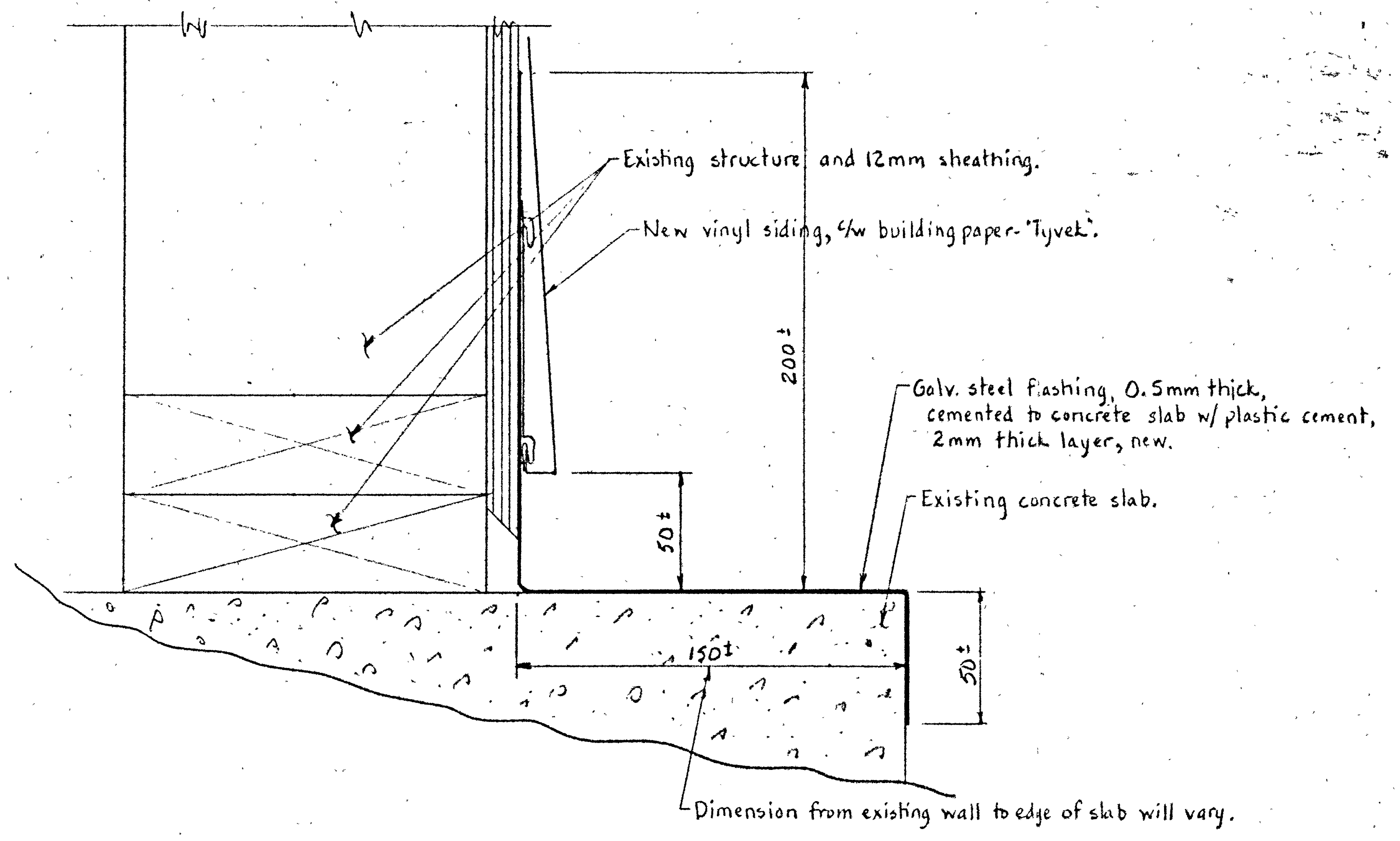
DESIGN NO.	DWG. NO.
242	5 OF 5

DATE MAY 1956
SCALE 1/2" = 1'-0"

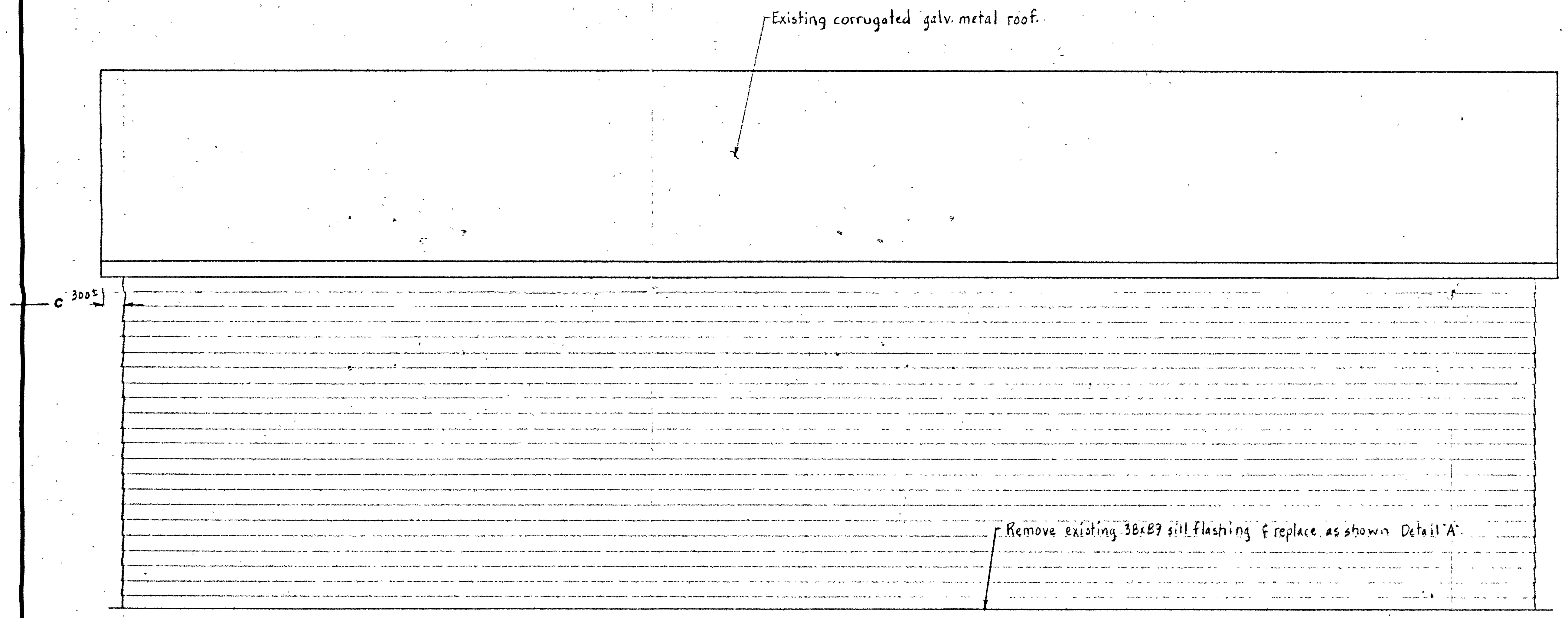


PLAN OF SECONDARY EXAM. BLDG.
(Scale: 1:100)

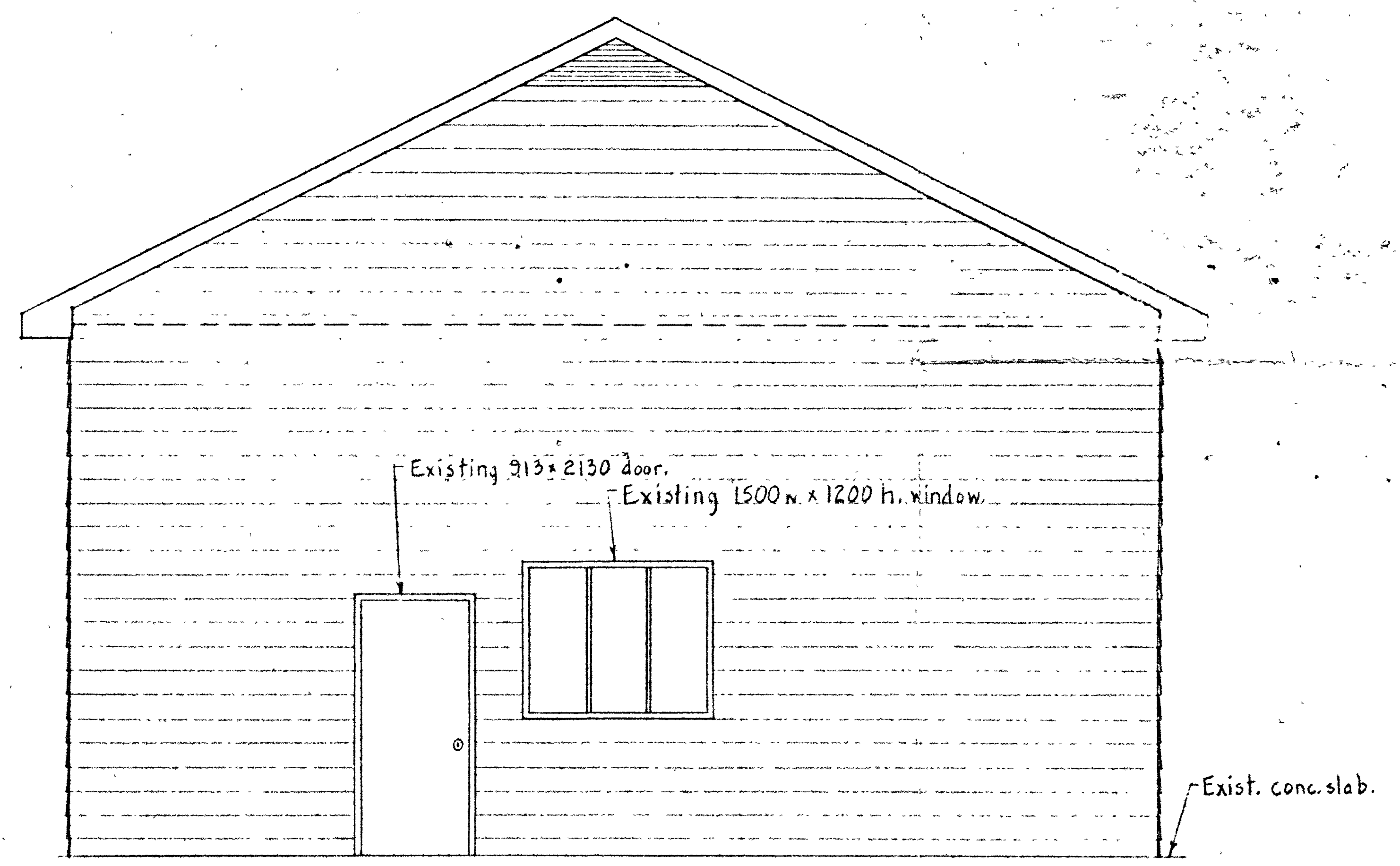
Notes:
1. At the south end of the shelter exist an antennamast, satellite dish and associated wiring. Care must be taken not to interfere with these installations. The dish is approx. 4m away from the bldg. and the antenna is braced against the overhanging fascia bd.
2. Existing electrical service comes from the ground near the south-east corner.



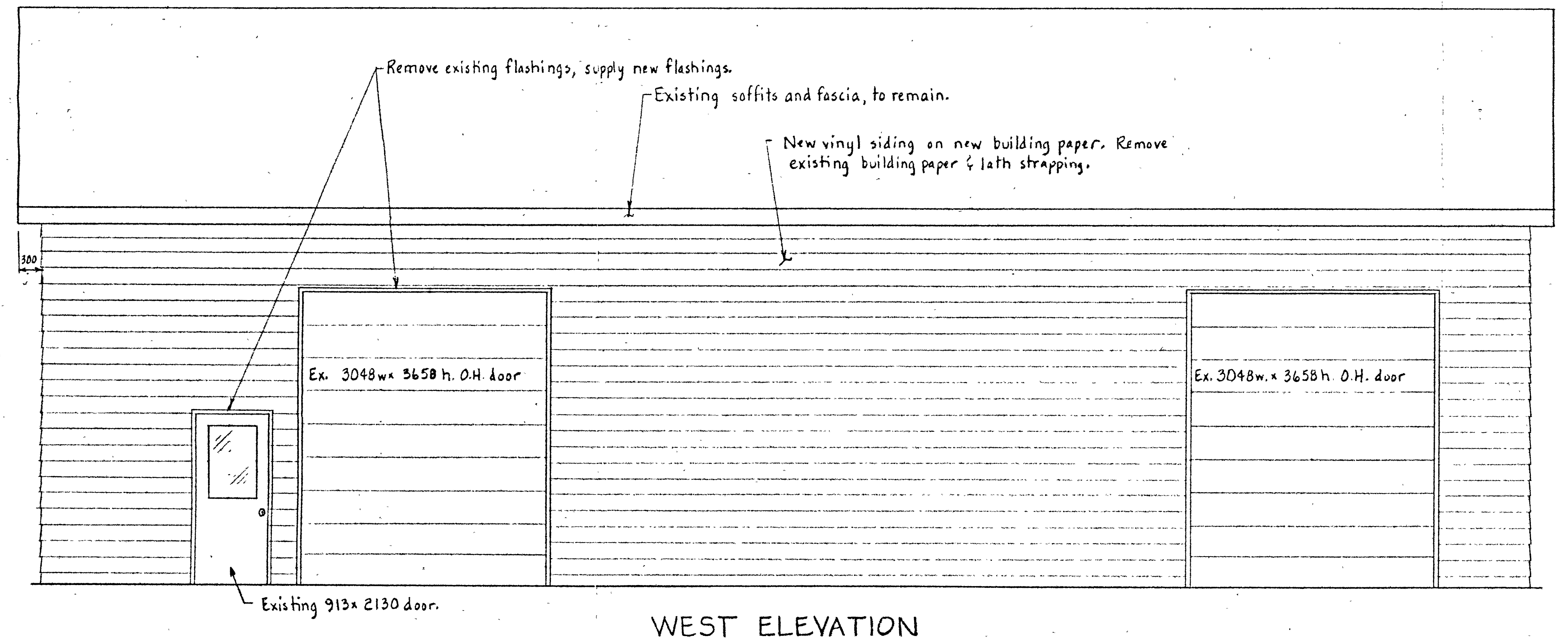
DETAIL "A" - EAST SIDE ONLY
(Scale: 1:2)



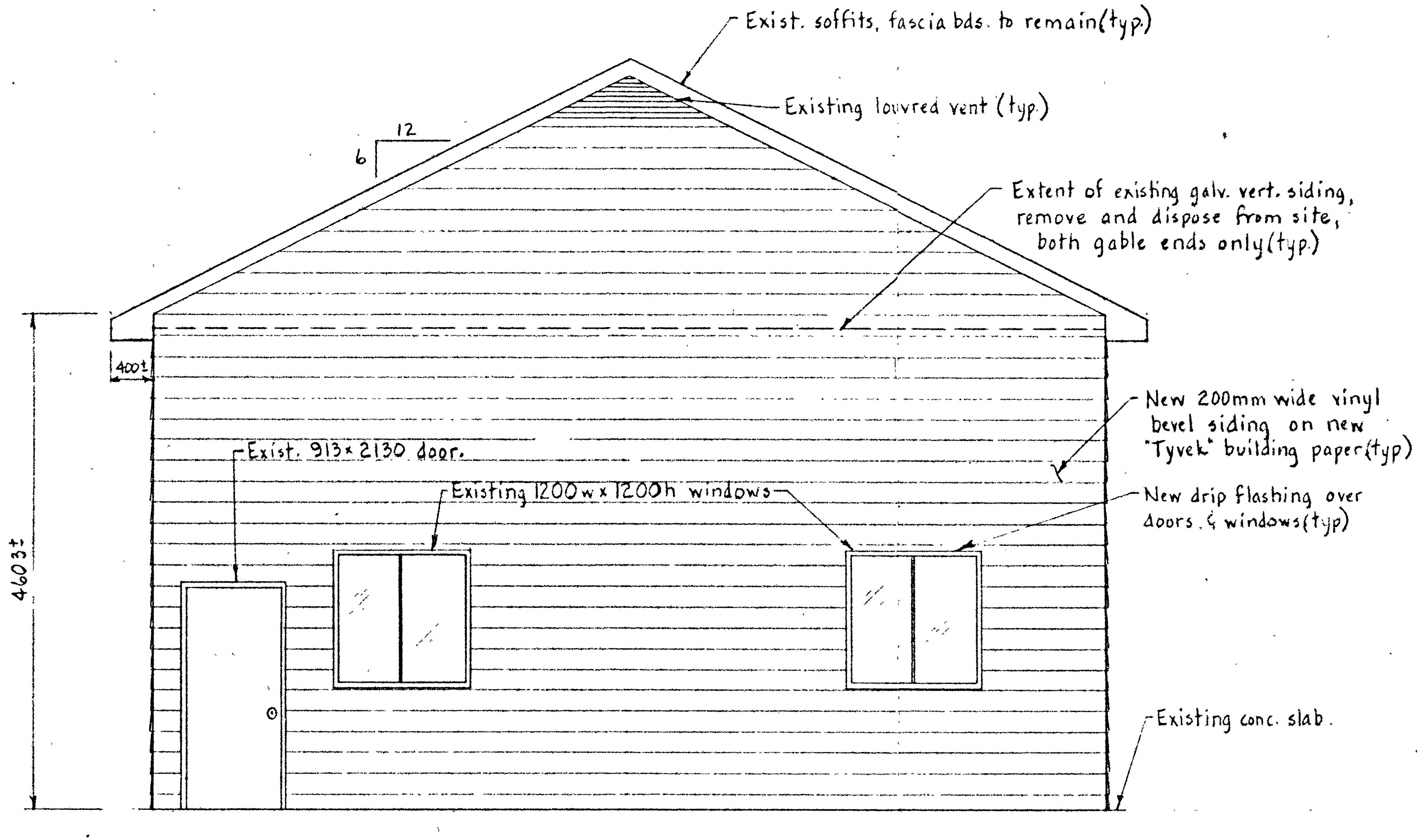
EAST ELEVATION
(Scale: 1:50)



NORTH ELEVATION
(Scale: 1:50)



WEST ELEVATION
(Scale: 1:50)



SOUTH ELEVATION
(Scale: 1:50)

Public Works Canada
Travaux publics Canada

revisions | date

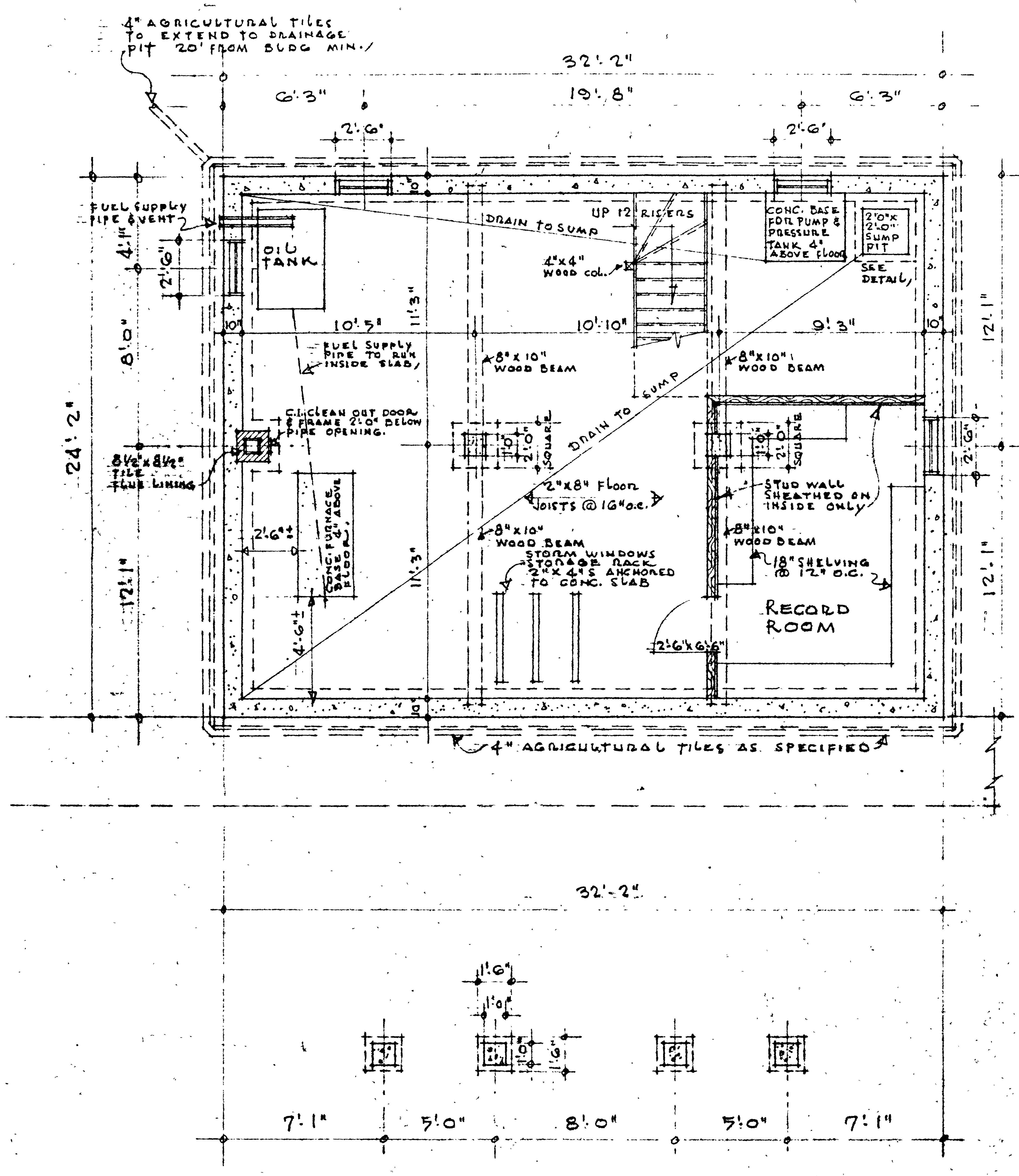
A detail no. / no. du détail
B location drawing no. / sur dessin no
C drawing no / dessin no.

project / projet
PLEASANT CAMP, B.C.
CUSTOMS FACILITY
INSTALL SIDING
SECONDARY
EXAMINATION SHELTER

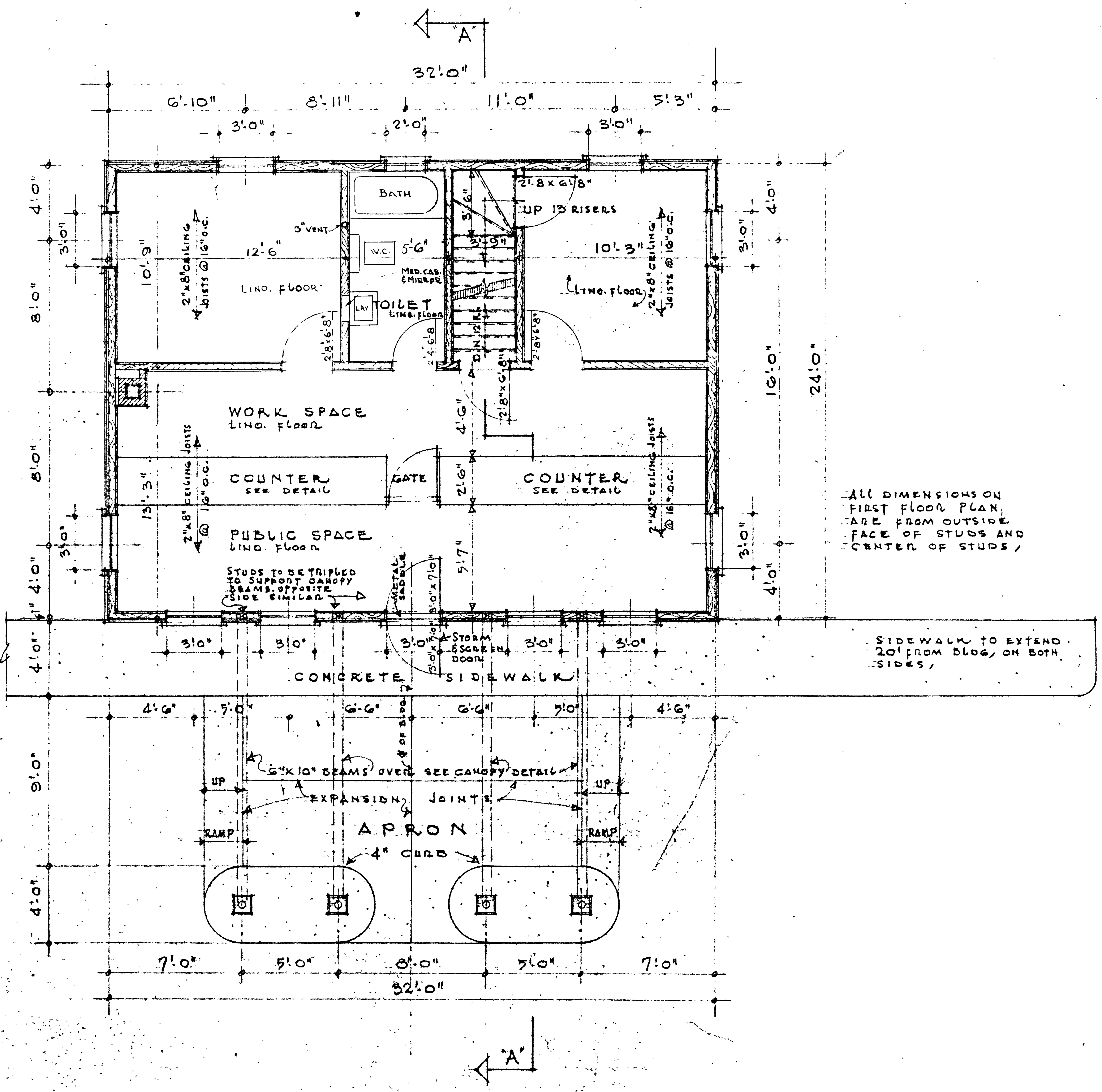
drawing / dessin
PLAN,
ELEVATIONS
AND DETAIL

designed / conçu: R. Ayotte 86.08.29
date
drawn / dessiné
date
reviewed / examiné
date
approved / approuvé
date
Tender / Soumission
R. AYOTTE
PWC Project Manager / Administrateur de projets TPC
project number / no du projet: 796005
drawing no / no du dessin: A1501-14

PWC A1



BASEMENT PLAN



FIRST FLOOR PLAN

REVISIONS

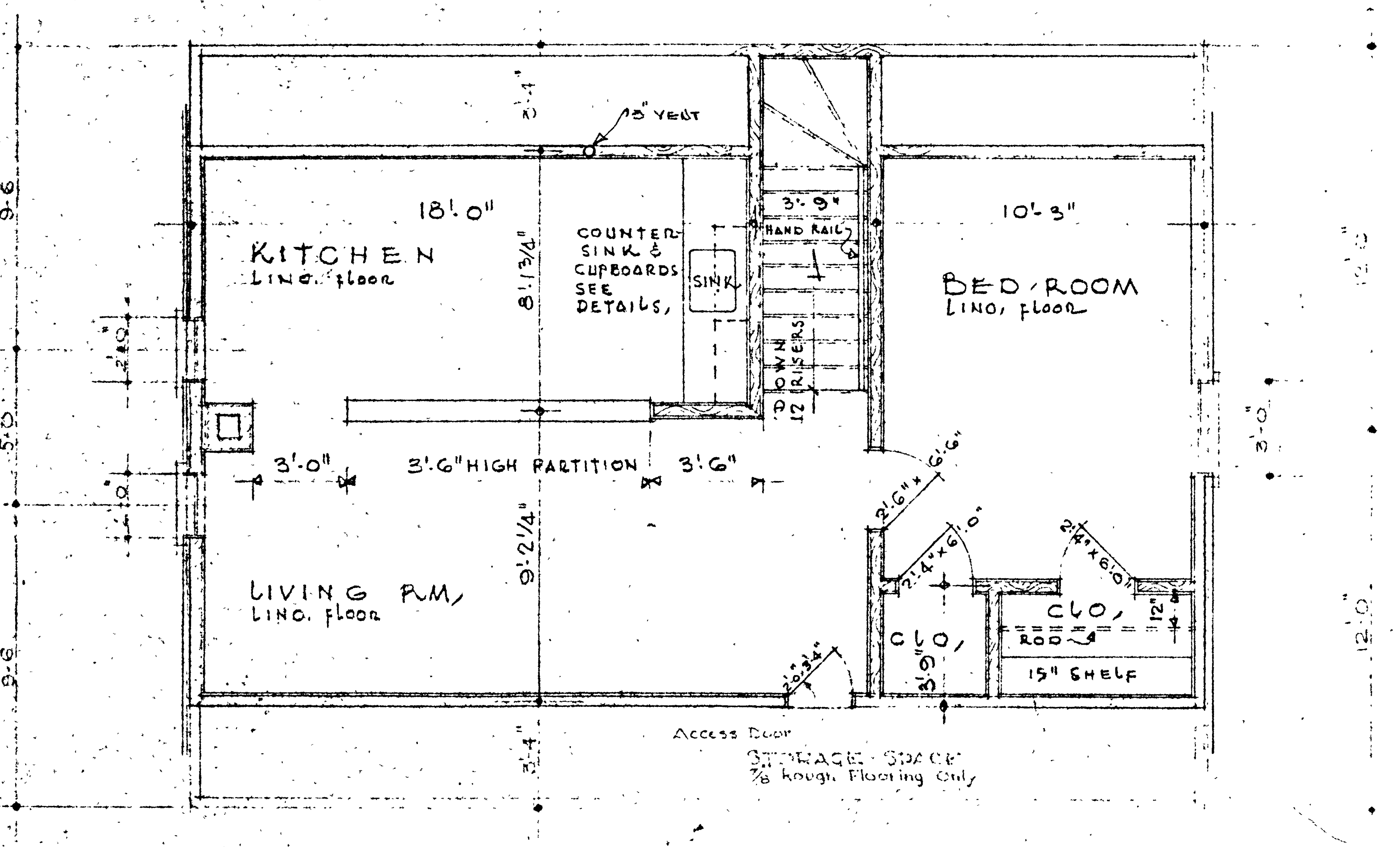
DATE

CUSTOMS AND IMMIGRATION
OFFICE BUILDING

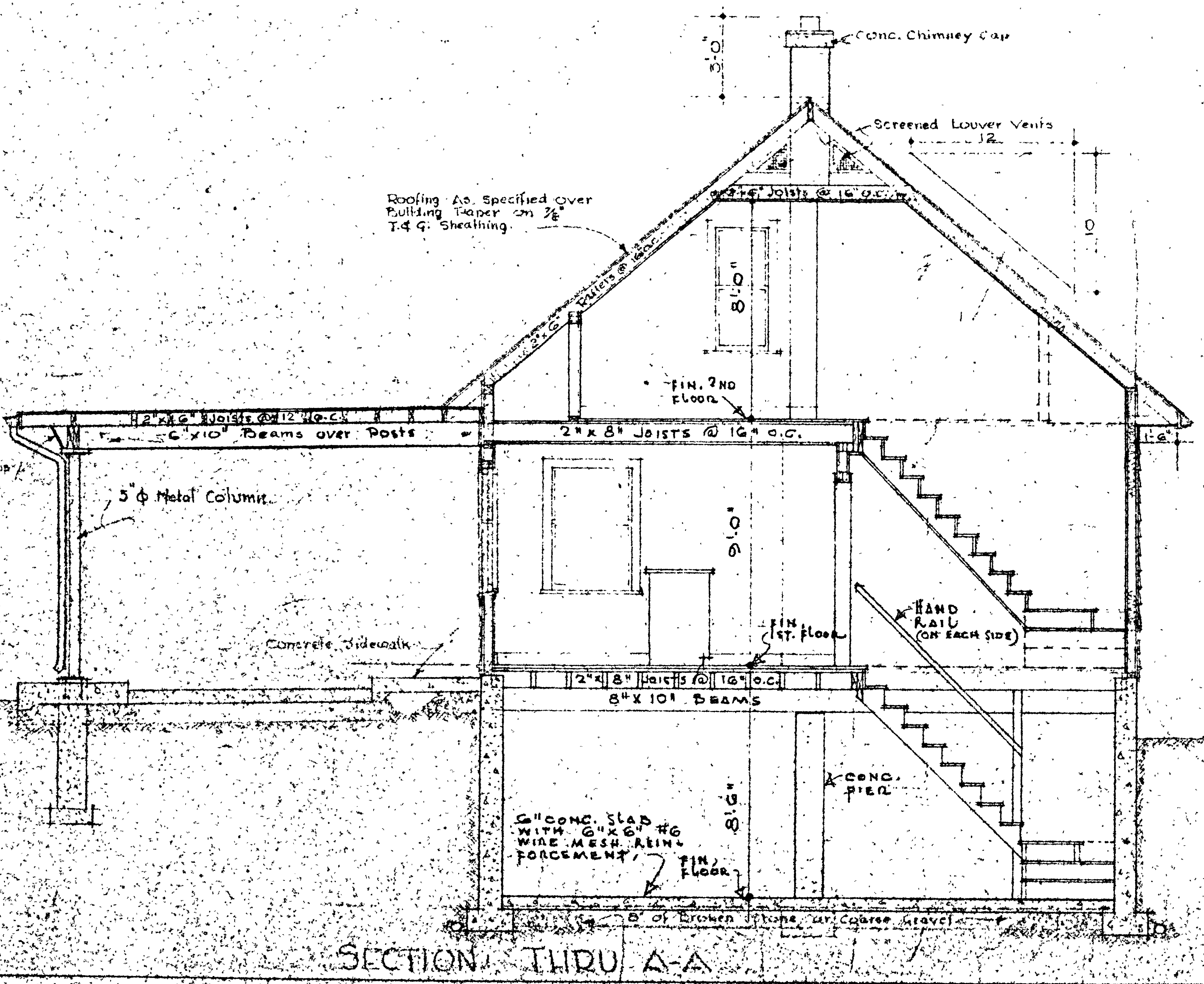
ACCOMMODATION

SCALE 1/4" = 1'0"
DATE MAY 10-57
DRAWN BY A.D.
DWG. NO. ST.3-144

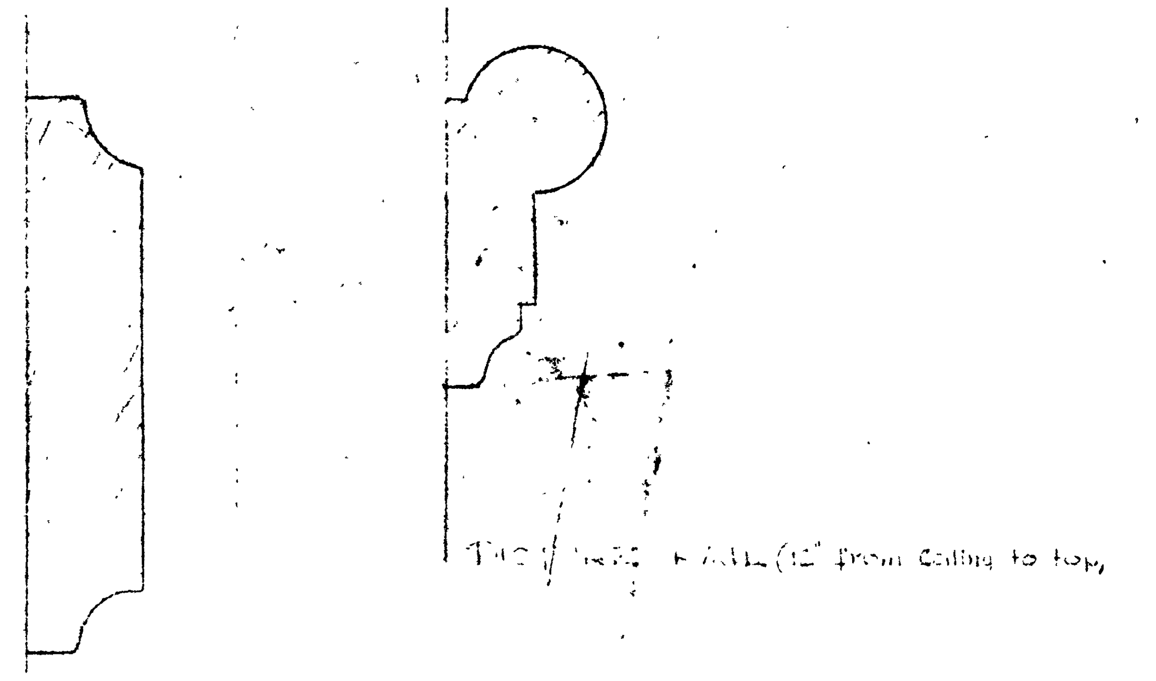
SHEET NO
1
OF 7



SECOND FLOOR PLAN



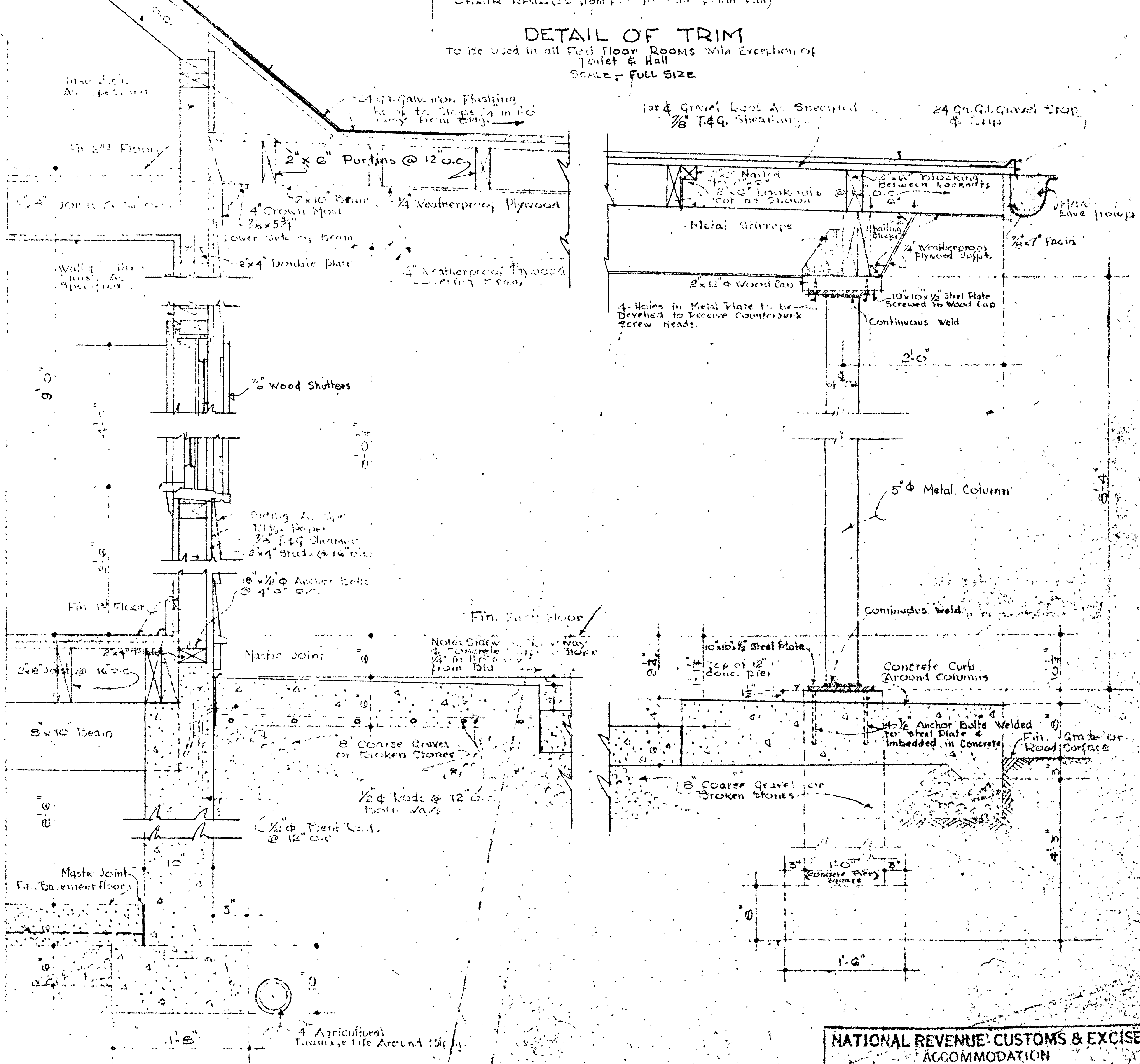
SECTION THRU A-A



DETAIL OF TRIM

To be Used in all First Floor Rooms With Exception of Toilet & Hall

SCALE - FULL SIZE



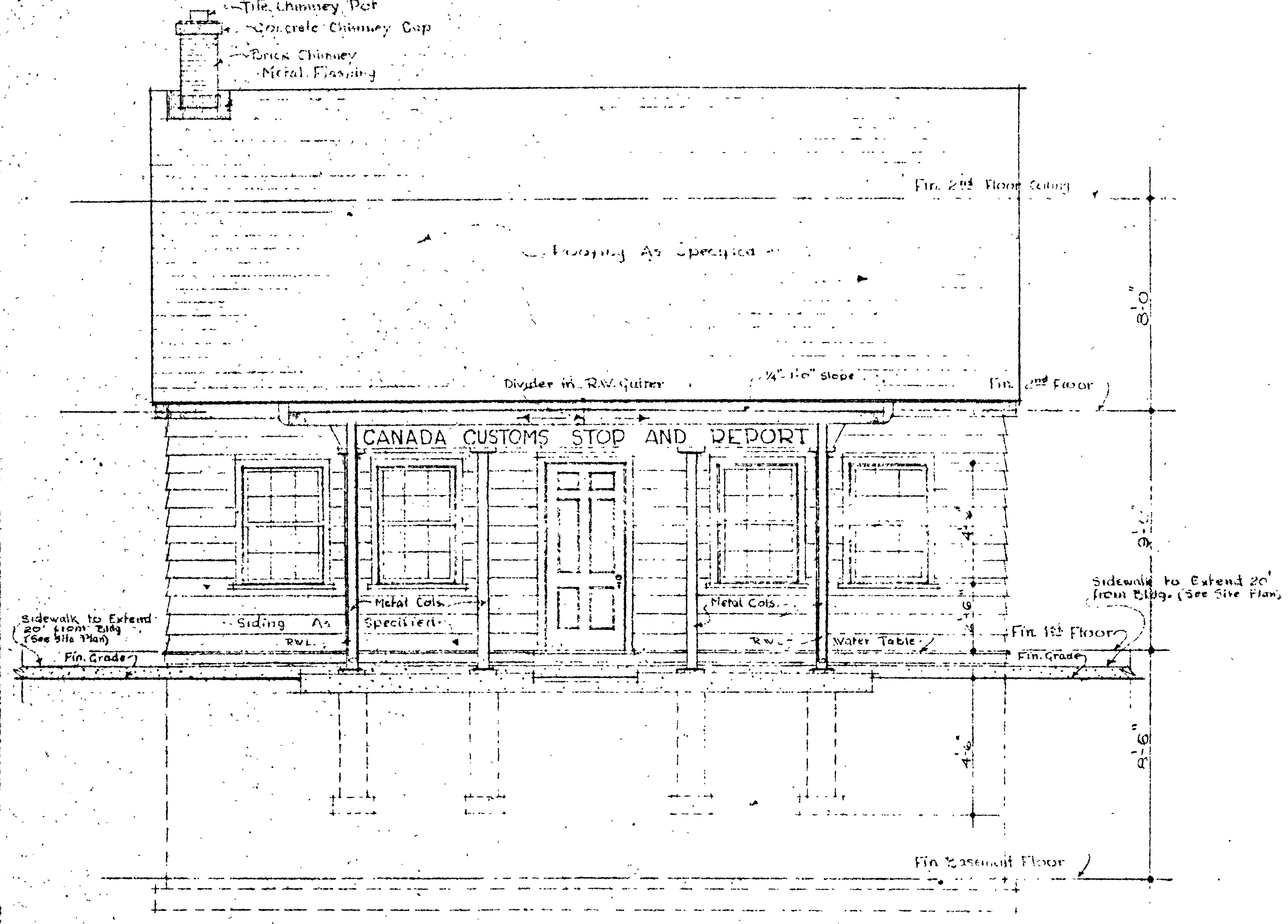
TYPICAL SECTION THRU WALL & CANOPY

SCALE 1" = 1'-0"

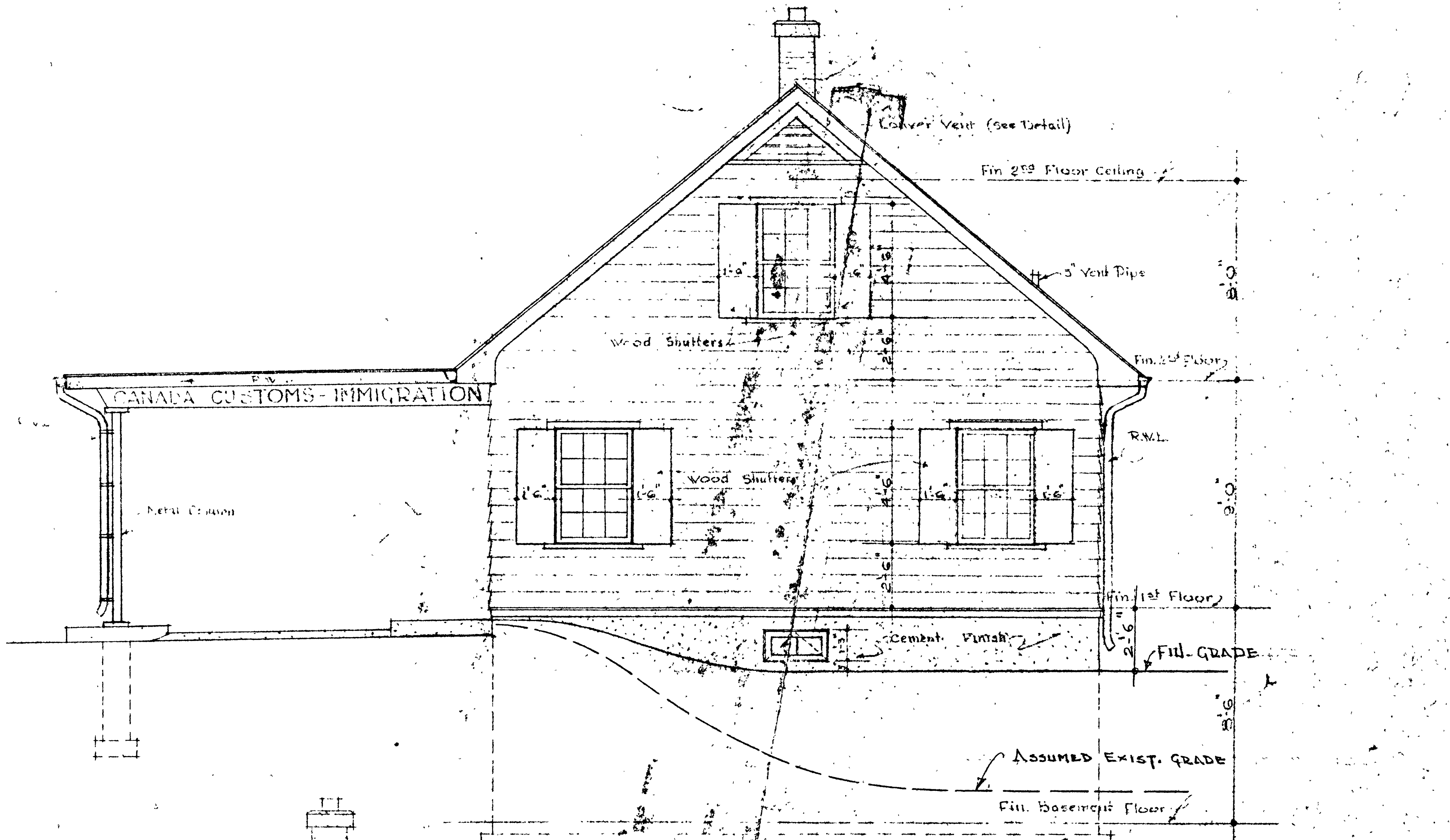
NATIONAL REVENUE: CUSTOMS & EXCISE
ACCOMMODATION

CUSTOMS AND IMMIGRATION
OFFICE BUILDING

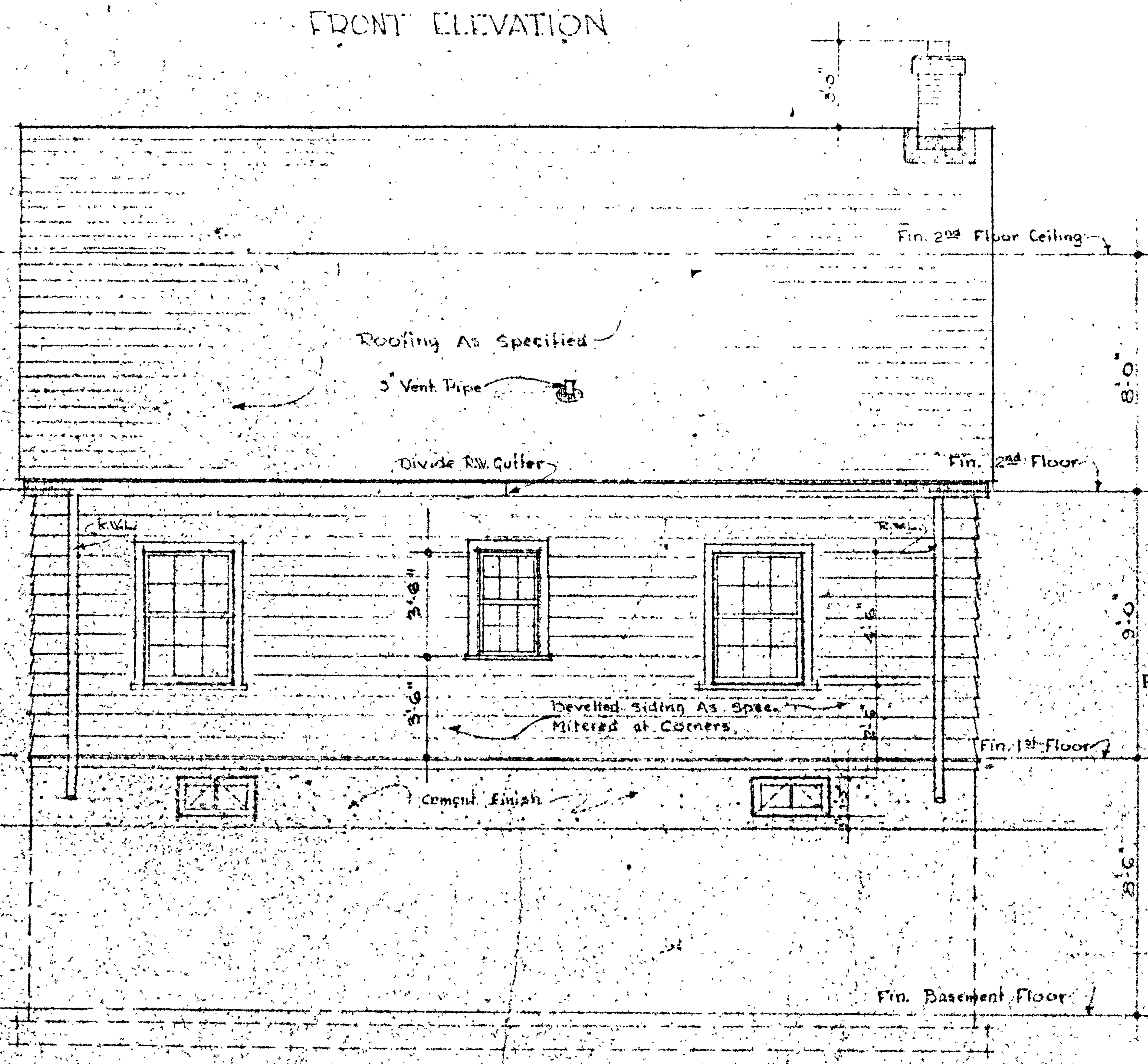
SCALE	REVISIONS	DRAWN BY	CH'K'D. BY
1/4" = 1'-0" As Noted		D. Robertson	
DATE MAY 10 - 57		DWG. No. ST3-144	



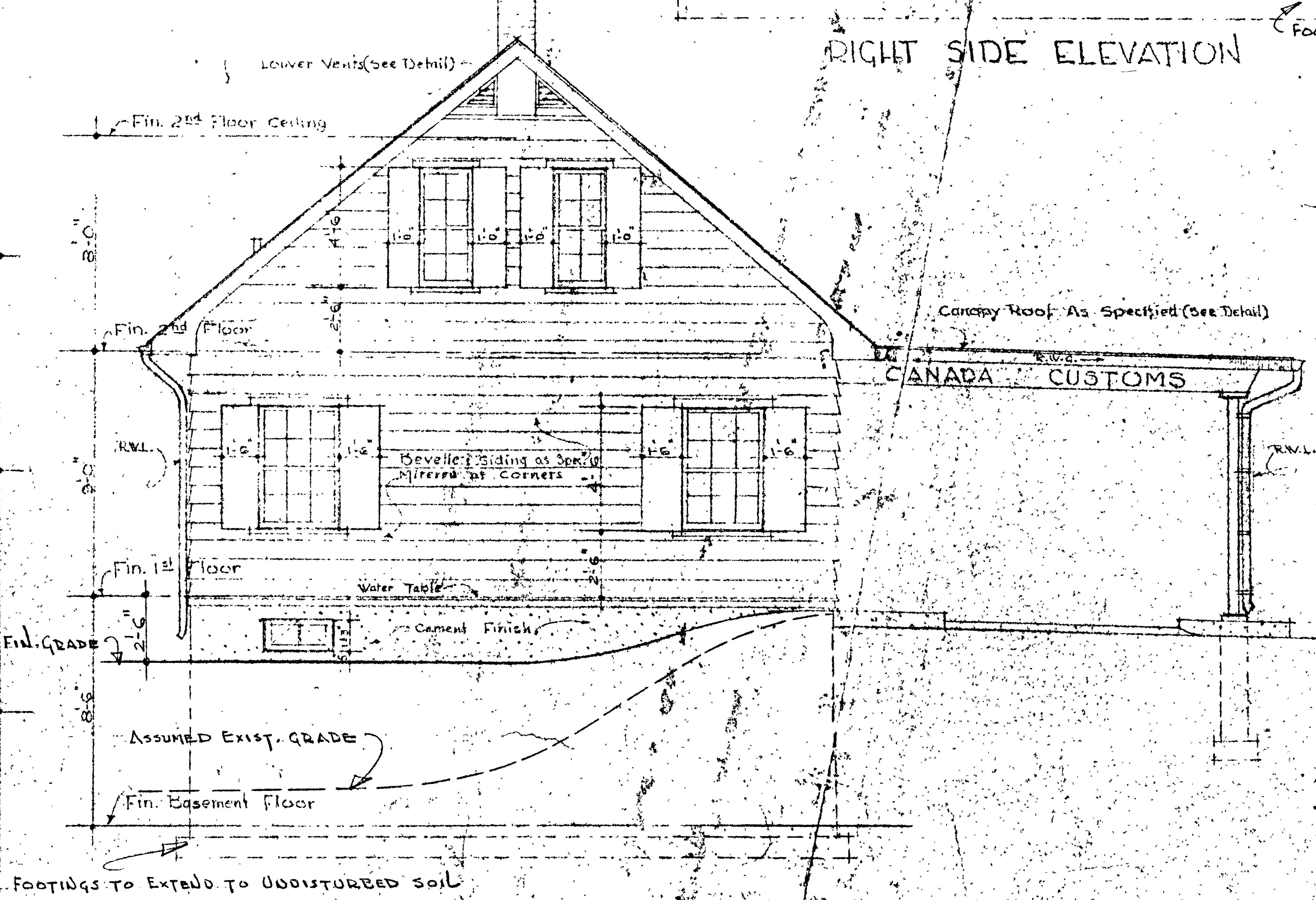
FRONT ELEVATION



RIGHT SIDE ELEVATION



REAR ELEVATION

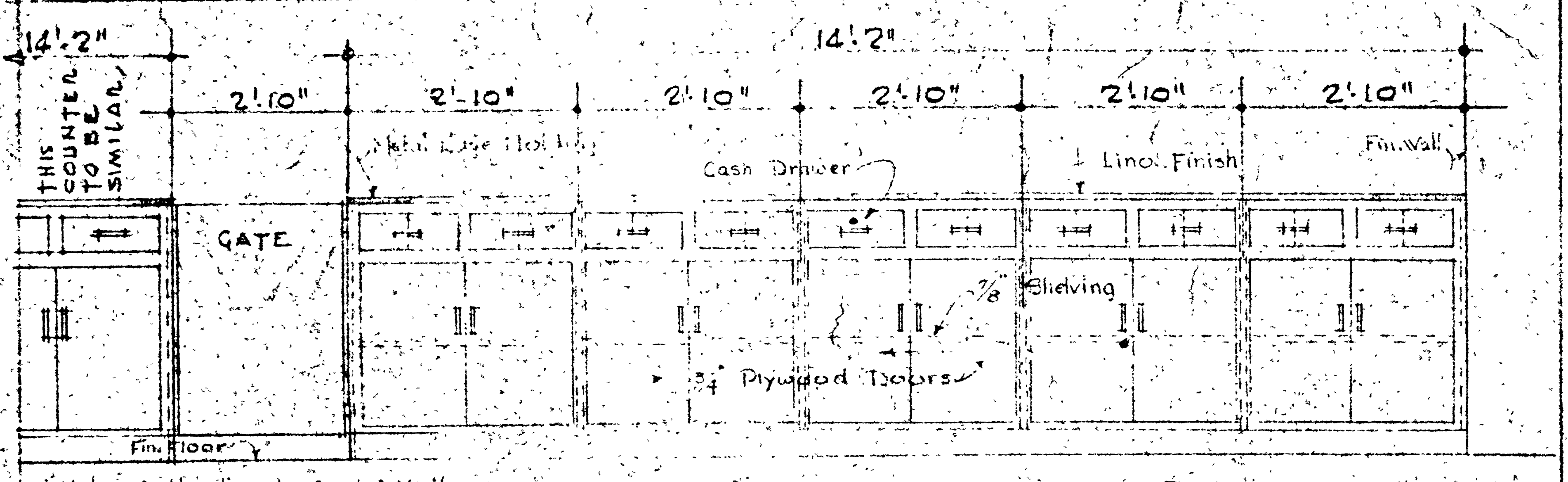


LEFT SIDE ELEVATION

NATIONAL REVENUE CUSTOMS & EXCISE
ACCOMMODATION.

CUSTOMS AND IMMIGRATION
OFFICE BUILDING

SCALE	REVISIONS	DRAWN BY	CH'K'D. BY
¼"=1'-0"		D. Robertson	
DATE MAY 10-37		DWG. No. ST3-144	



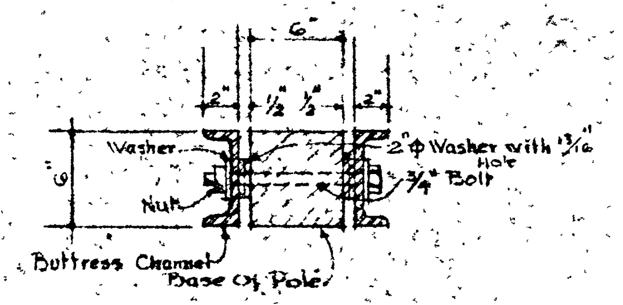
Note: Contractor to Check & Verify all Dimensions Shown to Finished Walls

REAR ELEVATION OF COUNTER
1/2" = 1'0"

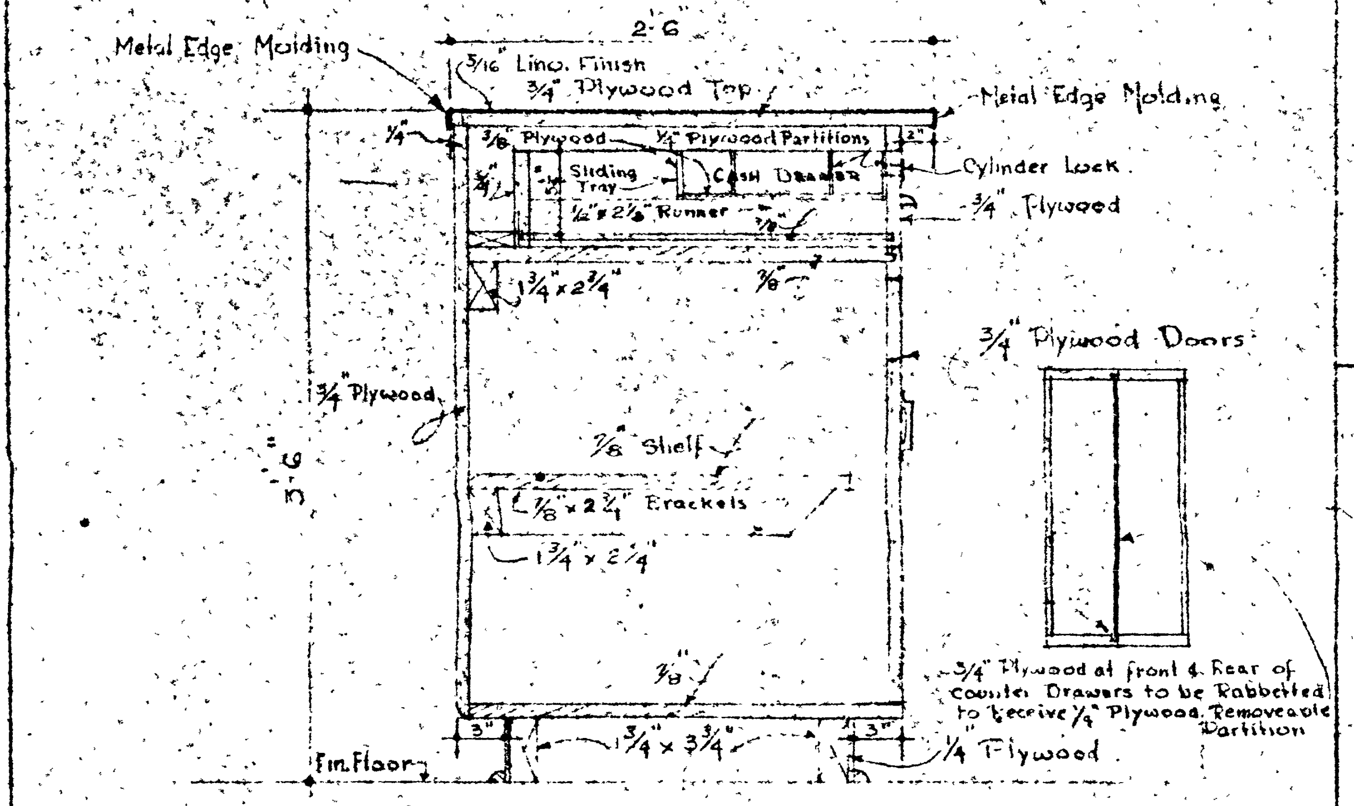
COLOUR SCHEME

Flag Pole	White
Buttress Channels	Black
Cap	Black
Pulleys	Black
Cleat	Black

NOTE
Buttress Channels Should be given One Coat of Rust Proof Paint.

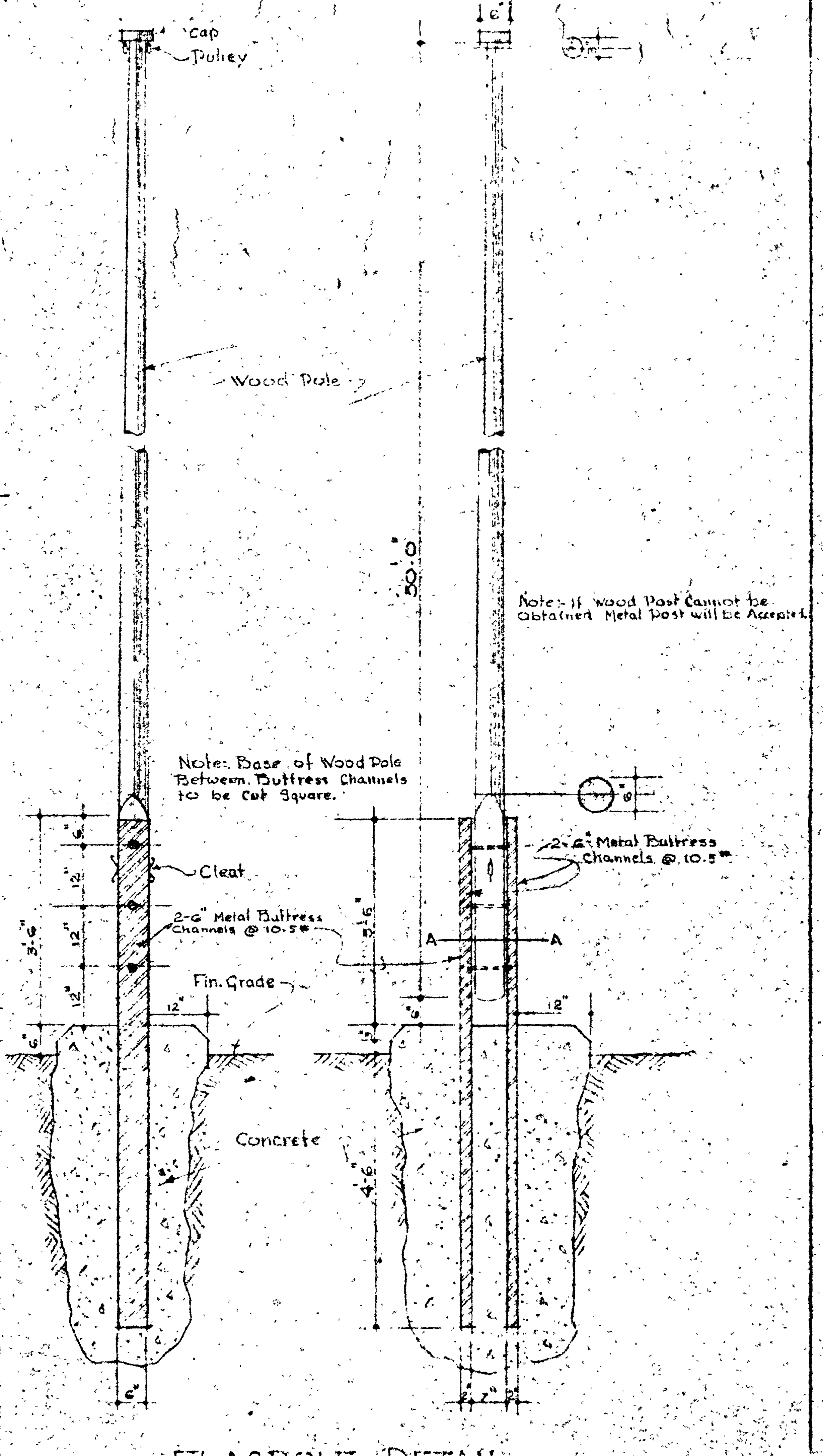


SECTION AT A-A
Scale 1"=1'0"

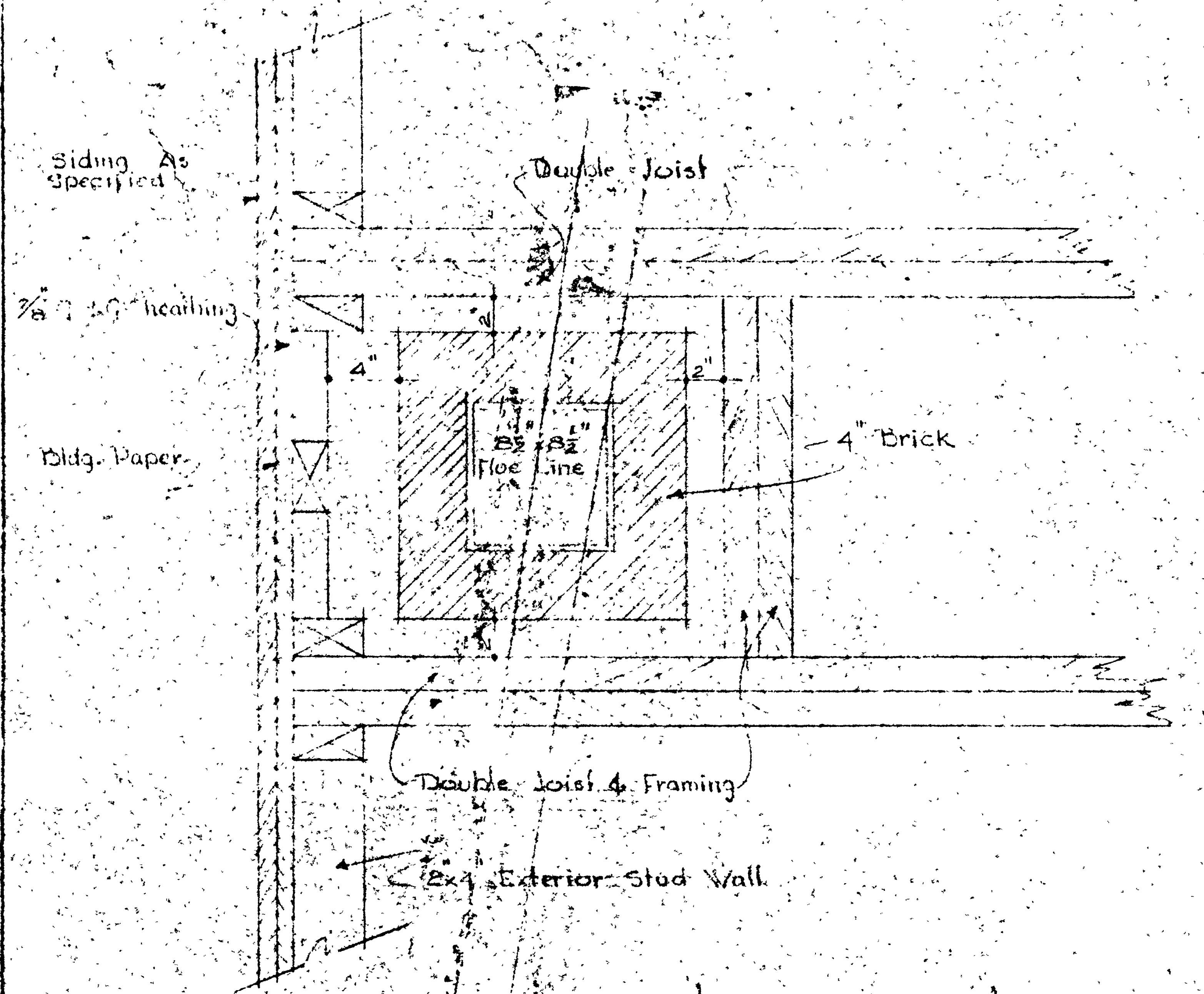


SECTION THRU CUSTOMS COUNTER
(Immigration Counter to be Similar)

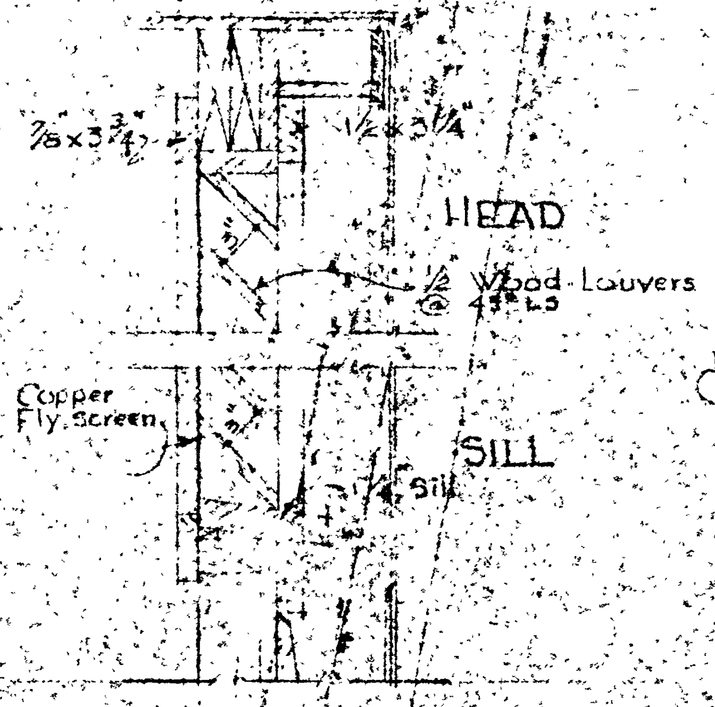
SCALE 1"=1'0"



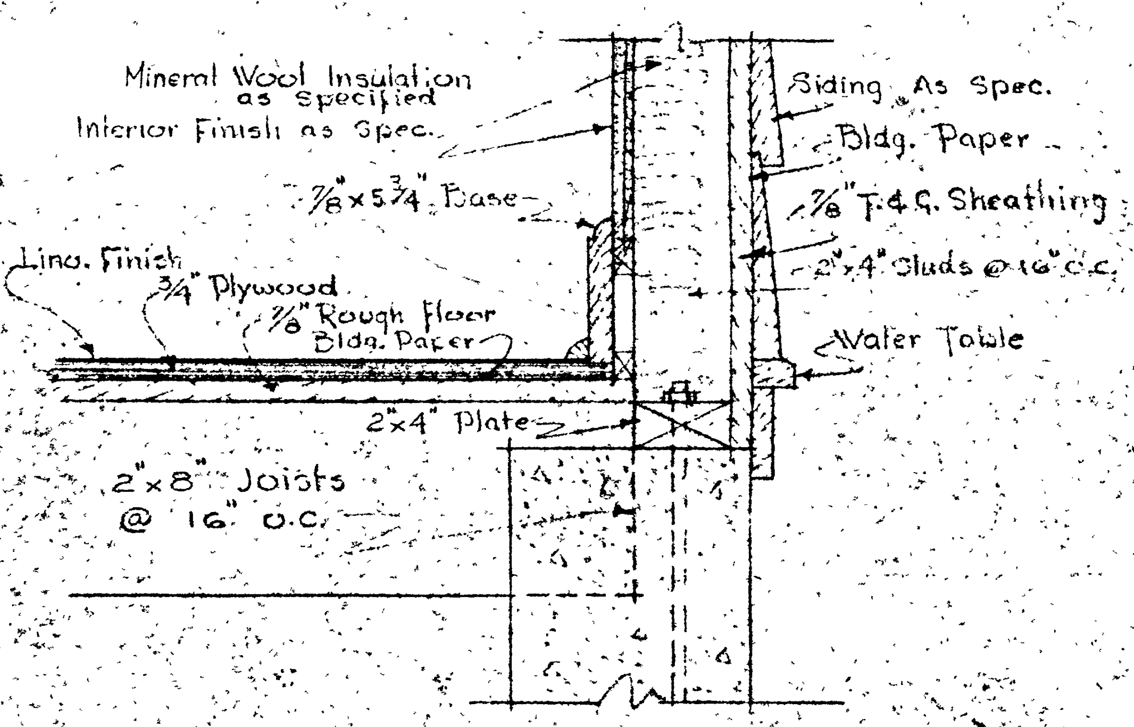
FLAGPOLE DETAIL
SCALE 1/8"=1'0"



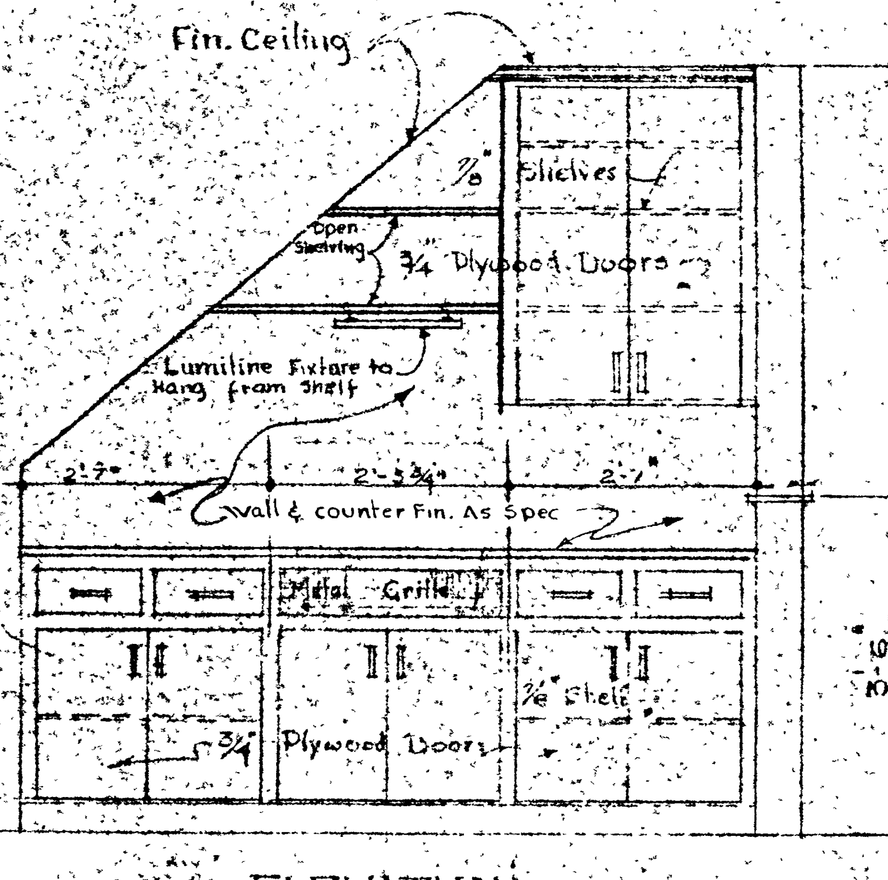
DETAIL OF FRAMING AT CHIMNEY
Scale 1 1/2"=1'0"



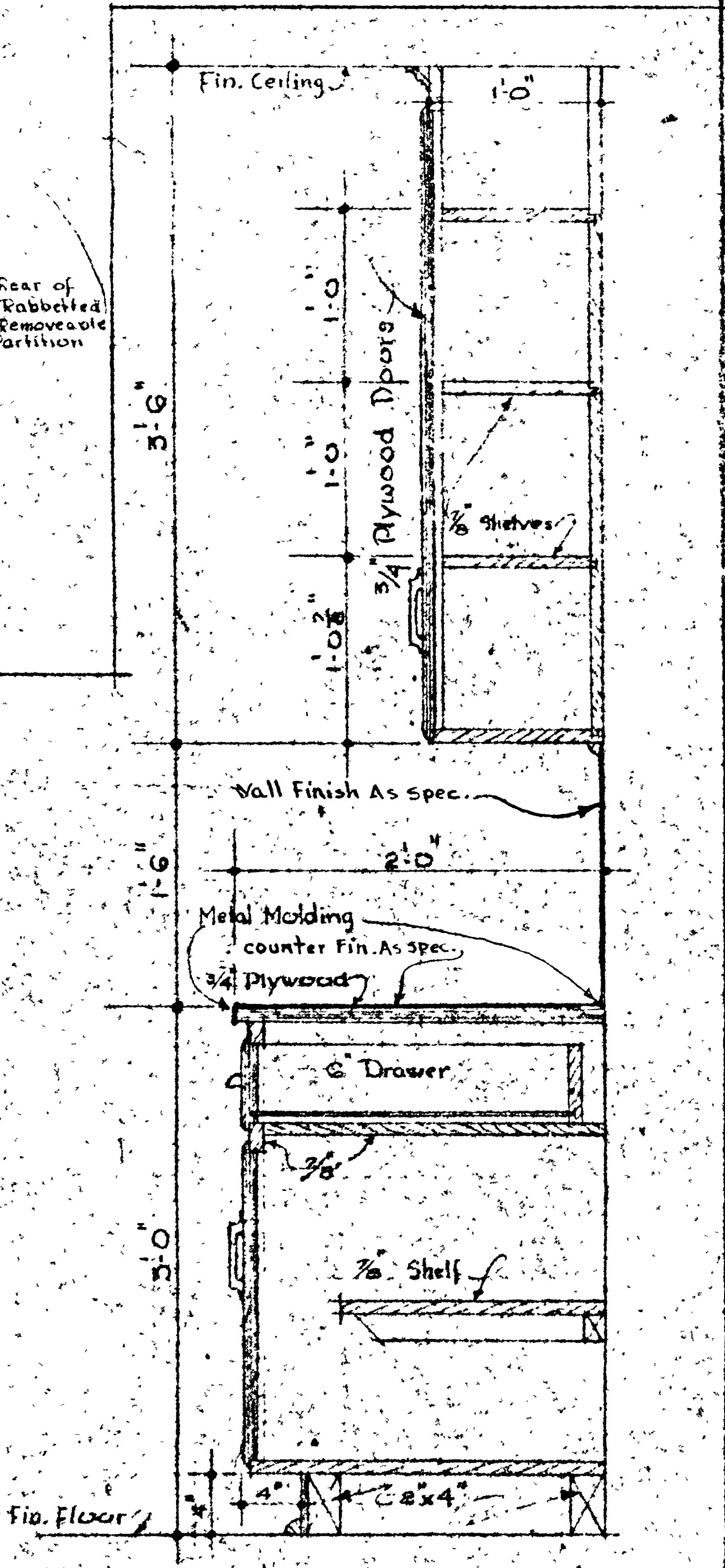
DETAIL OF GABLE LOUVER VENT
Scale 1 1/2"=1'0"



SECTION THRU END WALL AT FIRST FLOOR
Scale 1 1/2"=1'0"

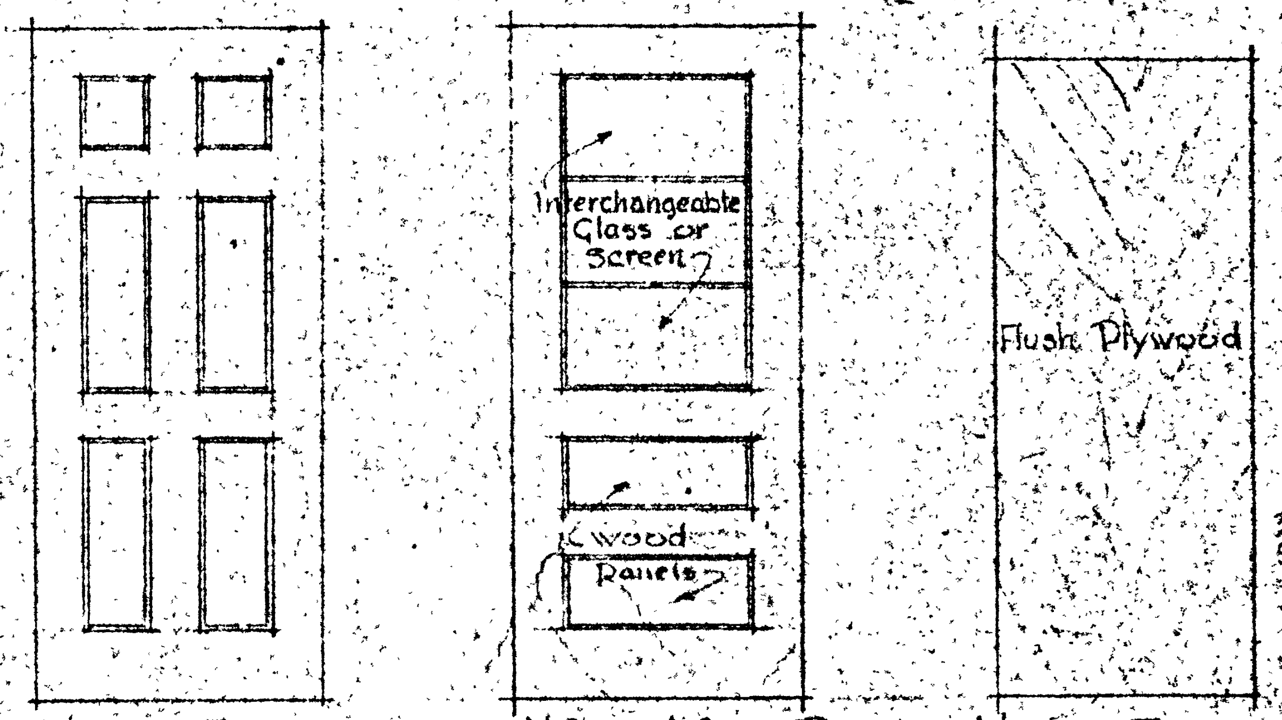


ELEVATION
SCALE 1/4"=1'0"



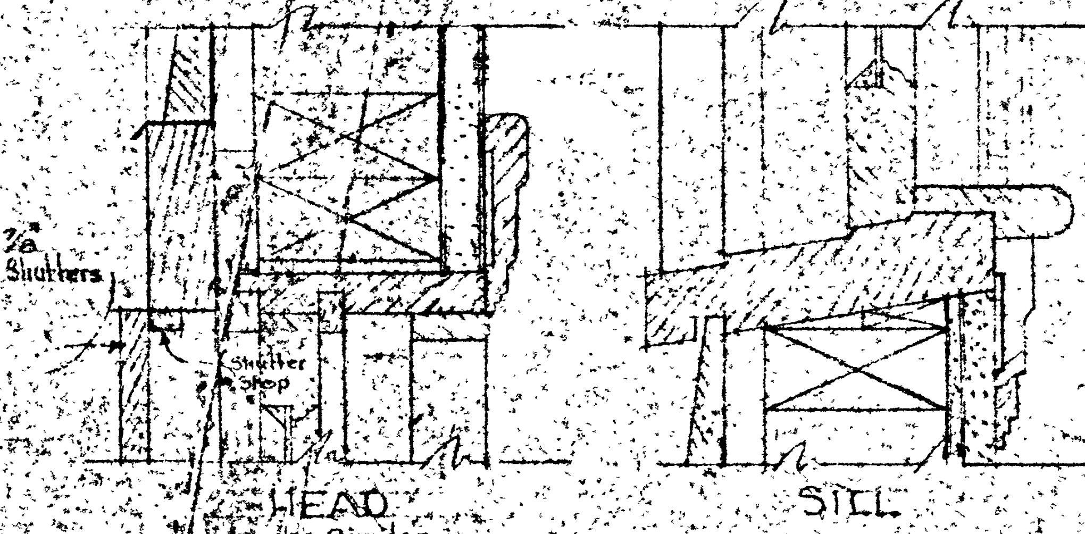
SECTION THRU COUNTER
SCALE 1"=1'0"

KITCHEN CABINET DETAILS



Exterior Door
Comb. Storm & Screen Door
Interior Doors

DOOR DETAILS
Sizes As Shown On Plan



HEAD
Jamb Similar

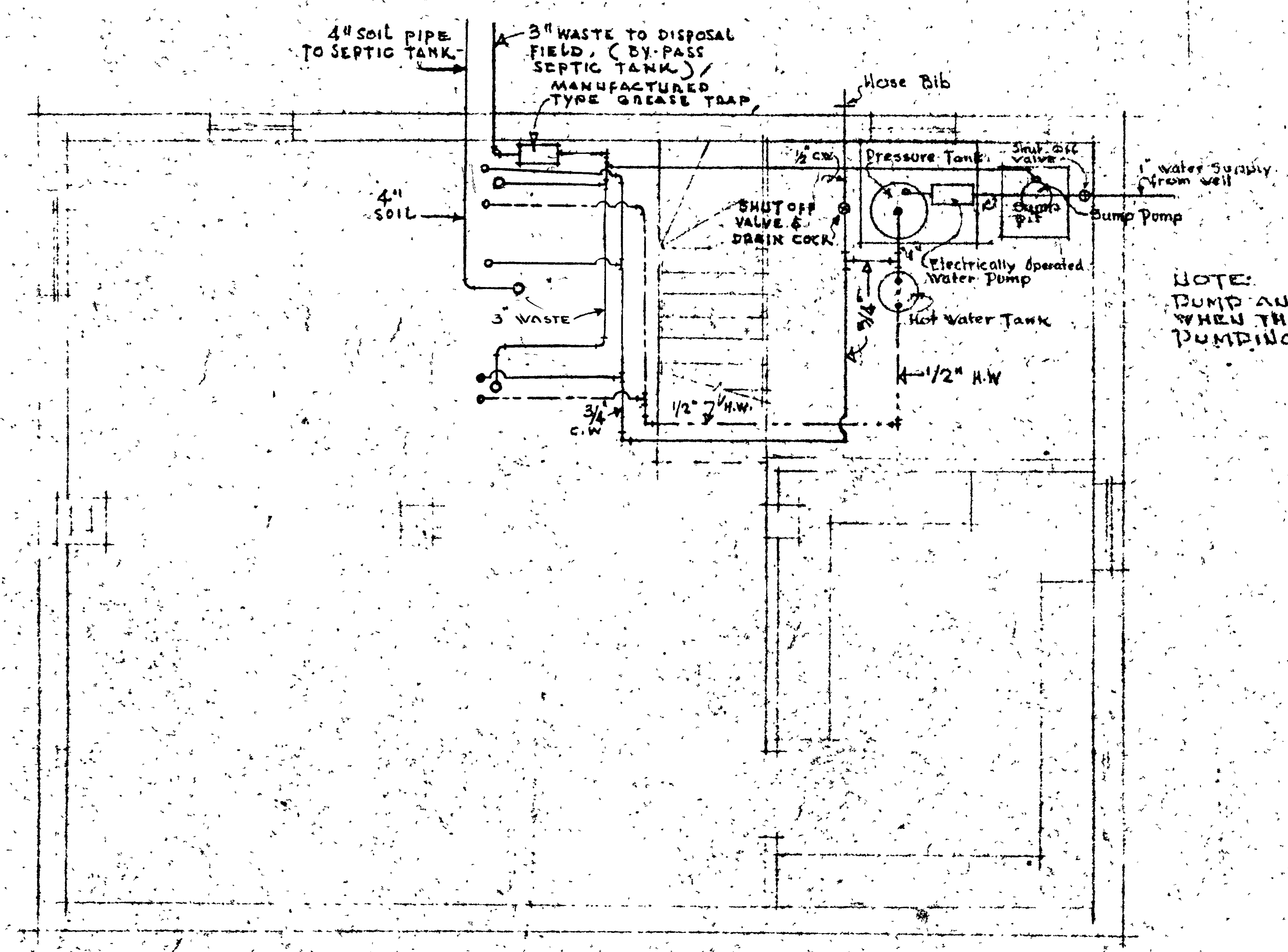
SILL

DETAIL OF WINDOW FRAMES
Scale 3"=1'0"

NATIONAL REVENUE CUSTOMS & EXCISE
ACCOMMODATION

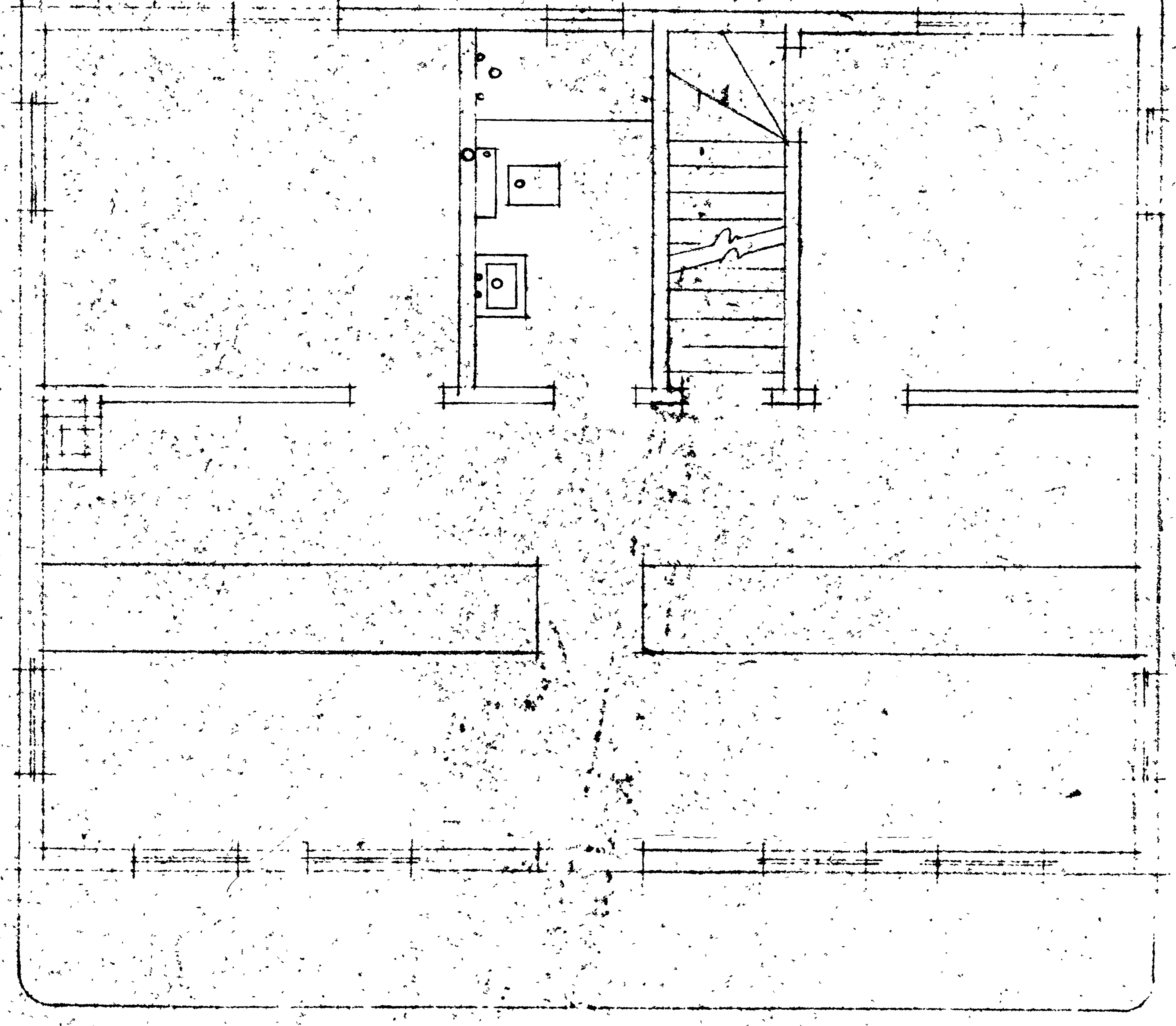
CUSTOMS AND IMMIGRATION OFFICE BUILDING

SCALE	REVISIONS	DRAWN BY	CH'K'D. BY
As Noted		D.Robertson	
DATE MAY.10.57		[illegible]STS·144	

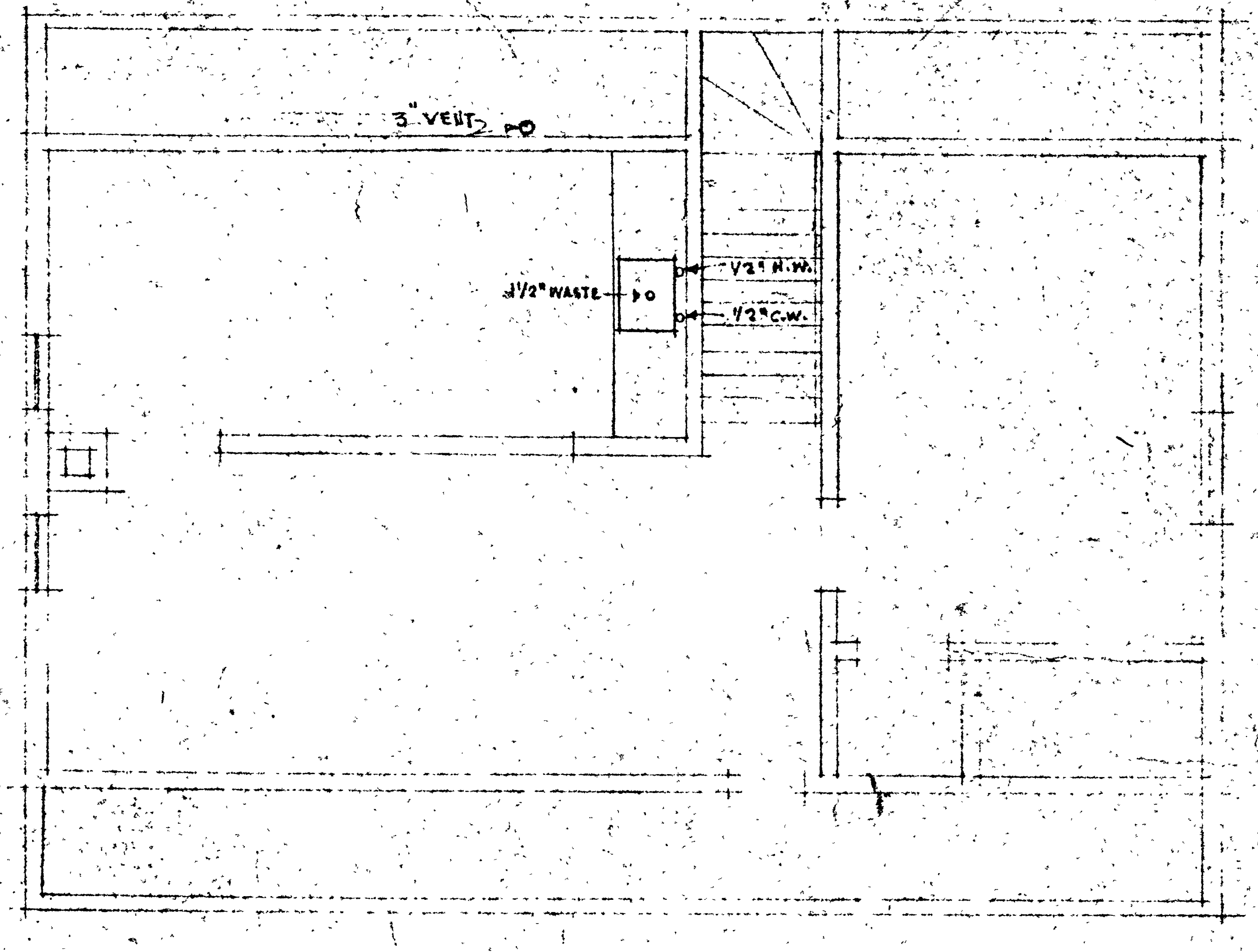


NOTE:
PUMP AND PRESSURE TANK TO BE OMITTED
WHEN THIS BLDG. IS TO BE CONNECTED TO
PUMPING STATION (SEE SITE PLAN)

BASEMENT PLAN



FIRST FLOOR PLAN



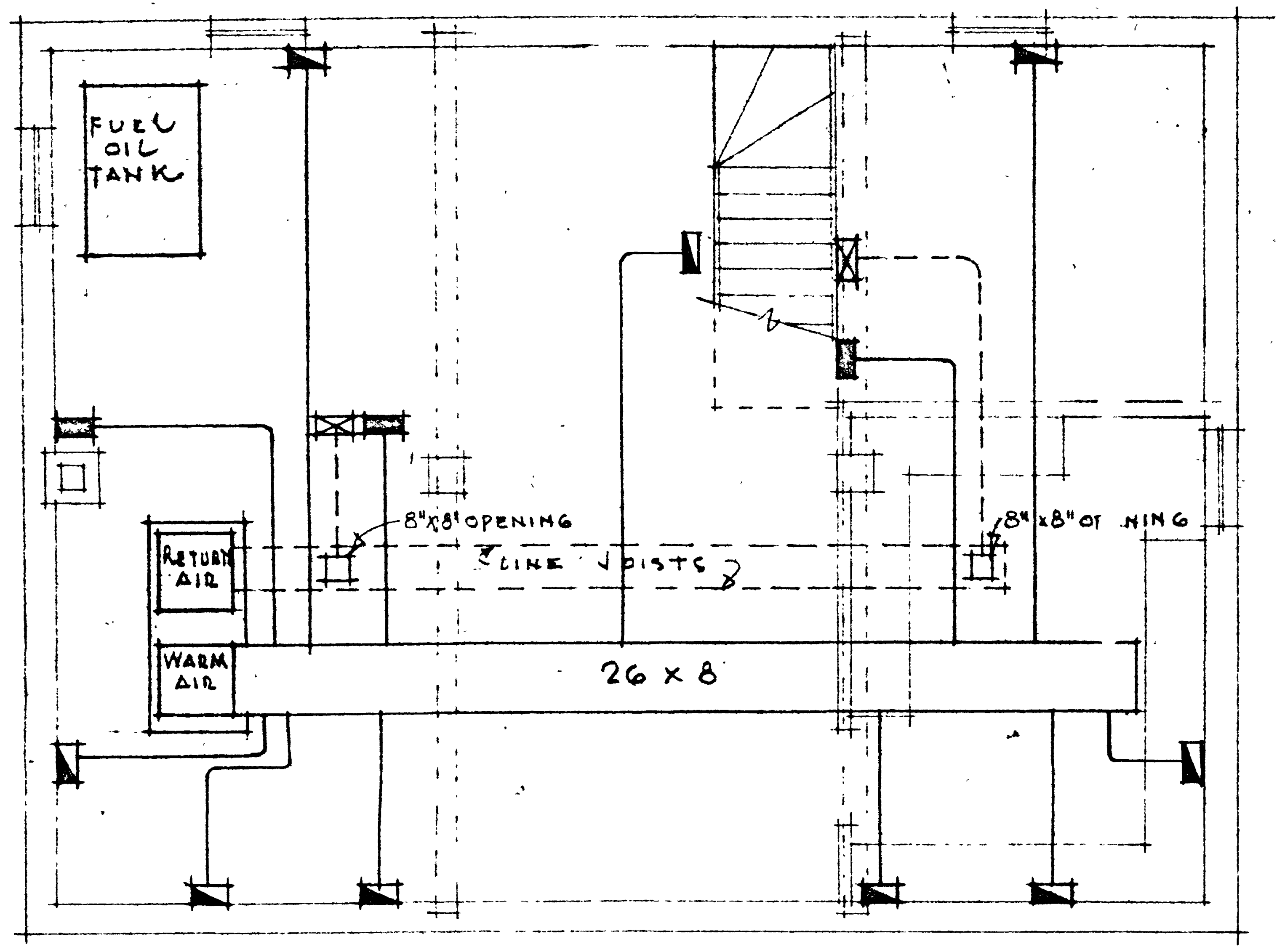
SECOND FLOOR PLAN

PLUMBING

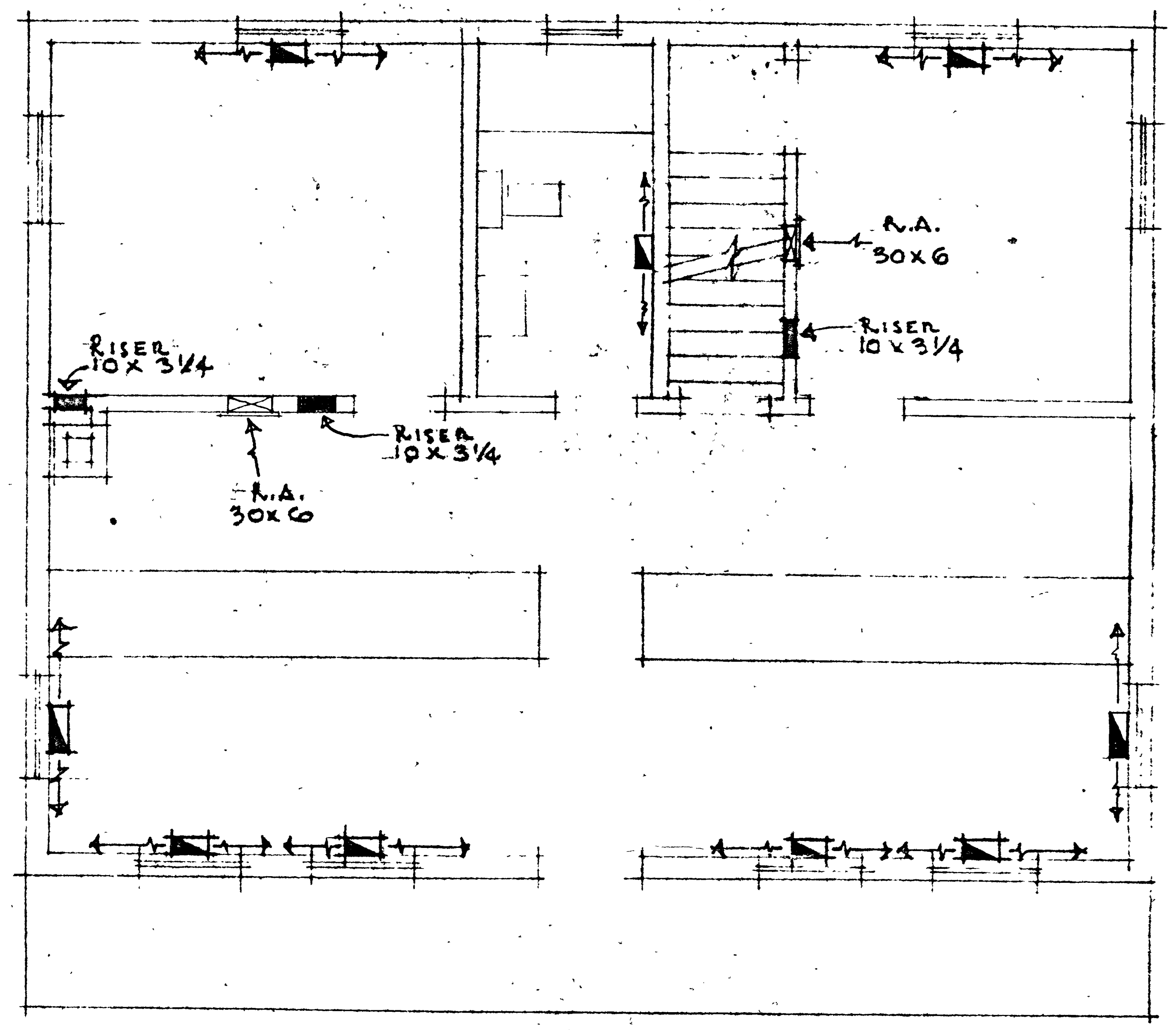
NATIONAL REVENUE CUSTOMS & EXCISE
ACCOMMODATION

CUSTOMS AND IMMIGRATION
OFFICE BUILDING

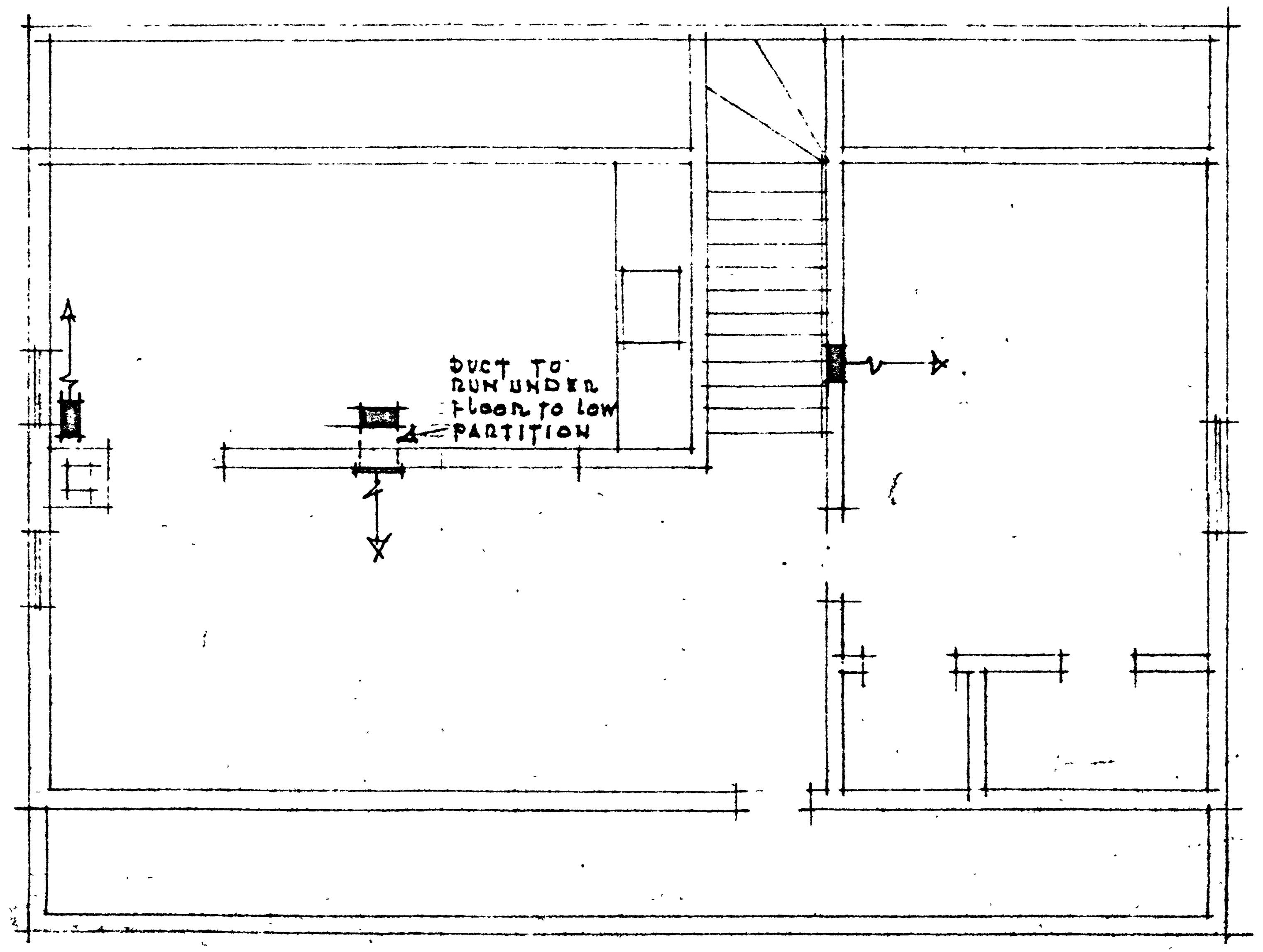
SCALE	REVISIONS	DRAWN BY	CHK'D BY
1/4"-1'-0"	W.C. PARTITIONS SEPT. 21-54 A.D.	D. Robertson	
DATE		DWG. No. ST.3-144	
MAY 10 - 57			



BASEMENT PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

LEGEND -
WARM AIR RISER ■
WARM AIR TO 1st floor ◪
RETURN AIR FROM 1st FLOOR ☒

HEATING

DEPARTMENT OF NATIONAL REVENUE
CUSTOMS & EXCISE DIVISION
ACCOMMODATION BRANCH

CUSTOMS AND IMMIGRATION
OFFICE BUILDING

S. G. OGILVIE
CHIEF OF ACCOMMODATION

APPROVED:
DATE:

SCALE 1/4" = 1'-0"
DATE MAI-10-57
DRAWN BY: A.D.

DWG. No. ST. 3-144

SHEET NO. 6 OF 7

REVISIONS
DATE

PRINTS	
No.	DATE
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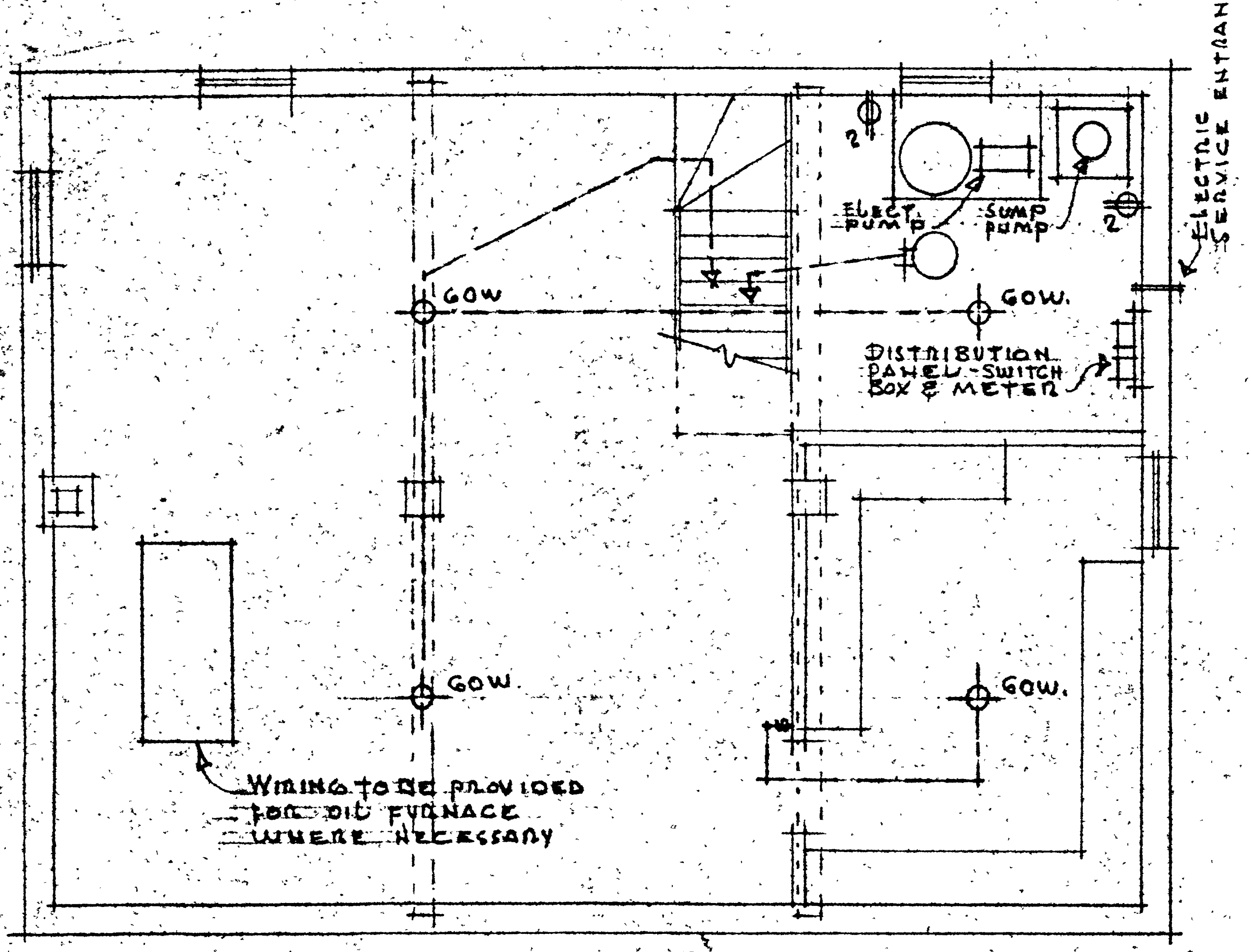
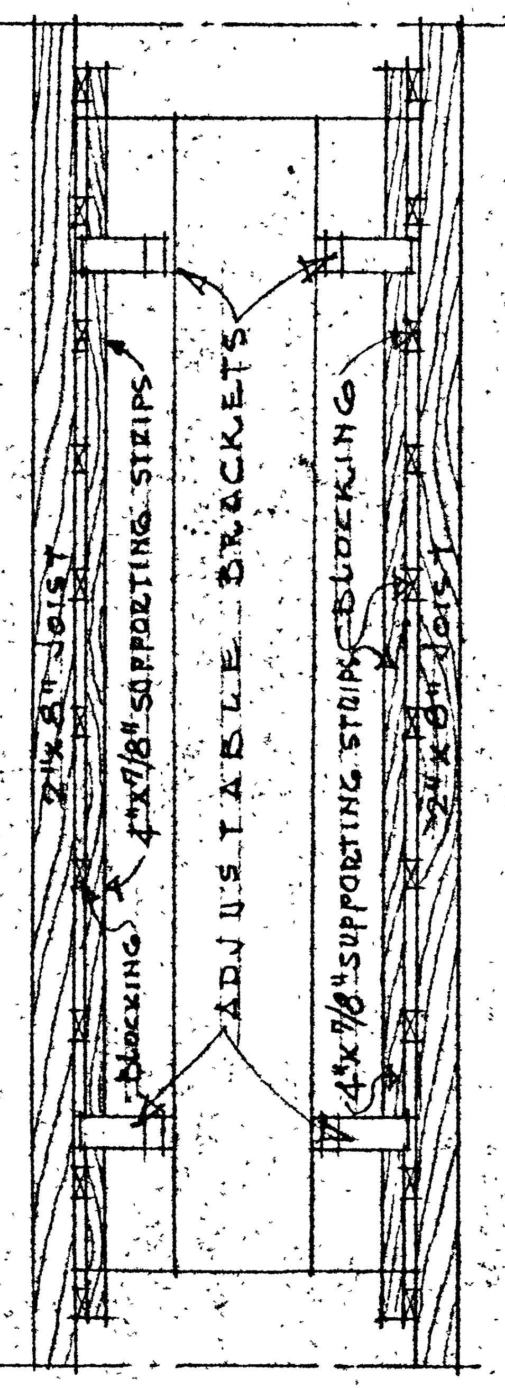
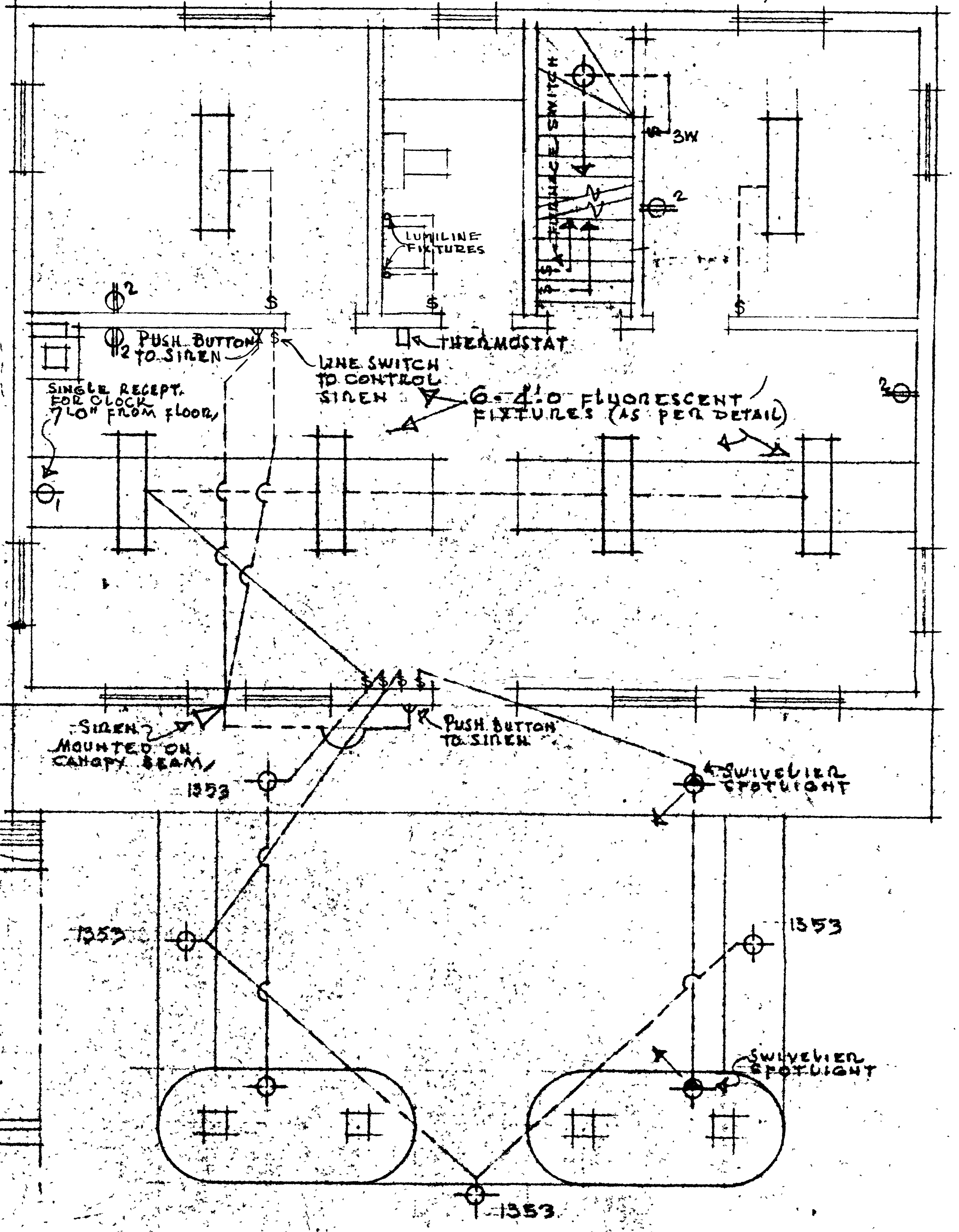
4	19-8-57



BASEMENT PLAN



PLAN
1½ - 1'-0"



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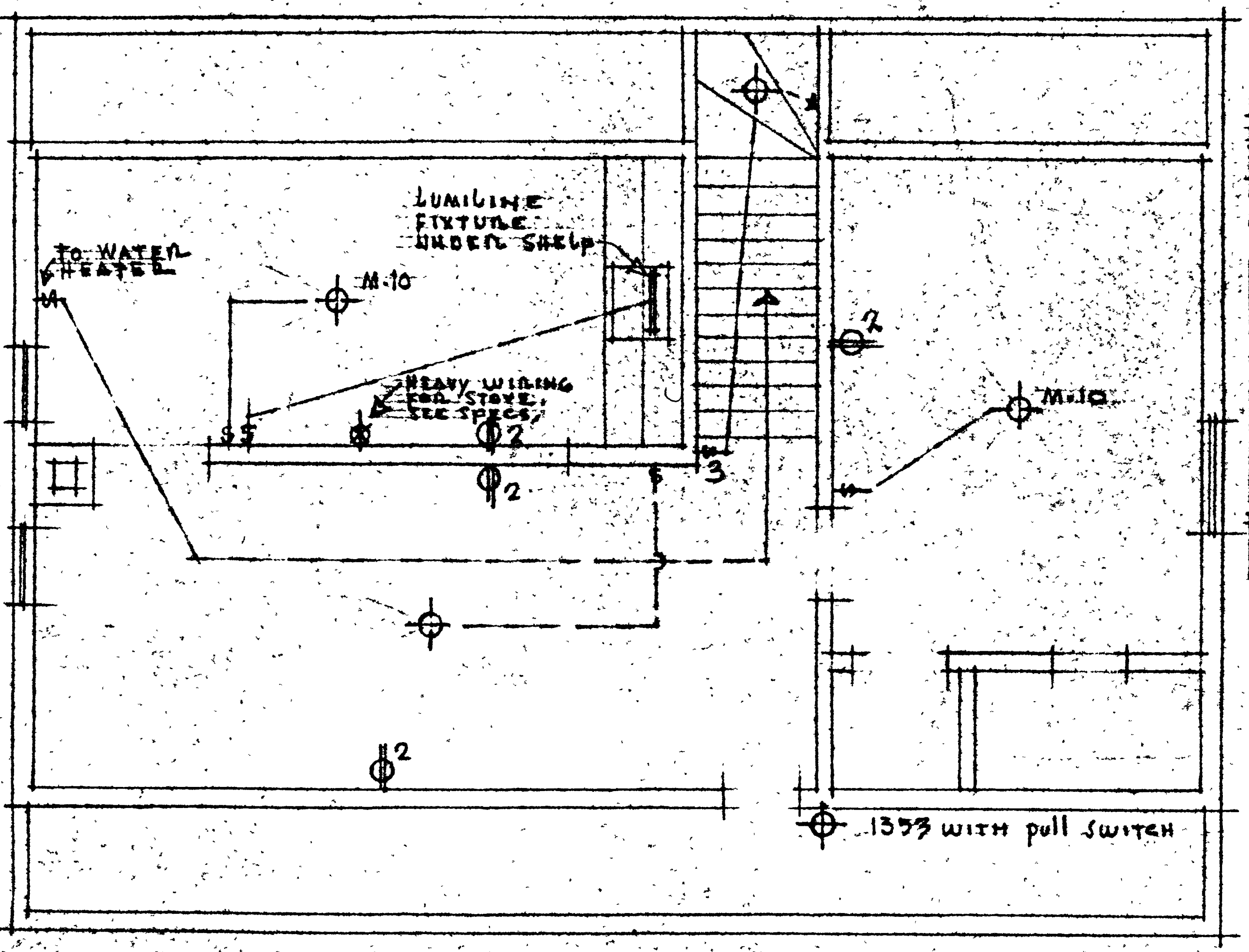
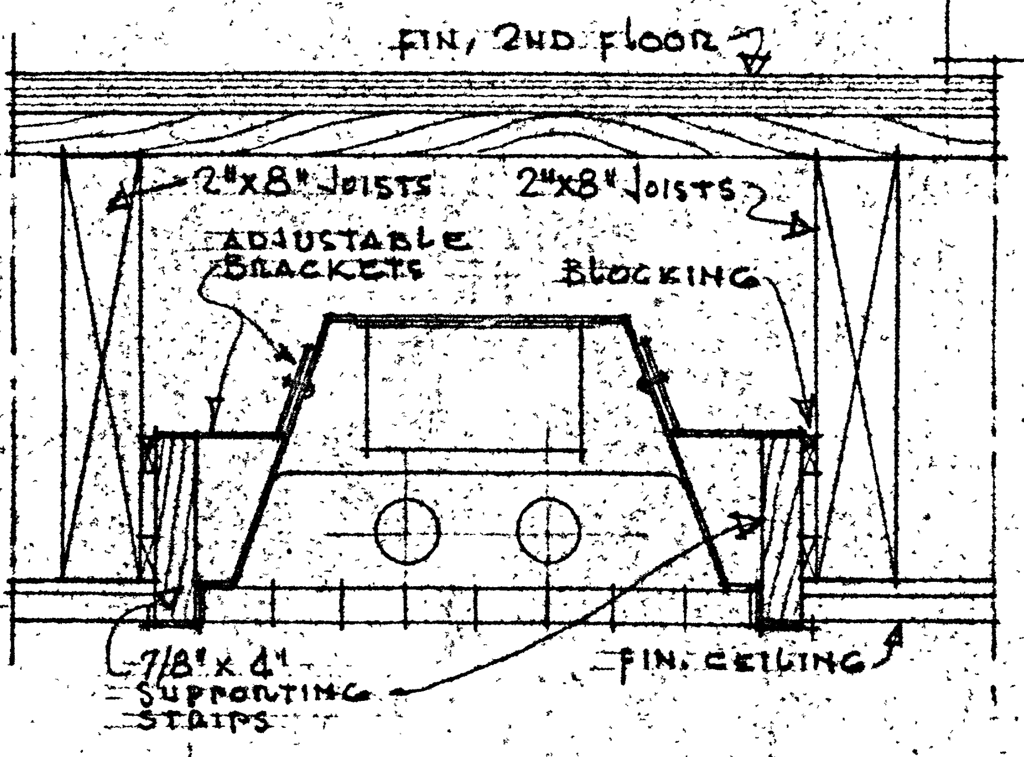
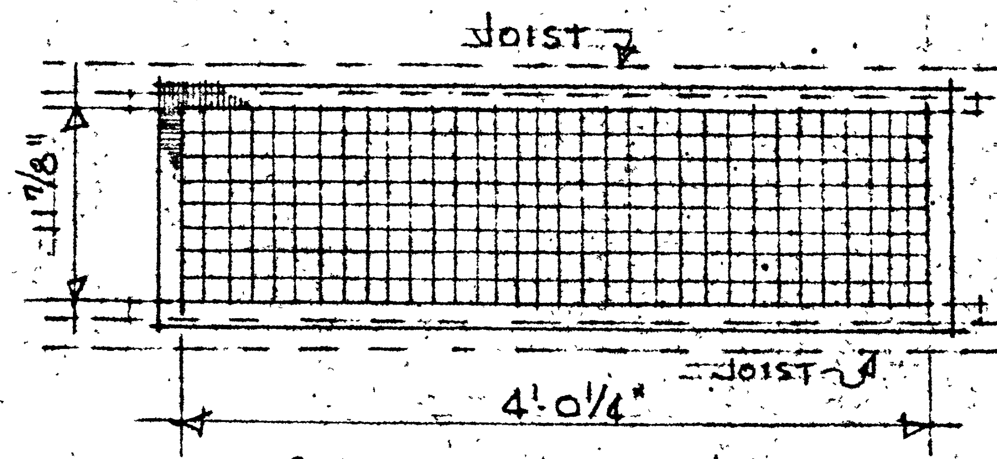


SECOND FLOOR PLAN



SECTION



REFLECTED PLAN - 1" = 1'-0"

DETAIL OF RECESSED FLUORESCENT LIGHT FIXTURES

ELECTRICAL

DEPARTMENT OF NATIONAL REVENUE
CUSTOMS & EXCISE DIVISION
ACCOMMODATION BRANCH

CUSTOMS AND IMMIGRATION
OFFICE BUILDING

PRINTS	
No	DATE
1	14-5-57
4	19-8-57

REVISIONS

DATE

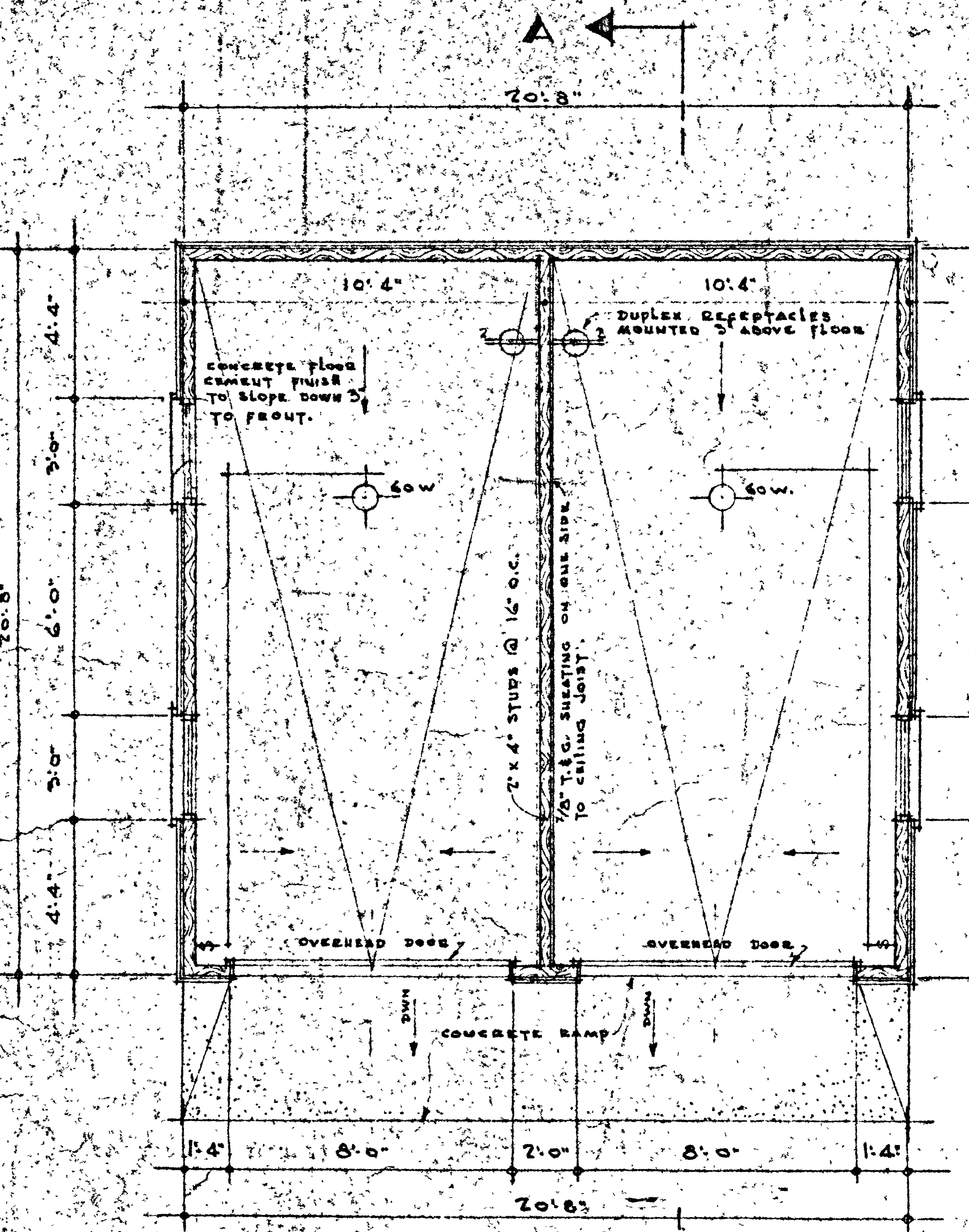
E. G. OGILVIE
CHIEF OF
ACCOMMODATION

APPROVED
DATE

SCALE 1/4" = 1'-0"
DATE MAY 10-57
DRAWN BY A.D.

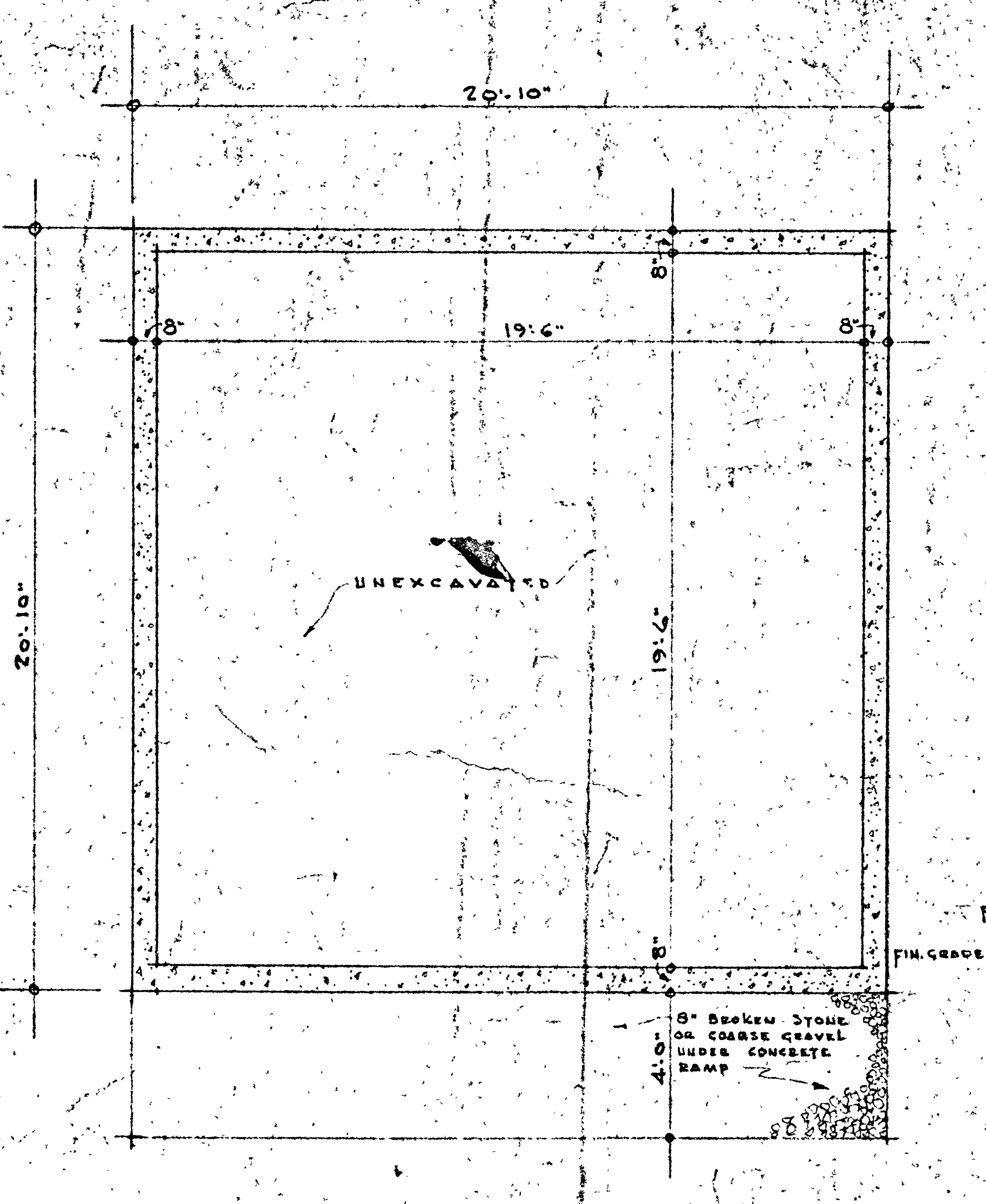
DWG. No. ST3-144

SHEET NO 7 OF 7

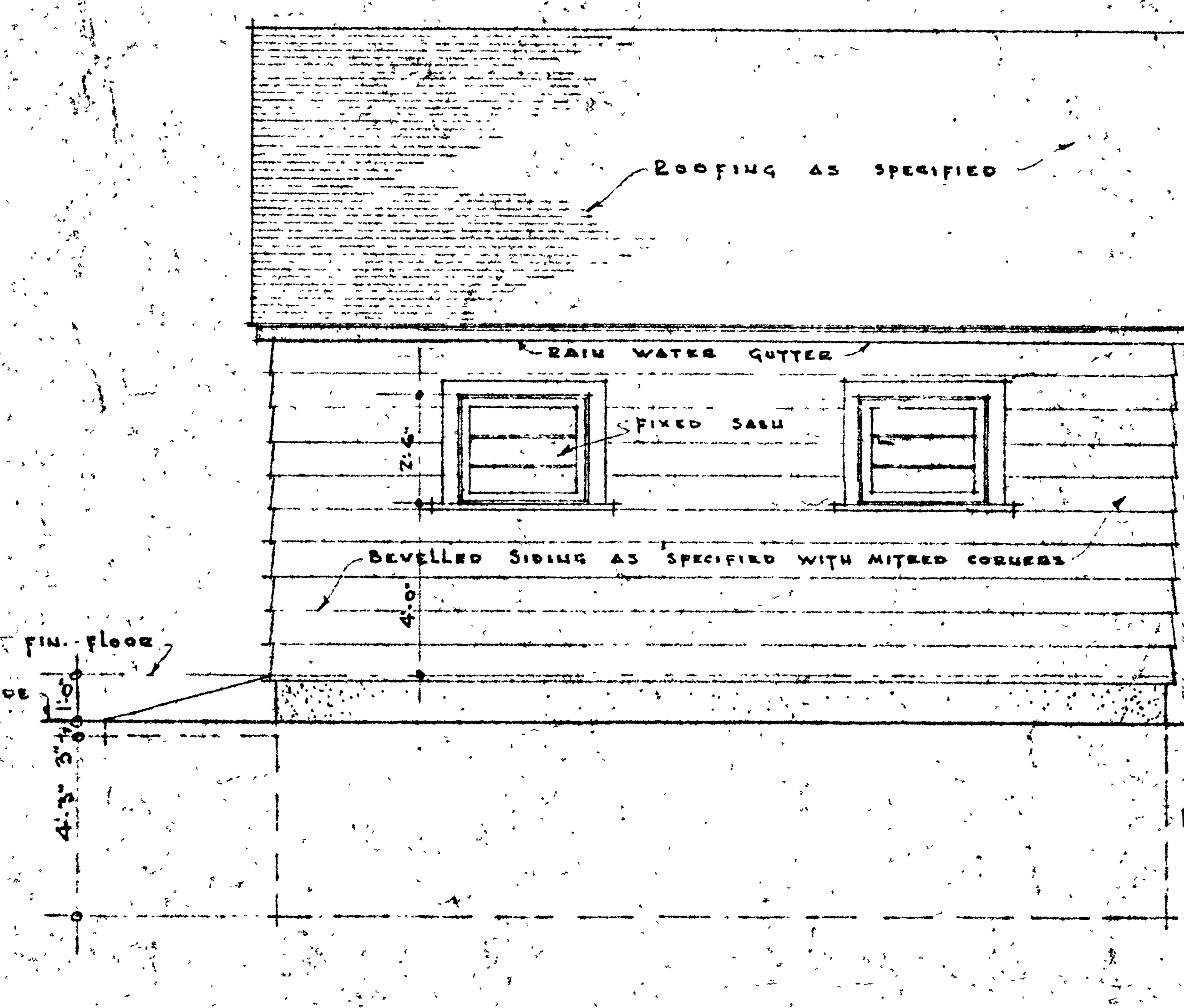


FLOOR PLAN

A

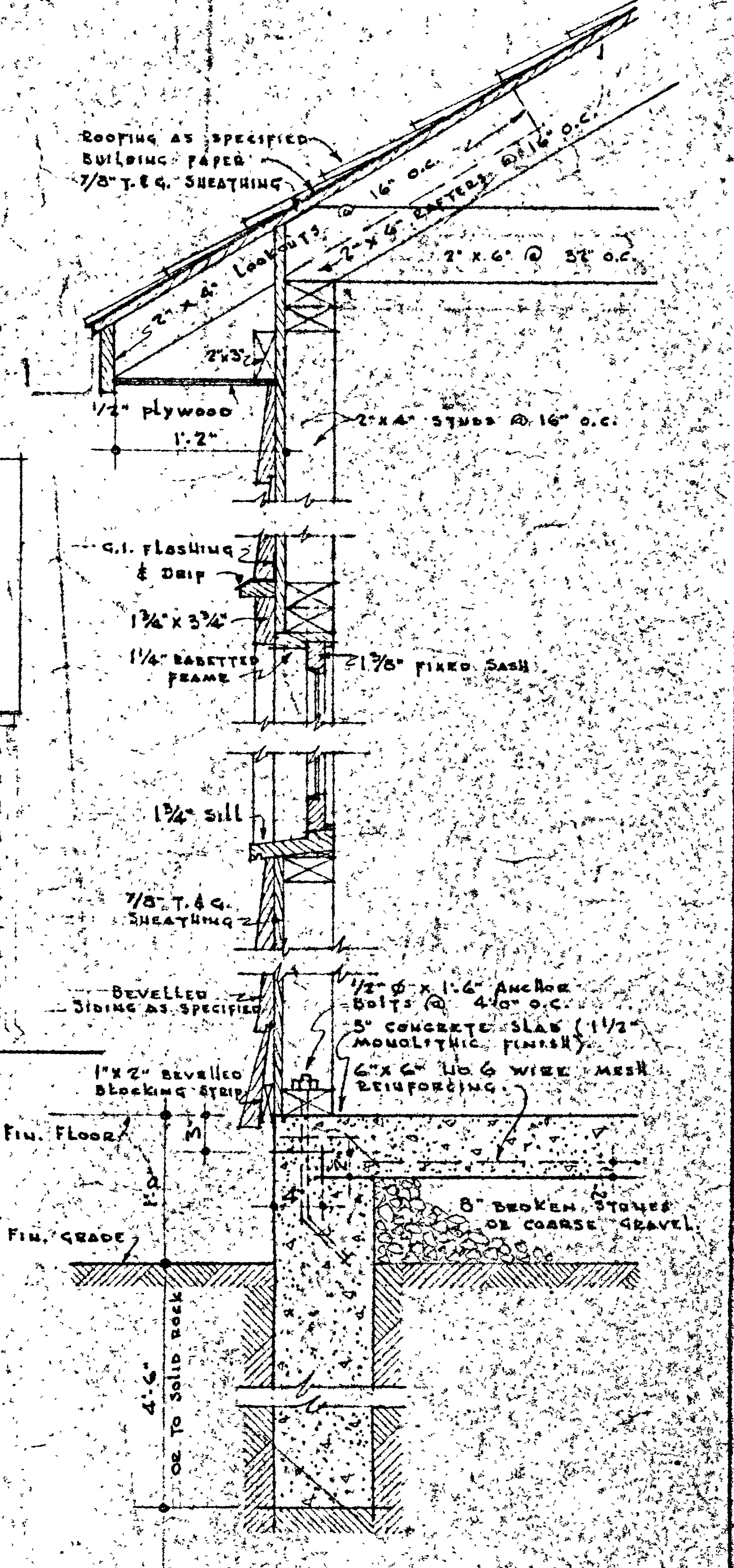


FOUNDATION PLAN



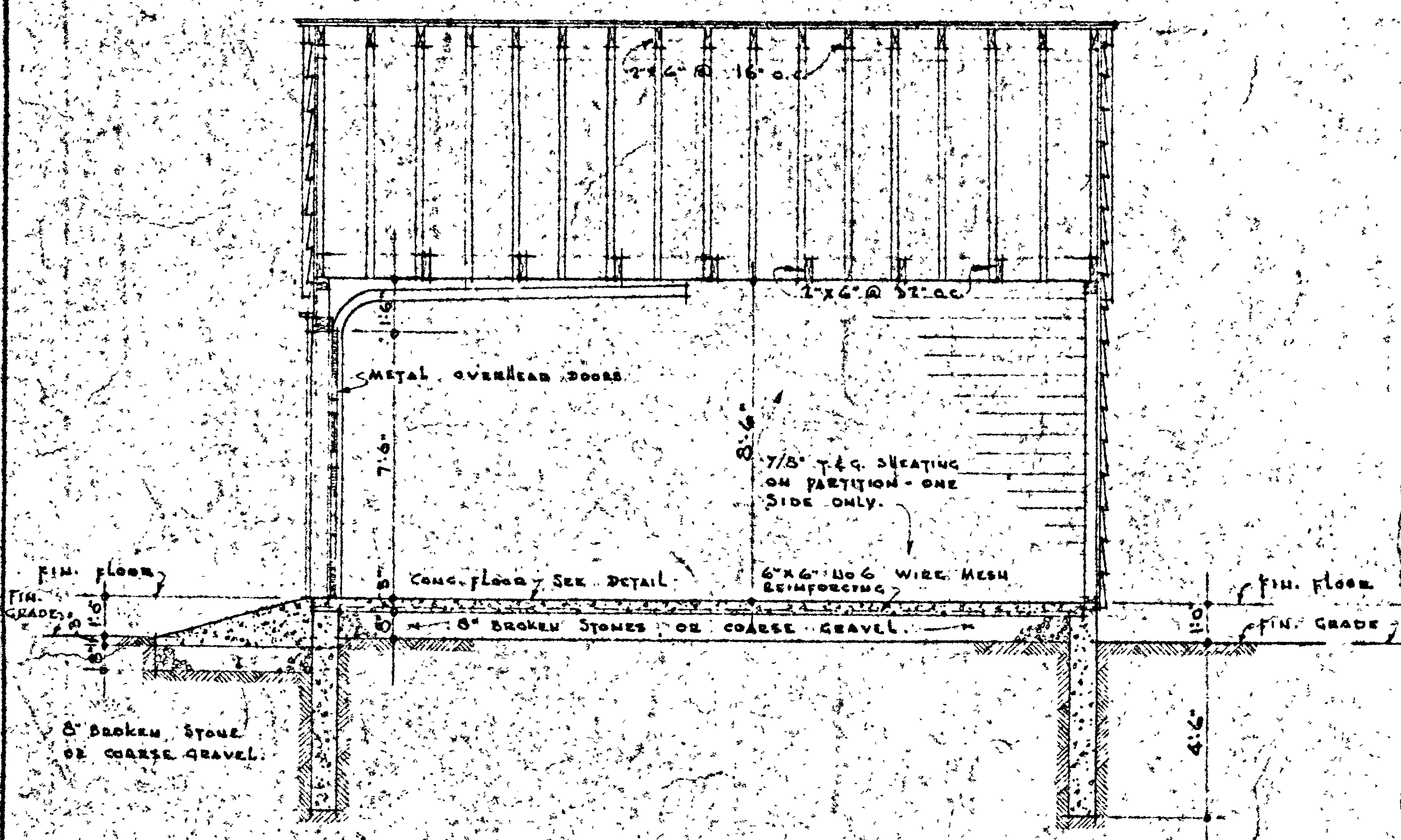
SIDE ELEVATION

(OPPOSITE SIDE SIMILAR)

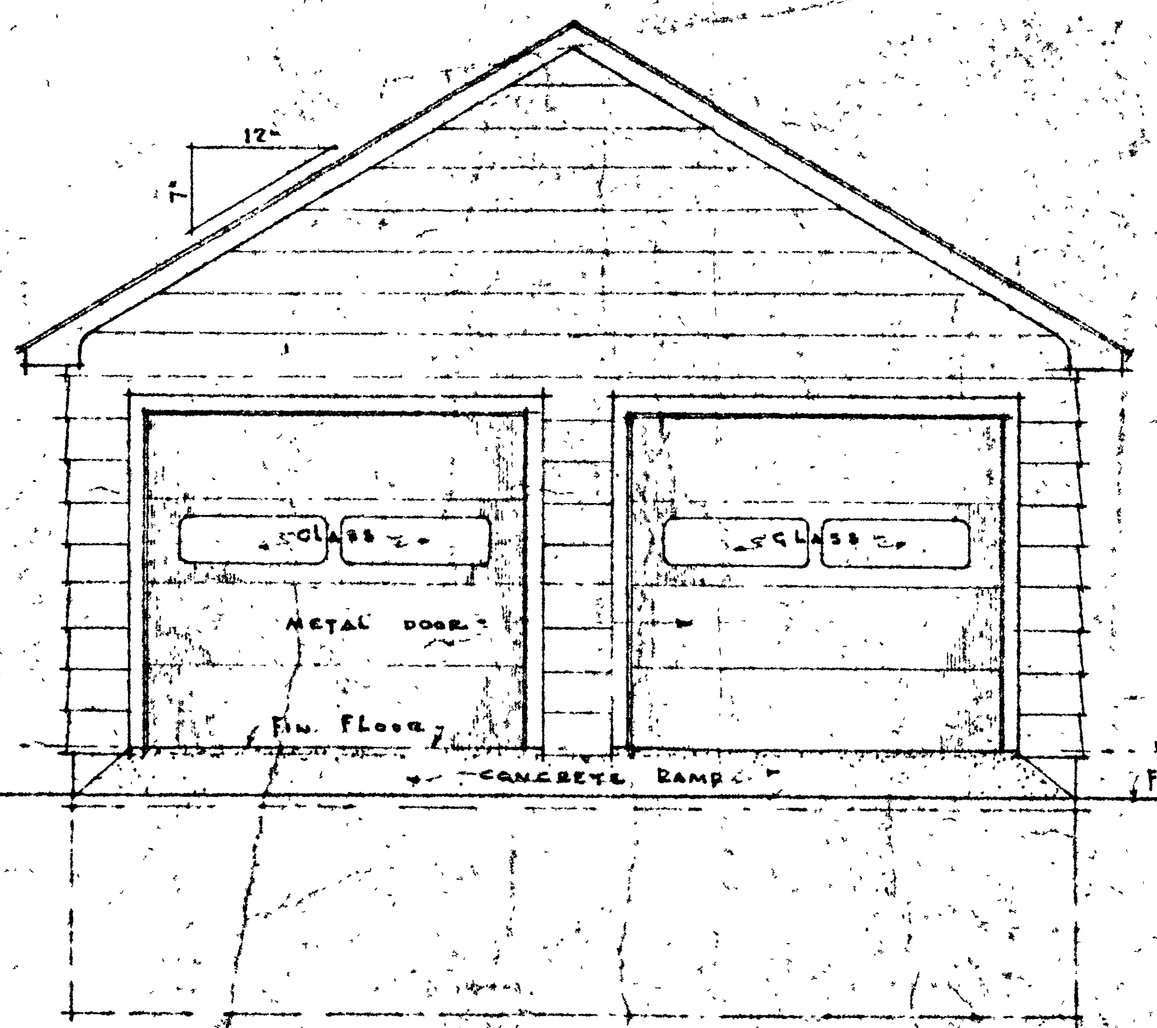


TYPICAL WALL SECTION

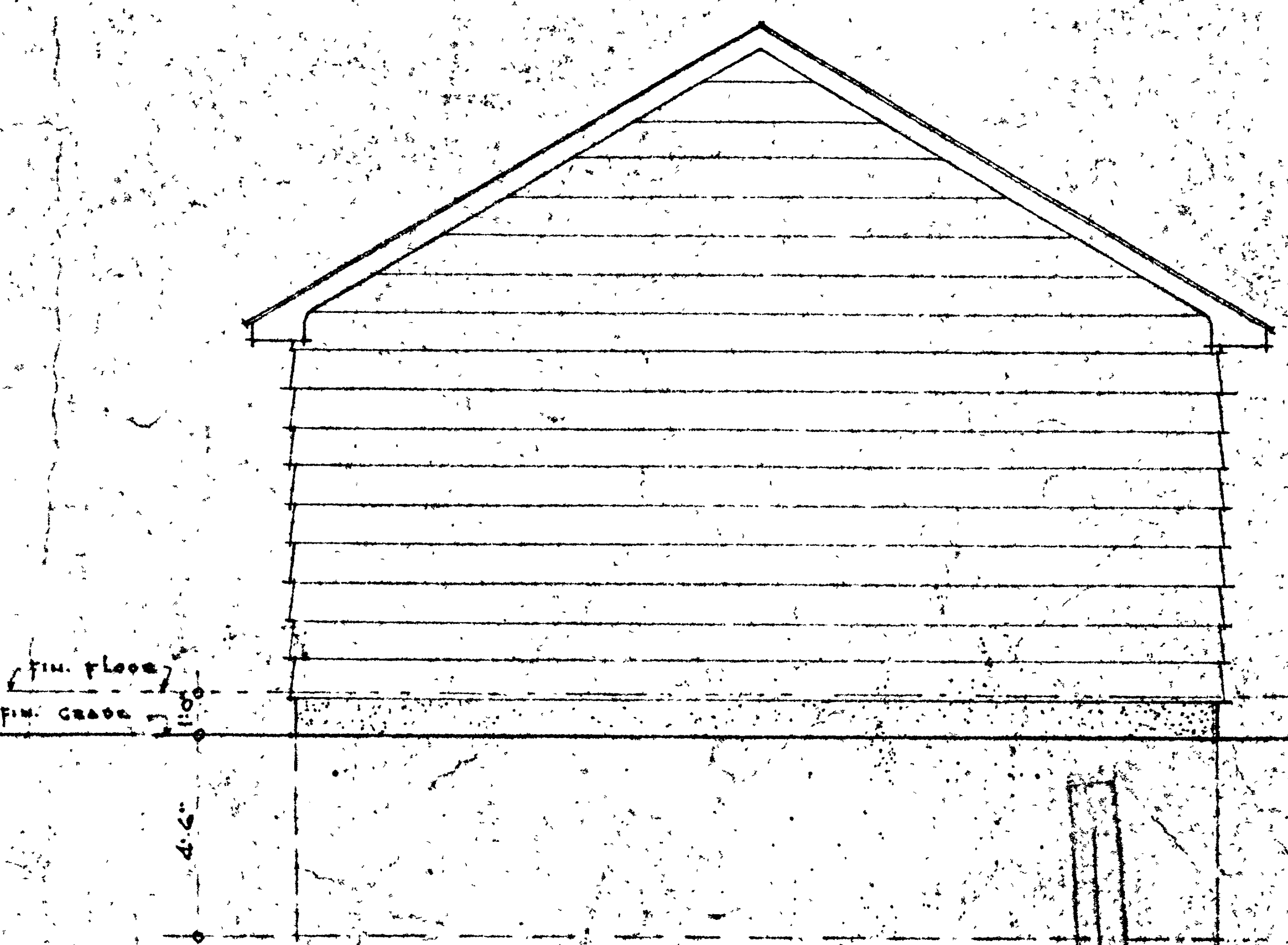
SCALE: 1" : 1'-0"



SECTION THRU A-A



FRONT ELEVATION



REAR ELEVATION

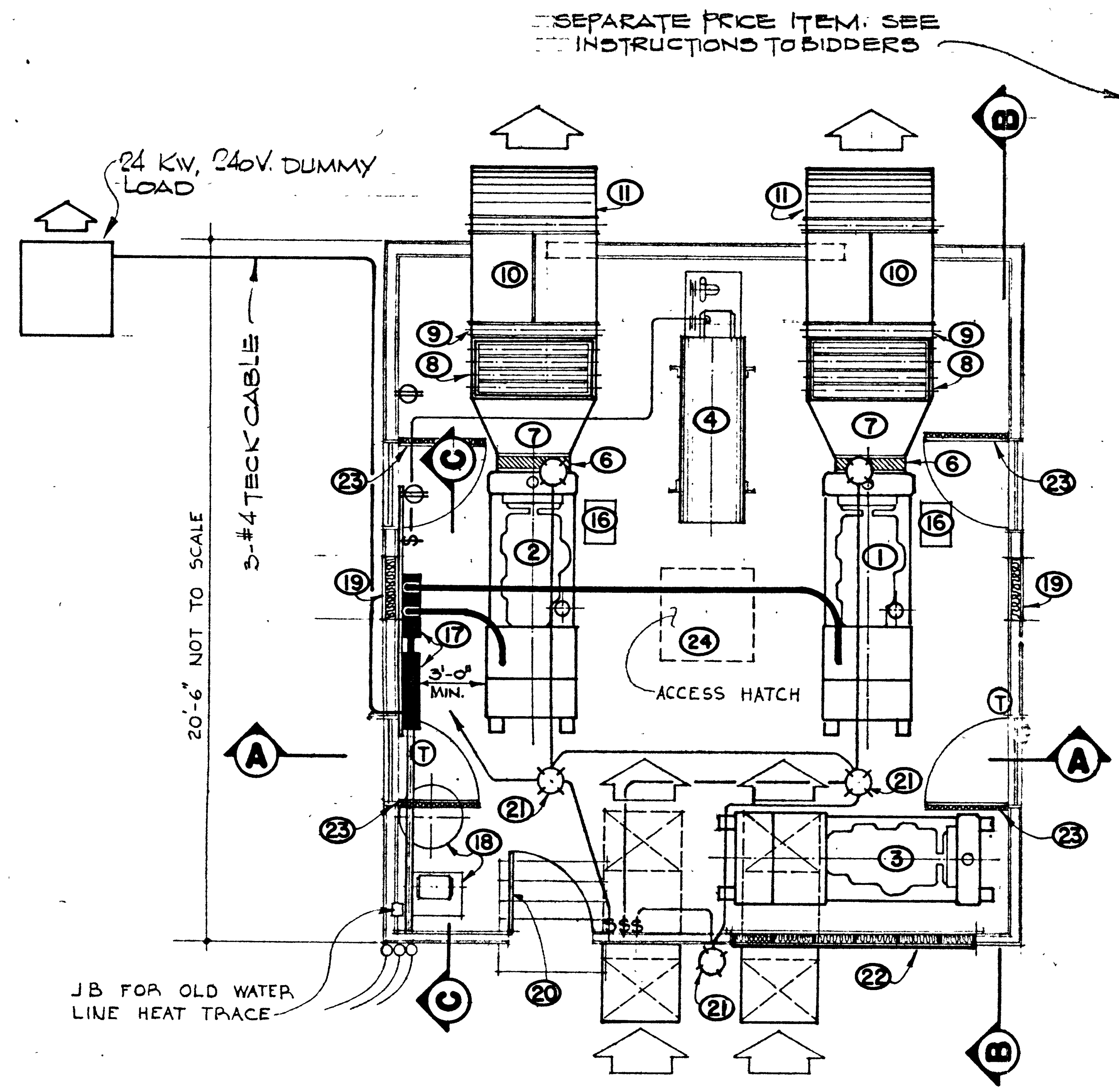
SCALE: 1/4" : 1'-0"

NATIONAL REVENUE CUSTOMS & EXCISE
ACCOMMODATION

DOUBLE GARAGE

SCALE As shown	REVISIONS	DRAWN BY A.d.	CH'K'D. BY
DATE Sept 19 1954		DWG. No. ST7-67	

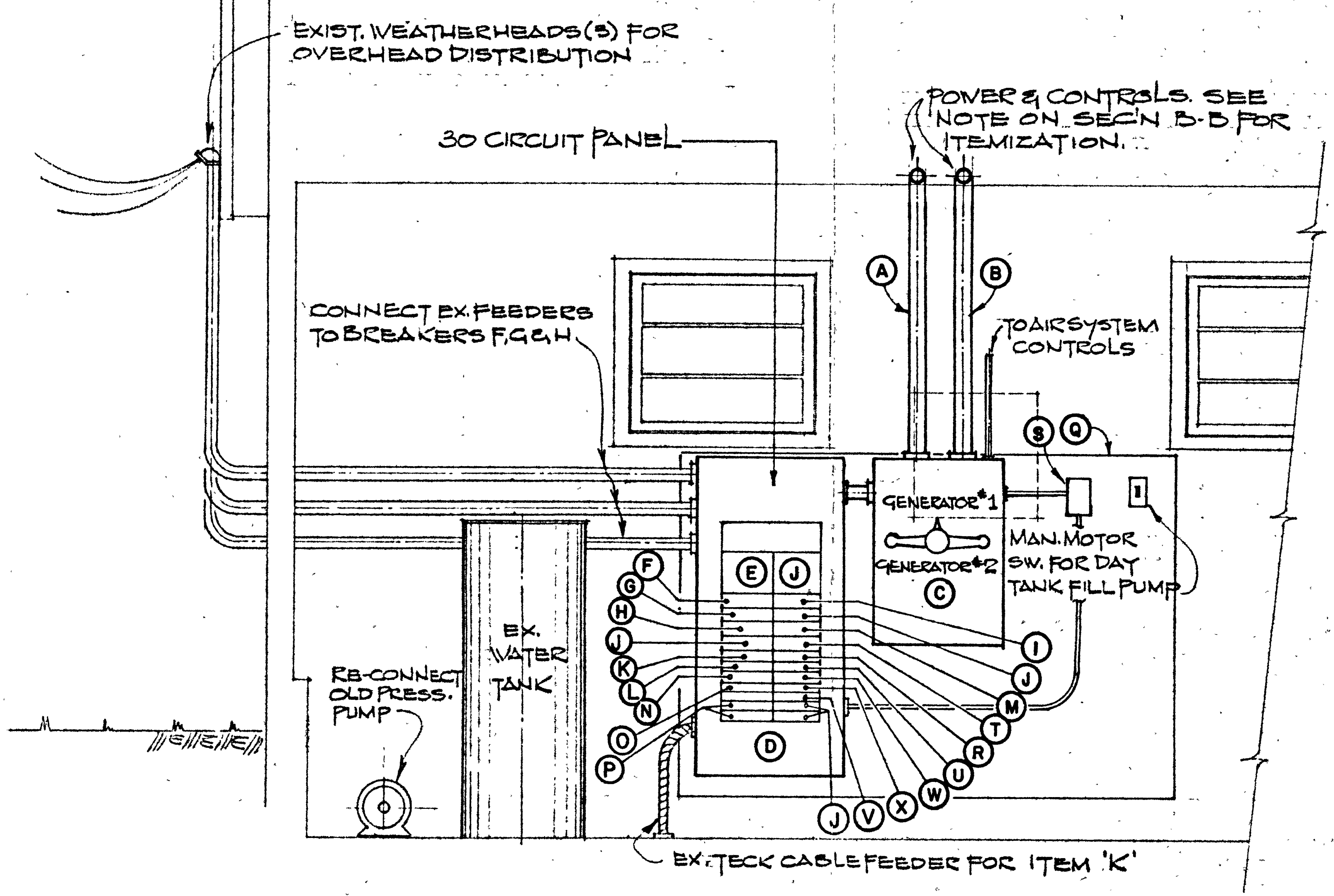
⑩ 4



GENERATOR HOUSE - PLAN 1/4" = 1'-0"

DETAIL NOTES

1. NEW GENERATOR SET #1. REMOVE EXISTING 'PERKINS' GENERATOR SET & DEMOLISH 15" HIGH, 30" WIDE x 69" LONG CONCRETE BASE. PATCH & LEVEL FLOOR.
2. NEW GENERATOR SET #2. REMOVE EX. 'WITTE' GENERATOR SET.
3. NEW GENERATOR SET #3 (NOT CONNECTED) STORE IN APPROX. LOCATION SHOWN
4. EXISTING 250 GAL. DAY TANK & FUEL OIL TRANSFER PUMP. RELOCATE TO POSITION SHOWN & RE-CONNECT PIPING
5. NEW MUFFLERS WITH 18" LONG FLEX. CONNECTION 8" FROM ENGINE. PROVIDE DRAIN COCK & SLOPE EXHAUST PIPE TOWARD DISCHARGE END. INSTALL NEW WALL THIMBLES APPROVED FOR WOOD FRAME CONSTRUCTION. REMOVE OLD THIMBLES & PATCH.
6. FLEXIBLE DUCT CONNECTION TO SUIT RADIATOR CORE OPENING.
7. DUCT TRANSITION - RADIATOR CORE SIZE TO 24"x48"
8. 24"x48" MOTORIZED ENGINE RETURN AIR DAMPER THERMOSTATICALLY CONTROLLED.
9. 24"x48" MOTORIZED ENGINE EXHAUST AIR DAMPER THERMOSTAT. CONTROLLED.
10. 24"x24"x36"L. DUCT SILENCERS. ASSEMBLE IN PAIRS AS SHOWN.
11. 24"x48" SNOW HOOD C/W INSECT SCREEN
12. ~~ANGLE IRON DUCT SUPPORTS ON CONC. FOOTING.~~ — NOT REQUIRE
13. 24"x30" SNOW HOOD C/W INSECT SCREEN.
14. 24"x30"x36"L. DUCT SILENCER FOR COOLING & COMBUSTION AIR INTAKE.
15. VIBRATION ISOLATORS ON 12"x12"x1/2" BEARING PLATES ON FLOOR
16. ENGINE STARTING BATTERIES.
17. NEW ELECTRICAL DISTRIBUTION (REMOVE EXISTING) SEE SECTION 'C'-'C'
18. EXISTING STANDBY WATER PUMP & PRESSURE TANK
19. REMOVE EX. AIR INTAKES & PATCH WALL IN & OUTSIDE TO MATCH EX.
20. 3'-0 x 7'-0" SOLID CORE EXTERIOR DOOR. WEATHERSTRIP NEW & EX. DOORS.
21 EXISTING LIGHTING - RE-CONNECT.
22. ACOUSTIC INFILL PANEL - 2x4 STUD FRAME WITH SHEATHING & SIDING ON EXTERIOR FACE TO MATCH BUILDING & INSULATE WITH 3" THICK F.G. BATTS. CONSTRUCT TO FIT OPENING SNUGLY & TACK NAIL TO ALLOW FUTURE REMOVAL AS A UNIT. EXISTING OVERHEAD DOOR TO REMAIN AS IS.
23. ACOUSTIC WINDOW PANELS - 3/4" PLYWOOD, HINGED ONE SIDE. ATTACH INSULATION TO BACK & PROVIDE TURN BUTTON CLOSURES.
24. ROOM THERMOSTATS. SUSPEND FROM CONDUIT AT 6'-5" ABOVE FLOOR.



SECTION 'C'-'C' 1/2" = 1'-0"

DISTRIBUTION EQUIPMENT SCHEDULE - 120/240V., 1Ø, 3W.

ITEM	SIZE	DESCRIPTION
A	235A.	3-#4/0 R90 IN 2½" CONDUIT - GENERATOR #1 FEEDER
B	235A.	3-#4/0 R90 IN 2½" CONDUIT - GENERATOR #2 FEEDER
C	225A	AUTO/MANUAL TRANSFER SWITCH
D	225A	CENTRAL DISTRIBUTION PANEL (ALL BREAKERS 10,000 A.I.C.)
E	225A	MAIN BREAKER
F	60A-2P	NEW RESIDENCE (DOUBLE-WIDE TRAILER) CIRCUIT 1/3
G	60A-2P	CUSTOMS OFFICE ″ 5/7
H	60A-2P	OLD RESIDENCE (HOUSE) ″ 9/11
I	60A-2P	24 KW. DUMMY LOAD ″ 2/4
J		SPACE CIRCUITS 6,8,13,15,24,26,28,30
K	30A-2P	NEW WELLHOUSE & WATER PUMP CIRCUIT 17/19
L	20A-1P.	OLD (STANDBY) WATER PUMP ″ 21
M	20A-1P.	FUEL OIL TRANSFER PUMP ″ 10
N	20A-1P	SPARE BREAKER ″ 23
O	15A-1P	POWERHOUSE LIGHTING ″ 25
P	15A-1P	SPARE BREAKERS ″ 27,29
Q	5'-6"x8'-0"	3/4" PLYWOOD BACKING - FASTEN SECURELY TO WALL
R	15A-1P	BREAKER FOR AIR SYSTEM CONTROLS CIRCUIT 14
S		40 V.A. 120/24V CONTROL TRANSFORMER

(CONT'D)

GENERAL NOTES

- REMOVE EXISTING GENERATOR SETS, CONTROL PANELS & ELECTRICAL DISTRIBUTION (150 A. PANEL & MANUAL TRANSFER SWITCH). INSTALL NEW EQUIPMENT AS SHOWN.
- FOR DETAILS OF NEW & EXISTING GENERATOR SETS SEE ELECT. SPECIFICATION.
- FOR DUCTWORK, SILENCERS AND DAMPER CONTROLS SEE MECH. SPECIFICATION.
- RE-CONNECT ALL ELECT. EQ. TO NEW DISTRIBUTION. SINCE THIS PLANT PROVIDES PRIME POWER, DO NOT INTERRUPT SERVICE FOR LONGER THAN 60 MINUTES, DURING DAYLIGHT HOURS ONLY. NOTIFY RESIDENTS ONE HOUR IN ADVANCE. SEE SPEC.
- APPLY 1½" THICK ACOUSTIC INSULATION TO STUD WALLS & CEILING INSIDE BUILDING. SEE SEC. 1A-16 OF SPEC.
- PATCH ALL DAMAGE TO OUTSIDE OF BUILDING CAUSED BY THIS WORK & PAINT TO MATCH EXISTING.

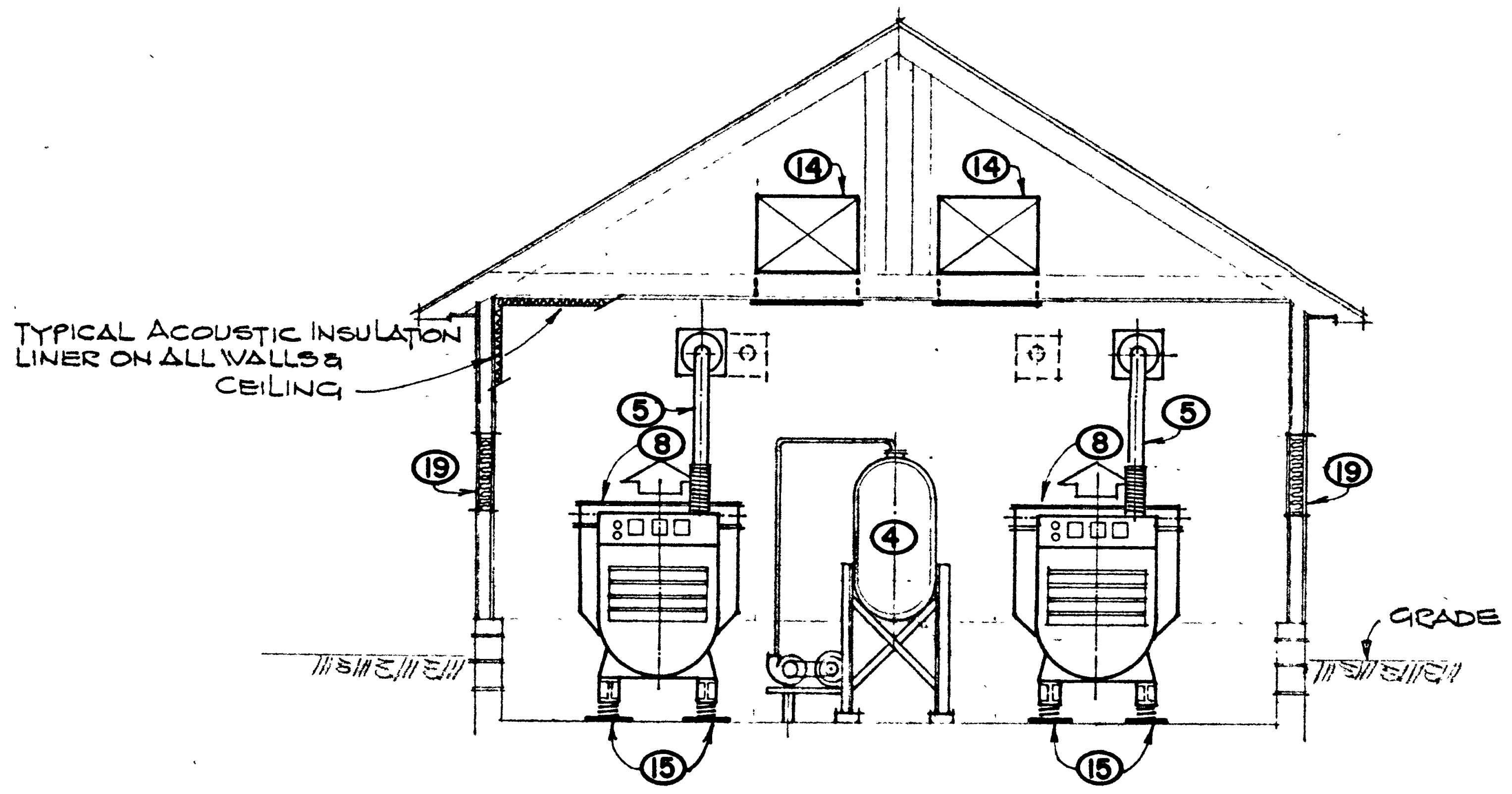
DISTRIBUTION EQUIPMENT SCHEDULE (CONT'D)

T	15A-1P	POWERHOUSE RECEPTACLES CIRCUIT 12
U	15A-1P	BATTERY CHARGER #1 ″ 16
V	15A-1P	BATTERY CHARGER #2 ″ 22
W	30A-1P	ENGINE JACKET HEATER #1 ″ 18
X	30A-1P	ENGINE JACKET HEATER #2 ″ 20

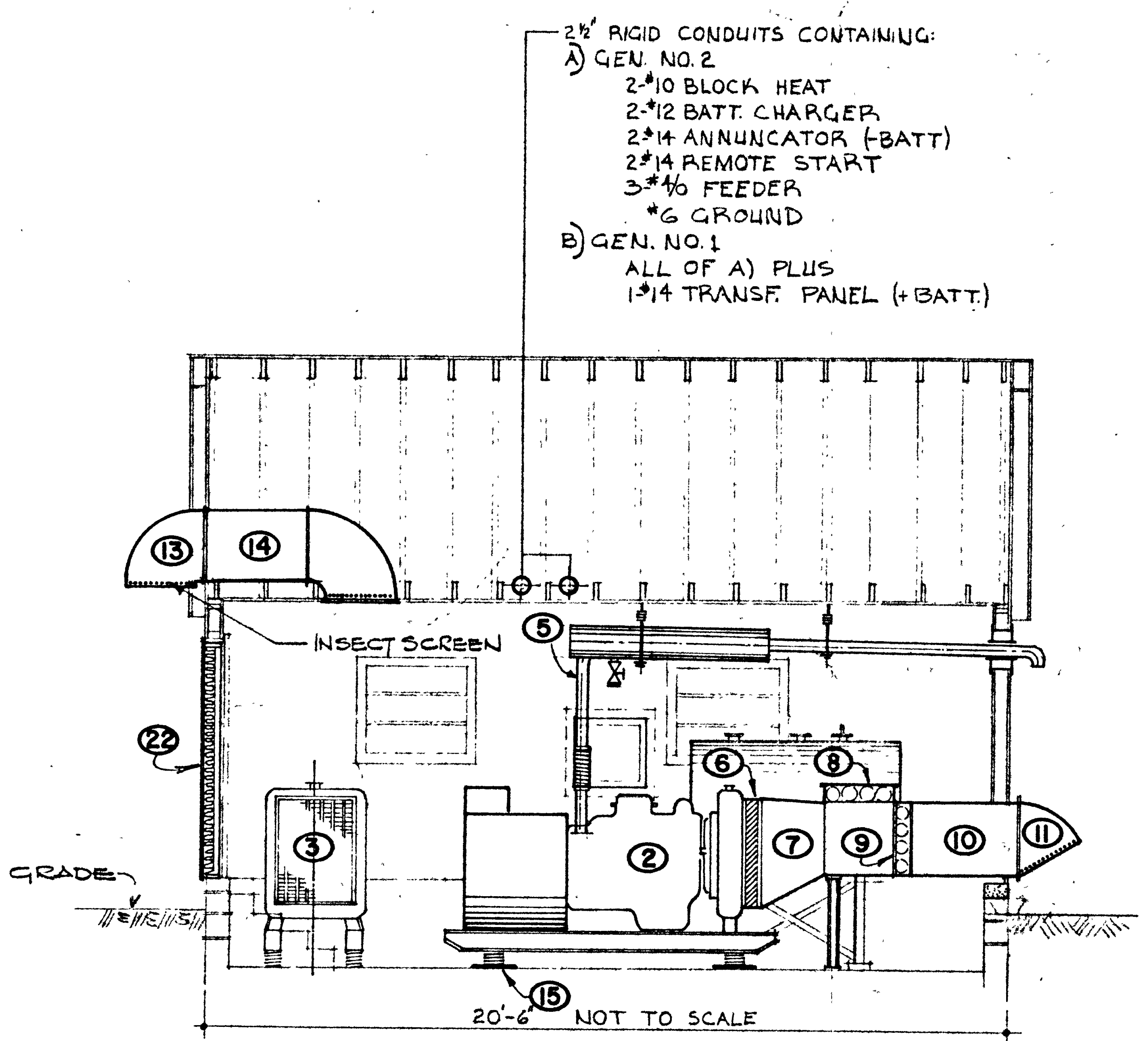
SEE ALSO:

E2: ELECTRICAL RENOVATIONS TO OFFICE & RES.

A.M.E3-ARCHITECTURAL/MECH./ELECT. NEW BATHROOM & SITE PLAN.



SECTION 'A'-'A' 1/4" = 1'-0"



SECTION 'B'-'B' 1/4" = 1'-0"

Public Works Canada Travaux publics Canada

PACIFIC REGION

A detail no. détail no.
B location drawing no. sur dessin no.
C drawing no. dessin no.

revisions date
REVISED TO AS BUILT 29/5/78 R.W.

AS CONSTRUCTED

project title titre du projet
PLEASANT CAMP, B.C.
CUSTOMS & EXCISE
NEW POWER SUPPLY

drawing title titre du dessin
MECHANICAL/ELECTRICAL
NEW GENERATORS
PLAN & DETAILS

designed by conçu par
C. SCHLUETER, C.E.T. SEPT. '76
date

drawn by dessiné par
C.S.
date

reviewed by examiné par
G.E. STOPFORTH, C.E.T.
date

approved by approuvé par
A. Derazopian P.ENG.
date

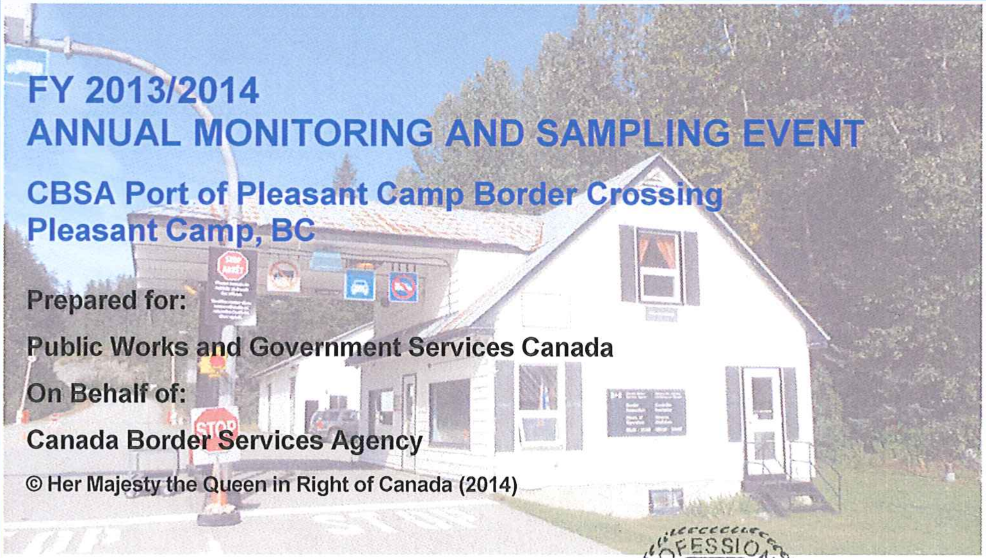
Tender Soumission
J. GORMAN, P.ENG.
D.P.W. Project Manager Administrateur de projets M.T.P.

project number no. du projet
010079-2

drawing no. dessin no.
M·E1 of 3 AS BUILT.

APPENDIX F – FY 2013/2014 ANNUAL MONITORING AND SAMPLING EVENT, CBSA PORT OF PLEASANT CAMP, PLEASANT CAMP, BC

SNC·LAVALIN



FY 2013/2014
ANNUAL MONITORING AND SAMPLING EVENT

CBSA Port of Pleasant Camp Border Crossing
Pleasant Camp, BC

Prepared for:

Public Works and Government Services Canada

On Behalf of:

Canada Border Services Agency

Prepared by:

Tim Drozda, EIT
Field Supervisor

D. W. BRIDGER
March 31/2014

Dave Bridger, M.Sc., P.Geo.
Project Manager

Reviewed By:

P.A. CARMICHAEL
Mar 31/14

Patricia Carmichael, M.Sc., P.Geo.
Senior Hydrogeologist

ENVIRONMENT & WATER

March 31, 2014

Internal Ref: 131416

SNC-LAVALIN INC.
8648 Commerce Court
Burnaby, British Columbia
Canada V5A 4N6
Tel.: 604-515-5151
Fax: 604-515-5150

EXECUTIVE SUMMARY

At the request of Public Works and Government Services Canada (PWGSC), the Environment & Water business unit of SNC-Lavalin Inc. (SNC-Lavalin) has completed an annual monitoring and sampling event completed in Fiscal Year (FY) 2013/2014 at the Canada Border Services Agency (CBSA) Port of Pleasant Camp border crossing facility located in Pleasant Camp, BC (the “site”).

In following with the Remedial Management Plan (RMP) for the site, the overall objectives of the work conducted in FY 2013/2014 were to 1) ensure protection of human and ecological receptors; and 2) confirm the stability and biodegradation of residual petroleum hydrocarbons in groundwater located beneath the border crossing facility and Haines Highway. In addition, sampling was conducted to confirm presence of soil contamination caused by Agent Orange herbicide used during construction of a former U.S. military fuel pipeline right-of-way (ROW) located north of the site.

The scope of work completed in September and October 2013 included completion of a site-wide monitoring event (66 monitoring wells), sampling of selected monitoring wells (22) and surface water in Granite Creek, soil sampling (3 locations) along the pipeline ROW, and long term water level monitoring using dataloggers.

Findings:

The findings of the FY 2013 / 2014 sampling event can be summarized as follows:

- Installation of dataloggers in selected wells between September 2012 and September 2013 confirmed that the lowest groundwater levels occur during the late summer and early fall months as well as late winter months (February). Seasonal high groundwater levels occur during the late spring as a result of snowmelt and higher temperatures. No seasonal changes in groundwater flow direction were observed and hydrocarbon-impacted groundwater remains at or above the bedrock surface for the majority of the year, with seepage into the upper weathered portion of the bedrock possibly occurring during extreme low water level conditions.

- The 2013 analytical and monitoring results indicate that the groundwater dissolved phase hydrocarbon and light non-aqueous phase liquid (LNAPL) plumes in groundwater remained stable. The size of the inferred LNAPL plume was similar to that observed in 2012 and three separate dissolved phase hydrocarbon plumes are all bounded by downgradient off-site monitoring wells that exhibit concentrations below applicable provincial standards. Geochemical indicators indicate biodegradation of the hydrocarbon plume is continuing and the overall trend since 2010 suggests that groundwater conditions are gradually improving at the site.

- A dissolved iron plume above the FGQG RL Tier 2 guidelines exists on-site and is bounded by cross-gradient monitoring wells and extends south (off-site) beyond the highway to the slope above Granite Creek.
- Concentrations of inorganic parameters and hydrocarbons in surface water in Granite Creek were lower than the applicable guidelines and confirm that hydrocarbon contamination or byproducts of hydrocarbon biodegradation (iron and manganese) are not impacting Granite Creek.
- Soil samples collected adjacent the former pipeline right-of-way indicated soil quality not been impacted by the historical application of Agent Orange herbicide during the installation of the pipeline in the 1950s.

Overall, as per the objectives of the RMP, the results of the FY 2013/2014 monitoring and sampling program confirm that the residual hydrocarbon impacted soil and groundwater at the site does not currently pose significant risks to human health and ecological receptors. The timeframe to achieve remedial closure at the site will require re-evaluation 1) based on further monitoring to confirm the stability and/or attenuation of the hydrocarbon plume; and 2) following any remediation of source contaminated soils during Port redevelopment.

Recommendations:

Based on the overall stable plume conditions observed in 2013 and gradual improving trend since 2010, future sampling can be carried out on a biennial basis (once every two years) or continued annually. The groundwater monitoring and sampling event should include, as a minimum, sampling of key “sentry” wells located along the top of the embankment upgradient from Granite Creek for both dissolved phase hydrocarbons and iron and manganese, and confirmation of water quality in Granite Creek.

No groundwater sampling events have been previously conducted to date during seasonal high groundwater conditions; therefore, a future monitoring and sampling event(s) should be conducted during seasonal high groundwater levels in late spring (mid to late May) to confirm late summer months are representative of worst case groundwater conditions. In addition, surface water sampling in Granite Creek should be carried out following an extended dry period (no rainfall) to capture water quality conditions more representative of groundwater baseflow to the creek.

The planning for port redevelopment in FY 2014/2015 should consider protection of the existing monitoring well network at the site due to the high cost of drilling new wells. In addition, any monitoring wells located within the footprint of the new port facility buildings or structures that will be destroyed should be decommissioned prior to commencing construction activities.

Well repairs and changes specific to the sampling plan are also recommended.

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In-Text Tables

Tables

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Drawings

Appendices

P:\CP\PW&GSC\131416\WP\R331DBA_CBSA PLEASANT CAMP FY2013-14 MONITORING REPORT_FINAL.DOCX

1 INTRODUCTION

At the request of Public Works and Government Services Canada (PWGSC), the Environment & Water business unit of SNC-Lavalin Inc. (SNC-Lavalin) has prepared the following letter to report results of the annual monitoring and sampling event completed in Fiscal Year (FY) 2013/2014 at the Canada Border Services Agency (CBSA) Port of Pleasant Camp border crossing facility located in Pleasant Camp, BC (the "site"). The location of the site is provided on Drawing 131416-L01, attached.

All work was conducted in accordance with the PWGSC Standing Offer Agreement (SOA) for Phase 1, 2 and 3 Environmental Site Assessments (E0276-092730/006/XSB) and the work plan and cost estimate submitted to PWGSC dated June 25, 2013. SNC-Lavalin prepared an updated work plan dated October 2, 2013 that included surface soil sampling for Agent Orange herbicide used during construction of a former U.S military fuel pipeline right-of-way located north of the site.

1.1 Objectives

The monitoring and sampling program is a continuation of the Risk Management Plan (RMP[1]), dated March 31, 2010, developed for Pleasant Camp in following with PWGSC Contaminated Sites Risk Management Best Practice[2] guidance. The overall objective of the RMP is to mitigate risks to human health and the environment from residual hydrocarbon impacted soils and groundwater at the site.

The ultimate goal of the RMP implementation is to reduce risks to an insignificant or negligible level and achieve remedial closure at the site. The timeframe to achieve remedial closure at the Pleasant Camp site is presently undetermined and will require re-evaluation 1) once stability and/or attenuation of the hydrocarbon plume is observed; and 2) following any remediation of source area contaminated soils during future Port redevelopment.

Based on the findings of the work completed in FY 2012/2013, the objectives of the FY 2013/2014 monitoring and sampling event were:

1) to ensure protection of human and ecological receptors by the sampling of key "sentry" wells located along the top of the embankment, upgradient from Granite Creek, and surface water sampling within Granite Creek;
2) to confirm the stability and biodegradation of residual petroleum hydrocarbons in groundwater present beneath the border crossing facility and Haines Highway; and,

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[1] *Risk Management Plan, CBSA Port of Pleasant Camp Border Crossing, Pleasant Camp, BC,* draft dated March 31, 2010.

[2] *Contaminated Sites Risk Management Best Practice*, prepared by Franz Environmental Ltd. for PWGSC dated September 18, 2003.

3) to identify potential for soil contamination caused by Agent Orange herbicide used during construction of a former U.S. military fuel pipeline right-of-way located north of the site. The 8-inch diameter pipeline was constructed between 1953 and 1955 to transport fuel from Haines to Fairbanks, Alaska. The pipeline was in operation until 1970 (section from Haines to Tok) and 1973 (remaining section from Tok to Fairbanks), at which time the pipeline was shut down due to deterioration of the pipe.

1.2 Scope of Work

The scope of work completed for FY 2013/2014 included the following tasks:

Task 1: Project Coordination and Preparation of Site-Specific Health and Safety Plan (HASP)

Task 2: Annual Monitoring and Sampling Event

- Completion of a site-wide groundwater monitoring event.
- Sampling of groundwater from selected wells and surface water from Granite Creek.

Task 3: Data Logger Retrieval

- Retrieval of the three (3) dataloggers and one (1) barologger installed in selected wells in 2012 and downloading and assessing information recorded to determine seasonal variations in groundwater levels.

Task 4: Pipeline Soil Sampling

- Collection of three (3) soil samples directly downgradient of the pipeline right-of-way located to the north of the border crossing facility on District Lot 6350. Sample locations were spaced between the pumphouse and the new staff residences as requested by PWGSC/CBSA.

Task 5: Purge Water Disposal

- Removal of onsite purge water and dispose of at an approved facility.

Task 6: Reporting

- Preparation of an update for PWGSC following the monitoring and sampling event.
- Preparation of an Annual Monitoring and Sampling Report to document monitoring and sampling activities and the status of the RMP.

Additional details of the above Tasks are described in the Field Methodology section.

2 BACKGROUND

The following section defines the regulatory framework for the site and provides a summary of findings from the most recent monitoring and sampling events completed in FY 2011/2012 and FY 2012/2013. Additional background information for the site including detailed description of stratigraphic and hydrogeologic conditions, contamination history, and an overview of the environmental assessment and remedial activities completed at the site between 1999 and 2009 are contained in SNC-Lavalin's 2010 RMP (referenced above) and Remediation Closure[3] reports. The results of subsequent annual monitoring and sampling events completed at the site in FYs 2010/2011, 2011/2012, 2012/2013 are documented in reports dated March 31, 2011[4] and 2012[5] and March 13, 2013[6].

2.1 Regulatory Framework

The Port is located on federal land; accordingly, the analytical results for soil, groundwater, and surface water samples have been evaluated based on the guidelines, criteria and standards in the following documents:

Federal

- *Canadian Environmental Quality Guidelines (CEQG)*, Canadian Council of Ministers of the Environment (CCME), Winnipeg MB, including updates to 2014.
- *Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites (FGQG)*, prepared for Environment Canada by Meridian Environmental Inc., November 2012.
- *Canadian Drinking Water Quality Guidelines (CDWQG), Health Canada, August 2012.*

The off-site areas where impacts on properties under provincial jurisdiction have been identified (i.e., under Haines Highway), the analytical results were also compared to BC provincial standards and guidelines contained in the following documents:

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[3] *FY 2009/2010 Monitoring and Remediation Closure Report, CBSA Port of Pleasant Camp Border Crossing, Pleasant Camp, BC*, draft dated March 31, 2010

[4] *FY 2010/2011 Remedial Management Plan Progress Report, CBSA Port of Pleasant Camp Border Crossing, Pleasant Camp, BC,* dated March 31, 2012.

[5] *FY 2011/2012 Risk Management Plan Update, CBSA Port of Pleasant Camp Border Crossing, Pleasant Camp, BC,* dated March 31, 2012.

[6] *FY 2012/2013 Risk Management Plan Update, BCSA Port of Pleasant Camp Border Crossing, Pleasant Camp, BC,* dated March 13, 2013.

Provincial

- *Contaminated Sites Regulation (CSR), B.C. Reg. 375/96,* includes amendments up to B.C. Reg. 4/2014, January 31, 2014.
- *British Columbia Approved Water Quality Guidelines (Criteria), updated 2013, includes [A Compendium of Working Water Quality Guidelines for BC, 2006] (BCWQG).* BC MoE, April, 2013.

The federal guidelines do not apply on provincially owned land, therefore, only provincial standards and guidelines apply for off-site locations.

It is noted that since the most recent sampling event in September 2012, the CSR DW standards for dissolved iron and manganese are no longer considered applicable at the site as per CSR Amendment No. 8, effective January 2013.

Additional details of the application of groundwater guidelines / standards at the site are included in Attachment 1.

2.2 Summary of Previous Monitoring and Sampling Results

The results from the most recent monitoring and sampling events in September 2011 and August 2012 indicated that the light non-aqueous phase liquid (LNAPL) plume was stable to improving. The dissolved phase hydrocarbon plume re-appeared in two locations but was similar to 2011 conditions and therefore, considered stable. The results are briefly summarized below. A site plan is provided on Drawing 131416-L02.

2.2.1 LNAPL Plume

The areal extent of the inferred LNAPL plume in groundwater in the vicinity of House #9 was similar in 2011 and 2012. Presence of measurable LNAPL thicknesses were not detected in any of the wells monitored during the 2011 or 2012 events and the extent of the LNAPL plume was inferred based on exceedances of the BC CSR NAPL indicator standard and/or presence of a hydrocarbon sheen during sampling. Concentrations of extractable petroleum hydrocarbons (EPH) exceeded the BC CSR NAPL indicator standard of 5,000 µg/L in only one monitoring well (MW09-5) located north of House #9 during the 2011 and 2012 sampling events; a significant decrease compared to previous results. Significant decreases in concentrations of extractable petroleum hydrocarbons (EPH) were also observed in the east and southeast of House #9 at MWs 08-2 and 01-17D where exceedances of the NAPL indicator standard were previously observed.

2.2.2 Dissolved Phase Hydrocarbons

Elevated dissolved phase hydrocarbon concentrations greater than the provincial CSR AW standards and/or the FGQG RL Tier 2 guidelines are observed within three separate areas of the site including: 1) the source area around House #9 (former House #5); 2) east of House #9 surrounding MW08-2; and 3) southeast of the source area in the vicinity of MW01-17D. The three separate dissolved phase hydrocarbon plumes are all bounded by downgradient monitoring wells that exhibit concentrations below applicable provincial standards.

In August 2012, the dissolved phase hydrocarbon plume reappeared in several locations including to the west at AS-11, southeast at MW06-2, and in the vicinity of AS-13 adjacent to MW08-2 to the east of House #9. The reappearance of the plume in these locations was attributed to lower groundwater levels at the site. The dissolved phase hydrocarbon plume in groundwater in the vicinity of MW01-17D remained similar to 2011.

Geochemical indicators in groundwater (dissolved iron, manganese, nitrate, and sulphate) indicate biodegradation of the hydrocarbon plume is continuing.

2.2.3 Dissolved Inorganics

Based on August 2012 results, elevated dissolved iron concentrations in excess of the FGQG RL Tier 2 guidelines were identified in a number of on-site wells and extended south (off-site) beyond the highway to the upper slope edge leading to Granite Creek. The dissolved iron plume was unbounded beyond the upper slope edge in three (3) of the monitoring wells along the slope (MWs 04-3, 08-5 and 04-2), all of which are located downgradient of the dissolved phase hydrocarbon plume.

2.2.4 Granite Creek Surface Water Quality

The 2012 surface water sampling results indicated total iron and manganese concentrations increased in midstream and downstream locations, to the highest concentrations yet recorded at each station. Although EPH concentrations in all samples remained below the laboratory MDL, the observed increase iron and manganese concentrations were considered potentially indicative of migration of hydrocarbon contaminants from the site.

2.2.5 Soil Contamination

Hydrocarbon impacted soils remaining in the vicinity of the Generator Building and House #9 continue to be a source of dissolved phase hydrocarbons in groundwater. Hydrocarbon impacted-soils (containing F2 hydrocarbons greater than CCME CWSPHC for commercial and residential land use) are present between

1.2 m to 5.5 m depth in the vicinity of the Generator Building and north towards the ditch that traverses the base of the slope. Further downgradient from the Generator Building, hydrocarbon-impacted soils were observed only at depths below 4 m within the saturated zone above the bedrock surface which slopes to the south and to the southwest of House #9. The soil contamination is observed above a silt and sand till layer which extends across this area at depths between 5.6 m to 8.3 m.

2.3 Recommendations from FY 2012/2013

Based on the findings of monitoring and sampling completed at the site in 2012, SNC-Lavalin made the following recommendations for additional work:

Additional groundwater monitoring and sampling should be carried out in 2013 to confirm analytical results obtained in 2012, and to confirm/refute reappearance of the dissolved phase hydrocarbon plume, and iron and manganese plumes in several wells. The groundwater monitoring and sampling should also include, as a minimum, sampling of key “sentry” wells located along the top of the embankment upgradient from Granite Creek for both dissolved phase hydrocarbons and iron and manganese. The analytical results will assist in determining the degree of hydrocarbon biodegradation occurring and will be used to monitor the protection of human and ecological receptors.

Annual surface water sampling in Granite Creek to confirm that contaminants (hydrocarbons or metals), originating from the site have not migrated to the creek.

Download and assess information recorded on dataloggers installed in selected wells in September 2012 to determine seasonal variations in groundwater levels and determine potential for hydrocarbons to seasonally migrate through the upper weathered portion of the bedrock surface in some areas.

3 FIELD METHODOLOGY

The field methodology followed during the work is described below. All work was conducted in accordance with SNC-Lavalin's Preferred Operating Procedures (POPs).

3.1 Project Coordination and Preparation of HASP

Upon approval from PWGSC and CBSA, SNC-Lavalin scheduled field staff and contractors (traffic control) in conjunction with other activities in the area. SNC-Lavalin acted as the "prime contractor" as defined by Worksafe BC. The site-specific HASP was consistent with WorkSafe BC Industrial Health and Safety Regulations and safety considerations recommended by PWGSC and CBSA.

A Government of Yukon Highways and Public Works permit for Performance of Work Within Right-of-Way was obtained from the Yukon Government prior to commencing work in order to access monitoring wells located on Haines Highway.

All personnel on site were required to review the HASP and confirm acceptance of the requirements prior to commencing work on site. A project kick-off safety meeting was held with all parties involved during the work. Tailgate safety meetings were also conducted prior to work each day.

3.2 Annual Monitoring and Sampling Event

Groundwater Monitoring

A site-wide groundwater monitoring event consisting of all accessible wells (66) was conducted by SNC-Lavalin personnel on September 23, 2013. Groundwater monitoring involved measurement of hydrocarbon vapour concentrations (HVC) using a GasTech® gas monitor calibrated to a hexane standard and depth to liquids (water and LNAPL if present) using an electronic probe. The results of the site-wide monitoring event are presented in the monitoring report in Attachment 5.

Traffic control (Arctic Backhoe Services Ltd. [Arctic] of Whitehorse, YT) was required for accessing the monitoring wells located along Haines Highway. Work on the highway was coordinated with CBSA to avoid peak traffic hours resulting in minimal disruption to port activities.

Groundwater Sampling

The groundwater sampling program was carried out between September 23 and 25, 2013 and included sampling of 12 key “sentry” wells located along the top of the embankment, above Granite Creek and either cross- or upgradient from the plume; and ten (10) wells located within the plume.

The annual groundwater sampling event was completed to:

1) characterize hydrocarbon concentrations within and downgradient of the plume;
2) assess on-site wells for F1 and F2 hydrocarbon parameters regulated by federal interim groundwater guidelines; and,
3) assess mechanisms of natural attenuation within the plume and at downgradient and upgradient locations from the plume.

The groundwater sampling program that was followed is outlined in Table A, below and the monitoring well locations are indicated on Drawing 131416-L02, attached.

TABLE A: Groundwater Sampling Program – September 2013

Well ID	F1 + F2 Hydrocarbons	EPH	PAH	Anions	Dissolved Fe + Mn
SENTRY WELLS – Onsite					
01-19	x	x	x	x	x
06-2	x + dup (MWA)	x + dup (MWA)		x + dup (MWA)	x + dup (MWA)
SENTRY WELLS – Offsite					
01-21		x		x	x
03-11		x		x	x
04-2		x		x	x
04-4		x		x	x
04-5		x		x	x
04-6		x			
08-5		x			
08-6		x			
08-7		x		x	
08-8		x			

TABLE A (Cont'd): Groundwater Sampling Program – September 2013

Well ID	F1 + F2 Hydrocarbons	EPH	PAH	Anions	Dissolved Fe + Mn
PLUME WELLS – Onsite					
01-17D	x	x	x	x	x
P4	x	x	x	x	x
AS-11	x	x			
AS-13	x	x + dup (MWC)			
AS-22	x	x		x	x
08-2	x	x	x	x	x
09-5	x	x + dup (MWB)	x + dup (MWB)	x + dup (MWB)	x + dup (MWB)
PLUME WELLS – Offsite					
03-8		x		x	x
03-10		x	x	x	x
03-10D		x			

The groundwater sampling methods were kept consistent with previous sampling events in order to produce comparable data.

Prior to sampling, the wells were purged using dedicated Waterra® tubing and foot valves to remove fine-grained material from the well and obtain a fresh representative formation sample. Field measurements of pH, temperature and conductivity were recorded during purging and sampling on field sampling record forms. Purge volumes consisted of three times the pipe volume measured in the well or if the well was slow to recover, it was purged dry before sample collection.

Groundwater samples were collected using dedicated Waterra® tubing and foot valves (F1, dissolved iron/manganese and anions) and a disposable bailer (F2, LEPHw[7] and PAH). Samples collected for F2, LEPHw and PAHs using dedicated high-density polyethylene bailers were collected on the day following well purging. This procedure was used to minimize the amount of fine-grained sediment in the groundwater sample. As the laboratories are required to analyze both dissolved and total values, which may have been adsorbed onto sediment particles within the sample, the use of this sampling procedure reduces the potential for obtaining "falsely elevated" concentrations of these parameters in groundwater. During the previous sampling event in FY2012/2013, dedicated Waterra® tubing was used to collect all samples (including LEPHw).

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[7] Note that $EPHw_{10\text{-}19}$ is considered equal to LEPHw for this report. Direct comparison to LEPHw CSR standards requires that certain PAHs be subtracted from EPH concentrations and since PAHs are not primary contaminants of concern in a majority of the wells they were not typically analyzed. Using the uncorrected $EPHw_{10\text{-}19}$ concentrations as LEPHw is considered a conservative comparison.

A smaller diameter disposable bailer was used in MW04-5 due to an internal bulge in the pipe. Repairs to MW04-5 will require use of a jackhammer (or similar) to remove the concrete and casing, and allow access to the damaged portion of the well pipe. This work will require an YTG permit, traffic control, and a contractor.

Groundwater samples were collected in appropriate laboratory-prepared containers; containers were filled by allowing the sample to flow gently down the inside of the container with minimal disturbance. Samples for dissolved Fe and Mn were field filtered using 0.45 micron inline filters, and preserved with nitric acid. All samples were stored in an ice-chilled cooler and shipped within recommended holding times and with the appropriate chain-of-custody documentation to ALS Laboratory (ALS) in Burnaby, BC.

Water removed from the groundwater monitoring wells during sampling that was not suspected of containing contamination (based on visual and olfactory evidence and previous analytical data in nearby groundwater monitoring wells) was dumped directly onto the ground surface. If contamination was suspected (i.e., odour or sheen was identified during development or previous analytical data in nearby wells identified contamination), then the purged groundwater was placed in 45 gallon steel drums and stored on site for future disposal.

Monitoring wells 03-7 and 04-1 (offsite sentry wells) were not sampled due to insufficient volumes of water identified during the full site monitoring event. Monitoring well 08-8 was added to the sampling plan to confirm western delineation of the dissolved phase hydrocarbon impacted area.

Surface Water (Granite Creek) Sampling

Surface water sampling was conducted on September 24, 2013 from four existing sample stations (SW04-1 upstream; SW04-2 and SW04-3 midstream; and SW04-4 downstream) in Granite Creek, which represent suspected groundwater discharge areas. The surface water sampling program that was followed is outlined below in Table B and the surface water sampling locations are indicated on Drawing 131416-L05, attached.

TABLE B: Summary of Surface Water Sampling Program – FY2013/2014

Sample Station	EPH	Anions	Speciated Alkalinity	Ammonia	Total Metals
SW13-1	x	x	x	x	x
SW13-2	x	x	x	x	x
SW13-3	x	x	x	x	x
SW13-4	x	x	x	x	x

Field measurements of pH, temperature and conductivity were recorded at the time of sample collection. No sheen or odour was observed at the time of sampling.

Quality Assurance / Quality Control (QA/QC)

Quality Assurance/Quality Control (QA/QC) measures were undertaken to ensure unbiased and representative sample collection and assess the repeatability and accuracy of laboratory analyses. Details of the QA/QC program are summarized in Attachment 2.

Blind field duplicate samples were collected during the September 2013 sampling event. The following Table C summarizes the details of the groundwater samples and their corresponding duplicates collected for QA/QC purposes. No duplicate surface water samples were collected.

TABLE C: Details of Groundwater Samples and Duplicates

Sample ID	Duplicate ID	Analyses Requested
MW06-2	MWA	F1, F2, EPH, Anions, Dissolved Fe + Mn
MW09-5	MWB	EPH, PAH, Anions, Dissolved Fe + Mn
AS-13	MWC	EPH

3.3 Data Logger Retrieval

During the September 2013 groundwater monitoring and sampling event, three (3) submersible dataloggers with pressure transducers (DI 501 Mini-Diver®) were removed from MWs 06-2, 08-3 and 08-7 and one (1) pressure transducer for barometric compensation (DI 500 Baro-Diver®) was removed from MW08-5. Dataloggers were programmed to start recording at 1 PM on September 4, 2012, and recorded data every 12 hours until they were removed on September 23, 2013. Datalogger details are included below in Table D.

TABLE D: Datalogger Details

Well ID	Equipment Removed	Details
MW06-2	Mini-Diver® (SIN M6075)	Removed from 0.15 m above bottom of well.
MW08-3	Mini-Diver® (SIN M5981)	Removed from 0.3 m above bottom of well.
MW08-7	Mini-Diver® (SIN M6022)	Removed from 0.3 m above bottom of well.
MW08-5	Mini-Baro® (L8482)	Removed from 1 m below top of well.

3.4 Pipeline ROW Soil Sampling

On September 25, 2013, SNC-Lavalin collected three (3) surface soil samples (0 m to 0.15 m below ground surface [bgs]) adjacent the pipeline right-of-way (ROW) located to the north of the border crossing facility on District Lot 6350. The soil samples were collected to assess potential contamination from historic use of herbicides (Agent Orange) during construction of the fuel pipeline in between 1953 and 1955. The soil sample locations were located immediately south of the pipeline ROW and were spaced between the pumphouse and the new staff residences as shown on Drawing 131416-L02. Photographs taken within the pipeline right-of-way are included in Attachment 3.

Soil conditions at each sample location were logged in detail with respect to soil type, colour, density, moisture content and indications of apparent contamination.

Soil samples were collected using a hand shovel and were placed directly into laboratory supplied sample jars with Teflon® lined lids. Soil samples were stored in an ice-chilled cooler and submitted to AGAT Laboratories (AGAT) in Whitehorse, YT under SNC-Lavalin chain-of-custody procedures. Samples were then transferred by AGAT to their Burnaby, BC laboratory for analysis of dioxins and furans (including 2,3,7,8-tetrachlorodibenzodioxin [TCDD]) as well as phenoxyacetic acids, both of which are main constituents in Agent Orange herbicide.

3.5 Purge Water Disposal

Four (4) drums containing contaminated purge water (including one [1] drum of hazardous waste purge water) were removed by Arctic from the site on January 23, 2014 and relocated to Arctic’s treatment facility (McLean Lake Quarry) located in Whitehorse, YT. A copy of the Yukon Environment Relocation Permit is provided in Attachment 6.

4 RESULTS

4.1 Groundwater Monitoring

Water level measurements, HVC readings, and observations from the site-wide groundwater monitoring event completed on September 23 to 25, 2013, are contained in the groundwater monitoring report in Attachment 5. Potentiometric elevations and inferred contours are shown on Drawing 131416-L03. The results of the monitoring events are as follows:

- LNAPL was not detected in any of the wells monitored during either event; however, a hydrocarbon odour and/or sheen were noted during purging of: MWs 01-17D, 03-8, 03-10, 03-11, 06-2, 08-2, 09-5, AS-11, AS-13 and AS-22.
- Hydrocarbon vapour concentrations measured in the monitoring well headspaces were low, ranging from 0 ppm to 160 ppm, similar to previous years.
- Water levels in the monitoring wells ranged from 2.8 m bgs at MW06-1 to 8.9 m bgs at MW03-10D.
- The inferred potentiometric contours for September 2013 (shown on Drawing 131416-L03) indicate that groundwater flow is to the south at an average hydraulic gradient of 0.08 m/m, consistent with previous monitoring events.

4.2 Datalogger Water Level Monitoring

Water level readings obtained from dataloggers installed in MWs 06-2, 08-3, and 08-7 between September 2012 and September 2013 are presented on Figure 1 in Attachment 4, along with daily precipitation and temperature data recorded at Pleasant Camp.

The findings from the datalogger monitoring data are discussed in Section 7.0.

4.3 Groundwater Analytical Results

The groundwater analytical results from the current and prior investigations are summarized in Tables 1 through 3. In addition, the detailed groundwater analytical results for hydrocarbons are shown on Drawing 131416-L04A and inorganics are shown on Drawing 131416-L04B. On-site monitoring well analytical results are compared to applicable federal and provincial guidelines/standards; whereas off-site monitoring well analytical results are compared to provincial standards only. The analytical laboratory reports are included as Attachment 7.

In September 2013, a total of 22 wells were sampled for EPH (including 3 blind field duplicate sets), 9 wells for F1/F2 (including 1 blind field duplicate set), 6 wells for PAH (including 1 blind field duplicate set), and 15 wells for anions and dissolved iron and manganese (including 2 blind field duplicate sets). The groundwater analytical results for petroleum hydrocarbons and inorganics are summarized in the sections below.

Petroleum Hydrocarbons

The groundwater analytical exceedences for hydrocarbons for the September 2013 sampling event are summarized below in Table E.

TABLE E: Summary of Hydrocarbon Exceedences in Groundwater - 2013

MW ID	$EPHw_{10-19}$ (µg/L)	LEPHw (µg/L)	F1 (µg/L)	F2 (µg/L)	PAH (µg/L)					
					Naphthalene	Fluorene	Phenanthrene	Pyrene	Benzo(a)anthracene	Benzo(a)pyrene
Port of Pleasant Camp (Onsite)										
AS-11	830	**830**	<100	580	-	-	-	-	-	-
AS-13	720	**720**	<100	580	-	-	-	-	-	-
AS-22	1,130	**1,130**	<100	840	-	-	-	-	-	-
01-17D	1,470	**860**	<100	560	<0.2	0.313	<0.05	<0.05[a]	<0.05[a]	<0.01
08-2	2,060	**2,060**	<100	**1,370**	<0.2	0.211	<0.1	<0.05[a]	<0.05[a]	<0.01
09-5[d]	**47,600**	**47,600**	**1,220**	**34,900**	<0.6	1.22	**3.02**	**0.43**	<0.05[a]	**0.042**
Provincial Land (Offsite)[c]										
03-8	590	**590**	-	-	-	-	-	-	-	-
03-10	4,560	**4,560**	-	-	<0.05	<0.05	<0.09	0.147	<0.05	<0.01
03-11	670	**670**	-	-	-	-	-	-	-	-
CSR AW	**5,000**	**500**	**n/a**	**n/a**	**10**	**120**	**3**	**0.2**	**1**	**0.1**
CSR DW	**5,000**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**0.01**
CDWQG	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**0.01**
FGQG RL T2[b]	**n/a**	**n/a**	**810**	**1,300**	**1.1**	**3**	**0.4**	**0.025**	**0.018**	**0.015**

BOLD Denotes results greater than applicable standard/guideline.
n/a Denotes no applicable standard/guideline exists
- Denotes parameter not analysed during the sampling event.
[a] Laboratory detection limit exceeds regulatory standard.
[b] Most stringent of fine grained and coarse grained Tier 2 guidelines applied
[c] Only provincial CSR standards were applied to off-site locations
[d] Represents the highest value of the original and duplicate sample

The results indicated the following:

- LEPHw concentrations in groundwater collected from onsite monitoring wells AS-11, AS-13, AS-22, MW01-17D, MW08-2, and MW09-5 as well as offsite monitoring wells MW03-8, MW03-10, and MW03-11 exceeded the CSR aquatic life (AW) standard of 500 µg/L. Concentrations of LEPHw were less than the CSR AW standard in the remaining monitoring wells sampled.
- The concentration of $EPHw_{10-19}$ was greater than the CSR NAPL indicator standard of 5,000 µg/L in groundwater collected from MW09-5, which is similar to previous years. Hydrocarbon odour and sheen were noted in purge water extracted from this well prior to sampling; although no measurable NAPL thickness was recorded during monitoring.
- F1 hydrocarbon concentrations exceeded the FGQG RL guideline in groundwater collected from MW09-5; and F2 concentrations exceeded the FGQG RL guideline in groundwater collected from MW08-2 and MW09-5. F1 and F2 hydrocarbon concentrations were below the applicable FGQG RL guidelines in the remaining wells sampled.
- For PAHs, the concentration of phenanthrene and pyrene in groundwater collected from MW09-5 exceeded the CSR AW standards and the FGQG RL guidelines. The concentration of benzo(a)pyrene in MW09-5 exceeded the CSR DW standard, the CDWQG guideline and the FGQG RL guideline.
- Several PAH parameters including anthracene, fluoranthene, and benzo(a)anthracene exhibited laboratory detection limits above the FGQG RL guidelines in all onsite monitoring wells sampled (MWP4, MW01-17D, MW01-19, MW08-2, and MW09-5). Laboratory detection limits for acridine exceeded the FGQG RL guidelines in monitoring wells MW01-17D and MW09-5. Also, laboratory detection limits for pyrene exceeded the FGQG RL guidelines in all onsite monitoring wells sampled with the exception of MW09-5, which exceeded the FGQG guideline and the CSR AW standard, as stated above.

Inorganics

The groundwater analytical exceedences for dissolved iron and manganese for the September 2013 sampling event are summarized below in Table F.

TABLE F: Summary of Dissolved Iron and Manganese Exceedences in Groundwater

Monitoring Well ID	Dissolved Iron (Fe) (µg/L)	Dissolved Manganese (Mn) (µg/L)
Port of Pleasant Camp (On-Site)		
P4	**9,260**	**794**
AS-22	**5,620**	**675**
01-17D	**3,420**	**1,050**
06-2*	**393**	**401**
08-2	**7,730**	**880**
09-5*	**6,280**	**241**
Provincial Land (Off-Site)**		
01-21	772	1,420
03-8	5,980	1,430
03-10	1,540	693
03-11	1,280	467
04-2	954	571
04-5	4,280	650
08-7	7,180	700
CSR DW	**n/a**	**n/a**
CDWQG	**300**	**50**
FGQG RL Tier 2	**300**	**n/a**

BOLD Denotes results greater than applicable standard/guideline.
n/a Denotes no applicable guideline exists
* Represents the highest value of the original and duplicate sample
** Provincial CSR standards apply to off-site locations only

Dissolved iron, manganese, nitrate and sulphate are parameters associated with natural attenuation of hydrocarbons through biodegradation. Typically low nitrate concentrations, elevated dissolved iron and/or manganese concentrations and occasionally low sulphate concentrations are indicative of natural attenuation.

On-Site Wells

On-site monitoring well analytical results were compared to FGQG RL Tier 2 and CDWQG guidelines.

Concentrations of dissolved iron exceeded the FGQG RL Tier 2 and CDWQG guidelines of 300 µg/L in groundwater collected from plume monitoring wells MWP4, AS-22, MW01-17D, MW06-2, MW08-2, and MW09-5.

Concentrations of nitrate and sulphate for on-site and off-site monitoring wells were below applicable federal and/or provincial guidelines/standards. No other exceedences for inorganic parameters above applicable standards/guidelines were identified during the 2013 sampling event in on-site monitoring wells.

Off-Site Wells

Provincial CSR standards were applied to off-site locations only. As per CSR Stage 8 Amendments (January 2013), provincial DW standards for Fe and Mn are no longer applicable at the site. CSR Stage 8 Amendments state that the CSR DW standards for iron and manganese do not apply to sites with temporary elevated iron and manganese concentrations (i.e., due to biodegradation of hydrocarbons), such as, Pleasant Camp. However, as shown in Table E, results from off-site wells indicate that elevated dissolved iron and manganese concentrations above FGQG RL Tier 2 guideline have migrated off-site.

Off-site monitoring well analytical results for other inorganic parameters were compared to BC CSR AW and DW standards. No exceedances of applicable standards were measured.

4.4 Surface Water Analytical Results

Sample station locations along Granite Creek are shown on Drawing 131416-L05. Analytical findings for the September 2013 surface water sampling are presented on the attached Tables 4 and 5. Analytical laboratory reports are contained in Attachment 7.

Weather conditions were cloudy with light rain on September 24, 2013 when surface water sampling was carried out. No hydrocarbon-like odours or sheen were detected in the water in Granite Creek at the time of sampling. Each location was monitored for pH, conductivity and temperature and sampled for EPH, anions, alkalinity, ammonia and total metals.

The following Table G outlines the field measurements of pH, conductivity and temperature recorded at each sampling station.

TABLE G: Summary of Surface Water Monitoring

Monitoring Well ID	pH	Conductivity (µS/cm)	Temperature (^{o}C)
Station #1	7.76	40.0	7.9
Station #2	7.67	44.9	7.7
Station #3	7.71	45.4	8.9
Station #4	7.69	46.0	7.8

Previously no standards or guidelines for LEPHw in surface water have existed; however, as outlined in Attachment 1, based on the introduction of TG15, 1/10th of the CSR standard (500/10 µg/L) is now considered to be a CSR surface water objective for LEPHw in surface water. Unfortunately, the laboratory method detection limit (MDL) was higher than the LEPHw objective of 50 µg/L. Because LEPHw concentrations were non-detectable, these higher MDL results are not considered to be a concern; lower detection limits will be requested during future sampling events.

Total iron concentrations were less than the laboratory detection limit of 30 µg/L at all four locations and lower than concentrations measured in September 2012 when the highest concentrations recorded at each station were recorded. Manganese concentrations were also lower than measured in September 2012.

A BCWQG AW guideline of 350 µg/L exists for dissolved iron which was not analyzed during this sampling event. However, since the MDL for total iron was 30 µg/L, it is evident that dissolved iron would not have exceeded the 350 µg/L guideline.

The analytical results indicate that no metals or dissolved inorganics exceeded the provincial BCWQG AW guidelines or CCME CEQG AW guidelines.

4.5 Quality Assurance / Quality Control

QA/QC procedures included analyzing blind field duplicate samples. Analytical results for the original samples and corresponding blind duplicate samples are compared using the calculated variability of the results, as expressed by the Relative Percent Difference (RPD_{DUP}). The RPD is defined as the absolute value of the difference between the results for the original and duplicate samples, divided by the average of the results. Because of the poor precision near the laboratory detection limit, RPD_{DUP} values are only calculated for sample sets in which the analytical results of the original or the duplicate sample is greater than five times the laboratory detection limit (practical quantitative limit [PQL]).

The following Table H indicates the acceptable RPD_{DUP} criteria used by SNC-Lavalin in the QA/QC analysis.

TABLE H: Summary of Duplicate Acceptance Criteria

Analyte	Duplicate Acceptance Criteria
	Water (RPD = 1.5 x Lab RPD)
Inorganics	30%
Organics	45%

The following Table I summarizes the highest RPD_{DUP} values for organic and inorganic parameters measured during the groundwater sampling events.

TABLE I: Summary of Blind Duplicate Sample Sets for Groundwater

Sample and Duplicate ID	Highest Organic RPD_{DUP}	Organic Parameter	Highest Inorganic RPD_{DUP}	Inorganic Parameter
MW06-2 and MWA	NC	NC	9%	Nitrate
MW09-5 and MWB	71%	$EPHw_{10-19}$	71%	Nitrate
AS-13 and MWC	NC	NC	N/A	N/A

NC – not calculated because both results were less than method detection limit.
N/A – duplicate parameter was not analyzed.

RPD_{DUP} values for organic parameters were not calculated for MW06-2 and AS-13 and their corresponding duplicate samples as both results were less than five times the MDL. The highest calculated RPD_{DUP} value was 71% for $EPHw_{10-19}$ and nitrate for a duplicate sample set collected from MW09-5, which is above SNC-Lavalin's acceptable limit of 45% and 30%, respectively. Several other parameters from MW09-5 also exceeded SNC-Lavalin's acceptable criteria for MW09-5 including nitrite (49%), fluorene (53%) and phenanthrene (48%). The analytical results for the original and duplicate sets of MW09-5 were below the applicable standards/guidelines for $EPHw_{10-19}$, nitrate, nitrite and fluorene and were above the applicable guideline for phenanthrene. As the original and duplicate sets were both either above or below the applicable standards/guidelines, and the higher values of the duplicate set were used in the interpretation of results, the exceedances of the duplicate criteria do not change the findings within this report.

A review of ALS's QA/QC procedures indicated acceptable reproducibility of laboratory results. Also, as a conservative measure, the highest obtained concentrations for each parameter of the original sample and the duplicate sample were used in this report.

The analytical data for groundwater are considered acceptable and reliable.

4.6 Pipeline Soil Sampling

Soil sample locations (SS13-1, SS13-2 and SS13-3) adjacent the pipeline right-of-way are shown on Drawing 131416-L02 and in Photographs 1 to 3 presented in Attachment 3. Tabulated soil analytical results are presented on the attached Table 6. Analytical laboratory reports are contained in Attachment 7.

Observations during the sampling were as follows:

- Soils primarily consisted of silt and organics with trace sand from 0 m to 0.15 m below ground surface.
- No evidence of contamination was identified in any of the three (3) soil samples collected.
- The pipeline right-of-way was easily identified based on a levelled cut-out on the slope (Photograph 4) and a visible section of pipe still remaining in the right-of-way (Photograph 5).
- Vegetation within the right-of-way was visibly stressed (Photograph 6) and may have been affected by the historical application of Agent Orange herbicide during the installation of the pipeline in the 1950s. Vegetation outside of the right-of-way showed no visible signs of stress. Surficial soil samples were only collected outside the pipeline right-of-way due to access restrictions (permission was not obtained from the owner of the right-of-way).

The analytical results for all soil samples collected adjacent the pipeline right-of-way were below the applicable CSR and CCME standards/guidelines for all analyzed parameters (dioxins, furans, herbicides and pesticides).

4.7 Purge Water Disposal

On January 23, 2014, Arctic removed four (4) drums containing approximately 800 L of contaminated purge water (including one [1] drum of hazardous waste purge water [approximately 200 L]) from the site and relocated them to their treatment facility (McLean Lake Quarry) located in Whitehorse, YT. A copy of the Yukon Environment Relocation Permit is provided in Attachment 5.

5 DISCUSSION

5.1 *Seasonal Groundwater Levels*

Groundwater levels recorded in MWs 06-2, 08-3, and 08-7 between September 2012 and September 2013 are presented on Figure 1 in Attachment 4. Table J below summarizes the available information for these monitoring wells including: well screen elevations (top and bottom of well screen in m geodetic); the observed range in groundwater potentiometric elevations from both previous manual measurements and dataloggers between September 4, 2012 and September 23, 2013; a description of stratigraphic conditions at the well location (upper and lower surfaces of geologic units in m geodetic); and a description of the well location.

TABLE J: Summary of Seasonal Groundwater Monitoring Results

Well ID	Well Screen Elevation (m geod)	Observed Range in Groundwater Elevations		Stratigraphy (upper / lower surfaces in m geod)	Location Description
		Manual	2012 - 2013 Datalogger		
MW08-3	272.9 – 269.9	271.9 – 271.5	272.1 – 271.5	**SAND and GRAVEL** 276.0 – 271.3 m **BEDROCK** < 271.3 m	West of the generator building adjacent to aboveground water tank. Upgradient of inferred LNAPL and dissolved phase hydrocarbon plumes.
MW06-2	270.8 – 267.7	270.5 – 268.4	271.6 – 268.0 (DRY)	**SAND and GRAVEL** 270.9 – 268.5 m **SILT (Till)** 268.5 – 267.9 m **BEDROCK (inferred)** ~ < 264 – 265 m	Southeast corner of driveway for House #9. East of inferred LNAPL plume and within the dissolved phase hydrocarbon plume.
MW08-7	270.8 – 266.9	269.9 – 267.4	270.5 – 267.8	**SAND and GRAVEL to silty SAND** 274.8 – 268.1 m **SILT (Till)** 268.1 m to 267.7 m **BEDROCK** < 267.7 m	Across Haines Hwy on the slope to Granite Creek. Located cross-gradient (southwest) of inferred LNAPL and dissolved phase hydrocarbon plumes.

Groundwater levels in all three wells were observed to rise during the early fall months (late September to mid-October), gradually decrease during winter months (mid-October to late March), rise during the spring snowmelt (late March to mid-May), and then gradually decline until the late summer months (mid-May to early/mid-September). The lowest groundwater levels were recorded in early February and late summer months

(August/September). The highest groundwater levels were observed during the end of the spring snowmelt in mid May; groundwater levels increased significantly (approximately 2.5 m) in MWs 06-2 and 08-7 over a two month period from April and May 2013 due to rising temperatures and increasing snowmelt.

In MW08-3, located upgradient and west of the generator building, groundwater levels were relatively unchanged during the monitoring period, ranging approximately 0.6 m from a maximum of 272.1 m geodetic in mid-May 2013 to a low of 271.5 m geodetic in September 2012 and August 2013. Groundwater levels in this well recorded by manual measurements during monitoring events between 2008 and 2012 ranged from 271.5 m to 271.9 m geodetic; the maximum groundwater levels measured during the datalogger monitoring period were slightly above this range and the minimum groundwater level was consistent. Groundwater levels remained approximately 0.2 m above the bedrock surface at 271.3 m geodetic over the monitoring period. Rainfall events do not appear to result in significant changes in groundwater levels in this well; though slight seasonal effects were observed.

In MW06-2, located within the dissolved phase hydrocarbon plume to the southeast of House #9, groundwater levels fluctuated up to 3.6 m over the monitoring period, ranging from a maximum of 271.6 m geodetic in May 2013 to a low of 268.0 m geodetic from early August 2013 to mid September. The lower elevation corresponds with the base of the monitoring well and indicates the well went dry during this period. Groundwater levels in this well recorded by manual measurements during monitoring events between 2008 and 2012 ranged from 268.4 m to 270.5 m geodetic; the minimum groundwater levels measured during the datalogger monitoring period were below this range by 0.4 m, and the maximum groundwater levels were 1.1 m higher than the highest manual reading. Groundwater levels in this well remained well above the bedrock surface inferred to be present at between 264 m to 265 m elevation geodetic based on geological cross-sections previously prepared for the site[8]. Groundwater levels were observed to respond to rainfall events in this well; an increase approximately 1.5 m was observed following a rainfall event in late September 2012 and then 0.2 m following a smaller rainfall event in mid October 2012. A rise in groundwater elevation of approximately 0.3 m in February 2013 coincides with temperatures rising above freezing on February 9, 2013 following a rain event (22 mm).

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[8] Refer to Geologic Cross-Section A-A’ in Drawing 131416-905 contained in the draft Closure Report dated March 31, 2010.

In MW08-7, located across Haines Highway above Granite Creek and cross-gradient (west) of inferred LNAPL and dissolved phase hydrocarbon plumes, fluctuations in groundwater levels were consistent with MW06-2 ranging up to 2.7 m from a maximum of 270.5 m geodetic in mid-May 2013 to a low of 267.8 m geodetic in February 2013 and from early August to early September. Groundwater levels in this well recorded by manual measurements during monitoring events between 2008 and 2012 ranged from 267.4 m to 269.9 m geodetic; the maximum groundwater levels measured during the datalogger monitoring period were above this range by 0.6 m and the minimum groundwater level was slightly higher than previously observed in September 2010 (267.4 m) by 0.4 m. The bedrock surface is located at 267.7 m geodetic, approximately 0.8 m above the base of the well screen and the lowest groundwater levels observed during the datalogger monitoring period appeared to correspond with the bedrock surface elevation. However, previous monitoring from September 2010 indicates that groundwater levels were 0.3 m below the bedrock surface. Response of groundwater levels to rainfall events in this well was similar but more pronounced than the response in MW06-2 as noted above.

Overall, the available datalogger monitoring results from these wells confirms that the lowest groundwater levels occur during the late summer and early fall months and that the monitoring and sampling events typically coincide with this period. During the dry season, the lowest groundwater levels in these wells were observed to remain either directly at or above the bedrock surface during the datalogger monitoring period; however, previous monitoring data indicates that groundwater levels have dropped within the upper surface of the bedrock zone (MW08-7 in September 2010) which is screened 1.8 m into bedrock. Evaluation of monitoring data from other monitoring wells collected during late summer months (during seasonal low groundwater levels) indicates groundwater levels remain at or above the bedrock surface. This suggests that hydrocarbon-impacted groundwater may seep into the upper weathered portion of bedrock during extreme low water level conditions which occurs over a short period of time. Nevertheless, the hydrocarbon plume mainly migrates above the bedrock for most of the year.

No groundwater sampling events have been conducted to date during seasonal high groundwater conditions in mid to late May. The highest water level sampling event occurred in September 2011 when levels were 0.3 m to 1.1 m lower than the maximum recorded in 2011/2012 using dataloggers. In general, hydrocarbon concentrations were lower during this event than the preceding and subsequent events.

No seasonal changes in groundwater flow direction were observed based on the fluctuation in groundwater levels in these wells. Groundwater continued to flow in a southward direction at all times throughout the year.

5.2 Water Quality

LNAPL Plume

The inferred extent of the LNAPL plume is based on hydrocarbon sheen (i.e., residual LNAPL) and odours noted in perimeter wells during monitoring in 2013 and analytical results from MW09-5. Limited monitoring and analytical data exist within the inferred LNAPL plume due to presence of House #9 and lack of monitoring wells. As a result, the size of the 2013 inferred LNAPL plume is similar to that observed in 2012. Concentrations of $EPHw_{10\text{-}19}$ exceeded the NAPL indicator standard only in MW09-5 during the 2011, 2012 and 2013 sampling events; a significant decrease compared to previous results. Concentrations of $EPHw_{10\text{-}19}$ in MW01-17D located to the southeast and MW08-2 located to the east were again below the NAPL indicator standard in September 2013; concentrations of $EPHw_{10\text{-}19}$ have not exceeded the NAPL indicator standard in this well since September 2010 following shut down of the AS/SVE system.

Elevated $EPHw_{10\text{-}19}$ concentrations (greater than 5,000 µg/L indicates NAPL presence) measured in groundwater and the associated presence of a hydrocarbon sheen observed during sampling in 2013 confirm that LNAPL is most likely present in the vicinity of MW09-5. Analytical data from MW03-10, located directly downgradient of the LNAPL plume (at the leading edge of the dissolved phase hydrocarbon plume) exhibited an increasing concentration for $EPHw_{10\text{-}19}$ from 2,670 µg/L in 2012 to 4,560 µg/L in 2013, which is approaching the NAPL indicator concentration of 5,000 µg/L. Groundwater levels were approximately 1.1 m higher in September 2013 than August 2012 when sampling occurred.

None of the wells monitored contained measurable product during the monitoring events carried out in 2013. Hydrocarbon sheens and/or odours were noted in a total of ten (10) monitoring wells: AS-11, AS-13, AS-22, 01-17D, 03-8, 03-10, 03-11, 06-2, 08-2, and 09-5 but analytical results did not confirm the presence of LNAPL in these wells, with the exception of MW09-5. Observations of hydrocarbon sheens during well purging have been a common occurrence in the past and typically the analytical data for many of these wells do not suggest the presence of LNAPL. As noted in previous monitoring reports, it is considered possible that residual LNAPL exists within the pore spaces of the unconsolidated soils. This LNAPL is immobile (i.e., not connected) and is extracted and released from the pore spaces when the well is purged. Since the well is not sampled immediately, any traces of LNAPL left in the well overnight most likely dissolve into groundwater prior to sample collection.

Dissolved Phase Hydrocarbons

Elevated dissolved phase hydrocarbon concentrations greater than the provincial CSR AW standards and/or the FGQG RL Tier 2 guidelines occur, as in previous years, in three separate areas of the site including: 1) the source area around House #9; 2) east of House #9 surrounding MW08-2; and 3) southeast of the source area in the vicinity of MW01-17D.

The dissolved phase hydrocarbon plume in the source area is overall slightly smaller than in 2012. The dissolved hydrocarbon impacts were not detected in MWP4, MW04-5 and MW06-2, all of which were above the standards/guidelines during the previous sampling event in September 2012. As noted above, an increasing concentration of $EPHw_{10\text{-}19}$ was observed in MW03-10. The nearest downgradient monitoring well to MW03-10 is MW04-2, which is located approximately 16 m downgradient. $EPHw_{10\text{-}19}$ concentrations in MW04-2 have been consistently low (less than 300 µg/L) since 2005, which suggests that the dissolved hydrocarbon plume is naturally attenuating.

The dissolved phase hydrocarbon plume in the vicinity of MW08-2 and AS-13 is similar to 2012. The plume in the vicinity of MW01-17D is larger due to the exceedence measured in groundwater collected from MW03-8. The last time an exceedence was measured in this well was in 2009. A single dissolved plume including these two has been inferred; however, data are limited to confirm or refute this inference. The data related to MW01-17D indicates decreasing hydrocarbon concentrations ($EPHw_{10\text{-}19}$) from the previous sampling events in 2010 (40,400 µg/L), 2011 (2,900 µg/L), and 2012 (1,470 µg/L) from the concentration measured in 2013 (860 µg/L). Both MW08-2 and MW01-17D exceeded the NAPL indicator concentration of 5,000 µg/L in 2010 but dropped significantly in subsequent sampling events in 2011 and 2012, and remain below the NAPL indicator concentration in 2013.

The three separate dissolved phase hydrocarbon plumes are all bounded by downgradient monitoring wells that exhibit concentrations below the applicable standards/guidelines.

Based on a review for individual wells of historical EPH data and EPH data since the shut-down of the air sparging soil vapour extraction system in 2009, the trend in hydrocarbon concentrations generally appears to be decreasing (including MW01-17D and MW03-08) or stable (AS-11, AS-13, MW08-2, MW03-10, MW03-11 and MW09-5). $EPHw_{10\text{-}19}$ concentrations in MW09-5 typically exceed the NAPL indicator of 5,000 µg/L; however, measureable NAPL has not been observed in the monitoring well and concentrations can therefore be considered stable. $EPHw_{10\text{-}19}$ concentrations in MW03-11 are stable to decreasing when compared to historical data; however, they are stable to increasing when comparing data since shut-down of the remedial system.

Dissolved Inorganics

Elevated dissolved iron and manganese concentrations were observed in several wells located both on-site and off-site. The presence of elevated dissolved iron and manganese concentrations are considered to be the result of hydrocarbon biodegradation.

An on-site dissolved iron plume in excess of the FGQG RL Tier 2 guidelines has been identified across the site and includes the three areas identified with dissolved phase hydrocarbons (the source area surrounding House #9 and in the vicinity of monitoring wells 08-2 and 01-17D). The onsite dissolved iron plume above FGQG RL Tier 2 guidelines is bounded by cross-gradient monitoring wells and extends south (off-site) beyond the highway to the upper slope edge leading to Granite Creek.

In on-site wells, elevated concentrations of dissolved iron in on-site MW08-2 increased to levels similar to those identified during the 2010 and 2011 sampling events, both of which exceeded the FGQG RL Tier 2 guideline. A slight decrease in concentration was observed during the 2012 sampling event. Dissolved iron concentrations surrounding MWP4 significantly decreased at MWs 03-10 and AS-22.

For the off-site monitoring wells, CSR DW standards for dissolved iron and manganese no longer apply off-site based on the Stage 8 Amendments dated January 2013. According to BC MoE Technical Guidance document #15 (TG15 – *Concentration Limits for the Protection of Aquatic Receiving Environments,* effective April 2013), groundwater aquatic life standards apply to groundwater located 10 m to 500 m from the closest aquatic life receptor (Granite Creek) and BCWQG apply to the surface water to the high water mark. The guidance does not specify concentration limits within the dilution zone located between 10 m and the high water mark of an aquatic receiving environment. It is assumed that groundwater will be diluted 10 fold in the 10 m distance to the receptor. At Pleasant Camp, no monitoring wells are currently located within 10 m of Granite Creek (the nearest well is 17.5 m distance away); however, as a conservative measure, the analytical results for monitoring wells nearest to Granite Creek have been compared to BCWQ aquatic life (AW) guidelines for dissolved iron only.

Elevated concentrations of dissolved iron exceed the BC WQG guideline of 350 µg/L in four of ten sentry wells positioned along the slope leading to Granite Creek, including: MW01-23 (last sampled in 2004); MW04-2 (sampled in 2013); MW08-5 (sampled in 2011), and MW08-7 (sampled in 2013). The concentration of dissolved iron (7,180 µg/L) in MW08-7 increased significantly in 2013 compared to previous results (which ranged from 40 µg/L to 1,750 µg/L) and should be confirmed during the next sampling event.

Based on surface water sampling results, discussed further below, the elevated concentrations of dissolved iron (and manganese) observed in the sentry wells do not appear to currently pose a concern to aquatic life in Granite Creek. Continued monitoring of groundwater quality in sentry wells and surface water quality in Granite Creek for these byproducts of hydrocarbon degradation is warranted however.

Surface Water

Surface water geochemistry was similar at all four (4) sample stations (upstream, two midstream locations and downstream) in September 2013. Total iron and manganese concentrations were below the applicable guidelines and exhibited concentrations lower (some significantly lower) than 2012 results, when the concentrations measured were the highest recorded to date at stations 2 through 4. All other inorganic sampling parameters are lower than the applicable guidelines (including the parameters that previously exceeded the applicable guidelines such as total aluminum and cadmium).

EPH concentrations in all of the samples were below the laboratory MDL, and have been since sampling began in 2004.

The 2013 analytical results for surface water from Granite Creek do not indicate that hydrocarbon contamination or byproducts of hydrocarbon biodegradation are impacting Granite Creek. It is possible that the higher iron and manganese concentrations observed in surface water sampled from the creek in 2012 were due to samples being collected following a seasonal dry period (early September 2012) and these results were more representative of groundwater baseflow entering the creek from the site. The stage levels in Granite Creek were noted to be higher in 2013 than 2012, based on visual observations.

5.3 Pipeline ROW Soil Sampling

Based on the analytical results for the three (3) soil samples collected along the side of the pipeline right-of-way, the soil adjacent to the right-of-way has not been affected by the historical application of Agent Orange herbicide which reportedly occurred during the installation of the pipeline in the 1950s. Soil samples were analyzed for dioxins, furans, herbicides and pesticides.

The two (2) main constituents of Agent Orange herbicide include 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) and 2,3,7,8-tetrachlorobenzodioxin (TCDD) is a toxic byproduct of self-condensation during production of the chemical. The half-life of 2,4-D and 2,4,5-T are short and range from several days to several months; however, the half-life of TCDD may extend beyond 10 years.

It is noted that CSR and CCME standards/guidelines only exist for 2,4-D and 2,4,5-T, not for individual dioxins (i.e., TCDD). Standards and guidelines exist for the toxic equivalency factor (TEF) sum of dioxins. The TEF is measured in terms of the most toxic form of dioxin (TCDD) which has a TEF value of 1. The TEF sum for dioxins in all three collected samples was below the applicable CSR standards and CCME guidelines for residential land use.

6 CONCLUSIONS

Based on the FY 2013/2014 findings detailed above, SNC-Lavalin makes the following conclusions.

- Installation of dataloggers in selected wells between September 2012 and September 2013 has confirmed that the lowest groundwater levels occur during the late summer and early fall months as well as late winter months (February). Seasonal high groundwater levels occur during the late spring as a result of snowmelt and higher temperatures. Groundwater levels showed a greater response to rainfall events in downgradient wells. No seasonal changes in groundwater flow direction were observed based on the wells monitored. Evaluation of monitoring data from other monitoring wells collected during late summer months (during seasonal low groundwater levels) indicates groundwater levels remain at or above the bedrock surface. Hydrocarbon-impacted groundwater may seep into the upper weathered portion of bedrock during extreme low water level conditions which occurs over a short period of time; however, the hydrocarbon plume mainly migrates above the bedrock for most of the year.

- The 2013 analytical and monitoring results indicate that the groundwater dissolved phase hydrocarbon and light non-aqueous phase liquid (LNAPL) plumes in groundwater remained stable. No significant decreases or increases in concentrations or plume size were observed in comparison to 2012. Increases in concentrations were observed in some wells (MWs 03-08 and 03-10) but these were not significant and overall the trend was stable or decreasing in those wells. The overall trend since 2010 suggests that groundwater conditions are gradually improving at the site.

- The size of the inferred LNAPL plume is similar to that observed in 2012. Concentration of hydrocarbons remain below the NAPL indicator standard in MWs 08-2 and 01-17D located east and southeast of House #9 following an initial rebound in concentrations observed in 2009 and 2010 after the shutdown of the air sparging soil vapour extraction system.

- Elevated dissolved phase hydrocarbon concentrations greater than the provincial CSR AW standards and/or the FGQG RL Tier 2 guidelines remain within three separate plumes at the site including: 1) the source area around House #9 (former House #5); 2) east of House #9 surrounding MW08-2; and 3) southeast of the source area in the vicinity of MW01-17D. The three separate dissolved phase hydrocarbon plumes are all bounded by downgradient monitoring wells that exhibit concentrations below applicable provincial standards. The dissolved phase hydrocarbon plume in the source area around House #9 is overall slightly smaller than observed in 2012. Dissolved hydrocarbon impacts were not detected in MWP4, MW04-5 and MW06-2, all of which were above the standards/guidelines during the 2012 sampling event. Geochemical indicators indicate biodegradation of the hydrocarbon plume is continuing.

- A dissolved iron plume above the FGQG RL Tier 2 guidelines exists on-site and is bounded by cross-gradient monitoring wells and extends south (off-site) beyond the highway to the slope above Granite Creek. The CSR DW standards for dissolved iron and manganese no longer apply off-site based on the Stage 8 Amendments dated January 2013. Conservative comparison of dissolved iron concentrations from current and previous sampling events to the BCWQG, applicable to surface water in Granite Creek, indicates concentrations of dissolved iron were above the BCWQG AW guideline in four of ten sentry wells located along the slope above Granite Creek; the nearest sentry well (MW08-7) to the creek is located approximately 17.5 m distance away, outside of the 10 m dilution zone. The dissolved iron concentration in MW08-7 increased significantly in 2013 compared to previous results.
- Concentrations of inorganic parameters and hydrocarbons in surface water in Granite Creek were lower than the applicable guidelines and confirm that hydrocarbon contamination or byproducts of hydrocarbon biodegradation (iron and manganese) are not impacting Granite Creek. Elevated surface water concentrations of total iron and manganese observed in September 2012 during seasonal dry conditions may be more representative of groundwater baseflow to the creek which also results in less dilution.
- Based on the analytical results for the three (3) soil samples collected along the side of the pipeline right-of-way, the soil adjacent to the right-of-way has not been impacted by the historical application of Agent Orange herbicide during the installation of the pipeline in the 1950s.
- Four (4) drums containing approximately 800 L of contaminated purge water (including one [1] drum of hazardous waste purge water [approximately 200 L]) was removed from the site by Arctic and relocated to their treatment facility (McLean Lake Quarry) located in Whitehorse, YT, as per the relocation permit acquired from the Yukon's Department of Environment.

Overall, as per the objectives of the RMP, the results of the FY 2013/2014 monitoring and sampling program confirm that the residual hydrocarbon impacted soil and groundwater at the site currently does not pose significant risks to human health and ecological receptors. The ultimate goal of RMP implementation is to reduce risks to an insignificant or negligible level and achieve remedial closure at the site. The timeframe to achieve remedial closure remains undetermined and will require re-evaluation 1) based on further monitoring to confirm the stability and/or attenuation of the hydrocarbon plume; and 2) following any remediation of source area contaminated soils during future Port redevelopment.

7 RECOMMENDATIONS

Based on the results of work completed in FY 2013/2014, the following tasks are recommended:

Additional groundwater monitoring and sampling should be carried out in 2014 or 2015 to confirm that the hydrocarbon plume in groundwater remains stable and observe any decreasing or increasing trends, and ensure protection of human and ecological receptors. The groundwater monitoring and sampling event should include, as a minimum, sampling of key “sentry” wells located along the top of the embankment upgradient from Granite Creek for both dissolved phase hydrocarbons and iron and manganese, and confirmation of water quality in Granite Creek. Based on the overall stable plume conditions observed in 2013 and gradual improving trend since 2010, future sampling can now be carried less frequently on a biennial basis (once every two years) or continue annually.

The planning for future port redevelopment should consider protection of the existing monitoring well network at the site due to the high cost of drilling new wells. In addition, any monitoring wells located within the footprint of the new port facility buildings or structures that will be destroyed should be decommissioned prior to commencing construction activities.

Specific recommendations to the existing sampling plan are as follows:

- A future monitoring and sampling event(s) should be conducted in late spring (mid to late May) during seasonal high groundwater levels at the site. No groundwater sampling events have been previously conducted to date during seasonal high groundwater conditions.
- If possible, surface water sampling in Granite Creek should be carried out following an extended dry period (no rainfall) in order to capture water quality conditions more representative of groundwater baseflow to the creek.
- Continue with sampling of MW03-10 for EPH and PAH to monitor the possibility of migration of the LNAPL plume.
- Groundwater from MW06-5 should be analyzed for $EPHw_{10\text{-}19}$ and F2 to confirm the stability of the dissolved phase hydrocarbon plume surrounding MW08-2 and AS-13.
- AS-11, located on the west edge of the dissolved phase hydrocarbon plume, should be sampled for $EPHw_{10\text{-}19}$ and F2 to confirm/refute concentrations measured in 2012 and 2013.

- Elevated concentrations of dissolved iron (and manganese) should be confirmed in MW08-7 and other sentry wells along the slope above Granite Creek.
- Surface water samples from Granite Creek should be collected for dissolved iron and compared to applicable BC WQG. Samples for EPH should be requested to be analyzed using low detection limits (< 50 µg/L).
- Waterra tubing for wells with elevated dissolved phase concentrations should be changed out prior to the next sampling event in order to ensure representative groundwater results.
- Repairs to MW04-5 are required due to an internal bulge in the pipe. The repairs to MW04-5 will require use of a jackhammer (or similar) to remove the concrete and casing, and allow access to the damaged portion of the well casing.

8 NOTICE TO READER

This report has been prepared by the Environment & Water business unit of SNC-Lavalin Inc. (SNC-Lavalin) for Public Works and Government Services Canada and the Canada Border Services Agency, who have been party to the development of the scope of work for this project and understand its limitations[9]. Copyright of this report vests with Her Majesty the Queen in Right of Canada. The Consultant's liability is specified in the Contract with PWGSC.

This report is intended to provide information to Public Works and Government Services Canada and the Canada Border Services Agency to assist them in making business decisions. SNC-Lavalin is not a party to the various considerations underlying the business decisions, and does not make recommendations regarding such business decisions. In providing this report, SNC-Lavalin accepts no liability or responsibility in respect of the site described in this report or for any business decisions relating to the site, including decisions in respect of the purchase, sale or investment in the site.

Any use, reliance on, or decision made by a third party based on this report is the sole responsibility of such third party. SNC-Lavalin accepts no liability or responsibility for any damages that may be suffered or incurred by any third party as a result of the use of, reliance on, or any decision made based on this report.

The findings, conclusions and recommendations in this report have been developed in a manner consistent with the level of skill normally exercised by environmental professionals currently practising under similar conditions in the area. The findings contained in this report are based, in part, upon information provided by others. If any of the information is inaccurate, modifications to the findings, conclusions and recommendations may be necessary.

The findings, conclusions and recommendations presented by SNC-Lavalin in this report reflect SNC-Lavalin's best judgement based on the site conditions at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. They have been prepared for specific application to this site and are based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific materials as described in this report during a specific time interval. The findings cannot be extended to previous or future site conditions or to portions of the site which were unavailable for direct observation, subsurface locations which were not investigated directly, or materials or analysis which were not specified. Substances other than those described may exist within the site, reported substance parameters may exist in areas of the site not investigated, and concentrations of substances greater or less than those reported may exist between sample locations.

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The findings and conclusions of this report are valid only as of the date of this report. If site conditions change, new information is discovered, or unexpected site conditions are encountered in future work, including excavations, borings, or other studies, SNC-Lavalin should be requested to re-evaluate the findings, conclusions and/or recommendations of this report, and to provide amendments as required.

TABLES

TABLE 1: Summary of Analytical Results for Groundwater - Hydrocarbons

			Monocyclic Aromatic Hydrocarbons				Gross Parameters					Petroleum Hydrocarbon Fractions			
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Benzene (µg/L)	Ethyl-benzene (µg/L)	Toluene (µg/L)	Xylenes (µg/L)	VHw_{6-10} (µg/L)	VPHw (C6-C10) (µg/L)	$EPHw_{10-19}$ (µg/L)	LEPHw (C10-C19)[b] (µg/L)	$EPHw_{19-32}$ (µg/L)	F1 (C6-C10) (µg/L)	F2 (>C10-C16) (µg/L)	F3 (>C16-C34) (µg/L)	F4 (>C34-C50) (µg/L)
Port of Pleasant Camp															
MWP3	MWP3	2001 09 28	< 0.1	< 0.1	0.1	0.2	< 100	< 100	1,000	**1,000**	< 250	-	-	-	-
	MWP3-050708	2005 07 08	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MWP4	MWP4-080620	2008 06 20	-	-	-	-	-	-	1,500	**1,500**	300	-	-	-	-
	MWP4-081002	2008 10 02	-	-	-	-	-	-	4,100	**4,100**	810	-	-	-	-
	MWP4-090927	2009 09 27	-	-	-	-	-	-	3,700	**3,700**	1,000	-	-	-	-
	MWP4-110930	2011 09 30	-	-	-	-	-	-	1,200	**1,200**	< 200	-	-	-	-
	MWP4-121006	2012 10 06							820	**820**	100	-	1,000	200	< 100
	MWP4-130925	**2013 09 25**	-	-	-	-	-	-	< 250	< 250	< 250	< 100	< 300	-	-
MWP11	MWP11	2001 09 29	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	5,000	**5,000**	790	-	-	-	-
	MW01-DUP1	Duplicate	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	4,200	**4,200**	690	-	-	-	-
	QA/QC RPD %		*	*	*	*	*	*	17	17	14	-	-	-	-
	MWP11-050708	2005 07 08	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MWP13	MWP13 09-29	2001 09 29	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	-	-	-	-	-	-	-
MW-AS-11	AS-11-081002	2008 10 02	-	-	-	-	-	-	2,800	**2,800**	800	-	-	-	-
	AS-11-090926	2009 09 27	-	-	-	-	-	-	1,500	**1,500**	450	-	-	-	-
	AS-11-110929	2011 09 29	-	-	-	-	-	-	240	240	< 200	-	-	-	-
	AS-11-121006	2012 10 06							670	**670**	300	-	300	200	< 100
	AS-11-130925	**2013 09 25**	-	-	-	-	-	-	830	**830**	520	< 100	580	-	-
MW-AS-13	AS-13-081002	2008 10 02	-	-	-	-	-	-	1,900	**1,900**	510	-	-	-	-
	AS-13-090714	2009 07 14	-	-	-	-	-	-	430	430	200	-	-	-	-
	AS-13-090927	2009 09 26	-	-	-	-	-	-	610	**610**	< 250	-	-	-	-
	AS-13-100906	2010 09 06	-	-	-	-	-	-	870	**870**	< 80	-	-	-	-
	AS-13-110929	2011 09 29	-	-	-	-	-	-	290	**870**	< 200	-	-	-	-
	MW11-C-110929	Duplicate	-	-	-	-	-	-	290	**870**	< 200	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	*	*	-	-	-	-
	AS-13-120904	**2012 09 04**							620	**620**	< 100	-	400	200	< 100
	AS-13-130925	**2013 09 25**	-	-	-	-	-	-	720	**720**	< 250	< 100	580	-	-
	MWC-130925	**2013 09 25**	-	-	-	-	-	-	670	**670**	< 250	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	-	*	-	-	-	-
MW-AS-15	AS-15-080620	2008 06 20	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	AS-15-081002	2008 10 02	-	-	-	-	-	-	< 250	< 250	250	-	-	-	-
	AS-15-090927	2009 09 27	-	-	-	-	-	-	< 250	< 250	310	-	-	-	-
MW-AS-22	AS-22-080620	2008 06 20	-	-	-	-	-	-	710	**710**	< 250	-	-	-	-
	AS-22-081004	2008 10 04	-	-	-	-	-	-	1,600	**1,600**	750	-	-	-	-
	AS-22-090714	2009 07 14	-	-	-	-	-	-	650	**650**	120	-	-	-	-
	AS-22-090927	2009 09 27	-	-	-	-	-	-	1,900	**1,900**	590	-	-	-	-
	AS-22-100924	2010 09 24	-	-	-	-	-	-	480	480	< 80	-	-	-	-
	AS-22-110929	2011 09 29	-	-	-	-	-	-	630	**630**	< 200	-	-	-	-
	AS-22-120904	2012 09 04							860	**860**	120	-	500	300	100
	AS-22-130925	**2013 09 25**	-	-	-	-	-	-	1,130	**1,130**	270	< 100	840	-	-
MW-AS-23	AS-23-081002	2008 10 02	-	-	-	-	-	-	360	360	< 250	-	-	-	-
	AS-23-090714	2009 07 14	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
	MW-D-090714	Duplicate	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	*	*	-	-	-	-
MW01-16	MW01-16	2001 09 28	< 0.1	< 0.1	< 0.1	0.2	< 100	< 100	1,100	**1,100**	330	-	-	-	-
MW01-17D	MW01-17D	2001 09 29	< 0.1	***3***	< 0.1	1.1	< 100	< 100	***17,000***	**17,000**	1,900	-	-	-	-
	MW01-17D 030909/10	2003 09 09/10	< 0.2	2	< 0.2	0.3	-	-	700	**700**	< 250	-	-	-	-
	MW01-17D 031025	2003 10 25	-	-	-	-	-	-	630	**630**	< 250	-	-	-	-
	MW01-17D-061001	2006 10 01	-	-	-	-	-	-	***2,300,000***	**2,300,000**	180,000	-	-	-	-
	MW01-17D-080619	2008 06 19	-	-	-	-	-	-	***9,700***	**9,700**	1,500	-	-	-	-
	MW01-17D-081004	2008 10 04	-	-	-	-	-	-	***7,200***	**7,200**	1,300	-	-	-	-
	MW01-17D-090713	2009 07 13	-	-	-	-	-	-	***7,200***	**7,200**	1,200	-	-	-	-
	MW-C-090713	Duplicate	-	-	-	-	-	-	2,300	**2,300**	440	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	103	103	*	-	-	-	-
	MW01-17D-090926	2009 09 26	-	-	-	-	-	-	***72,000***	**72,000**	10,000	-	-	-	-
	MW-C-090926	Duplicate	-	-	-	-	-	-	***170,000***	**170,000**	22,000	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	81	81	75	-	-	-	-
	MW01-17D-100924	2010 09 24	-	-	-	-	-	-	***34,600***	**34,600**	5,900	-	-	-	-
	MWB-100924	2010 09 24	-	-	-	-	-	-	***40,400***	**40,400**	7,000	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	15	15		-	-	-	-
	MW01-17D-110930	2011 09 30	-	-	-	-	-	-	1,000	**1,000**	< 200	-	-	-	-
	MW11-A-110930	2011 09 30	-	-	-	-	-	-	2,900	**2,900**	370	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	97	97	*	-	-	-	-
	MW01-17D-120904	2012 09 04							1,470	**1,470**	310	-	500	900	100
	MW01-17D-130925	**2013 09 25**	-	-	-	-	-	-	860	**860**	< 250	< 100	560	-	-
MW01-18	MW01-18	2001 09 28	< 0.1	< 0.1	< 0.1	0.1	< 100	< 100	< 250	< 250	< 250	-	-	-	-
	MW01-18 031025	2003 10 25	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MW01-19	MW01-19	2001 09 29	< 0.1	< 0.1	0.3	0.3	< 100	< 100	< 250	< 250	< 250	-	-	-	-
	MW01-19 031025	2003 10 25	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW01-19-061001	2006 10 01	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW01-19-070925	2007 09 25	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW01-19-080619	2008 06 19	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW-A-080619	2008 06 19	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	*	*	-	-	-	-
	MW01-19-081004	2008 10 04	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
BC Standards															
CSR Aquatic Life (AW)[a]			4,000	2,000	390	n/a	15,000	1,500	5,000	500	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			5	2.4	24	300	15,000	n/a	5,000	n/a	n/a	n/a	n/a	n/a	n/a
Federal Guidelines															
Canadian Drinking Water Quality Drinking Water (DW)			5	2.4	24	300	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
FGQG T2 Residential Land Use (RL)[d] - Fine Grained Soil			2,800	42,000	82,000	21,000	n/a	n/a	n/a	n/a	n/a	6,500	1,800	n/a	n/a
FGQG T2 Residential Land Use (RL)[d] - Coarse Grained Soil			140	16,000	83	3,900	n/a	n/a	n/a	n/a	n/a	810	1,300	n/a	n/a

Associated ALS files: L1368607.

Associated Maxxam files: B081839, B083828, B085238, B091731, B193983.

Associated CanTest files: 100714077, 100718016, 100831012, 100928032, 100929013, 11002077, 40916043, 41007033, 41030015, 51020086, 51020107, 60711045, 70720118, 70930027, 71002069, 80920016, 80927170, 81001087, 90619137, 90623066, 90623067, 90623069, 90623071, 90623079, 90825115, 91002010, 91006083, 91006094.

All terms defined within the body of SNC Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard.

* RPDs are not normally calculated where one or more concentrations are less than five times MDL.

SHADOW	Concentration greater than CSR Aquatic Life (AW) standard.
ITALIC	Concentration greater than CSR Drinking Water (DW) standard.
SHADED	Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.
OUTLINE	Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for fine grained soils.
UNDERLINE	Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for coarse grained soils.

[a] Standard to protect freshwater aquatic life.

[b] EPHw10-19 concentration has been compared to the CSR AW standard for LEPHw, which is a conservative comparison.

[c] Sample Id corrected.

[d] The exposure pathway(s) used for determining the FGQG Tier 2 guidelines for this site include: inhalation, direct contact by soil organisms, and freshwater life.

[e] Only BC standards apply to Provincial Lands.

TABLE 1 (Cont'd): Summary of Analytical Results for Groundwater - Hydrocarbons

			Monocyclic Aromatic Hydrocarbons				Gross Parameters					Petroleum Hydrocarbon Fractions			
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Benzene (µg/L)	Ethyl-benzene (µg/L)	Toluene (µg/L)	Xylenes (µg/L)	VHw$_{6-10}$ (µg/L)	VPHw (C6-C10) (µg/L)	EPHw$_{10-19}$ (µg/L)	LEPHw (C10-C19)[b] (µg/L)	EPHw$_{19-32}$ (µg/L)	F1 (C6-C10) (µg/L)	F2 (>C10-C16) (µg/L)	F3 (>C16-C34) (µg/L)	F4 (>C34-C50) (µg/L)
Port of Pleasant Camp															
MW01-19 cont'd	MW01-19-090712	2009 07 12	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
	MW-A-090712	Duplicate	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	*	*	-	-	-	-
	MW01-19-090926	2009 09 26	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW-B-090926	Duplicate	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	*	*	-	-	-	-
	MW01-19-100924	2010 09 24	-	-	-	-	-	-	< 80	< 80	< 80	-	-	-	-
	MW01-19-110930	2011 09 30	-	-	-	-	-	-	< 200	< 200	< 200	-	-	-	-
	MW01-19-120904	2012 09 04							< 100	< 100	< 100	-	< 100	< 100	< 100
	MW01-19-130925	**2013 09 25**	-	-	-	-	-	-	< 250	< 250	< 250	< 100	< 300	-	-
MW03-03	MW03-03 030909	2003 09 09/10	< 0.2	***3.4***	0.6	1.8	-	-	***6,700***	**6,700**	870	-	-	-	-
	MW03-03 031025	2003 10 25	-	-	-	-	-	-	2,100	**2,100**	630	-	-	-	-
	MW03-3-080620	2008 06 20	-	-	-	-	-	-	280	280	< 250	-	-	-	-
	MW03-3-081002	2008 10 02	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MWA-081002	Duplicate	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	*	*	-	-	-	-
	MW03-3-090713	2009 07 13	-	-	-	-	-	-	170	170	< 100	-	-	-	-
	MW03-3-090926	2009 09 26	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MW03-04	MW03-04 030909	2003 09 09/10	< 0.1	< 0.1	0.2	0.2	-	-	800	**800**	400	-	-	-	-
	MW03-04 031025	2003 10 25	-	-	-	-	-	-	< 250	< 250	250	-	-	-	-
MW03-05	MW03-05 030909	2003 09 09/10	0.1	0.4	0.6	1.2	-	-	350	350	520	-	-	-	-
	MW03-05 031025	2003 10 25	-	-	-	-	-	-	360	360	< 250	-	-	-	-
MW06-1	MW06-1-061001	2006 10 01	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW06-1-090926	2009 09 26	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MW06-2	MW06-2-061001	2006 10 01	-	-	-	-	-	-	3,200	**3,200**	600	-	-	-	-
	MW06-2-070926	2007 09 26	-	-	-	-	-	-	1,100	**1,100**	250	-	-	-	-
	MW06-2-080619	2008 06 19	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW06-2-081002	2008 10 02	-	-	-	-	-	-	1,100	**1,100**	530	-	-	-	-
	MW06-2-090713	2009 07 13	-	-	-	-	-	-	600	**600**	120	-	-	-	-
	MW06-2-090926	2009 09 26	-	-	-	-	-	-	330	330	270	-	-	-	-
	MW06-2-100913	2010 09 13	-	-	-	-	-	-	450	450	< 80	-	-	-	-
	MW06-2-110929	2011 09 29	-	-	-	-	-	-	330	330	< 200	-	-	-	-
	MW06-2-120903	2012 09 03							2,010	**2,010**	180	-	800	1100	<100
	MWC-120903	Duplicate							2,250	**2,250**	200	-	600	400	<100
	QA/QC RPD %		-	-	-	-	-	-	*	*	*	-	-	-	-
	MW06-2-130925	**2013 09 25**	-	-	-	-	-	-	460	460	< 250	<100	< 300	-	-
	MWA-130925	**2013 09 25**	-	-	-	-	-	-	480	480	< 250	<100	< 300	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	-	*	-	-	-	-
MW06-4	MW06-4-061001	2006 10 01	-	-	-	-	-	-	550	**550**	< 250	-	-	-	-
	MW06-4-070926	2007 09 26	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW06-4-081002	2008 10 02	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MW06-5	MW06-5-061001	2006 10 01	-	-	-	-	-	-	***9,000***	**9000**	1,100	-	-	-	-
	MW06-A-061001	Duplicate	-	-	-	-	-	-	***10,000***	**10000**	1,200	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	11	11	*	-	-	-	-
	MW06-5-070926	2007 09 26	-	-	-	-	-	-	1,400	**1,400**	430	-	-	-	-
	MW06-5-080619	2008 06 19	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW06-5-081004	2008 10 04	-	-	-	-	-	-	320	320	560	-	-	-	-
	MW06-5-090713	2009 07 13	-	-	-	-	-	-	120	120	110	-	-	-	-
	MW06-5-100924	2010 09 24	-	-	-	-	-	-	130	130	< 80	-	-	-	-
	MW06-5-110929	2011 09 29	-	-	-	-	-	-	< 200	< 200	< 200	-	-	-	-
MW06-6	MW06-6-061001	2006 10 01	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW06-6-070926	2007 09 26	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW06-6-080619	2008 06 19	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW06-6-081002	2008 10 02	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW06-6-090715	2009 07 15	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
MW08-1	MW08-1-081004	2008 10 04	-	-	-	-	-	-	310	310	750	-	-	-	-
	MW08-1-090713	2009 07 13	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
MW08-2	MW08-2-081004	2008 10 04	-	-	-	-	-	-	360	360	< 250	-	-	-	-
	MW08-2-090712	2009 07 12	-	-	-	-	-	-	2,200	**2,200**	360	-	-	-	-
	MW08-2-090926	2009 09 26	-	-	-	-	-	-	***6,600***	**6,600**	1,100	-	-	-	-
	MW08-2-100913	2010 09 13	-	-	-	-	-	-	***9,200***	**9,200**	1,140	-	-	-	-
	MW08-2-110929	2011 09 29	-	-	-	-	-	-	410	410	< 200	-	-	-	-
	MW08-2-120904	2012 09 04							1,260	**1,260**	150	-	600	500	100
	MW08-2-130925	**2013 09 25**	-	-	-	-	-	-	2,060	**2,060**	380	< 100	1,370	-	-
MW08-3	MW08-3-081004	2008 10 04	-	-	-	-	-	-	550	**550**	660	-	-	-	-
	MW08-3-090715	2009 07 15	-	-	-	-	-	-	180	180	140	-	-	-	-
	MW08-3-090926	2009 09 26	-	-	-	-	-	-	< 250	< 250	260	-	-	-	-
	MW08-3-100924	2010 09 24	-	-	-	-	-	-	< 80	< 80	< 80	-	-	-	-
	MW08-3-110929	2011 09 29	-	-	-	-	-	-	< 200	< 200	< 200	-	-	-	-
MW08-4	MW08-4(75')-080822	2008 08 22	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW08-4-081003	2008 10 03	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW08-4-090927	2009 09 27	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MW09-5	MW09-5-090926	2009 09 26	-	-	-	-	-	-	***14,000***	**14000**	1,900	-	-	-	-
	MW-D-090926	Duplicate	-	-	-	-	-	-	***17,000***	**17000**	2,200	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	19	19	*	-	-	-	-
	MW09-5-100913	2010 09 13	-	-	-	-	-	-	***6,780***	**6,780**	750	-	-	-	-
	MW09-5-110929	2011 09 29	-	-	-	-	-	-	***8,900***	**8,900**	880	-	-	-	-
BC Standards															
CSR Aquatic Life (AW)[a]			4,000	2,000	390	n/a	15,000	1,500	5,000	500	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			5	2.4	24	300	15,000	n/a	5,000	n/a	n/a	n/a	n/a	n/a	n/a
Federal Guidelines															
Canadian Drinking Water Quality Drinking Water (DW)			5	2.4	24	300	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
FGQG T2 Residential Land Use (RL)[d] - Fine Grained Soil			2,800	42,000	82,000	21,000	n/a	n/a	n/a	n/a	n/a	6,500	1,800	n/a	n/a
FGQG T2 Residential Land Use (RL)[d] - Coarse Grained Soil			140	16,000	83	3,900	n/a	n/a	n/a	n/a	n/a	810	1,300	n/a	n/a

Associated ALS files: L1368607.

Associated Maxxam files: B081839, B083828, B085238, B091731, B193983.

Associated CanTest files: 100714077, 100718016, 100831012, 100928032, 100929013, 11002077, 40916043, 41007033, 41030015, 51020086, 51020107, 60711045, 70720118, 70930027, 71002069, 80920016, 80927170, 81001087, 90619137, 90623066, 90623067, 90623069, 90623071, 90623079, 90825115, 91002010, 91006083, 91006094.

All terms defined within the body of SNC Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

- Denotes analysis not conducted.

n/a Denotes no applicable standard.

* RPDs are not normally calculated where one or more concentrations are less than five times MDL.

SHADOW	Concentration greater than CSR Aquatic Life (AW) standard.
ITALIC	Concentration greater than CSR Drinking Water (DW) standard.
SHADED	Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.
OUTLINE	Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for fine grained soils.
UNDERLINE	Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for coarse grained soils.

[a] Standard to protect freshwater aquatic life.

[b] EPHw10-19 concentration has been compared to the CSR AW standard for LEPHw, which is a conservative comparison.

[c] Sample Id corrected.

[d] The exposure pathway(s) used for determining the FGQG Tier 2 guidelines for this site include: inhalation, direct contact by soil organisms, and freshwater life.

[e] Only BC standards apply to Provincial Lands.

TABLE 1 (Cont'd): Summary of Analytical Results for Groundwater - Hydrocarbons

			Monocyclic Aromatic Hydrocarbons				Gross Parameters					Petroleum Hydrocarbon Fractions			
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Benzene (µg/L)	Ethyl-benzene (µg/L)	Toluene (µg/L)	Xylenes (µg/L)	VHw$_{6-10}$ (µg/L)	VPHw (C6-C10) (µg/L)	EPHw$_{10-19}$ (µg/L)	LEPHw (C10-C19)^{b} (µg/L)	EPHw$_{19-32}$ (µg/L)	F1 (C6-C10) (µg/L)	F2 (>C10-C16) (µg/L)	F3 (>C16-C34) (µg/L)	F4 (>C34-C50) (µg/L)
Port of Pleasant Camp															
	MW09-5-120903	2012 09 03							***36,000***	**36,000**	3,400	-	**2,000**	1,100	< 100
	MW09-5-130925	**2013 09 25**	-	-	-	-	-	-	47,600	**47,600**	5,620	*1,220*	**34,900**	-	-
	MWB-130925	**2013 09 25**	-	-	-	-	-	-	22,800	**22,800**	2,750	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	71	-	69	-	-	-	-
MW09-16	MW09-16-090927	2009 09 27	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW09-16-110930	2011 09 30	-	-	-	-	-	-	< 200	< 200	< 200	-	-	-	-
Travel Blank	TB60713A	2006 07 17	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	-	-	-	-	-	-	-
Provincial Lands^{e}															
AS-4	AS-4-080620	2008 06 20	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	AS-4-081002	2008 10 02	-	-	-	-	-	-	1,300	**1,300**	860	-	-	-	-
	AS-4-090927	2009 09 27	-	-	-	-	-	-	1,600	**1,600**	760	-	-	-	-
	AS-4-100906	2010 09 09	-	-	-	-	-	-	320	320	120	-	-	-	-
	AS-4-110930	2011 09 30	-	-	-	-	-	-	< 200	< 200	< 200	-	-	-	-
MW-AS-12	AS-12-080930	2008 09 30	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MW01-20	MW01-20	2001 09 29	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250	-	-	-	-
	MW01-20 031024/25	2003 10 24/25	< 0.1	< 0.1	0.5	0.4	-	-	< 250	< 250	< 250	-	-	-	-
	MW01-20-041019	2004 10 19	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW01-20-061001	2006 10 01	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW01-20-080619	2008 06 19	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW01-20-081003	2008 10 03	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW01-20-090925	2009 09 25	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
MW01-21	MW01-21	2001 09 28	< 0.1	0.2	0.2	0.2	< 100	< 100	370	370	< 250	-	-	-	-
	MW01-DUP2	Duplicate	< 0.1	0.2	0.3	0.2	< 100	< 100	390	390	< 250	-	-	-	-
	QA/QC RPD %		*	0	40	0	*	*	5	5	*	-	-	-	-
	MW01-21 030909/10	2003 09 09/10	< 0.1	0.6	0.3	0.1	-	-	340	340	< 250	-	-	-	-
	MW01-21 031025	2003 10 25	-	-	-	-	-	-	500	500	< 250	-	-	-	-
	MW01-21-041018	2004 10 18/19	< 0.1	0.2	< 0.1	< 0.1	< 100	< 100	500	500	< 250	-	-	-	-
	MWD-041018	Duplicate	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	-	-	-	-	-	-	-
	QA/QC RPD %		*	*	*	*	*	*	*	*	*	-	-	-	-
	MW01-21-050708	2005 07 08	-	-	-	-	-	-	590	**580**	< 250	-	-	-	-
	MW01-21-060718	2006 07 18	-	-	-	-	-	-	300	300	< 250	-	-	-	-
	MW01-21-061001	2006 10 01	-	-	-	-	-	-	310	310	< 250	-	-	-	-
	MW01-21-070925	2007 09 25	-	-	-	-	-	-	310	310	< 250	-	-	-	-
	MW01-21-080619	2008 06 19	-	-	-	-	-	-	830	**830**	< 250	-	-	-	-
	MW01-21-081003	2008 10 03	-	-	-	-	-	-	650	**650**	250	-	-	-	-
	MW01-21-090714	2009 07 14	-	-	-	-	-	-	420	420	130	-	-	-	-
	MW01-21-090926	2009 09 26	-	-	-	-	-	-	260	260	< 250	-	-	-	-
	MW01-21-100924	2010 09 24	-	-	-	-	-	-	170	170	< 80	-	-	-	-
	MWC-100924	Duplicate	-	-	-	-	-	-	80	80	< 80	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	*	*	-	-	-	-
	MW01-21-111001	2011 10 01	-	-	-	-	-	-	290	290	< 200	-	-	-	-
	MW01-21-120903	2012 09 03	-	-	-	-	-	-	430	430	< 100	-	-	-	-
	MWA-120903	Duplicate	-	-	-	-	-	-	400	400	< 200	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	*	*	-	-	-	-
	MW01-21-130925	**2013 09 25**	-	-	-	-	-	-	420	420	< 250	-	-	-	-
MW01-23	MW01-23	2001 09 28	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250	-	-	-	-
	MW01-23 031025	2003 10 25	-	-	-	-	-	-	< 250	< 250	570	-	-	-	-
	MW01-23-041019	2004 10 19	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW01-23-050708	2005 07 08	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW01-23-060718	2006 07 18	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW01-23-061001	2006 10 01	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW01-23-070925	2007 09 25	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MW03-01	MW03-01 030909	2003 09 09/10	< 0.1	< 0.1	0.1	0.1	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-01 031025	2003 10 25	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-1-050708	2005 07 08	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-1-070925	2007 09 25	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-1-080619	2008 06 19	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-1-081003	2008 10 03	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-1-090714	2009 07 14	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
MW03-06	MW03-06 030909	2003 09 09/10	< 0.1	< 0.1	0.1	0.2	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-06 031025	2003 10 25	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-6-060717	2006 07 17	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-6-060930	2006 09 30	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-6-070917	2007 09 17	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-6-080618	2008 06 18	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MW03-07	MW03-07 031025	2003 10 25	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-7-041018	2004 10 18/19	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250	-	-	-	-
	MW03-7-050707	2005 07 07	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-7-060717	2006 07 17	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-7-080618	2008 06 18	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-7-080930	2008 09 30	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-7-090712	2009 07 12	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
	MW03-7-090925	2009 09 25	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
	MW03-7-110930	2011 09 30	-	-	-	-	-	-	< 200	< 200	< 200	-	-	-	-
	MW03-7-120830	2012 08 30	-	-	-	-	-	-	< 100	< 100	110	-	-	-	-
BC Standards															
CSR Aquatic Life (AW)^{a}			4,000	2,000	390	n/a	15,000	1,500	5,000	500	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			5	2.4	24	300	15,000	n/a	5,000	n/a	n/a	n/a	n/a	n/a	n/a
Federal Guidelines															
Canadian Drinking Water Quality Drinking Water (DW)			5	2.4	24	300	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
FGQG T2 Residential Land Use (RL)^{d} - Fine Grained Soil			2,800	42,000	82,000	21,000	n/a	n/a	n/a	n/a	n/a	6,500	1,800	n/a	n/a
FGQG T2 Residential Land Use (RL)^{d} - Coarse Grained Soil			140	16,000	83	3,900	n/a	n/a	n/a	n/a	n/a	810	1,300	n/a	n/a

Associated ALS files: L1368607.

Associated Maxxam files: B081839, B083828, B085238, B091731, B193983.

Associated CanTest files: 100714077, 100718016, 100831012, 100928032, 100929013, 11002077, 40916043, 41007033, 41030015, 51020086, 51020107, 60711045, 70720118, 70930027, 71002069, 80920016, 80927170, 81001087, 90619137, 90623066, 90623067, 90623069, 90623071, 90623079, 90825115, 91002010, 91006083, 91006094.

All terms defined within the body of SNC Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard.
*	RPDs are not normally calculated where one or more concentrations are less than five times MDL.

SHADOW	Concentration greater than CSR Aquatic Life (AW) standard.
ITALIC	Concentration greater than CSR Drinking Water (DW) standard.
SHADED	Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.
OUTLINE	Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for fine grained soils.
UNDERLINE	Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for coarse grained soils.

[a] Standard to protect freshwater aquatic life.

[b] EPHw10-19 concentration has been compared to the CSR AW standard for LEPHw, which is a conservative comparison.

[c] Sample Id corrected.

[d] The exposure pathway(s) used for determining the FGQG Tier 2 guidelines for this site include: inhalation, direct contact by soil organisms, and freshwater life.

[e] Only BC standards apply to Provincial Lands.

TABLE 1 (Cont'd): Summary of Analytical Results for Groundwater - Hydrocarbons

			Monocyclic Aromatic Hydrocarbons				Gross Parameters					Petroleum Hydrocarbon Fractions			
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Benzene (µg/L)	Ethyl-benzene (µg/L)	Toluene (µg/L)	Xylenes (µg/L)	VHw_{6-10} (µg/L)	VPHw (C6-C10) (µg/L)	$EPHw_{10-19}$ (µg/L)	LEPHw (C10-C19)[b] (µg/L)	$EPHw_{19-32}$ (µg/L)	F1 (C6-C10) (µg/L)	F2 (>C10-C16) (µg/L)	F3 (>C16-C34) (µg/L)	F4 (>C34-C50) (µg/L)
Provincial Lands[e]															
MW03-08	MW03-08 030909	2003 09 09/10	< 0.1	***2.5***	< 0.1	0.4	-	-	2,700	**2,700**	630	-	-	-	-
	MW03-08 031024/25	2003 10 24/25	< 0.1	2.1	< 0.1	0.7	-	-	3,800	**3,800**	610	-	-	-	-
	MW03-8-041019	2004 10 19	-	-	-	-	-	-	1,100	**1,100**	< 250	-	-	-	-
	MW03-8-050707	2005 07 07	-	-	-	-	-	-	810	**810**	< 250	-	-	-	-
	MW03-8-060717	2006 07 17	-	-	-	-	-	-	1,300	**1,300**	< 250	-	-	-	-
	MW06-A-060717	2006 07 17	-	-	-	-	-	-	1,300	**1,300**	< 250	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	0	0	*	-	-	-	-
	MW03-8-060930	2006 09 30	-	-	-	-	-	-	4,200	**4,200**	370	-	-	-	-
	MW03-8-070925	2007 09 25	-	-	-	-	-	-	***8,900***	**8,900**	1,400	-	-	-	-
	MW03-8-080618	2008 06 18	-	-	-	-	-	-	1,500	**1,500**	400	-	-	-	-
	MW03-8-080930	2008 09 30	-	-	-	-	-	-	880	**880**	330	-	-	-	-
	MW03-8-090712	2009 07 12	-	-	-	-	-	-	540	**540**	170	-	-	-	-
	MW03-8-090925	2009 09 25	-	-	-	-	-	-	1,100	**1,100**	380	-	-	-	-
	MW03-8-100909	2010 09 09	-	-	-	-	-	-	350	350	< 80	-	-	-	-
	MW03-8-110930	2011 09 30	-	-	-	-	-	-	< 200	< 200	< 200	-	-	-	-
	MW03-8-120830	2012 08 30	-	-	-	-	-	-	440	440	< 100	-	-	-	-
	MW03-8-130924	**2013 09 24**	-	-	-	-	-	-	590	**590**	< 250	-	-	-	-
MW03-09	MW03-09 030909	2003 09 09/10	< 0.1	2.1	< 0.1	0.5	-	-	370	370	< 250	-	-	-	-
	MW03-09 031025	2003 10 25	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-9-041018	2004 10 18/19	< 0.1	1.3	< 0.1	0.3	< 100	< 100	< 250	< 250	< 250	-	-	-	-
	MW03-9-050707	2005 07 07	-	-	-	-	-	-	800	**800**	< 250	-	-	-	-
	MW03-9-060717	2006 07 17	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW03-9-060930	2006 09 30	-	-	-	-	-	-	250	250	< 250	-	-	-	-
	MW03-9-080618	2008 06 18	-	-	-	-	-	-	< 250	< 250	430	-	-	-	-
	MW03-9-090712	2009 07 12	-	-	-	-	-	-	490	490	140	-	-	-	-
	MW03-9-090925	2009 09 25	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
	MW03-9-100909	2010 09 08	-	-	-	-	-	-	320	320	< 80	-	-	-	-
	MW03-9-110930	2011 09 30	-	-	-	-	-	-	< 200	< 200	< 200	-	-	-	-
MW03-10	MW03-10 030909	2003 09 09/10	< 0.1	0.3	< 0.1	0.1	-	-	***6,600***	**6,600**	890	-	-	-	-
	MW03-10 031024/25	2003 10 24/25	< 0.1	0.2	< 0.1	< 0.1	-	-	4,100	**4,100**	810	-	-	-	-
	MW03-10-060930	2006 09 30	-	-	-	-	-	-	***11,000***	**11,000**	1,500	-	-	-	-
	MW03-10-070917	2007 09 17	-	-	-	-	-	-	1,200	**1,200**	< 250	-	-	-	-
	MW03-10-080618	2008 06 18	-	-	-	-	-	-	2,300	**2,300**	370	-	-	-	-
	MW03-10-080930	2008 09 30	-	-	-	-	-	-	3,000	**3,000**	640	-	-	-	-
	MW03-10-090712	2009 07 12	-	-	-	-	-	-	***34,000***	**34,000**	3,900	-	-	-	-
	MW03-10-090829	2009 08 29	-	-	-	-	-	-	2,600	**2,600**	470	-	-	-	-
	MW03-10-090925	2009 09 25	-	-	-	-	-	-	3,900	**3,900**	1,000	-	-	-	-
	MW03-10-100910	2010 09 10	-	-	-	-	-	-	2,450	**2,450**	280	-	-	-	-
	MW03-10-110930	2011 09 30	-	-	-	-	-	-	710	**710**	< 200	-	-	-	-
	MW03-10-120830	2012 08 30	-	-	-	-	-	-	2,670	**2,670**	280	-	-	-	-
	MW03-10-130924	**2013 09 24**	-	-	-	-	-	-	4,560	**4,560**	810	-	-	-	-
MW03-10D	MW03-10D-121006	2012 10 06	-	-	-	-	-	-	350	350	290	-	-	-	-
	MW03-10D-130924	**2013 09 24**	-	-	-	-	-	-	380	380	< 250	-	-	-	-
MW03-11	MW03-11 031024/25	2003 10 24/25	< 0.1	1.5	< 0.1	0.3	-	-	2,600	**2,600**	510	-	-	-	-
	MW03-11-041018	2004 10 18/19	< 0.1	0.6	< 0.1	0.3	1,300	1,300	1,300	**1,300**	< 250	-	-	-	-
	MW03-11-080620	2008 06 20	-	-	-	-	-	-	950	**950**	360	-	-	-	-
	MW03-11-081004	2008 10 04	-	-	-	-	-	-	1,600	**1,600**	1,000	-	-	-	-
	MW03-11-090925	2009 09 25	-	-	-	-	-	-	250	250	400	-	-	-	-
	MW03-11-110930	2011 09 30	-	-	-	-	-	-	560	**560**	< 200	-	-	-	-
	MW03-11-121006	2012 10 06	-	-	-	-	-	-	790	**790**	480	-	-	-	-
	MW03-11-130924	**2013 09 24**	-	-	-	-	-	-	670	**670**	270	-	-	-	-
MW04-1	MW04-1-041019	2004 10 19	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-1-080619	2008 06 19	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-1-081003	2008 10 03	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-1-090925	2009 09 25	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
	MW04-1-111001	2011 10 01	-	-	-	-	-	-	< 200	< 200	< 200	-	-	-	-
	MW04-1-121006	2012 10 06	-	-	-	-	-	-	240	240	100	-	-	-	-
MW04-2	MW04-2-041019	2004 10 19	-	-	-	-	-	-	750	**750**	250	-	-	-	-
	MW04-2-050708	2005 07 08	-	-	-	-	-	-	300	300	< 250	-	-	-	-
	MW04-2-060718	2006 07 18	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-2-061001	2006 10 01	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-2-070925	2007 09 25	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-2-080619	2008 06 19	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-2-081003	2008 10 03	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-2-090713	2009 07 13	-	-	-	-	-	-	160	160	< 100	-	-	-	-
	MW04-2-090925	2009 09 25	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
	MW04-2-100924	2010 09 24	-	-	-	-	-	-	190	190	< 80	-	-	-	-
	MW04-2-111001	2011 10 01	-	-	-	-	-	-	< 200	< 200	< 200	-	-	-	-
	MW04-2-120903	2012 09 03	-	-	-	-	-	-	280	280	< 100	-	-	-	-
	MW04-2-130925	**2013 09 25**	-	-	-	-	-	-	260	260	< 250	-	-	-	-
MW04-3	MW04-3-041018	2004 10 18/19	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	310	-	-	-	-
	MW04-3-050708	2005 07 08	-	-	-	-	-	-	560	**560**	< 250	-	-	-	-
	MW05-A-050708	2005 07 08	-	-	-	-	-	-	420	420	< 250	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	29	29	*	-	-	-	-
	MW04-3-060718	2006 07 18	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-3-061001	2006 10 01	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-3-070925	2007 09 25	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MWA-070925	Duplicate	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	*	*	-	-	-	-
BC Standards															
CSR Aquatic Life (AW)[a]			4,000	2,000	390	n/a	15,000	1,500	5,000	500	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			5	2.4	24	300	15,000	n/a	5,000	n/a	n/a	n/a	n/a	n/a	n/a
Federal Guidelines															
Canadian Drinking Water Quality Drinking Water (DW)			5	2.4	24	300	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
FGQG T2 Residential Land Use (RL)[d] - Fine Grained Soil			2,800	42,000	82,000	21,000	n/a	n/a	n/a	n/a	n/a	6,500	1,800	n/a	n/a
FGQG T2 Residential Land Use (RL)[d] - Coarse Grained Soil			140	16,000	83	3,900	n/a	n/a	n/a	n/a	n/a	810	1,300	n/a	n/a

Associated ALS files: L1368607.

Associated Maxxam files: B081839, B083828, B085238, B091731, B193983.

Associated CanTest files: 100714077, 100718016, 100831012, 100928032, 100929013, 11002077, 40916043, 41007033, 41030015, 51020086, 51020107, 60711045, 70720118, 70930027, 71002069, 80920016, 80927170, 81001087, 90619137, 90623066, 90623067, 90623069, 90623071, 90623079, 90825115, 91002010, 91006083, 91006094.

All terms defined within the body of SNC Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard.
*	RPDs are not normally calculated where one or more concentrations are less than five times MDL.
SHADOW	Concentration greater than CSR Aquatic Life (AW) standard.
ITALIC	Concentration greater than CSR Drinking Water (DW) standard.
SHADED	Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.
OUTLINE	Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for fine grained soils.
UNDERLINE	Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for coarse grained soils.

[a] Standard to protect freshwater aquatic life.

[b] EPHw10-19 concentration has been compared to the CSR AW standard for LEPHw, which is a conservative comparison.

[c] Sample Id corrected.

[d] The exposure pathway(s) used for determining the FGQG Tier 2 guidelines for this site include: inhalation, direct contact by soil organisms, and freshwater life.

[e] Only BC standards apply to Provincial Lands.

TABLE 1 (Cont'd): Summary of Analytical Results for Groundwater - Hydrocarbons

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Monocyclic Aromatic Hydrocarbons				Gross Parameters					Petroleum Hydrocarbon Fractions			
			Benzene (µg/L)	Ethyl-benzene (µg/L)	Toluene (µg/L)	Xylenes (µg/L)	VHw_{6-10} (µg/L)	VPHw (C6-C10) (µg/L)	$EPHw_{10-19}$ (µg/L)	LEPHw (C10-C19)[b] (µg/L)	$EPHw_{19-32}$ (µg/L)	F1 (C6-C10) (µg/L)	F2 (>C10-C16) (µg/L)	F3 (>C16-C34) (µg/L)	F4 (>C34-C50) (µg/L)
Provincial Lands[e]															
MW04-3	MW04-3-081003	2008 10 03	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
cont'd	MW04-3-090714	2009 07 14	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
MW04-4	MW04-4-041018	2004 10 18/19	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250	-	-	-	-
	MWB-041019	Duplicate	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	QA/QC RPD %		*	*	*	*	*	*	*	*	*	-	-	-	-
	MW04-4-050708	2005 07 08	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-4-060717	2006 07 17	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-4-061001	2006 10 01	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-4-070917	2007 09 17	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-4-080618	2008 06 18	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-4-081003	2008 10 03	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-4-090712	2009 07 12	-	-	-	-	-	-	120	120	190	-	-	-	-
	MW04-4-090925	2009 09 25	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
	MW04-4-100910	2010 09 10	-	-	-	-	-	-	< 80	< 80	< 80	-	-	-	-
	MW04-4-110930	2011 09 30	-	-	-	-	-	-	250	250	< 200	-	-	-	-
	MW04-4-120830	2012 08 30	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
	MW04-4-130924	**2013 09 24**	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MW04-5	MW04-5-041018	2004 10 18/19	< 0.1	1.4	< 0.1	0.3	170	170	1,400	**1,400**	< 250	-	-	-	-
	MWA-041019	2004 10 19	-	-	-	-	-	-	1,100	**1,100**	400	-	-	-	-
	MW05-B-050708	Duplicate	-	-	-	-	-	-	1,400	**1,400**	< 250	-	-	-	-
	QA/QC RPD %		*	*	*	*	*	*	24	24	*	-	-	-	-
	MW04-5-050708	2005 07 08	-	-	-	-	-	-	810	**810**	< 250	-	-	-	-
	MW04-5-060717	2006 07 17	-	-	-	-	-	-	590	**590**	< 250	-	-	-	-
	MW04-5-061001	2006 10 01	-	-	-	-	-	-	1,100	**1,100**	< 250	-	-	-	-
	MW04-5-070925	2007 09 25	-	-	-	-	-	-	1,200	**1,200**	270	-	-	-	-
	MW04-5-080618	2008 06 18	-	-	-	-	-	-	470	470	280	-	-	-	-
	MW04-5-081003	2008 10 03	-	-	-	-	-	-	< 250	< 250	350	-	-	-	-
	MW04-5-090925	2009 09 25	-	-	-	-	-	-	< 100	< 100	170	-	-	-	-
	MW04-5-110929	2011 09 29	-	-	-	-	-	-	950	**950**	< 200	-	-	-	-
	MW04-5-121005	2012 10 05	-	-	-	-	-	-	1,200	**1,200**	270	-	-	-	-
	MW04-5-130924	**2013 09 24**	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MW04-6	MW04-6-041018	2004 10 18/19	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	440	440	280	-	-	-	-
	MW04-6-050707	2005 07 07	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-6-060717	2006 07 17	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-6-060930	2006 09 30	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-6-070917	2007 09 17	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW06-4-080618[c]	2008 06 18/19	-	-	-	-	-	-	980	**980**	450	-	-	-	-
	MW04-6-080930	2008 09 30	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW04-6-090712	2009 07 12	-	-	-	-	-	-	110	110	190	-	-	-	-
	MW04-6-090925	2009 09 25	-	-	-	-	-	-	< 100	< 100	150	-	-	-	-
	MW04-6-120830	2012 08 30	-	-	-	-	-	-	120	120	100	-	-	-	-
	MW04-6-130924	**2013 09 24**	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MW08-5	MW08-5-081003	2008 10 03	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW08-5-090714	2009 07 14	-	-	-	-	-	-	120	120	120	-	-	-	-
	MW08-5-100924	2010 09 24	-	-	-	-	-	-	< 80	< 80	< 80	-	-	-	-
	MW08-5-111001	2011 10 01	-	-	-	-	-	-	< 200	< 200	< 200	-	-	-	-
	MW08-5-120903	2012 09 03	-	-	-	-	-	-	240	240	< 100	-	-	-	-
	MWB-120903	2012 09 03	-	-	-	-	-	-	260	260[b]	< 100	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	*	*	-	-	-	-
	MW08-5-130925	**2013 09 25**	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MW08-6	MW08-6-081003	2008 10 03	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW08-6-090714	2009 07 14	-	-	-	-	-	-	360	360	170	-	-	-	-
	MW08-6-090827	2009 08 27	-	-	-	-	-	-	370	370	< 250	-	-	-	-
	MW08-6-090926	2009 09 26	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW-A-090926	Duplicate	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	*	*	-	-	-	-
	MW08-6-120903	2012 09 03	-	-	-	-	-	-	110	110	< 100	-	-	-	-
	MW08-6-130925	**2013 09 25**	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MW08-7	MW08-7-081003	2008 10 03	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MWB-081003	2008 10 03	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW08-7-090713	2009 07 13	-	-	-	-	-	-	730	**730**	180	-	-	-	-
	MW-B-090713	2009 07 13	-	-	-	-	-	-	580	**580**	170		-	-	-
	MW08-7-090827	2009 08 27	-	-	-	-	-	-	410	410	< 250	-	-	-	-
	MW08-7-090925	2009 09 25	-	-	-	-	-	-	< 100	< 100	< 100	-	-	-	-
	MW08-7-100906	2010 09 06	-	-	-	-	-	-	260	260	< 80	-	-	-	-
	MW08-7-111001	2011 10 01	-	-	-	-	-	-	< 200	< 200	< 200	-	-	-	-
	MW08-7-120903	2012 09 03	-	-	-	-	-	-	330	330[b]	< 100	-	-	-	-
	MW08-7-130925	**2013 09 25**	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
MW08-8	MW08-8-081003	2008 10 03	-	-	-	-	-	-	370	370	< 250	-	-	-	-
	MW08-8-090712	2009 07 12	-	-	-	-	-	-	580	**580**	220	-	-	-	-
	MW08-8-090827	2009 08 27	-	-	-	-	-	-	450	450	< 250	-	-	-	-
	MW08-8-090926	2009 09 26	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
	MW08-8-100913	2010 09 13	-	-	-	-	-	-	250	250	< 80	-	-	-	-
	MW10-A-100913	Duplicate	-	-	-	-	-	-	290	290	80	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	*	*	-	-	-	-
	MW08-8-111001	2011 10 01	-	-	-	-	-	-	< 200	< 200	< 200	-	-	-	-
	MW11-B-111001	2011 10 01	-	-	-	-	-	-	< 200	< 200	< 200	-	-	-	-
	QA/QC RPD %		-	-	-	-	-	-	*	*	*	-	-	-	-
	MW08-8-130925	**2013 09 25**	-	-	-	-	-	-	< 250	< 250	< 250	-	-	-	-
Purge Water															
Yellow Drum	Yellow Drum - 070927	2007 09 27	-	-	-	-	-	-	4,700	**4,700**	740	-	-	-	-
Blue Drum	Blue Drum - 070927	2007 09 27	-	-	-	-	-	-	410	410	< 250	-	-	-	-
BC Standards															
CSR Aquatic Life (AW)[a]			4,000	2,000	390	n/a	15,000	1,500	5,000	500	n/a	n/a	n/a	n/a	n/a
CSR Drinking Water (DW)			5	2.4	24	300	15,000	n/a	5,000	n/a	n/a	n/a	n/a	n/a	n/a
Federal Guidelines															
Canadian Drinking Water Quality Drinking Water (DW)			5	2.4	24	300	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
FGQG T2 Residential Land Use (RL)[d] - Fine Grained Soil			2,800	42,000	82,000	21,000	n/a	n/a	n/a	n/a	n/a	6,500	1,800	n/a	n/a
FGQG T2 Residential Land Use (RL)[d] - Coarse Grained Soil			140	16,000	83	3,900	n/a	n/a	n/a	n/a	n/a	810	1,300	n/a	n/a

Associated ALS files: L1368607.

Associated Maxxam files: B081839, B083828, B085238, B091731, B193983.

Associated CanTest files: 100714077, 100718016, 100831012, 100928032, 100929013, 11002077, 40916043, 41007033, 41030015, 51020086, 51020107, 60711045, 70720118, 70930027, 71002069, 80920016, 80927170, 81001087, 90619137, 90623066, 90623067, 90623069, 90623071, 90623079, 90825115, 91002010, 91006083, 91006094.

All terms defined within the body of SNC Lavalin's report.

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n/a	Denotes no applicable standard.
*	RPDs are not normally calculated where one or more concentrations are less than five times MDL.

SHADOW	Concentration greater than CSR Aquatic Life (AW) standard.
ITALIC	Concentration greater than CSR Drinking Water (DW) standard.
SHADED	Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.
OUTLINE	Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for fine grained soils.
UNDERLINE	Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for coarse grained soils.

[a] Standard to protect freshwater aquatic life.

[b] EPHw10-19 concentration has been compared to the CSR AW standard for LEPHw, which is a conservative comparison.

[c] Sample Id corrected.

[d] The exposure pathway(s) used for determining the FGQG Tier 2 guidelines for this site include: inhalation, direct contact by soil organisms, and freshwater life.

[e] Only BC standards apply to Provincial Lands.

TABLE 2: Summary of Analytical Results for Groundwater - PAHs

			Polycyclic Aromatic Hydrocarbons																	
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Naphthalene (µg/L)	Acenaphthylene (µg/L)	Acenaphthene (µg/L)	Fluorene (µg/L)	Phenanthrene (µg/L)	Anthracene (µg/L)	Acridine (µg/L)	Fluoranthene (µg/L)	Pyrene (µg/L)	Benzo(a) anthracene (µg/L)	Chrysene (µg/L)	Benzo(b) fluoranthene (µg/L)	Benzo(k) fluoranthene (µg/L)	Benzo(a) pyrene (µg/L)	Indeno(1,2,3-cd) pyrene (µg/L)	Dibenz(a,h) anthracene (µg/L)	Benzo(g,h,i) perylene (µg/L)	Quinoline (µg/L)
Port of Pleasant Camp																				
MWP3	MWP3-050708	2005 07 08	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MWP4	MWP4-090927	2009 09 27	< 0.6	< 0.2	1	2.3	**1.3**	< 0.02[a]	< 0.1[a]	< 0.08[a]	**0.05**	< 0.02[a]	< 0.02	< 0.02	< 0.02	< 0.02[a]	< 0.02	< 0.02	< 0.02	< 1
	MWP4-110930	2011 09 30	**1.7**	< 0.3	1.1	**3**	**2.3**	< 0.01	**0.33**	< 0.02	**0.03**	< 0.01	< 0.05	< 0.05	< 0.05	< 0.009	< 0.05	< 0.05	< 0.05	< 0.5
	MWP4-121006	2012 10 06	< 0.5	< 0.5	< 0.5	1.8	**1.1**	< 0.5[a]	< 0.5[a]	< 0.05[a]	< 0.02	< 0.05[a]	< 0.05	< 0.05	< 0.05	< 0.01	< 0.05	< 0.05	< 0.05	< 1
	MWP4-130925	**2013 09 25**	< 0.05	< 0.05	< 0.05	0.054	< 0.05	< 0.05[a]	< 0.05	< 0.05[a]	< 0.05[a]	< 0.05[a]	< 0.05	< 0.05	< 0.05	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05
MWP11	MWP11-050708	2005 07 08	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
AS-4	AS-4-090927	2009 09 27	< 3[a]	< 1	< 1	< 0.5	< 0.5[a]	< 0.1[a]	< 0.5[a]	< 0.4[a]	< 0.2[a]	< 0.1[a]	< 0.1	< 0.1	< 0.1	< 0.1[a]	< 0.1	< 0.1	< 0.1	< 5[a]
MW-AS-11	AS-11-090926	2009 09 27	< 0.3	< 0.1	0.13	0.25	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW-AS-13	AS-13-090714	2009 07 14	< 0.3	< 0.1	0.12	0.28	0.1	< 0.01	< 0.05	< 0.04	**0.03**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	AS-13-090927	2009 09 26	< 0.3	< 0.1	< 0.1	0.11	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW-AS-15	AS-15-090927	2009 09 27	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW-AS-22	AS-22-090714	2009 07 14	< 0.3	< 0.1	0.49	0.91	0.17	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	AS-22-090927	2009 09 27	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW-AS-23	AS-23-090714	2009 07 14	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW-D-090714	Duplicate	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	QA/QC RPD %		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
MW01-17D	MW01-17D-090713	2009 07 13	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	**0.12**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW-C-090713	Duplicate	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	**0.05**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	QA/QC RPD %		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW01-17D-090926	2009 09 26	< 3[a]	< 1	< 1	< 0.5	< 0.5[a]	< 0.1[a]	< 0.5[a]	< 0.4[a]	< 0.2[a]	< 0.1[a]	< 0.1	< 0.1	< 0.1	< 0.1[a]	< 0.1	< 0.1	< 0.1	< 5[a]
	MW-C-090926	Duplicate	< 3[a]	< 1	< 1	< 0.5	< 0.5[a]	< 0.1[a]	< 0.5[a]	< 0.4[a]	< 0.2[a]	< 0.1[a]	< 0.1	< 0.1	< 0.1	< 0.1[a]	< 0.1	< 0.1	< 0.1	< 5[a]
	QA/QC RPD %		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
BC Standards																				
CSR Aquatic Life (AW)[b]			10	n/a	60	120	3	1	0.5	2	0.2	1	1	n/a	n/a	0.1	n/a	n/a	n/a	34
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.01	n/a	n/a	n/a	n/a
Federal Guidelines																				
Canadian Drinking Water Quality Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.01	n/a	n/a	n/a	n/a
FGQG T2 Residential Land Use (RL)[c] - Fine Grained Soil			1.1	46	5.8	3	0.4	0.012	0.05	0.04	0.025	0.018	1.4	n/a	0.48	0.017	0.23	0.28	0.21	3.4
FGQG T2 Residential Land Use (RL)[c] - Coarse Grained Soil			1.1	46	5.8	3	0.4	0.012	0.05	0.04	0.025	0.018	1.4	n/a	0.48	0.015	0.21	0.26	0.17	3.4

Associated Maxxam files: B081839, B083828, B085238, B091731, B193983.

Associated CanTest files: 100714077, 100718016, 100831012, 100928032, 100929013, 11002077, 40916043, 41007033, 41030015, 51020086, 51020107, 60711045, 70720118, 70930027, 71002069, 80920016, 80927170, 81001087, 90619137, 90623066, 90623067, 90623069, 90623071, 90623079, 90825115, 91002010, 91006083, 91006094.

All terms defined within the body of SNC Lavalin's report.

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< Denotes concentration less than indicated detection limit or RPD less than indicated value.

\- Denotes analysis not conducted.

n/a Denotes no applicable standard.

* RPDs are not normally calculated where one or more concentrations are less than five times MDL.

SHADOW Concentration greater than CSR Aquatic Life (AW) standard.

ITALIC Concentration greater than CSR Drinking Water (DW) standard.

SHADED Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.

OUTLINE Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for fine grained soils.

UNDERLINE Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for coarse grained soils.

[a] Laboratory detection limit exceeds regulatory standard.

[b] Standard to protect freshwater aquatic life.

[c] The exposure pathway(s) used for determining the FGQG Tier 2 guidelines for this site include: inhalation, direct contact by soil organisms, and freshwater life

[d] Only BC standards apply to Provincial Land.

TABLE 2 (Cont'd): Summary of Analytical Results for Groundwater - PAHs

			Polycyclic Aromatic Hydrocarbons																		
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Naphthalene (µg/L)	Acenaphthylene (µg/L)	Acenaphthene (µg/L)	Fluorene (µg/L)	Phenanthrene (µg/L)	Anthracene (µg/L)	Acridine (µg/L)	Fluoranthene (µg/L)	Pyrene (µg/L)	Benzo(a) anthracene (µg/L)	Chrysene (µg/L)	Benzo(b) fluoranthene (µg/L)	Benzo(k) fluoranthene (µg/L)	Benzo(a) pyrene (µg/L)	Indeno(1,2,3-cd) pyrene (µg/L)	Dibenz(a,h) anthracene (µg/L)	Benzo(g,h,i) perylene (µg/L)	Quinoline (µg/L)
Port of Pleasant Camp																					
MW01-17D	MW01-17D-100924	2010 09 24	< 0.05	< 0.4	< 0.6	< 0.08	< 0.2	< 0.3[a]	< 1[a]	< 0.2[a]	**0.2**	< 0.03[a]	0.02	0.01	< 0.01	< 0.01	< 0.02	< 0.02	< 0.02	0.15
cont'd	MWB-100924	2010 09 24	< 0.05	< 0.2	< 0.1	< 0.03	< 0.1	< 0.2[a]	< 0.8[a]	**0.09**	**0.13**	< 0.03[a]	0.01	< 0.01	< 0.01	< 0.01	< 0.02	< 0.02	< 0.02	< 0.07
	QA/QC RPD %		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW01-17D-110930	2011 09 30	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.1[a]	< 0.02	< 0.02	< 0.01	< 0.05	< 0.05	< 0.05	< 0.009	< 0.05	< 0.05	< 0.05	< 0.5
	MW11-A-110930	Duplicate	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02[a]	< 0.2[a]	< 0.02	**0.03**	< 0.01	< 0.05	< 0.05	< 0.05	< 0.009	< 0.05	< 0.05	< 0.05	< 0.5
	QA/QC RPD %		*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW01-17D-120904	2012 09 04	< 0.05	< 0.05	0.07	0.25	< 0.05	< 0.05[a]	< 0.05	< 0.05	< 0.02	< 0.05[a]	< 0.05	< 0.05	< 0.05	< 0.01	< 0.05	< 0.05	< 0.05	< 0.1
	MWD-120904	2012 09 04	< 0.05	< 0.05	0.07	0.22	< 0.05	< 0.05[a]	< 0.05	< 0.05	< 0.02	< 0.05[a]	< 0.05	< 0.05	< 0.05	< 0.01	< 0.05	< 0.05	< 0.05	< 0.1
	QA/QC RPD %		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW01-17D-130925	**2013 09 25**	< 0.2	< 0.05	< 0.2	0.313	< 0.05	< 0.05[a]	< 0.2[a]	< 0.05[a]	< 0.05[a]	< 0.05[a]	< 0.05	< 0.05	< 0.05	< 0.01	< 0.05	< 0.05	< 0.05	< 0.1
MW01-19	MW01-19-090712	2009 07 12	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW-A-090712	Duplicate	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	QA/QC RPD %		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW01-19-090926	2009 09 26	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW-B-090926	Duplicate	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	QA/QC RPD %		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW01-19-130925	**2013 09 25**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05[a]	< 0.05	< 0.05[a]	< 0.05[a]	< 0.05[a]	< 0.05	< 0.05	< 0.05	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05
MW03-03	MW03-03 030909	2003 09 09/10	**9.9**	< 0.1	1.4	**3.8**	**3.7**	**0.38**	< 0.05	**0.05**	**0.18**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW03-03 031025	2003 10 25	< 0.3	< 0.1	< 0.1	0.06	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW03-3-090713	2009 07 13	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW03-3-090926	2009 09 26	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW03-04	MW03-04 030909	2003 09 09/10	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	**0.07**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW03-04 031025	2003 10 25	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW03-05	MW03-05 030909	2003 09 09/10	< 0.3	< 0.1	< 0.1	< 0.05	0.07	< 0.01	< 0.05	< 0.04	**0.06**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW03-05 031025	2003 10 25	0.4	< 0.1	< 0.1	0.11	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW06-1	MW06-1-090926	2009 09 26	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
BC Standards																					
CSR Aquatic Life (AW)[b]			10	n/a	60	120	3	1	0.5	2	0.2	1	1	n/a	n/a	0.1	n/a	n/a	n/a	34
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.01	n/a	n/a	n/a	n/a
Federal Guidelines																					
Canadian Drinking Water Quality Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.01	n/a	n/a	n/a	n/a
FGQG T2 Residential Land Use (RL)[c] - Fine Grained Soil			1.1	46	5.8	3	0.4	0.012	0.05	0.04	0.025	0.018	1.4	n/a	0.48	0.017	0.23	0.28	0.21	3.4
FGQG T2 Residential Land Use (RL)[c] - Coarse Grained Soil			1.1	46	5.8	3	0.4	0.012	0.05	0.04	0.025	0.018	1.4	n/a	0.48	0.015	0.21	0.26	0.17	3.4

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UNDERLINE	Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for coarse grained soils.

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TABLE 2 (Cont'd): Summary of Analytical Results for Groundwater - PAHs

			Polycyclic Aromatic Hydrocarbons																		
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Port of Pleasant Camp																					
MW06-2	MW06-2-090713	2009 07 13	< 0.3	< 0.1	0.29	0.65	< 0.05	< 0.01	< 0.05	< 0.04	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01[a]	< 0.01	< 0.01	< 0.01	< 0.5
	MW06-2-090926	2009 09 26	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01[a]	< 0.01	< 0.01	< 0.01	< 0.5
MW06-5	MW06-5-090713	2009 07 13	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01[a]	< 0.01	< 0.01	< 0.01	< 0.5
MW06-6	MW06-6-090715	2009 07 15	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01[a]	< 0.01	< 0.01	< 0.01	< 0.5
MW08-1	MW08-1-090713	2009 07 13	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01[a]	< 0.01	< 0.01	< 0.01	< 0.5
MW08-2	MW08-2-090712	2009 07 12	< 0.3	< 0.1	0.2	0.37	< 0.05	< 0.01	< 0.05	< 0.04	**0.08**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01[a]	< 0.01	< 0.01	< 0.01	< 0.5
	MW08-2-090926	2009 09 26	< 0.6	< 0.2	< 0.2	< 0.1	< 0.1	< 0.02[a]	< 0.1[a]	< 0.08[a]	**0.18**	< 0.02[a]	< 0.02	< 0.02	< 0.02	< 0.02[a]	< 0.02	< 0.02	< 0.02	< 1
	MW08-2-100913	2010 09 13	< 0.2	< 0.1	1.8	< 1	< 0.4	< 0.4[a]	< 1[a]	**0.1**	**0.36**	< 0.02[a]	0.06	< 0.01	< 0.01	< 0.02[a]	< 0.02	< 0.02	< 0.02	< 0.5
	MW08-2-110929	2011 09 29	< 0.2	< 0.06	0.27	0.66	0.26	< 0.03[a]	**0.19**	< 0.02	0.02	< 0.01	< 0.05	< 0.05	< 0.05	< 0.009	< 0.05	< 0.05	< 0.05	< 0.5
	MW08-2-120904	2012 09 04	0.11	< 0.05	< 0.05	0.89	**0.43**	< 0.05[a]	< 0.05	< 0.05	0.02	< 0.05[a]	< 0.05	< 0.05	< 0.05	< 0.01	< 0.05	< 0.05	< 0.05	< 0.1
	MW08-2-130925	**2013 09 25**	< 0.2	< 0.05	< 0.2	0.211	< 0.1	< 0.1[a]	< 0.05	< 0.05[a]	< 0.05[a]	< 0.05[a]	< 0.05	< 0.05	< 0.05	< 0.01	< 0.05	< 0.05	< 0.05	< 0.2
MW08-3	MW08-3-090715	2009 07 15	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01[a]	< 0.01	< 0.01	< 0.01	< 0.5
	MW08-3-090926	2009 09 26	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01[a]	< 0.01	< 0.01	< 0.01	< 0.5
MW08-4	MW08-4-090927	2009 09 27	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01[a]	< 0.01	< 0.01	< 0.01	< 0.5
MW09-5	MW09-5-090926	2009 09 26	< 0.6	< 0.2	< 0.2	< 0.1	**1.4**	< 0.02[a]	< 0.1[a]	< 0.08[a]	**0.36**	< 0.02[a]	< 0.02	< 0.02	< 0.02	< 0.02[a]	< 0.02	< 0.02	< 0.02	< 1
	MW-D-090926	Duplicate	< 0.6	< 0.2	< 0.2	< 0.1	**1.8**	< 0.02[a]	< 0.1[a]	< 0.08[a]	**0.43**	< 0.02[a]	< 0.02	< 0.02	< 0.02	***0.02***	< 0.02	< 0.02	< 0.02	< 1
	QA/QC RPD %		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW09-5-100913	2010 09 13	< 0.08	< 0.03	< 0.7	< 0.5	< 0.1	< 0.2[a]	< 0.3[a]	0.03	**0.16**	< 0.01	0.03	< 0.01	< 0.01	< 0.01	< 0.02	< 0.02	< 0.02	< 0.2
	MW09-5-110929	2011 09 29	< 0.3	< 0.2	< 0.1	0.55	**1.4**	< 0.2[a]	**1.7**	**0.06**	**0.18**	**0.02**	< 0.05	< 0.05	< 0.05	***0.011***	< 0.05	< 0.05	< 0.05	< 0.5
	MW09-5-120903	2012 09 03	< 0.5	< 0.5	< 0.5	1.9	**4.8**	< 0.5[a]	< 0.5[a]	< 0.5[a]	**0.6**	< 0.5[a]	< 0.5	< 0.5[a]	< 0.5[a]	< 0.1[a]	< 0.5[a]	< 0.5[a]	< 0.5[a]	< 1
	MW09-5-130925	**2013 09 25**	< 0.4	< 0.5	< 0.4	0.71	**1.85**	< 0.8[a]	< 0.5[a]	< 0.2[a]	**0.396**	< 0.05[a]	< 0.05	0.053	< 0.05	***0.042***	< 0.05	< 0.05	< 0.05	< 0.7
	MWB-130925	**2013 09 25**	< 0.6	< 0.4	< 0.5	1.22	**3.02**	< 2[a]	< 0.7[a]	< 0.2[a]	**0.43**	< 0.05[a]	< 0.05	< 0.05	< 0.05	***0.025***	< 0.05	< 0.05	< 0.05	< 2
	QA/QC RPD %		*	*	*	53	48	*	*	*	8	*	*	*	*	*	*	*	*	*
MW09-16	MW09-16-090927	2009 09 27	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01[a]	< 0.01	< 0.01	< 0.01	< 0.5
BC Standards																					
CSR Aquatic Life (AW)[b]			10	n/a	60	120	3	1	0.5	2	0.2	1	1	n/a	n/a	0.1	n/a	n/a	n/a	34
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.01	n/a	n/a	n/a	n/a
Federal Guidelines																					
Canadian Drinking Water Quality Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.01	n/a	n/a	n/a	n/a
FGQG T2 Residential Land Use (RL)[c] - Fine Grained Soil			1.1	46	5.8	3	0.4	0.012	0.05	0.04	0.025	0.018	1.4	n/a	0.48	0.017	0.23	0.28	0.21	3.4
FGQG T2 Residential Land Use (RL)[c] - Coarse Grained Soil			1.1	46	5.8	3	0.4	0.012	0.05	0.04	0.025	0.018	1.4	n/a	0.48	0.015	0.21	0.26	0.17	3.4

Associated Maxxam files: B081839, B083828, B085238, B091731, B193983.

Associated CanTest files: 100714077, 100718016, 100831012, 100928032, 100929013, 11002077, 40916043, 41007033, 41030015, 51020086, 51020107, 60711045, 70720118, 70930027, 71002069, 80920016, 80927170, 81001087, 90619137, 90623066, 90623067, 90623069, 90623071, 90623079, 90825115, 91002010, 91006083, 91006094.

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SHADOW Concentration greater than CSR Aquatic Life (AW) standard.

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SHADED Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.

OUTLINE Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for fine grained soils.

UNDERLINE Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for coarse grained soils.

[a] Laboratory detection limit exceeds regulatory standard.

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[c] The exposure pathway(s) used for determining the FGQG Tier 2 guidelines for this site include: inhalation, direct contact by soil organisms, and freshwater life

[d] Only BC standards apply to Provincial Land.

TABLE 2 (Cont'd): Summary of Analytical Results for Groundwater - PAHs

			Polycyclic Aromatic Hydrocarbons																		
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Naphthalene (µg/L)	Acenaphthylene (µg/L)	Acenaphthene (µg/L)	Fluorene (µg/L)	Phenanthrene (µg/L)	Anthracene (µg/L)	Acridine (µg/L)	Fluoranthene (µg/L)	Pyrene (µg/L)	Benzo(a) anthracene (µg/L)	Chrysene (µg/L)	Benzo(b) fluoranthene (µg/L)	Benzo(k) fluoranthene (µg/L)	Benzo(a) pyrene (µg/L)	Indeno(1,2,3-cd) pyrene (µg/L)	Dibenz(a,h) anthracene (µg/L)	Benzo(g,h,i) perylene (µg/L)	Quinoline (µg/L)
Provincial Lands[d]																					
MW01-20	MW01-20-090925	2009 09 25	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW01-21	MW01-21 031025	2003 10 25	1.2	< 0.1	< 0.1	1.1	0.57	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW01-21-050708	2005 07 08	< 0.3	< 0.1	1	3.5	1.5	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW01-21-060718	2006 07 18	< 0.6	< 0.2	< 0.2	< 0.1	< 0.1	< 0.02	< 0.1	< 0.08	< 0.04	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02[a]	< 0.02	< 0.02	< 0.02	< 1
	MW01-21-090714	2009 07 14	< 0.3	< 0.1	0.43	2.1	1.2	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.01	0.01	< 0.5
	MW01-21-090926	2009 09 26	< 0.3	< 0.1	0.18	0.95	0.38	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW01-21-100924	2010 09 24	< 0.2	< 0.01	0.1	0.96	0.06	< 0.02	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	< 0.02	< 0.02	< 0.06
	MW01-21-111001	2011 10 01	< 0.2	< 0.05	0.45	1.6	0.79	< 0.05	0.22	< 0.02	< 0.02	< 0.01	< 0.05	< 0.05	< 0.05	< 0.009	< 0.05	< 0.05	< 0.05	< 0.5
MW01-23	MW01-23 031025	2003 10 25	< 0.3	< 0.1	< 0.1	0.12	0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW03-01	MW03-01 030909	2003 09 09/10	< 0.3	< 0.1	< 0.1	0.25	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW03-1-090714	2009 07 14	< 0.3	< 0.1	< 0.1	0.32	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.01	0.01	0.01	< 0.5
MW03-06	MW03-06 030909	2003 09 09/10	< 0.3	< 0.1	< 0.1	< 0.05	0.17	< 0.01	< 0.05	0.15	0.16	0.03	0.03	0.03	< 0.01	0.01	0.01	< 0.01	0.01	< 0.5
	MW03-06 031025	2003 10 25	< 0.3	< 0.1	< 0.1	< 0.05	0.05	< 0.01	< 0.05	< 0.04	0.02	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW03-07	MW03-7-060717	2006 07 17	< 0.6	< 0.2	< 0.2	< 0.1	< 0.1	< 0.02	< 0.1	< 0.08	< 0.04	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02[a]	< 0.02	< 0.02	< 0.02	< 1
	MW03-7-090712	2009 07 12	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW03-7-090925	2009 09 25	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW03-08	MW03-8-060717	2006 07 17	< 0.6	< 0.2	< 0.2	< 0.1	< 0.1	< 0.02	< 0.1	< 0.08	< 0.04	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02[a]	< 0.02	< 0.02	< 0.02	< 1
	MW06-A-060717	2006 07 17	< 0.6	< 0.2	< 0.2	< 0.1	< 0.1	< 0.02	< 0.1	< 0.08	< 0.04	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02[a]	< 0.02	< 0.02	< 0.02	< 1
	MW03-8-090712	2009 07 12	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	0.04	0.02	0.02	0.02	0.01	0.01	0.01	< 0.01	< 0.01	< 0.5
	MW03-8-090925	2009 09 25	< 0.3	< 0.1	< 0.1	0.08	< 0.05	< 0.01	< 0.05	< 0.04	0.09	< 0.01	0.02	< 0.01	< 0.01	***0.02***	< 0.01	< 0.01	< 0.01	< 0.5
MW03-09	MW03-9-060717	2006 07 17	< 0.6	< 0.2	< 0.2	< 0.1	< 0.1	< 0.02	< 0.1	< 0.08	< 0.04	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02[a]	< 0.02	< 0.02	< 0.02	< 1
	MW03-9-090712	2009 07 12	< 0.3	< 0.1	0.33	1.1	0.28	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW03-9-090925	2009 09 25	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
BC Standards																					
CSR Aquatic Life (AW)[b]			10	n/a	60	120	3	1	0.5	2	0.2	1	1	n/a	n/a	0.1	n/a	n/a	n/a	34
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.01	n/a	n/a	n/a	n/a
Federal Guidelines																					
Canadian Drinking Water Quality Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.01	n/a	n/a	n/a	n/a
FGQG T2 Residential Land Use (RL)[c] - Fine Grained Soil			1.1	46	5.8	3	0.4	0.012	0.05	0.04	0.025	0.018	1.4	n/a	0.48	0.017	0.23	0.28	0.21	3.4
FGQG T2 Residential Land Use (RL)[c] - Coarse Grained Soil			1.1	46	5.8	3	0.4	0.012	0.05	0.04	0.025	0.018	1.4	n/a	0.48	0.015	0.21	0.26	0.17	3.4

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[a] Laboratory detection limit exceeds regulatory standard.

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TABLE 2 (Cont'd): Summary of Analytical Results for Groundwater - PAHs

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Polycyclic Aromatic Hydrocarbons																	
			Naphthalene (µg/L)	Acenaphthylene (µg/L)	Acenaphthene (µg/L)	Fluorene (µg/L)	Phenanthrene (µg/L)	Anthracene (µg/L)	Acridine (µg/L)	Fluoranthene (µg/L)	Pyrene (µg/L)	Benzo(a) anthracene (µg/L)	Chrysene (µg/L)	Benzo(b) fluoranthene (µg/L)	Benzo(k) fluoranthene (µg/L)	Benzo(a) pyrene (µg/L)	Indeno(1,2,3-cd) pyrene (µg/L)	Dibenz(a,h) anthracene (µg/L)	Benzo(g,h,i) perylene (µg/L)	Quinoline (µg/L)
Provincial Lands[d]																				
MW03-10	MW03-10-090712	2009 07 12	< 3[a]	< 1	< 1	6	4.9	< 0.1	< 0.5	< 0.4	**1.5**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1[a]	< 0.1	< 0.1	< 0.1	< 5
	MW03-10-090925	2009 09 25	< 0.3	< 0.1	0.48	0.97	< 0.05	< 0.01	< 0.05	< 0.04	0.12	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW03-10-100910	2010 09 10	< 0.2	< 0.06	< 0.1	0.12	< 0.1	< 0.2	< 2[a]	0.05	**0.22**	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.02	< 0.02	< 0.02	< 0.9
	MW03-10-110930	2011 09 30	< 0.2	< 0.05	0.33	0.72	< 0.2	< 0.03	0.23	< 0.02	0.04	< 0.01	< 0.05	< 0.05	< 0.05	< 0.009	< 0.05	< 0.05	< 0.05	< 0.5
	MW03-10-120830	2012 08 30	< 0.1	< 0.1	< 0.1	0.6	0.4	< 0.1	< 0.1	< 0.1	0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.02[a]	< 0.1	< 0.1	< 0.1	< 0.2
	MW03-10-130924	**2013 09 24**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.09	< 0.05	< 0.7[a]	< 0.05	0.147	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05
MW03-11	MW03-11-090925	2009 09 25	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW04-1	MW04-1-041019	2004 10 19	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW04-1-090925	2009 09 25	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW04-2	MW04-2-041019	2004 10 19	2.4	< 0.1	0.47	1.1	0.49	< 0.01	< 0.05	0.04	0.04	0.02	0.02	0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW04-2-050708	2005 07 08	< 0.3	< 0.1	0.42	1.2	0.27	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW04-2-060718	2006 07 18	< 0.6	< 0.2	< 0.2	< 0.1	< 0.1	< 0.02	< 0.1	< 0.08	< 0.04	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02[a]	< 0.02	< 0.02	< 0.02	< 1
	MW04-2-090713	2009 07 13	< 0.3	< 0.1	< 0.1	0.23	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW04-2-090925	2009 09 25	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW04-3	MW04-3-041018	2004 10 18/19	< 0.3	< 0.1	0.3	1.1	0.38	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW04-3-090714	2009 07 14	< 0.3	< 0.1	< 0.1	0.09	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW04-4	MW04-4-041018	2004 10 18/19	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MWB-041019	Duplicate	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	QA/QC RPD %		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW04-4-090712	2009 07 12	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW04-4-090925	2009 09 25	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
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CSR Aquatic Life (AW)[b]			10	n/a	60	120	3	1	0.5	2	0.2	1	1	n/a	n/a	0.1	n/a	n/a	n/a	34
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.01	n/a	n/a	n/a	n/a
Federal Guidelines																				
Canadian Drinking Water Quality Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.01	n/a	n/a	n/a	n/a
FGQG T2 Residential Land Use (RL)[c] - Fine Grained Soil			1.1	46	5.8	3	0.4	0.012	0.05	0.04	0.025	0.018	1.4	n/a	0.48	0.017	0.23	0.28	0.21	3.4
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			Polycyclic Aromatic Hydrocarbons																	
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Naphthalene (µg/L)	Acenaphthylene (µg/L)	Acenaphthene (µg/L)	Fluorene (µg/L)	Phenanthrene (µg/L)	Anthracene (µg/L)	Acridine (µg/L)	Fluoranthene (µg/L)	Pyrene (µg/L)	Benzo(a) anthracene (µg/L)	Chrysene (µg/L)	Benzo(b) fluoranthene (µg/L)	Benzo(k) fluoranthene (µg/L)	Benzo(a) pyrene (µg/L)	Indeno(1,2,3-cd) pyrene (µg/L)	Dibenz(a,h) anthracene (µg/L)	Benzo(g,h,i) perylene (µg/L)	Quinoline (µg/L)
Provincial Lands[d]																				
MW04-5	MW04-5-041018	2004 10 18/19	6.5	< 0.1	1.2	3.2	2	< 0.01	< 0.05	< 0.04	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MWA-041019	2004 10 19	4.4	< 0.1	< 0.1	1.3	1.4	< 0.01	< 0.05	< 0.04	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	QA/QC RPD %		26	*	29	13	35	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW05-B-050708	Duplicate	5	< 0.1	0.9	2.8	1.4	0.1	< 0.05	< 0.04	0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW04-5-060717	2006 07 17	< 0.6	< 0.2	< 0.2	< 0.1	< 0.1	< 0.02	< 0.1	< 0.08	< 0.04	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02[a]	< 0.02	< 0.02	< 0.02	< 1
	MW04-5-090925	2009 09 25	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW04-6	MW04-6-041018	2004 10 18/19	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW04-6-090712	2009 07 12	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW04-6-090925	2009 09 25	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW08-5	MW08-5-090714	2009 07 14	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW08-6	MW08-6-090714	2009 07 14	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW08-6-090926	2009 09 26	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW-A-090926	Duplicate	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	QA/QC RPD %		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
MW08-7	MW08-7-090713	2009 07 13	< 0.3	< 0.1	0.58	1.5	0.19	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW-B-090713	2009 07 13	< 0.3	< 0.1	0.49	1.1	< 0.05	< 0.01	< 0.05	< 0.04	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW08-7-090925	2009 09 25	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
MW08-8	MW08-8-090712	2009 07 12	< 0.3	< 0.1	0.13	0.49	0.16	< 0.01	< 0.05	< 0.04	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
	MW08-8-090926	2009 09 26	< 0.3	< 0.1	< 0.1	< 0.05	< 0.05	< 0.01	< 0.05	< 0.04	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.5
BC Standards																				
CSR Aquatic Life (AW)[b]			10	n/a	60	120	3	1	0.5	2	0.2	1	1	n/a	n/a	0.1	n/a	n/a	n/a	34
CSR Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.01	n/a	n/a	n/a	n/a
Federal Guidelines																				
Canadian Drinking Water Quality Drinking Water (DW)			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.01	n/a	n/a	n/a	n/a
FGQG T2 Residential Land Use (RL)[c] - Fine Grained Soil			1.1	46	5.8	3	0.4	0.012	0.05	0.04	0.025	0.018	1.4	n/a	0.48	0.017	0.23	0.28	0.21	3.4
FGQG T2 Residential Land Use (RL)[c] - Coarse Grained Soil			1.1	46	5.8	3	0.4	0.012	0.05	0.04	0.025	0.018	1.4	n/a	0.48	0.015	0.21	0.26	0.17	3.4

Associated Maxxam files: B081839, B083828, B085238, B091731, B193983.

Associated CanTest files: 100714077, 100718016, 100831012, 100928032, 100929013, 11002077, 40916043, 41007033, 41030015, 51020086, 51020107, 60711045, 70720118, 70930027, 71002069, 80920016, 80927170, 81001087, 90619137, 90623066, 90623067, 90623069, 90623071, 90623079, 90825115, 91002010, 91006083, 91006094.

All terms defined within the body of SNC Lavalin's report.

Term(s) defined within the body of SNC Lavalin's report, or the Glossary of Technical Terms and Abbreviations (available upon request).

< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
* RPDs are not normally calculated where one or more concentrations are less than five times MDL.

SHADOW Concentration greater than CSR Aquatic Life (AW) standard.

ITALIC Concentration greater than CSR Drinking Water (DW) standard.

SHADED Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.

OUTLINE Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for fine grained soils.

UNDERLINE Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline for coarse grained soils.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Standard to protect freshwater aquatic life.
[c] The exposure pathway(s) used for determining the FGQG Tier 2 guidelines for this site include: inhalation, direct contact by soil organisms, and freshwater life
[d] Only BC standards apply to Provincial Land.

TABLE 3: Summary of Analytical Results for Groundwater - Inorganics

			Physical Parameters		Dissolved Inorganics							Dissolved Metals																								
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness (mg/L)	pH (field) (pH)	Ammonia Nitrogen (µg/L)	Nitrate Nitrogen (µg/L)	Nitrite Nitrogen (µg/L)	Nitrate+Nitrite Nitrogen (µg/L)	Chloride (mg/L)	Fluoride (µg/L)	Sulphate (mg/L)	Dissolved Aluminum (µg/L)	Dissolved Iron (µg/L)	Dissolved Magnesium (mg/L)	Dissolved Manganese (µg/L)	Dissolved Sodium (mg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Boron (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Lithium (µg/L)	Mercury (µg/L)	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Titanium (µg/L)	Uranium (µg/L)	Zinc (µg/L)
BC Standards																																				
CSR Aquatic Life (AW)[b]			n/a	n/a	1,310-18,500[e]	400,000	200-2,000[f]	400,000	1,500	2,000-3,000[g]	1,000	n/a	n/a	n/a	n/a	n/a	200	50	10,000	53	50,000	0.3-0.6[g]	10	40	20-90[g]	40-160[g]	n/a	1	10,000	250-1,500[g]	10	0.5-15[g]	3	1,000	3,000	75-2,400[g]
CSR Drinking Water (DW)			n/a	n/a	n/a	10,000	3,200	10,000	250	1,500	500	9,500	n/a	100	n/a	200	6	10	1,000	n/a	5,000	5	50	n/a	1,000	10	730	1	250	n/a	10	n/a	n/a	n/a	20	5,000
Canadian Drinking Water Quality Drinking Water (DW)			n/a	n/a	n/a	10,000	1,000	n/a	250	1,500	500	100	300	n/a	50	200	6	10	1,000	n/a	5,000	5	50	n/a	1,000	10	n/a	1	n/a	n/a	10	n/a	n/a	n/a	20	5,000
FGQG T2 Residential Land Use (RL) - Fine & Coarse Grained			n/a	6.5-9.0	1,830 (0.017 - 190 mg/L - Check CEQG)[e]	13,000	60	n/a	230	120	100	5-100[e]	300	n/a	n/a	n/a	2,000	5	2,900	5.3	n/a	0.017	8.9	n/a	2-4[g]	1-25[g]	n/a	0.026	73	25-150[g]	1	0.1	0.8	100	300	30
Port of Pleasant Camp																																				
MWP3	MWP3	2001 09 28	234	-	-	70	-	-	0.7	< 50	4.1	29	140	5.79	390	0.79	< 1	< 1	92	< 1	< 50	< 0.2[a]	< 1	1	1	< 1	< 1	< 0.02	< 1	< 1	< 2[a]	< 0.1	< 0.1	< 1	0.7	< 5
	MWP3-050707	2005 07 07	198	7.16	10	< 50	< 2	< 50	< 0.2	< 50	2.6	< 5	50	4.92	71	0.7	< 1	< 1	49	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	< 1	< 0.02	< 0.5	< 1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
MWP4	MWP4-110929/30	2011 09 29/30	222	7.11	-	< 20	103	50	1.2	20	2	-	4,040	-	671	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MWP4-121005	2012 10 05	-	7.48	-	9	< 5	-	0.92	< 20	5.7	-	6,730	-	883	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MWP11	MWP11	2001 09 29	343	-	-	< 50	-	-	2.4	< 50	6.9	13	300	9.41	120	1.63	< 1	< 1	160	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	< 1	< 0.02	< 1	< 1	< 2[a]	< 0.1	< 0.1	< 1	0.8	< 5
	MW01-DUP1	2001 09 29	306	-	-	< 50	-	-	2.4	< 50	7	27	250	7.84	110	1.37	< 1	< 1	150	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	< 1	< 0.02	< 1	< 1	< 2[a]	< 0.1	< 0.1	< 1	0.8	< 5
	QA/QC RPD %		11	-	-	*	-	-	0	*	1	70	18	18	9	17	*	*	7	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	*
	MWP11-050707	2005 07 07	269	7.28	< 10	< 50	3	< 50	2.1	< 50	8	8	< 50	6.71	95	1.22	< 1	< 1	110	< 1	< 50	< 0.2[a]	< 1	< 1	1	< 1	< 1	< 0.02	< 0.5	1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MWP4-11-130924	**2013 09 24**	-	-	-	15.3	2.6	-	7.75	23	8.12	-	9,260	-	794	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MWP13	MWP13 09-28	2001 09 28	-	-	-	< 50	-	-	6	< 50	5.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AS-22	AS-22-081003/04	2008 10 03/04	347	7.24	150	2,850	**228**	3,080	1.27	< 50	33.4	50	820	9.89	2,370	3	< 50[a]	< 30[a]	190	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	10
	AS-22-100923	2010 09 23	389	-	-	50	< 5	50	0.8	50	2.7	-	18,800	-	2,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AS-22-110928	2011 09 28	295	7.1	-	160	< 5	160	1.3	20	4.9	-	5,630	-	927	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AS-22-120903	2012 09 03	-	-	-	< 5	< 5	-	0.48	< 20	2.4	-	9,600	-	1,140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	AS-22-130924	**2013 09 24**	-	-	-	689	45	-	10.1	24	10.5	-	5,620	-	675	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW01-17D	MW01-17D	2001 09 29	-	-	-	< 50	-	-	2.8	< 50	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW01-17D 030909	2003 09 09	275	-	-	< 50	< 2	< 50	2.4	< 50	< 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW01-17D-080618	2008 06 18	226	7.33	100	< 50	< 2	< 50	0.29	< 50	13.4	4	630	5.42	343	2.25	< 0.2	0.8	60	< 0.2	< 10	< 0.04[a]	< 0.2	0.6	0.7	< 0.2	0.4	< 0.02	0.4	0.6	0.6	< 0.05	< 0.02	0.5	0.4	1
	MW01-17D-081003/04	2008 10 03/04	253	7.11	100	< 10	< 2	< 10	1.47	60	22.9	< 50	2,910	6.49	920	2.4	< 50[a]	< 30[a]	110	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	9
	MW01-17D-100923	2010 09 23	243	-	-	< 20	< 5	< 20	0.9	70	7.8	-	2,100	-	1,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-100923	2010 09 23	250	-	-	< 20	< 5	< 20	0.8	60	0.6	-	2,140	-	1,350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD %		3	-	-	*	*	*	*	15	*	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW01-17D-110929/30	2011 09 29/30	361	7.76	-	120	< 5	120	4.1	30	2.6	-	483	-	473	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW11-A-110929	2011 09 29	354	-	-	140	< 5	140	3.9	30	2.8	-	464	-	468	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD %		2	*	-	15	*	15	5	*	7	-	4	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW01-17D-120903	2012 09 03	-	-	-	< 5	< 5	-	0.6	60	0.7	-	2,200	-	895	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW01-17D-130924	**2013 09 24**	-	-	-	< 5	< 1	-	1.83	63	< 0.5	-	3,420	-	1,050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW01-18	MW01-18	2001 09 28	-	-	-	290	-	-	3.5	< 50	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW01-19	MW01-19	2001 09 29	270	-	-	190	-	-	2.2	< 50	11.5	10	80	8.55	46	2.54	< 1	< 1	180	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	1	< 0.02	< 1	< 1	< 2[a]	< 0.1	< 0.1	< 1	0.7	< 5
	MW01-19-080618	2008 06 18	224	7.26	< 10	160	< 2	160	1.13	< 50	8.64	6	430	6.41	1.5	1.99	< 0.2	< 0.2	172	< 0.2	< 10	< 0.04[a]	< 0.2	< 0.2	1	< 0.2	1	< 0.02	0.2	0.2	0.7	< 0.05	< 0.02	0.8	0.2	4
	MWA-080618	2008 06 18	212	-	< 10	190	< 2	190	1.11	< 50	8.57	13	370	5.89	< 1	1.68	< 1	< 1	170	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	< 1	< 0.02	< 0.5	< 1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	QA/QC RPD %		6	*	*	17	*	17	2	*	< 1	74	15	9	*	17	*	*	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW01-19-081003/04	2008 10 03/04	254	7.2	20	360	< 2	360	1.59	< 50	11.1	< 50	< 10	6.66	< 3	2.6	< 50[a]	< 30[a]	140	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	9
	MW01-19-090712	2009 07 12	237	7.56	-	240	< 2	240	1.65	< 50	10.5	< 1	< 10	6.65	0.9	1.95	< 0.2	< 0.2	159	< 0.2	< 10	0.06	0.4	< 0.2	< 0.2	< 0.2	0.4	< 0.02	0.2	< 0.2	0.4	< 0.05	< 0.02	< 0.2	0.3	< 1
	MW-A-090712	2009 07 12	239	-	-	240	< 2	240	1.68	< 50	10.3	1	< 10	6.47	0.8	1.66	< 0.2	< 0.2	129	< 0.2	< 10	< 0.04[a]	0.3	< 0.2	< 0.2	< 0.2	0.4	< 0.02	0.2	< 0.2	0.5	< 0.05	< 0.02	< 0.2	0.3	< 1
	QA/QC RPD %		< 1	*	-	*	*	*	2	*	2	*	*	3	*	16	*	*	21	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW01-19-090925	2009 09 25	173	7.05	-	-	-	-	-	-	-	< 1	< 10	4.74	0.2	1.58	< 0.1	< 0.2	102	< 0.1	< 5	0.01	0.2	< 0.1	0.3	< 0.05	0.4	< 0.02	0.2	< 0.2	0.4	< 0.04	< 0.02	0.2	0.21	1
	MW-B-090925	2009 09 25	247	7.05	-	300	< 2	300	1.32	< 50	8.64	< 1	< 10	6.71	1.2	2.25	< 0.1	< 0.2	149	< 0.1	< 5	0.03	< 0.2	< 0.1	0.2	< 0.05	0.6	< 0.02	0.2	< 0.2	0.4	< 0.04	< 0.02	0.3	0.29	1
	QA/QC RPD %		35	0	-	*	*	*	*	*	*	*	*	34	*	35	*	*	38	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW01-19-100923	2010 09 23	249	-	-	100	34	130	1.4	20	13	-	< 5	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW01-19-110929	2011 09 29	286	7.29	-	680	< 5	680	4	20	8.6	-	33	-	< 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW01-19-120903	2012 09 03	-	-	-	245	< 5	-	2.11	< 20	9.7	-	20	-	< 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW01-19-130924	**2013 09 24**	-	-	-	301	< 1	-	2.96	< 20	8.8	-	< 30	-	0.419	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03-03	MW03-03 030909	2003 09 09	277	-	-	< 50	< 2	< 50	3	< 50	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-3-090712	2009 07 12	245	7.62	-	< 50	< 2	< 50	0.81	< 50	8.97	< 1	20	6.91	1,510	1.23	< 0.2	0.4	91	< 0.2	< 10	0.13	< 0.2	1.2	0.5	< 0.2	0.5	< 0.02	1	1.6	< 0.2	< 0.05	< 0.02	< 0.2	0.4	< 1
	MW03-3-090925	2009 09 25	316	7.06	-	-	-	-	-	-	-	< 1	< 10	8.95	15	1.78	< 0.1	< 0.2	102	< 0.1	< 5	0.04	< 0.2	< 0.1	0.7	< 0.05	0.5	< 0.02	0.3	< 0.2	0.9	< 0.04	< 0.02	0.5	0.63	1
MW03-04	MW03-04 030909	2003 09 09	262	-	-	< 50	4	< 50	1.3	< 50	6.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03-05	MW03-05 030909	2003 09 09	262	-	-	< 50	5	< 50	1.9	< 50	10.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06-2	MW06-2-070926	2007 09 26	217	7.44	120	< 10	< 2	< 10	0.86	< 50	32.7	8	1,010	5.5	457	1.57	< 0.2	3	118	< 0.2	< 10	0.07	< 0.2	1.2	0.7	< 0.2	0.3	< 0.02	2.8	2.2	0.5	< 0.05	< 0.02	< 0.2	1.1	2
	MW06-2-100911	2010 09 11/13	374	10.86	-	40	20	60	6.8	30	16	-	2,900	-	1,190	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW06-2-110928	2011 09 28	368	7.02	-	610	6	610	2	20	7.5	-	199	-	382	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW06-2-120902	2012 09 02	-	-	-	6	< 5	-	0.78	< 20	2.3	-	5,650	-	701	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MWC-120902	2012 09 02	-	-	-	25	< 5	-	0.79	< 20	2.1	-	6,220	-	714	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD %		-	-	-	*	*	-	1	*	*	-	10	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW06-2-130924	**2013 09 24**	-	-	-	566	< 5	-	< 2.5	< 100	13.5	-	386	-	401	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MWA-130924	**2013 09 24**	-	-	-	517	< 1	-	1.25	< 20	14.1	-	393	-	393	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD %		-	-	-	9	*	-	*	*	4	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06-4	MW06-4-061001	2006 10 01	325	7.31	< 10	< 10	< 2	< 10	1.37	< 100	176	< 1	280	9.1	347	3.55	0.2	0.5	166	< 0.2	< 10	0.12	< 0.2	2	1	< 0.2	68	< 0.02	1	2.8	0.6	< 0.05	0.03	0.3	1.5	3
	MW06-4-090925	2009 09 25	332	6.87	-	-	-	-	-	-	-	< 1	< 10	9.47	55	1.93	< 0.1	< 0.2	127	< 0.1	< 5	0.1	< 0.2	0.1	0.6	< 0.05	0.6	< 0.02	0.1	< 0.2	< 0.2	< 0.04	< 0.02	0.5	0.55	< 1

Associated Maxxam files: B083828, B085238, B091731, B193983.
Associated ALS file: L1368607.
Associated CanTest files: 100714077, 100718016, 100831012, 100928032, 100929013, 11002077, 40916043, 51020086, 60711045, 70720118, 71002069, 80920016, 80927170, 90619137, 90623067, 90623069, 90623071, 91002010, 91006083, 91029091.
Associated AGAT files: 1289637609, 1289638657, 1289651256.
All terms defined within the body of SNC-Lavalin's report.
<   Denotes concentration less than indicated detection limit or RPD less than indicated value.
-   Denotes analysis not conducted.
n/a Denotes no applicable standard.

BOLD Concentration greater than CSR Aquatic Life (AW) standard.

UNDERLINE Concentration greater than CSR Drinking Water (DW) standard.

SHADOW Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.

SHADED Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Standard to protect freshwater aquatic life.
[c] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[d] Only BC standards apply to Provincial Land.
[e] Standards varies with pH.
[f] Standards varies with chloride
[g] Standards varies with hardness.

TABLE 3 (Cont'd): Summary of Analytical Results for Groundwater - Inorganics

			Physical Parameters		Dissolved Inorganics							Dissolved Metals																								
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness (mg/L)	pH (field) (pH)	Ammonia Nitrogen (µg/L)	Nitrate Nitrogen (µg/L)	Nitrite Nitrogen (µg/L)	Nitrate+Nitrite Nitrogen (µg/L)	Chloride (mg/L)	Fluoride (µg/L)	Sulphate (mg/L)	Dissolved Aluminum (µg/L)	Dissolved Iron (µg/L)	Dissolved Magnesium (mg/L)	Dissolved Manganese (µg/L)	Dissolved Sodium (mg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Boron (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Lithium (µg/L)	Mercury (µg/L)	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Titanium (µg/L)	Uranium (µg/L)	Zinc (µg/L)
BC Standards																																				
CSR Aquatic Life (AW)[b]			n/a	n/a	1,310-18,500[e]	400,000	200-2,000[f]	400,000	1,500	2,000-3,000[g]	1,000	n/a	n/a	n/a	n/a	n/a	200	50	10,000	53	50,000	0.3-0.6[g]	10	40	20-90[g]	40-160[g]	n/a	1	10,000	250-1,500[g]	10	0.5-15[g]	3	1,000	3,000	75-2,400[g]
CSR Drinking Water (DW)			n/a	n/a	n/a	10,000	3,200	10,000	250	1,500	500	9,500	n/a	100	n/a	200	6	10	1,000	n/a	5,000	5	50	n/a	1,000	10	730	1	250	n/a	10	n/a	n/a	n/a	20	5,000
Canadian Drinking Water Quality Drinking Water (DW)			n/a	n/a	n/a	10,000	1,000	n/a	250	1,500	500	100	300	n/a	50	200	6	10	1,000	n/a	5,000	5	50	n/a	1,000	10	n/a	1	n/a	n/a	10	n/a	n/a	n/a	20	5,000
FGQG T2 Residential Land Use (RL) - Fine & Coarse Grained			n/a	6.5-9.0	1,830 (0.017 - 190 mg/L - Check CEQG)[e]	13,000	60	n/a	230	120	100	5-100[e]	300	n/a	n/a	n/a	2,000	5	2,900	5.3	n/a	0.017	8.9	n/a	2-4[g]	1-25[g]	n/a	0.026	73	25-150[g]	1	0.1	0.8	100	300	30
Port of Pleasant Camp																																				
MW06-5	MW06-5-061001	2006 10 01	355	7.55	< 10	< 10	< 2	< 10	2.47	< 100	245	2	300	8.8	211	2.25	0.6	0.6	208	< 0.2	< 10	0.06	< 0.2	0.8	1.3	< 0.2	26	< 0.02	2.3	2.7	1	< 0.05	0.04	0.3	2.8	3
	MW06-A-061001	2006 10 01	358	-	< 10	< 10	< 2	< 10	2.42	< 100	243	14	320	8.8	213	2.29	0.7	0.6	217	< 0.2	< 10	0.07	< 0.2	0.9	1.9	0.6	16	< 0.02	2.5	2.8	1	< 0.05	0.05	0.5	2.9	8
	QA/QC RPD %		< 1	*	*	*	*	*	2	*	< 1	*	7	0	< 1	2	*	*	4	*	*	*	*	*	38	*	48	*	8	4	0	*	*	*	4	*
	MW06-5-070926	2007 09 26	228	7.47	< 10	< 10	< 2	< 10	0.94	70	54.5	52	< 10	5.89	36	2.52	0.2	0.3	130	< 0.2	10	0.04	0.2	< 0.2	1.3	< 0.2	0.5	< 0.02	1.2	0.8	0.6	< 0.05	0.04	< 0.2	0.7	3
	MW06-5-080618	2008 06 18	197	7.41	< 10	< 50	< 2	< 50	< 0.2	< 50	4.43	< 1	380	5.7	9.5	1.01	< 0.2	< 0.2	59	< 0.2	< 10	< 0.04[a]	< 0.2	< 0.2	0.8	< 0.2	0.3	< 0.02	0.4	0.3	0.4	< 0.05	< 0.02	0.4	0.4	< 1
	MW06-5-081003	2008 10 03	219	7.15	20	660	6	670	0.63	50	10.2	< 50	< 10	6.26	< 3	1	< 50[a]	< 30[a]	65	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	8
	MW06-5-090712	2009 07 12	244	7.49	-	< 50	< 2	< 50	0.77	< 50	9.91	< 1	180	6.77	841	1.24	< 0.2	0.7	99	< 0.2	< 10	0.1	0.2	2	0.6	< 0.2	0.4	< 0.02	1.9	1.9	< 0.2	< 0.05	< 0.02	0.2	0.5	< 1
	MW06-5-100923	2010 09 23	277	-	-	< 20	< 5	< 20	1.2	50	6.3	-	513	-	2,170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW06-5-110928	2011 09 28	392	7.28	-	440	< 5	440	3.7	30	6.2	-	< 5	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06-6	MW06-6-061001	2006 10 01	229	7.52	20	150	< 2	150	< 0.2	< 50	29.5	1	190	6.1	2.6	0.99	< 0.2	< 0.2	57	< 0.2	< 10	< 0.04[a]	< 0.2	< 0.2	1.1	< 0.2	17	< 0.02	0.9	1.2	0.4	< 0.05	< 0.02	0.3	0.9	2
	MW06-6-070926	2007 09 26	203	7.38	170	100	< 2	100	< 0.2	< 50	4.58	23	< 10	5.16	11	1.83	< 0.2	< 0.2	49	< 0.2	20	< 0.04[a]	0.2	< 0.2	2	< 0.2	0.2	< 0.02	0.7	0.6	0.4	< 0.05	< 0.02	0.2	0.3	3
	MW06-6-080618	2008 06 18	154	7.85	< 10	< 50	< 2	< 50	< 0.2	< 50	3.12	11	280	3.81	30	0.66	< 1	< 1	32	< 1	< 50	< 0.2[a]	< 1	< 1	1	< 1	< 1	< 0.02	< 0.5	< 1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
MW08-1	MW08-1-081003	2008 10 03	317	7.14	20	430	< 2	430	0.73	50	9.97	50	< 10	9.05	91	2.7	< 50[a]	< 30[a]	110	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	9
MW08-2	MW08-2-081003	2008 10 03	259	7.14	100	< 10	< 2	< 10	1.1	120	17.4	< 50	40	6.89	510	2.1	< 50[a]	< 30[a]	120	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	10
	MW08-2-090712	2009 07 12	239	7.29	-	< 50	< 2	< 50	0.55	110	20.1	2	6,090	6.26	1,290	1.35	< 0.2	3	122	< 0.2	< 10	0.05	< 0.2	3.8	0.5	< 0.2	0.6	< 0.02	4.5	2.4	< 0.2	< 0.05	< 0.02	< 0.2	1	< 1
	MW08-2-100911	2010 09 11/13	262	10.04	-	< 20	6	< 20	0.9	70	12	-	7,860	-	814	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW08-2-110928	2011 09 28	228	7.35	-	< 20	< 5	< 20	1.2	60	3.8	-	7,200	-	703	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW08-2-120903	2012 09 03	-	-	-	< 5	< 5	-	0.81	50	2.9	-	6,190	-	613	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW08-2-130924	**2013 09 24**	-	-	-	6.7	1	-	10.4	50	6.07	-	7,730	-	880	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW08-3	MW08-3-081003	2008 10 03	268	7.17	40	300	11	310	1.3	< 50	7.42	< 50	210	8.15	430	1.2	< 50[a]	< 30[a]	100	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	11
	MW08-3-090714	2009 07 14	239	7.92	-	< 50	< 2	< 50	2.28	< 50	6	6	60	8.14	160	1.22	< 1	< 1	75	< 1	< 50	< 0.2[a]	< 1	2	< 1	< 1	< 1	< 0.02	< 0.5	3	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW08-3-090925	2009 09 25	213	7	-	250	7	260	2.02	< 50	7.45	1	< 10	6.32	242	2.29	0.2	0.3	100	< 0.1	11	0.26	< 0.2	0.8	0.7	< 0.05	0.5	< 0.02	0.4	2.8	< 0.2	< 0.04	0.04	0.2	0.33	3
	MW08-3-100923	2010 09 23	306	-	-	< 20	< 5	< 20	< 0.5	30	9.3	-	7	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW08-3-110928	2011 09 28	227	7.25	-	80	5	90	1	20	3.6	-	9	-	172	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW08-4	MW08-4-081003	2008 10 03	101	7.15	20	< 10	< 2	< 10	6.07	1,720	75.4	< 50	< 10	5.54	88	35.9	< 50[a]	< 30[a]	17	< 3	50	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	12
	MW08-4-090926	2009 09 26	97.4	7.37	-	< 50	< 2	< 50	4.95	1,040	46.1	5	< 10	5.36	233	36.3	1.3	2.8	34	< 0.1	47	< 0.01	1.1	1.4	< 0.1	< 0.05	4.7	< 0.02	13	26	0.4	< 0.04	< 0.02	0.9	1.1	43
MW09-5	MW09-5-090925	2009 09 25	273	6.62	-	< 50	10	< 50	0.99	< 50	11	3	1,940	6.94	550	0.95	0.1	1.8	120	< 0.1	< 5	0.02	< 0.2	2.3	0.3	< 0.05	0.4	< 0.02	1.1	2.6	0.3	< 0.04	< 0.02	0.4	1	< 1
	MW09-5-100911	2010 09 11/13	322	11.19	-	< 20	< 5	< 20	< 0.5	30	4.5	-	1,880	-	532	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW09-5-110928	2011 09 28	190	7.27	-	< 20	8	< 20	0.9	20	2.3	-	1,870	-	185	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW09-5-120902	2012 09 02	-	-	-	< 5	< 5	-	0.16	< 20	4.4	-	2,050	-	278	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW09-5-130924	**2013 09 24**	-	-	-	111	22.6	-	0.72	< 20	7.56	-	6,280	-	241	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-130924	**2013 09 24**	-	-	-	233	37.2	-	0.72	< 20	7.41	-	6,260	-	240	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD %		-	-	-	71	49	-	*	*	2	-	< 1	-	< 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW09-16	MW09-16-090926	2009 09 26	297	7.08	-	1,220	3	1,220	5	< 50	18	6	< 10	9.65	117	3.18	0.2	0.3	182	< 0.1	7	0.03	< 0.2	0.7	0.9	< 0.05	1.9	< 0.02	1.1	4.4	0.4	< 0.04	0.05	0.7	1.5	< 1
Provincial Lands[d]																																				
MW01-20	MW01-20	2001 09 29	198	-	-	< 50	-	-	5.1	< 50	3.2	52	110	4.82	27	9.3	< 1	< 1	69	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	< 1	< 0.02	< 1	< 1	< 2[a]	< 0.1	< 0.1	1	< 0.5	< 5
	MW01-20-041018	2004 10 18	308	7.58	20	190	< 2	190	6.3	< 50	4.6	< 5	< 50	5.89	< 1	6.84	< 1	< 1	85	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	< 1	< 0.02	< 0.5	< 1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW01-20-090924	2009 09 24	35.3	7.32	-	190	< 2	190	12.5	< 50	5.15	2	< 10	0.98	< 0.1	1.82	< 0.1	< 0.2	7.7	< 0.1	< 5	< 0.01	< 0.2	< 0.1	< 0.1	< 0.05	< 0.1	< 0.02	< 0.1	< 0.2	< 0.2	< 0.04	< 0.02	< 0.2	< 0.05	< 1
MW01-21	MW01-21	2001 09 28	216	-	-	110	-	-	2.9	< 50	2.6	21	2,880	5.9	1,190	1.69	< 1	3	190	< 1	< 50	< 0.2[a]	< 1	4	< 1	< 1	< 1	< 0.02	< 1	3	< 2[a]	< 0.1	< 0.1	< 1	1.1	< 5
	MW01-DUP2	2001 09 28	217	-	-	90	-	-	2.9	< 50	2.5	36	2,870	5.97	1,190	1.76	< 1	3	200	< 1	< 50	< 0.2[a]	< 1	4	< 1	< 1	< 1	< 0.02	< 1	4	< 2[a]	< 0.1	< 0.1	< 1	1.1	< 5
	QA/QC RPD %		< 1	-	-	20	-	-	0	*	4	53	< 1	1	0	4	*	0	5	*	*	*	*	0	*	*	*	*	*	29	*	*	*	*	0	*
	MW01-21-041018	2004 10 18	296	-	110	< 50	< 2	< 50	2.6	< 50	4.5	< 5	7,040	7.31	1,310	2.07	< 1	2	240	< 1	< 50	< 0.2[a]	< 1	2	2	< 1	< 1	< 0.02	1	3	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW01-21-050707	2005 07 07	226	6.73	50	< 50	< 2	< 50	1.6	< 50	1.4	< 5	8,000	5.77	870	1.59	< 1	2	150	< 1	< 50	< 0.2[a]	< 1	1	< 1	< 1	< 1	< 0.02	1	1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW01-21-060717	2006 07 17	268	7.07	60	< 100	< 2	< 100	1.51	< 100	41	< 5	210	6.74	940	1.67	< 1	< 1	200	< 1	< 50	< 0.2[a]	< 1	1	2	< 1	2	< 0.02	0.9	2	< 1	< 0.25[a]	< 0.1	< 1	0.6	< 5
	MW01-21-061001	2006 10 01	332	7.05	60	30	3	30	1.89	< 100	139	8	300	8.1	825	2.4	0.3	0.4	233	< 0.2	< 10	0.23	< 0.2	0.7	1.8	0.4	27	< 0.02	1.1	1.8	0.8	< 0.05	0.03	0.4	0.9	7
	MW01-21-070925	2007 09 25	271	7.29	60	< 10	< 2	< 10	1.73	< 50	54.1	14	< 10	5.98	1,000	2.08	< 0.2	0.3	100	< 0.2	< 10	0.26	< 0.2	0.5	1.2	< 0.2	0.6	< 0.02	1	1.3	0.6	< 0.05	0.04	< 0.2	0.3	1
	MW01-21-080618	2008 06 18	270	7.2	20	10	4	10	3.38	< 50	35.7	< 1	600	6.07	431	2.26	< 0.2	0.2	98	< 0.2	< 10	0.08	< 0.2	0.5	1.2	< 0.2	1.1	< 0.02	0.6	3.3	0.6	< 0.05	0.03	0.6	0.4	1
	MW01-21-081002	2008 10 02	253	7.26	60	50	2	50	2.71	< 50	25.2	< 1	430	6.4	1,550	1.86	< 0.2	0.3	132	< 0.2	30	0.2	< 0.2	1.2	1.3	< 0.2	0.7	< 0.02	1.2	1.2	0.5	< 0.05	0.04	< 0.2	0.5	6
	MW01-21-100923	2010 09 23	244	-	-	< 20	< 5	< 20	1.6	40	2.8	-	681	-	1,340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW01-21-110930	2011 09 30	319	7.21	-	130	5	130	6.8	30	7.5	-	602	-	1,390	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW01-21-120902	2012 09 02	-	-	-	5	< 5	-	1.44	30	1.9	-	1,350	-	1,450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MWA-120902	2012 09 02	-	-	-	72	< 5	-	1.47	30	2.4	-	1,320	-	1,440	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD %		-	-	-	*	*	-	2	*	*	-	2	-	< 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW01-21-130924	**2013 09 24**	-	-	-	< 5	1.6	-	3.32	31	2.06	-	772	-	1,420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW01-23	MW01-23	2001 09 28	-	-	-	60	-	-	3.9	< 50	12.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW01-23-041018	2004 10 18	290	7.54	10	< 50	< 2	< 50	1.9	< 50	5.6	< 5	< 50	6.8	1,340	1.7	< 1	< 1	180	< 1	< 50	< 0.2[a]	< 1	3	< 1	< 1	1	< 0.02	1.1	9	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW01-23-050708	2005 07 08	-	7.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW01-23-060718	2006 07 18	-	7.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03-01	MW03-01 030909	2003 09 09	254	-	-	80	5	90	1.5	< 50	4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-1-050708	2005 07 08	-	7.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-1-090713	2009 07 13	236	7.55	-	60	< 2	60	1.5	< 50	10.6	6	< 50	5.92	1	2.16	< 1	< 1	81	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	1	< 0.02	< 0.5	< 1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5

Associated Maxxam files: B083828, B085238, B091731, B193983.
Associated ALS file: L1368607.
Associated CanTest files: 100714077, 100718016, 100831012, 100928032, 100929013, 11002077, 40916043, 51020086, 60711045, 70720118, 71002069, 80920016, 80927170, 90619137, 90623067, 90623069, 90623071, 91002010, 91006083, 91029091.
Associated AGAT files: 1289637609, 1289638657, 1289651256.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.

BOLD	Concentration greater than CSR Aquatic Life (AW) standard.
UNDERLINE	Concentration greater than CSR Drinking Water (DW) standard.
SHADOW	Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.
SHADED	Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Standard to protect freshwater aquatic life.
[c] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[d] Only BC standards apply to Provincial Land.
[e] Standards varies with pH.
[f] Standards varies with chloride
[g] Standards varies with hardness.

TABLE 3 (Cont'd): Summary of Analytical Results for Groundwater - Inorganics

			Physical Parameters		Dissolved Inorganics							Dissolved Metals																								
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness (mg/L)	pH (field) (pH)	Ammonia Nitrogen (µg/L)	Nitrate Nitrogen (µg/L)	Nitrite Nitrogen (µg/L)	Nitrate+Nitrite Nitrogen (µg/L)	Chloride (mg/L)	Fluoride (µg/L)	Sulphate (mg/L)	Dissolved Aluminum (µg/L)	Dissolved Iron (µg/L)	Dissolved Magnesium (mg/L)	Dissolved Manganese (µg/L)	Dissolved Sodium (mg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Boron (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Lithium (µg/L)	Mercury (µg/L)	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Titanium (µg/L)	Uranium (µg/L)	Zinc (µg/L)
BC Standards																																				
CSR Aquatic Life (AW)[b]			n/a	n/a	1,310-18,500[e]	400,000	200-2,000[f]	400,000	1,500	2,000-3,000[g]	1,000	n/a	n/a	n/a	n/a	n/a	200	50	10,000	53	50,000	0.3-0.6[g]	10	40	20-90[g]	40-160[g]	n/a	1	10,000	250-1,500[g]	10	0.5-15[g]	3	1,000	3,000	75-2,400[g]
CSR Drinking Water (DW)			n/a	n/a	n/a	10,000	3,200	10,000	250	1,500	500	9,500	6,500	100	550	200	6	10	1,000	n/a	5,000	5	50	n/a	1,000	10	730	1	250	n/a	10	n/a	n/a	n/a	20	5,000
Canadian Drinking Water Quality Drinking Water (DW)			n/a	n/a	n/a	10,000	1,000	n/a	250	1,500	500	100	300	n/a	50	200	6	10	1,000	n/a	5,000	5	50	n/a	1,000	10	n/a	1	n/a	n/a	10	n/a	n/a	n/a	20	5,000
FGQG T2 Residential Land Use (RL) - Fine & Coarse Grained			n/a	6.5-9.0	1,830 (0.017 - 190 mg/L - Check CEQG)[e]	13,000	60	n/a	230	120	100	5-100[e]	300	n/a	n/a	n/a	2,000	5	2,900	5.3	n/a	0.017	8.9	n/a	2-4[g]	1-25[g]	n/a	0.026	73	25-150[g]	1	0.1	0.8	100	300	30
Provincial Lands[d]																																				
MW03-06	MW03-06 030909	2003 09 09	324	-	-	140	4	140	0.9	< 50	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-6-060717	2006 07 17	-	7.26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-6-070917	2007 09 17	275	7.13	< 10	130	< 2	130	0.39	< 50	5.49	< 5	< 50	6.26	3	1.36	< 1	< 1	91	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	< 1	< 0.02	< 0.5	< 1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
MW03-07	MW03-7-041018	2004 10 18	424	7.4	< 10	190	< 2	190	3.2	< 50	8.5	< 5	< 50	8.43	38	2.15	< 1	< 1	250	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	< 1	< 0.02	< 0.5	2	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW03-7-050707	2005 07 07	-	7.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-7-060716	2006 07 16	425	7.35	< 10	420	< 2	420	3.7	< 100	12.2	25	< 50	9.24	2	2.43	< 1	< 1	220	< 1	< 50	< 0.2[a]	< 1	< 1	15	7	2	< 0.02	< 0.5	< 1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	170
	MW03-7-090711	2009 07 11	312	7.86	-	450	< 2	450	6.14	< 50	16	< 1	< 10	7.01	0.2	1.75	< 0.2	< 0.2	124	< 0.2	< 10	< 0.04[a]	0.4	< 0.2	0.7	< 0.2	0.5	< 0.02	< 0.1	0.2	< 0.2	< 0.05	< 0.02	< 0.2	0.3	< 1
	MW03-7-090924	2009 09 24	50.4	7.26	-	250	< 2	250	3.68	< 50	12.1	< 1	< 10	1.33	0.1	0.47	< 0.1	< 0.2	21	< 0.1	10	< 0.01	< 0.2	< 0.1	< 0.1	< 0.05	< 0.1	< 0.02	< 0.1	< 0.2	< 0.2	< 0.04	< 0.02	< 0.2	0.05	< 1
	MW03-7-100910	2010 09 10	348	7.53	-	420	< 5	420	5.4	20	11	-	18	7.42	4	2.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-7-110929	2011 09 29	436	7.47	-	260	< 5	260	11	20	18	-	< 5	-	< 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03-08	MW03-08 030909	2003 09 09	268	-	-	< 50	< 2	< 50	1.6	< 50	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-8-041018	2004 10 18	350	7.28	90	< 50	5	< 50	2.7	< 50	1.3	< 5	12,900	8.33	1,210	1.66	< 1	3	300	< 1	< 50	< 0.2[a]	< 1	1	< 1	< 1	< 1	< 0.02	1	2	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW03-8-050706	2005 07 06	202	7.28	90	< 50	< 2	< 50	0.78	< 50	< 0.5	< 5	8,090	5.19	790	1.29	< 1	3	150	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	< 1	< 0.02	0.9	1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW03-8-060716	2006 07 16	240	7.61	100	< 100	2	< 100	0.69	< 100	95.6	< 5	2,090	5.64	660	1.57	< 1	2	200	< 1	< 50	< 0.2[a]	< 1	1	< 1	< 1	2	< 0.02	2	2	< 1	< 0.25[a]	< 0.1	< 1	0.9	< 5
	MW06-A-060716	2006 07 16	240	7.61	120	< 100	2	< 100	0.95	< 100	85.6	< 5	2,060	5.64	660	1.6	< 1	2	200	< 1	< 50	< 0.2[a]	< 1	1	3	< 1	2	< 0.02	2.1	2	< 1	< 0.25[a]	< 0.1	< 1	0.9	< 5
	QA/QC RPD %		0	0	18	*	*	*	*	*	11	*	1	0	0	2	*	*	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW03-8-060930	2006 09 30	378	7.19	50	< 10	< 2	< 10	1.17	< 100	256	< 1	1,190	8.7	623	2.16	0.6	1.8	276	< 0.2	< 10	0.05	< 0.2	1.1	0.9	< 0.2	14	< 0.02	2.5	2.9	1.5	< 0.05	< 0.02	0.3	2.6	4
	MW03-8-070917	2007 09 17	256	7.4	50	< 10	< 2	< 10	1.71	< 50	76.7	< 5	160	6.71	690	1.99	< 1	1	180	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	< 1	< 0.02	1.8	1	< 1	< 0.25[a]	< 0.1	< 1	2.9	< 5
	MW03-8-080617	2008 06 17	209	7.29	< 10	50	2	50	1.1	< 50	17.6	< 1	260	5.44	294	1.83	< 0.2	0.8	95	< 0.2	< 10	0.05	< 0.2	0.5	0.9	< 0.2	0.5	< 0.02	1.8	1	0.6	< 0.05	0.06	< 0.2	1	< 1
	MW03-8-080929	2008 09 29	272	-	40	< 10	< 2	< 10	2.28	< 50	30	< 1	1,130	7.64	504	1.73	0.4	2.3	166	< 0.2	< 10	< 0.04[a]	< 0.2	0.8	0.6	< 0.2	0.8	< 0.02	2.1	1.8	< 0.2	< 0.05	< 0.02	< 0.2	3.2	< 1
	MW03-8-100908	2010 09 08/10	231	9.99	-	< 20	6	< 20	1.7	40	0.6	-	2,470	6.45	1,410	2.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-8-110929	2011 09 29	332	7.45	-	240	< 5	240	4.8	30	6.5	-	1,400	-	1,150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-8-120829	2012 08 29	-	-	-	< 5	< 5	-	1.18	50	0.6	-	870	-	1,030	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-8-130923	**2013 09 23**	-	-	-	< 5	< 1	-	3.08	40	< 0.5	-	5,980	-	1,430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03-09	MW03-09 030909	2003 09 09	260	-	-	< 50	7	< 50	1.7	< 50	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-9-041018	2004 10 18	381	7.49	80	< 50	4	< 50	3.2	< 50	2.4	< 5	7,940	8.37	1,020	1.6	< 1	2	210	< 1	< 50	< 0.2[a]	< 1	6	< 1	< 1	< 1	< 0.02	0.7	3	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW03-9-050706	2005 07 06	230	7.22	100	< 50	< 2	< 50	0.58	< 50	0.96	< 5	3,180	5.54	650	1.26	< 1	< 1	97	< 1	< 50	< 0.2[a]	< 1	2	< 1	< 1	< 1	< 0.02	< 0.5	1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW03-9-060716	2006 07 16	245	7.65	20	< 100	< 2	< 100	1.21	< 100	25.5	< 5	< 50	5.89	220	1.72	< 1	< 1	88	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	2	< 0.02	< 0.5	2	< 1	< 0.25[a]	< 0.1	< 1	0.5	< 5
	MW03-9-060930	2006 09 30	283	7.36	20	< 10	< 2	< 10	< 0.2	< 50	86.4	< 1	250	7	177	2.54	< 0.2	0.3	150	< 0.2	< 10	0.11	< 0.2	0.8	1.1	< 0.2	44	< 0.02	0.6	2.3	0.6	< 0.05	0.02	0.4	1.1	5
	MW03-9-080617	2008 06 17	194	7.36	20	150	< 2	150	1.04	< 50	10.7	< 1	< 10	4.8	< 0.2	1.34	< 0.2	< 0.2	49	< 0.2	< 10	< 0.04[a]	< 0.2	< 0.2	0.6	< 0.2	0.3	< 0.02	0.3	0.2	< 0.2	< 0.05	< 0.02	< 0.2	0.3	< 1
	MW03-9-090711	2009 07 11	248	7.3	-	< 50	< 2	< 50	1.26	< 50	8.05	1	< 10	6.74	362	1.31	< 0.2	< 0.2	76	< 0.2	< 10	0.19	0.3	0.8	0.7	< 0.2	0.5	< 0.02	0.4	1	< 0.2	< 0.05	< 0.02	< 0.2	0.3	< 1
	MW03-9-090924	2009 09 24	55.8	6.93	-	230	< 2	230	5.18	< 50	13.1	2	100	1.83	179	0.46	< 0.1	< 0.2	24	< 0.1	15	0.03	< 0.2	0.5	0.1	< 0.05	0.2	< 0.02	0.1	< 0.2	< 0.2	< 0.04	< 0.02	< 0.2	0.09	< 1
	MW03-9-100909	2010 09 08/10	226	9.27	-	< 20	6	20	0.9	30	2.7	-	865	6	1,080	1.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-9-110929	2011 09 29	409	7.09	-	1,580	< 5	1,580	9.3	20	8.3	-	< 5	-	< 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03-10	MW03-10 030909	2003 09 09	427	-	-	< 50	5	< 50	6	< 50	2.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-10-070917	2007 09 17	206	7.17	280	< 10	< 2	< 10	0.56	< 50	37.3	< 5	< 50	5.04	710	1.43	2	3	110	< 1	< 50	< 0.2[a]	< 1	6	2	< 1	< 1	< 0.02	22	41	< 1	< 0.25[a]	< 0.1	< 1	27	< 5
	MW03-10-080929	2008 09 29	270	-	80	40	3	40	3.61	< 50	23.5	< 1	610	6.74	1,290	0.97	< 0.2	1.8	138	< 0.2	< 10	< 0.04[a]	< 0.2	1.9	0.7	< 0.2	0.4	< 0.02	1.1	3.4	0.5	< 0.05	< 0.02	< 0.2	1.2	< 1
	MW03-10-090828	2009 08 28	302	7.11	-	< 50	-	-	1.55	< 50	19.9	7	6,000	7.01	1,370	1.21	< 1	6	250	< 1	< 50	< 0.2[a]	< 1	3	< 1	< 1	< 1	< 0.02	2.7	15	< 1	< 0.25[a]	< 0.1	< 1	6.9	< 5
	MW03-10-100910	2010 09 10	389	9.28	-	< 50	< 50	< 20	1.1	20	7.8	-	10,600	8.27	2,660	1.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-10-110929	2011 09 29	345	7.22	-	< 20	< 5	< 20	2.6	20	4.5	-	3,630	-	1,060	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-10-120829	2012 08 29	-	-	-	< 5	< 5	-	0.74	< 20	2.8	-	13,200	-	1,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-10-130923	**2013 09 23**	-	-	-	40.5	6.9	-	11.5	< 20	6.88	-	1,540	-	693	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03-11	MW03-11-041018	2004 10 18	380	6.85	230	< 50	5	< 50	3.3	< 50	3.7	< 5	17,300	7.99	1,030	2.16	< 1	5	270	< 1	< 50	< 0.2[a]	< 1	6	< 1	< 1	< 1	< 0.02	1.2	7	< 1	< 0.25[a]	< 0.1	< 1	0.5	< 5
	MW03-11-081003	2008 10 03	301	7.3	70	20	< 2	20	24.9	< 50	30.3	60	490	6.4	1,170	3.5	< 50[a]	< 30[a]	150	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	10
	MW03-11-110929	2011 09 29	362	7.33	-	20	< 5	20	4.6	20	12	-	7,750	-	2,250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-11-121005	2012 10 05	-	7.83	-	42	< 5	-	8.54	30	14.6	-	1,230	-	917	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW03-11-130923	**2013 09 23**	-	-	-	291	2.4	-	22.6	< 20	11.3	-	1,280	-	467	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03-21	MW01-21 030909	2003 09 09	259	-	-	< 50	< 2	< 50	1.5	< 50	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW04-1	MW04-1-090924	2009 09 24	36.2	7.45	-	460	< 2	460	7.17	< 50	4.56	< 1	< 10	1.28	0.4	0.69	< 0.1	< 0.2	12	< 0.1	8	< 0.01	< 0.2	< 0.1	< 0.1	< 0.05	< 0.1	< 0.02	< 0.1	< 0.2	< 0.2	< 0.04	< 0.02	< 0.2	0.07	< 1
MW04-2	MW04-2-050707	2005 07 07	225	7.15	110	< 50	4	< 50	0.9	< 50	2.2	< 5	6,630	5.5	600	1.46	< 1	3	140	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	< 1	< 0.02	0.9	1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW04-2-060717	2006 07 17	254	7	30	< 100	< 2	< 100	1.89	< 100	15.9	< 5	2,720	6.3	600	1.98	< 1	1	150	< 1	< 50	< 0.2[a]	< 1	1	< 1	< 1	2	< 0.02	0.8	< 1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW04-2-061001	2006 10 01	229	7.36	40	< 10	< 2	< 10	2.82	< 50	54.3	< 1	690	5.6	355	2.11	< 0.2	0.6	151	< 0.2	< 10	0.05	< 0.2	0.8	0.6	< 0.2	18	< 0.02	0.8	0.7	< 0.2	< 0.05	< 0.02	0.2	0.4	4
	MW04-2-070925	2007 09 25	226	7.27	30	20	< 2	20	2.07	< 50	27.3	3	1,210	5.56	233	2.04	< 0.2	1.2	132	< 0.2	< 10	< 0.04[a]	0.2	0.3	0.3	< 0.2	0.5	< 0.02	1.3	0.4	< 0.2	< 0.05	< 0.02	< 0.2	0.3	2
	MW04-2-080618	2008 06 18	202	7.31	20	10	< 2	10	1.4	< 50	11	1	1,510	5.03	381	1.63	< 0.2	1.2	104	< 0.2	< 10	< 0.04[a]	< 0.2	0.5	0.3	< 0.2	0.9	< 0.02	1.4	0.4	0.5	< 0.05	< 0.02	0.5	0.4	< 1
	MW04-2-081002	2008 10 02	244	7.16	20	50	4	50	7.77	< 50	13.6	< 50	290	6.22	150	3.4	< 50[a]	< 30[a]	110	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	8
	MW04-2-090712	2009 07 12	234	7.69	-	< 50	< 2	< 50	2.99	< 50	9.03	< 1	1,360	6.14	341	1.51	< 0.2	1.1	126	< 0.2	< 10	< 0.04[a]	< 0.2	0.4	< 0.2	< 0.2	0.6	< 0.02	1.1	0.4	< 0.2	< 0.05	< 0.02	< 0.2	0.7	< 1
	MW04-2-090924	2009 09 24	52.2	7.22	-	< 50	< 2	< 50	5.2	< 50	11.8	1	230	1.72	74	0.81	< 0.1	0.3	29	< 0.1	9	< 0.01	< 0.2	0.1	< 0.1	< 0.05	< 0.1	< 0.02	0.2	< 0.2	< 0.2	< 0.04	< 0.02	< 0.2	0.13	< 1
	MW04-2-100923	2010 09 23	249	-	-	< 20	< 5	< 20	3.2	40	6.7	-	2,990	-	535	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW04-2-110930	2011 09 30	354	7.07	-	< 20	< 5	< 20	8	30	5.3	-	4,650	-	1,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW04-2-120902	2012 09 02	-	-	-	< 5	< 5	-	2.46	30	4.3	-	2,980	-	472	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW04-2-130924	**2013 09 24**	-	-	-	49.5	1.6	-	3.9	30	2.98	-	954	-	571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Associated Maxxam files: B083828, B085238, B091731, B193983.
Associated ALS file: L1368607.
Associated CanTest files: 100714077, 100718016, 100831012, 100928032, 100929013, 11002077, 40916043, 51020086, 60711045, 70720118, 71002069, 80920016, 80927170, 90619137, 90623067, 90623069, 90623071, 91002010, 91006083, 91029091.
Associated AGAT files: 1289637609, 1289638657, 1289651256.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.

BOLD Concentration greater than CSR Aquatic Life (AW) standard.

UNDERLINE Concentration greater than CSR Drinking Water (DW) standard.

SHADOW Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.

SHADED Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Standard to protect freshwater aquatic life.
[c] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[d] Only BC standards apply to Provincial Land.
[e] Standards varies with pH.
[f] Standards varies with chloride
[g] Standards varies with hardness.

TABLE 3 (Cont'd): Summary of Analytical Results for Groundwater - Inorganics

			Physical Parameters		Dissolved Inorganics							Dissolved Metals																								
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness (mg/L)	pH (field) (pH)	Ammonia Nitrogen (µg/L)	Nitrate Nitrogen (µg/L)	Nitrite Nitrogen (µg/L)	Nitrate+Nitrite Nitrogen (µg/L)	Chloride (mg/L)	Fluoride (µg/L)	Sulphate (mg/L)	Dissolved Aluminum (µg/L)	Dissolved Iron (µg/L)	Dissolved Magnesium (mg/L)	Dissolved Manganese (µg/L)	Dissolved Sodium (mg/L)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Boron (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Lithium (µg/L)	Mercury (µg/L)	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Titanium (µg/L)	Uranium (µg/L)	Zinc (µg/L)
BC Standards																																				
CSR Aquatic Life (AW)[b]			n/a	n/a	1,310-18,500[e]	400,000	200-2,000[f]	400,000	1,500	2,000-3,000[g]	1,000	n/a	n/a	n/a	n/a	n/a	200	50	10,000	53	50,000	0.3-0.6[g]	10	40	20-90[g]	40-160[g]	n/a	1	10,000	250-1,500[g]	10	0.5-15[g]	3	1,000	3,000	75-2,400[g]
CSR Drinking Water (DW)			n/a	n/a	n/a	10,000	3,200	10,000	250	1,500	500	9,500	6,500	100	550	200	6	10	1,000	n/a	5,000	5	50	n/a	1,000	10	730	1	250	n/a	10	n/a	n/a	n/a	20	5,000
Canadian Drinking Water Quality Drinking Water (DW)			n/a	n/a	n/a	10,000	1,000	n/a	250	1,500	500	100	300	n/a	50	200	6	10	1,000	n/a	5,000	5	50	n/a	1,000	10	n/a	1	n/a	n/a	10	n/a	n/a	n/a	20	5,000
FGQG T2 Residential Land Use (RL) - Fine & Coarse Grained			n/a	6.5-9.0	1,830 (0.017 - 190 mg/L - Check CEQG)[e]	13,000	60	n/a	230	120	100	5-100[e]	300	n/a	n/a	n/a	2,000	5	2,900	5.3	n/a	0.017	8.9	n/a	2-4[g]	1-25[g]	n/a	0.026	73	25-150[g]	1	0.1	0.8	100	300	30
Provincial Lands[d]																																				
MW04-3	MW04-3-041018	2004 10 18	278	7.25	80	100	5	110	3	< 50	1.1	< 5	2,110	7.33	1,450	1.78	< 1	2	240	< 1	< 50	< 0.2[a]	< 1	6	< 1	< 1	< 1	< 0.02	1.2	7	< 1	< 0.25[a]	< 0.1	< 1	0.5	< 5
	MW04-3-050707	2005 07 07	217	7.21	160	< 50	6	< 50	1.2	< 50	1	< 5	6,960	5.81	880	1.54	< 1	4	150	< 1	< 50	< 0.2[a]	< 1	2	< 1	< 1	< 1	< 0.02	1.3	2	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW05-A-050707	2005 07 07	218	7.2	-	-	-	-	-	-	-	< 5	6,860	5.87	870	1.57	< 1	4	160	< 1	< 50	< 0.2[a]	< 1	2	< 1	< 1	< 1	< 0.02	1.2	2	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	QA/QC RPD %		< 1	< 1	*	*	*	*	*	*	*	*	1	1	1	2	*	*	7	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW04-3-060717	2006 07 17	207	6.91	80	< 100	3	< 100	1.58	< 100	19.3	< 5	3,540	5.45	830	1.56	< 1	2	160	< 1	< 50	< 0.2[a]	< 1	2	1	< 1	2	< 0.02	1.3	1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW04-3-061001	2006 10 01	258	7.18	110	< 10	2	10	1.77	< 50	64.8	< 1	2,700	6.8	1,040	1.98	< 0.2	0.9	228	< 0.2	< 10	0.07	< 0.2	1.9	0.6	< 0.2	16	< 0.02	1.4	1.8	0.5	< 0.05	0.02	0.3	0.6	3
	MW04-3-070925	2007 09 25	256	7.33	60	10	< 2	10	3.04	< 50	51.9	16	1,810	6.55	565	2.63	< 0.2	0.9	185	< 0.2	10	< 0.04[a]	0.2	1.1	1	< 0.2	0.7	< 0.02	1.7	1.3	< 0.2	< 0.05	< 0.02	< 0.2	0.4	< 1
	MWA-070925	2007 09 25	263	-	60	10	< 2	10	2.98	< 50	51.8	24	1,820	6.57	565	2.79	< 0.2	0.9	185	< 0.2	10	< 0.04[a]	0.2	1.1	1	< 0.2	0.7	< 0.02	1.7	1.2	< 0.2	< 0.05	< 0.02	< 0.2	0.4	1
	QA/QC RPD %		3	*	*	*	*	*	2	*	< 1	40	< 1	< 1	0	6	*	*	0	*	*	*	*	0	0	*	*	*	0	8	*	*	*	*	*	*
	MW04-3-090713	2009 07 13	254	7.52	-	< 50	< 2	< 50	2.34	< 50	13	11	410	6.92	480	2.42	< 1	< 1	190	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	1	< 0.02	1.4	< 1	< 1	< 0.25[a]	< 0.1	< 1	0.5	< 5
MW04-4	MW04-4-041018	2004 10 18	352	7.38	< 10	290	7	300	14.7	< 50	11.3	< 5	< 50	7.76	150	3.74	< 1	< 1	240	< 1	< 50	< 0.2[a]	< 1	2	4	< 1	1	< 0.02	0.9	7	< 1	< 0.25[a]	< 0.1	< 1	0.5	5
	MW04-4-050708	2005 07 08	-	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW04-4-060717	2006 07 17	-	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW04-4-090711	2009 07 11	287	7.85	-	80	< 2	80	10.8	< 50	23.6	2	< 10	6.99	87	1.89	< 0.2	< 0.2	127	< 0.2	< 10	< 0.04[a]	0.3	0.4	0.6	< 0.2	0.7	< 0.02	0.4	0.9	< 0.2	< 0.05	< 0.02	< 0.2	0.6	< 1
	MW04-4-090924	2009 09 24	44.5	7.28	-	380	< 2	380	16.9	< 50	11.8	3	< 10	1.33	3.7	1.2	< 0.1	< 0.2	21	< 0.1	15	< 0.01	< 0.2	< 0.1	0.1	< 0.05	< 0.1	< 0.02	< 0.1	< 0.2	< 0.2	< 0.04	< 0.02	< 0.2	0.08	< 1
	MW04-4-100910	2010 09 10	265	9.66	-	150	< 5	150	5.2	30	14	-	26	6.26	5	2.73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW04-4-110929	2011 09 29	397	7.6	-	70	6	80	2.5	30	12	-	< 5	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW04-4-120829	2012 08 29	-	-	-	83	< 5	-	4.05	< 20	11.8	-	< 10	-	109	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW04-4-130923	**2013 09 23**	-	-	-	143	< 1	-	8.19	< 20	24	-	< 30	-	13.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW04-5	MW04-5-041018	2004 10 18	330	6.9	160	140	13	150	4.5	< 50	4	< 5	7,120	9.29	1,080	2.09	< 1	4	260	< 1	< 50	< 0.2[a]	< 1	6	< 1	< 1	1	< 0.02	1.7	9	< 1	< 0.25[a]	< 0.1	< 1	1	< 5
	MWC-041018	2004 10 18	340	-	-	-	-	-	-	-	-	< 5	7,270	9.66	1,120	2.2	< 1	4	260	< 1	< 50	< 0.2[a]	< 1	6	< 1	< 1	1	< 0.02	1.7	9	< 1	< 0.25[a]	< 0.1	< 1	1	< 5
	QA/QC RPD %		3	*	*	*	*	*	*	*	*	*	2	4	4	5	*	*	0	*	*	*	*	0	*	*	*	*	*	0	*	*	*	*	*	*
	MW04-5-050707	2005 07 07	247	7.2	110	< 50	9	< 50	2.6	< 50	2.1	< 5	10,500	6.5	660	1.33	< 1	3	160	< 1	< 50	< 0.2[a]	< 1	2	< 1	< 1	< 1	< 0.02	< 0.5	2	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW05-B-050708	2005 07 07	-	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD %		*	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	MW04-5-060715/17	2006 07 15/17	228	7.13	70	< 100	< 2	< 100	2.36	< 100	29.3	< 5	3,380	5.49	600	1.36	< 1	1	140	< 1	< 50	< 0.2[a]	< 1	1	< 1	< 1	2	< 0.02	0.7	1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW04-5-061001	2006 10 01	355	7.45	20	140	3	140	10.7	< 100	168	< 1	310	8.8	338	2.42	0.8	0.8	254	< 0.2	< 10	0.08	< 0.2	0.8	1.3	< 0.2	21	< 0.02	1.6	2.5	1.8	< 0.05	0.05	0.2	2.8	3
	MW04-5-080617	2008 06 17	203	6.89	60	20	< 2	20	0.65	< 50	4.31	< 1	1,170	5.12	326	1.19	< 0.2	1.2	98	< 0.2	< 10	< 0.04[a]	< 0.2	0.4	0.6	< 0.2	0.4	< 0.02	0.6	0.5	0.5	< 0.05	< 0.02	< 0.2	0.4	< 1
	MW04-5-081002	2008 10 02	271	7.18	90	680	< 2	680	8.13	< 50	14.6	< 50	790	7.01	310	1.9	< 50[a]	< 30[a]	130	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	9
	MW04-5-090924	2009 09 24	56.9	7.58	-	140	8	150	9.24	< 50	8.33	1	520	2.01	174	0.76	< 0.1	0.4	33	< 0.1	12	< 0.01	< 0.2	0.2	< 0.1	< 0.05	0.2	< 0.02	0.1	< 0.2	< 0.2	< 0.04	< 0.02	< 0.2	0.19	< 1
	MW04-5-110929	2011 09 29	364	7.34	-	30	< 5	30	4.5	30	5.6	-	9,670	-	1,750	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW04-5-121005	2012 10 05	-	7.73	-	843	6	-	6.19	40	7.4	-	2,310	-	488	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW04-5-130923	**2013 09 23**	-	-	-	143	9.9	-	10.3	23	8.88	-	4,280	-	650	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW04-6	MW04-6-041018	2004 10 18	489	6.75	20	2,300	30	2,300	4.2	< 50	29.2	< 5	80	16.2	340	3.29	< 1	< 1	310	< 1	< 50	< 0.2[a]	< 1	4	1	< 1	3	< 0.02	1.6	14	< 1	< 0.25[a]	< 0.1	< 1	2.4	5
	MW04-6-050706	2005 07 06	307	6.96	< 10	70	< 2	70	1.1	< 50	7.2	< 5	< 50	8.75	2	1.63	< 1	< 1	120	< 1	< 50	< 0.2[a]	< 1	< 1	1	< 1	< 1	< 0.02	< 0.5	2	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW04-6-070917	2007 09 17	231	7.28	10	30	< 2	30	0.57	< 50	13	< 5	< 50	6.78	110	1.15	< 1	< 1	84	< 1	< 50	< 0.2[a]	< 1	< 1	1	< 1	< 1	< 0.02	< 0.5	< 1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW06-4-080618	2008 06 18	171	7.44	< 10	< 50	< 2	< 50	0.34	50	4.64	14	290	4.61	< 1	0.99	< 1	< 1	49	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	< 1	< 0.02	< 0.5	< 1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
MW08-5	MW08-5-081002	2008 10 02	250	7.3	40	60	< 2	60	4.29	50	24.2	< 50	< 10	6.46	200	2.1	< 50[a]	< 30[a]	130	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	9
	MW08-5-090713	2009 07 13	233	7.51	-	< 50	< 2	< 50	1.78	< 50	8.16	6	< 50	6.34	250	1.99	< 1	< 1	150	< 1	< 50	< 0.2[a]	< 1	< 1	1	< 1	1	< 0.02	1.1	1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	< 5
	MW08-5-100923	2010 09 23	227	-	-	40	8	50	1.8	40	2.5	-	8	-	773	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW08-5-110930	2011 09 30	305	7.26	-	< 20	< 5	< 20	4.6	40	3.9	-	355	-	1,410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW08-6	MW08-6-081002	2008 10 02	280	7.17	20	330	< 2	330	10.9	< 50	16.5	60	20	8.85	180	3.5	< 50[a]	< 30[a]	160	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	10
	MW08-6-090713	2009 07 13	235	7.32	-	70	< 2	70	4.17	< 50	6.64	< 5	120	6.65	720	1.78	< 1	2	180	< 1	< 50	< 0.2[a]	< 1	1	< 1	< 1	< 1	< 0.02	1.8	< 1	< 1	< 0.25[a]	< 0.1	< 1	0.8	< 5
	MW08-6-090826	2009 08 26	232	7.11	-	< 50	-	-	4.34	< 50	3.52	10	1,450	6.58	660	1.6	< 1	2	180	< 1	< 50	< 0.2[a]	< 1	< 1	< 1	< 1	1	< 0.02	1.3	1	< 1	< 0.25[a]	< 0.1	< 1	< 0.5	5
	MW08-6-090924	2009 09 24	50.8	7.46	-	50	4	50	7.79	< 50	10.3	1	240	1.73	110	0.59	< 0.1	0.3	36	< 0.1	20	< 0.01	< 0.2	0.4	< 0.1	< 0.05	0.2	< 0.02	0.2	< 0.2	< 0.2	< 0.04	< 0.02	< 0.2	0.12	< 1
	MW08-A-090924	2009 09 24	51.4	7.46	-	80	3	80	7.93	< 50	10.8	2	220	1.75	109	0.59	< 0.1	0.3	34	< 0.1	< 5	< 0.01	< 0.2	0.4	< 0.1	< 0.05	0.2	< 0.02	0.2	< 0.2	< 0.2	< 0.04	< 0.02	< 0.2	0.11	< 1
	QA/QC RPD %		1	0	-	*	*	*	2	*	5	*	9	1	< 1	0	*	*	6	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
MW08-7	MW08-7-081002	2008 10 02	305	7.36	40	20	6	30	4.66	< 50	14.1	< 50	480	9.85	730	3.2	< 50[a]	< 30[a]	130	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	10
	MWB-081002	2008 10 02	303	-	50	30	< 2	30	4.62	< 50	14.1	< 50[a]	480	9.8	730	3.2	< 50[a]	< 30[a]	130	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	10
	QA/QC RPD %		< 1	*	*	*	*	*	< 1	*	0	*	0	< 1	0	0	*	*	0	*	*	*	*	*	*	*	-	-	*	*	-	*	-	*	-	*
	MW08-7-090712	2009 07 12	248	7.4	-	< 50	< 2	< 50	5.59	< 50	4.7	2	1,700	7.67	903	1.76	< 0.2	1.9	120	< 0.2	< 10	< 0.04[a]	0.2	1.9	< 0.2	< 0.2	0.6	< 0.02	0.9	1.1	< 0.2	< 0.05	< 0.02	< 0.2	0.5	< 1
	MW-B-090712	2009 07 12	250	7.4	-	< 50	2	< 50	5.62	< 50	4.74	2	1,750	7.66	897	1.76	< 0.2	2	118	< 0.2	< 10	0.07	0.3	1.8	< 0.2	< 0.2	0.7	< 0.02	0.9	1.2	< 0.2	< 0.05	0.02	< 0.2	0.5	< 1
	QA/QC RPD %		< 1	0	-	*	*	*	< 1	*	< 1	*	3	< 1	< 1	0	*	5	2	*	*	*	*	5	*	*	*	*	0	9	*	*	*	*	0	*
	MW08-7-090826	2009 08 26	276	7.29	-	< 50	-	-	5.38	< 50	7.6	11	1,550	8.99	1,280	2.34	< 1	3	140	< 1	< 50	< 0.2[a]	< 1	2	< 1	< 1	< 1	< 0.02	1.7	3	< 1	< 0.25[a]	< 0.1	< 1	1	< 5
	MW08-7-090924	2009 09 24	56.1	7.17	-	< 50	7	< 50	9.91	< 50	8.26	< 1	570	2.14	216	0.81	< 0.1	0.4	24	< 0.1	< 5	< 0.01	< 0.2	0.3	< 0.1	< 0.05	< 0.1	< 0.02	0.1	< 0.2	< 0.2	< 0.04	< 0.02	< 0.2	0.11	< 1
	MW08-7-120902	2012 09 02	-	-	-	21	< 5	-	5.06	20	7.3	-	40	-	957	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW08-7-130924	**2013 09 24**	-	-	-	84.8	4.6	-	13.7	27	4.93	-	7,180	-	700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW08-8	MW08-8-081002	2008 10 02	312	7.26	30	2,140	56	2,200	8.16	< 50	11.4	< 50	< 10	10.4	120	4.1	< 50[a]	< 30[a]	110	< 3	< 10	< 10[a]	< 10[a]	< 20	< 20[a]	< 30[a]	-	-	< 20	< 20	-	< 10[a]	-	< 5	-	10
	MW08-8-090711	2009 07 11	322	7.45	-	< 50	< 2	< 50	8.61	< 50	17.9	2	110	10.2	641	2.73	0.2	1.8	104	< 0.2	< 10	0.07	0.3	2.4	0.2	< 0.2	0.8	< 0.02	1	3.1	< 0.2	< 0.05	< 0.02	< 0.2	0.7	< 1
	MW08-8-090826	2009 08 26	347	7.16	-	< 50	-	-	7.98	< 50	61.2	12	2,920	11.6	800	3.43	< 1	1	120	< 1	< 50	< 0.2[a]	< 1	2	< 1	< 1	1	< 0.02	0.6	3	< 1	< 0.25[a]	< 0.1	< 1	0.7	< 5
	MW08-8-090926	2009 09 26	264	7.13	-	1,530	20	1,550	8.08	< 50	7.16	1	< 10	8.84	85	7.15	0.1	< 0.2	84	< 0.1	< 5	0.24	0.3	0.2	4.3	0.21	0.5	< 0.02	0.3	1.2	0.2	< 0.04	0.04	0.3	0.48	2
	MW08-8-100911	2010 09 11/13	359	-	-	< 20	6	< 20	4.5	30	15	-	1,290	-	790	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW10-A-100913	2010 09 13	353	-	-	-	-	-	-	-	-	-	1,270	-	788	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD %		2	-	-	*	*	*	*	*	*	-	2	-	< 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW08-8-110930	2011 09 30	317	7.14	-	870	< 5	870	5.3	20	7	-	< 5	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW11-B-110930	2011 09 30	309	-	-	870	< 5	870	5.2	20	6.9	-	21	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	QA/QC RPD %		3	*	-	0	*	0	2	*	1	-	*	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Associated Maxxam files: B083828, B085238, B091731, B193983.
Associated ALS file: L1368607.
Associated CanTest files: 100714077, 100718016, 100831012, 100928032, 100929013, 11002077, 40916043, 51020086, 60711045, 70720118, 71002069, 80920016, 80927170, 90619137, 90623067, 90623069, 90623071, 91002010, 91006083, 91029091.
Associated AGAT files: 1289637609, 1289638657, 1289651256.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
\- Denotes analysis not conducted.
n/a Denotes no applicable standard.

BOLD Concentration greater than CSR Aquatic Life (AW) standard.
UNDERLINE Concentration greater than CSR Drinking Water (DW) standard.
SHADOW Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.
SHADED Concentration greater than or equal to FGQG T2 Residential Land Use (RL) guideline.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Standard to protect freshwater aquatic life.
[c] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[d] Only BC standards apply to Provincial Land.
[e] Standards varies with pH.
[f] Standards varies with chloride
[g] Standards varies with hardness.

TABLE 4: Summary of Analytical Results for Surface Water - Hydrocarbons

			Monocyclic Aromatic Hydrocarbons				Gross Parameters				
Sample Location	**Sample ID**	**Sample Date (yyyy mm dd)**	**Benzene (µg/L)**	**Ethyl-benzene (µg/L)**	**Toluene (µg/L)**	**Xylenes (µg/L)**	**VHw$_{6-10}$ (µg/L)**	**VPHw (C6-C10) (µg/L)**	**EPHw$_{10-19}$ (µg/L)**	**LEPHw (C10-C19) (µg/L)**	**EPHw$_{19-32}$ (µg/L)**
SS01 (upstream)	SS01 031025	2003 10 25	< 0.1	< 0.1	0.2	0.3	-	-	< 250	< 250[c]	< 250
SS02 (mid-stream)	SS02 031025	2003 10 25	< 0.1	< 0.1	0.1	0.1	-	-	< 250	< 250[c]	< 250
SW04-1 (upgradient)	SW04-1	2004 10 16	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-1-050707	2005 07 07	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-1-060717	2006 07 17	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-1-060926	2006 09 26	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 100	< 100[c]	< 100
	SW04-1-080619	2008 06 19	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW08-1-081004	2008 10 04	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-1-090711	2009 07 11	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 100	< 100[c]	< 100
	SW-A-090711	2009 07 11	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 100	< 100[c]	< 100
	QA/QC RPD %		*	*	*	*	*	*	*	-	*
	SW04-1-090926	2009 09 26	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW10-1-100909	2010 09 09	-	-	-	-	-	-	< 80	< 80[c]	< 80
	SW1-120829	2012 08 29	-	-	-	-	-	-	< 100	< 100[c]	< 100
	SW13-1-130924	**2013 09 24**	-	-	-	-	-	-	< 250	< 250[c]	< 250
SW04-2 (mid-stream)	SW04-2	2004 10 16	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-2-050707	2005 07 07	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-2-060717	2006 07 17	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-2-060926	2006 09 26	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 100	< 100[c]	< 100
	SW04-2-080619	2008 06 19	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW08-2-081004	2008 10 04	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-2-090711	2009 07 11	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 100	< 100[c]	< 100
	SW04-2-090926	2009 09 26	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW10-2-100909	2010 09 09	-	-	-	-	-	-	< 80	< 80[c]	< 80
	SW2-120829	2012 08 29	-	-	-	-	-	-	< 100	< 100[c]	< 100
	SW13-2-130924	**2013 09 24**	-	-	-	-	-	-	< 250	< 250[c]	< 250
SW04-3 (mid-stream)	SW04-3	2004 10 16	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-3-050707	2005 07 07	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-3-060717	2006 07 17	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-3-060926	2006 09 26	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 100	< 100[c]	< 100
	SW04-3-080619	2008 06 19	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW08-3-081004	2008 10 04	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-3-090711	2009 07 11	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 100	< 100[c]	< 100
	SW04-3-090926	2009 09 26	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW10-3-100909	2010 09 09	-	-	-	-	-	-	< 80	< 80[c]	< 80
	SW3-120829	2012 08 29	-	-	-	-	-	-	< 100	< 100[c]	< 100
	SW13-3-130924	**2013 09 24**	-	-	-	-	-	-	< 250	< 250[c]	< 250
SW04-4 (downstream)	SW04-4	2004 10 16	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-4-050707	2005 07 07	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-4-060717	2006 07 17	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-4-060926	2006 09 26	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 100	< 100[c]	< 100
	SW04-4-080619	2008 06 19	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW08-4-081004	2008 10 04	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW04-4-090711	2009 07 11	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 100	< 100[c]	< 100
	SW04-4-090926	2009 09 26	< 0.1	< 0.1	< 0.1	< 0.1	< 100	< 100	< 250	< 250	< 250
	SW10-4-100909	2010 09 09	-	-	-	-	-	-	< 80	< 80[c]	< 80
	SW4-120829	2012 08 29	-	-	-	-	-	-	< 100	< 100[c]	< 100
	SW13-4-130924	**2013 09 24**	-	-	-	-	-	-	< 250	< 250[c]	< 250
BC Standards											
BCWQG Aquatic Life (AW)[a]			400	200	39	30	n/a	150[d]	n/a	50[d]	n/a
Federal Guidelines											
CCME CEQG Aquatic Life (AW)[a]			370	90	2	n/a	n/a	n/a	n/a	n/a	n/a

Associated CanTest/Maxxam files: 51020107, 60711045, 70720118, 70930027, 90623066, 91006094, 100714077, 100929013, B083828.
Associated AGAT file: 1289637605.
Associated ALS file: L1369090.
All terms defined within the body of SNC Lavalin's report.

< Denotes concentration less than indicated detection limit.
\- Denotes analysis not conducted.
n/a Denotes no applicable standard.
BOLDED sample denotes most recent sampling event

BOLD	Concentration greater than or equal to BCWQG Aquatic Life (AW) guideline.
SHADED	Concentration greater than or equal to CCME CEQG Aquatic Life (AW) guideline.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Standard/Guideline to protect freshwater aquatic life.
[c] EPH$_w$10-19 concentration has been compared to the BCWQG AW/CCME AW standard for LEPH$_w$, which is a conservative comparison.
[d] Ministry of Transportation Technical Guideline 15.

TABLE 5: Summary of Analytical Results for Surface Water - Inorganics

Sample Location		SW04-1 (Upstream)													SW04-2 (Mid-Stream)					**BC Standards**	**Federal Guidelines**
Sample ID		SW04-1	SW04-1-050707	SW04-1-060717	SW04-1-060926	SW04-1-080619	SW08-1-081004	SW04-1-090711	SW-A-090711	**QA/QC**	SW04-1-090926	SW10-1-100909	SW1-120829	**SW13-1-130924**	SW04-2	SW04-2-050707	SW04-2-060717	SW04-2-060926	SW04-2-080619	**BCWQG**	**CCME CEQG**
Sample Date (yyyy mm dd)		2004 10 16	2005 07 07	2006 07 17	2006 09 26	2008 06 19	2008 10 04	2009 07 11	2009 07 11	**RPD** %	2009 09 26	2010 09 09	2012 08 29	**2013 09 24**	2004 10 16	2005 07 07	2006 07 17	2006 09 26	2008 06 19	**Aquatic Life[b,c,h] (AW)**	**Aquatic Life[h] (AW)**
Parameter	**Units**	**Analytical Results**																			
Physical Parameters																					
Hardness	mg/L	22.3	16.9	13	20.7	13.4	16.8	18.1	18.2	*	15.1	25.7	21.8	17.7	23.2	17.8	15	21.7	13.6	n/a	n/a
pH (field)	pH	-	-	-	-	-	7.27	8.76	8.76	*	7.56	8.76	7.04	7.52	-	-	-	-	-	n/a	n/a
Dissolved Inorganics																					
Ammonia Nitrogen	µg/L	< 10	-	< 10	< 10	< 10	20	< 10	< 10	*	< 10	60	< 10	< 5	< 10	-	-	< 10	< 10	n/a	n/a
Nitrate	µg/L	500	-	210	480	280	460	250	270	*	280	280	215	315	490	-	210	480	280	31,300 (max)	2,900
Nitrite	µg/L	< 2	-	< 2	< 2	< 2	< 2	< 2	< 2	*	< 2	< 5	< 5	< 1	< 2	-	< 2	< 2	< 2	60 (Cl<2.0)	60
Nitrate+Nitrite	µg/L	500	-	210	480	280	460	250	270	*	280	280			490	-	210	480	280	31,300 (max)	n/a
Chloride	mg/L	0.3	-	< 0.2	0.22	< 0.2	0.22	< 0.2	< 0.2	*	< 0.2	< 0.5	0.1	< 0.5	0.29	-	< 0.2	0.23	< 0.2	600	n/a
Fluoride	µg/L	< 50	-	< 50	< 50	< 50	< 50	< 50	< 50	*	< 50	30	< 20	< 20	< 50	-	< 50	< 50	< 50	200 (H<50)	120
Sulphate	mg/L	2.8	-	1.59	2	1.3	1.42	1.93	2.01	*	1.3	2.3	1.8	1.75	2.9	-	1.59	2	1.33	100 (max)	n/a
Total Alkalinity (as CaCO3)	mg/L	24.2	-	-	21.7	-	-	-	-	-	-	26	21	16.1	24.8	-	-	21.8	-	n/a	n/a
Bicarbonate HCO3	mg/L	29.5	-	21.4	26.5	17.6	23.6	27.5	27.2	*	20.2	32	21	16.1	30.3	-	22.6	26.6	17.6	n/a	n/a
Carbonate CO3	mg/L	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	*	< 0.5	< 0.5	< 1	< 2	< 0.5	-	< 0.5	< 0.5	< 0.5	n/a	n/a
Hydroxide	mg/L	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	*	< 0.5	< 0.5	< 1	< 2	< 0.5	-	< 0.5	< 0.5	< 0.5	n/a	n/a
Total Metals																					
Aluminum	µg/L	29	26	15	22	51	**100**	25	26	*	81	29	22	45.2	26	26	31	22	51	n/a	100[f]
Antimony	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	*	< 0.1	< 0.5	< 0.05	< 0.5	< 0.2	< 0.2	< 1	< 0.2	< 0.2	20	n/a
Arsenic	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	*	< 0.2	< 0.1	< 0.1	< 0.5	< 0.2	< 0.2	< 1	< 0.2	< 0.2	5	5
Barium	µg/L	6.7	5.1	5	6.6	4.9	5.6	6.2	6.3	*	5.6	8	6.6	< 20	6.9	5.1	5	7.1	5.1	5,000 (max)	n/a
Beryllium	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	*	< 0.1	< 0.1	< 0.05	< 1	< 0.2	< 0.2	< 1	< 0.2	< 0.2	5.3 (chronic)	n/a
Bismuth	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	*	< 0.1	< 1	-	< 200	< 0.2	< 0.2	< 1	< 0.2	< 0.2	n/a	n/a
Boron	µg/L	< 10	< 10	< 50	10	< 10	< 10	< 10	< 10	*	< 5	< 50	< 2	< 100	< 10	< 10	< 50	< 10	< 10	1,200	n/a
Cadmium	µg/L	-	-	< 0.2[a]	< 0.04[a]	< 0.04[a]	< 0.04[a]	< 0.04[a]	< 0.04[a]	-	< 0.01[a]	***0.03***	< 0.01[a]	< 0.01	-	-	< 0.2[a]	< 0.04[a]	< 0.04[a]	0.005 - 0.09[d]	0.005 - 0.09[d]
Calcium	µg/L	7,930	6,000	4,720	7,570	4,680	6,050	6,470	6,520	*	5,280	9,160	7,850	6,340	8,240	6,340	5,270	7,910	4,760	n/a	n/a
Chromium	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	*	< 0.2	< 1	< 0.5	< 1	< 0.2	< 0.2	< 1	< 0.2	< 0.2	1 (Cr(+6))	1
Cobalt	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	*	< 0.1	< 0.5	< 0.05	< 0.3	< 0.2	< 0.2	< 1	< 0.2	< 0.2	110	n/a
Copper	µg/L	0.4	0.2	< 1	0.6	1.1	0.4	< 0.2	< 0.2	*	0.4	< 0.2	< 0.5	< 1	0.5	0.3	< 1	0.5	0.4	3.2 - 4.8[e]	2 (H<120)
Iron	µg/L	20	< 10	< 50	20	20	20	< 10	< 10	*	< 10	10	< 10	< 30	< 10	< 10	< 50	20	20	1,000	300
Lead	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	*	< 0.05	< 0.2	0.07	< 0.5	< 0.2	< 0.2	< 1	< 0.2	< 0.2	6.0 - 17.1 (max)[g]	1 (H<60)
Lithium	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	*	< 0.1	< 5	< 0.1	< 5	< 0.2	< 0.2	< 1	< 0.2	< 0.2	870	n/a
Magnesium	µg/L	600	460	330	430	400	400	460	470	*	460	690	540	460	640	470	390	460	410	n/a	n/a
Manganese	µg/L	0.7	0.5	< 1	0.3	0.4	1.1	0.3	0.3	*	0.6	< 1	< 1	0.41	0.5	0.4	< 1	0.3	0.9	3.3 - 863 (acute m	n/a
Mercury	µg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	*	< 0.02	< 0.02	< 0.003	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.1	0.026
Molybdenum	µg/L	0.3	0.2	< 0.5	0.3	< 0.1	0.3	0.3	0.3	*	0.2	< 1	0.3	< 1	0.3	0.2	< 0.5	0.3	< 0.1	2,000 (max)	73
Nickel	µg/L	< 0.2	< 0.2	< 1	< 0.2	0.3	< 0.2	< 0.2	< 0.2	*	< 0.2	< 1	< 0.5	< 1	< 0.2	< 0.2	< 1	< 0.2	0.5	25 (H 0-60)	25 (H<60)
Selenium	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	*	< 0.2	< 0.1	< 0.3	< 0.1	< 0.2	< 0.2	< 1	< 0.2	< 0.2	2	1
Silver	µg/L	< 0.05	< 0.05	< 0.25[a]	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	*	< 0.04	< 0.02	< 0.01	< 0.02	< 0.05	< 0.05	< 0.25[a]	< 0.05	< 0.05	0.1 (H<=100)	0.1
Thallium	µg/L	< 0.02	< 0.02	< 0.1	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	*	< 0.02	< 0.05	< 0.01	< 0.2	< 0.02	< 0.02	< 0.1	< 0.02	< 0.02	0.3	0.8
Titanium	µg/L	0.5	0.3	< 1	0.3	0.4	1	< 0.2	0.2	*	0.8	< 5	9	< 10	0.4	0.3	< 1	0.3	0.4	2,000	n/a
Uranium	µg/L	< 0.1	< 0.1	< 0.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	*	0.08	< 0.1	0.05	< 0.2	< 0.1	< 0.1	< 0.5	< 0.1	< 0.1	300 (max)	n/a
Vanadium	µg/L	0.2	0.2	< 1	< 0.2	0.2	0.2	0.3	0.3	*	0.3	< 5	< 0.5	< 1	0.2	0.2	< 1	< 0.2	< 0.2	6	n/a
Zinc	µg/L	2	< 1	< 5	< 1	4	10	< 1	< 1	*	< 1	< 5	< 5	< 5	1	2	< 5	< 1	9	33 (H<=90)	30

Associated CanTest/Maxxam files: 51020107, 60711045, 70720118, 70930027, 90623066, 91006094, 100714077, 100929013, B083828.

Associated AGAT file: 1289637605.

Associated ALS file: L1369090.

All terms defined within the body of SNC Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard.

BOLDED sample denotes most recent sampling event

BOLD	Concentration greater than or equal to BCWQG Aquatic Life (AW) guideline.
SHADED	Concentration greater than or equal to CCME CEQG Aquatic Life (AW) guideline.

[a] Laboratory detection limit exceeds regulatory standard.

[b] British Columbia Approved Water Quality Guidelines 2006 Edition, updated August 2006.

[c] A Compendium of Working Water Quality Guidelines for British Columbia, updated August 2006.

[d] Criterion for cadmium (µg/L) is determined using the following formula: 10^(0.86[log(hardness)]-3.2)

[e] Criterion for copper (µg/L) is determined using the following formula: [0.094*(hardness)+2]

[f] Guideline varies with pH. Since surface water pH has not been measured below 6.5, a guideline of 100 µg/L has been used for comparison.

[g] If hardness is <= 8mg/L CaCO3, guideline for Total Pb =3 µg/L, otherwise Total Pb (µg/L) = exp[1.273*ln(hardness)-1.460]

[h] Guideline to protect freshwater aquatic life.

TABLE 5 (Cont'd): Summary of Analytical Results for Surface Water - Inorganics

Sample Location		SW04-2 (Mid-Stream) (Cont'd)						SW04-3 (Mid-Stream)											**BC Standards**	**Federal Guidelines**
Sample ID		SW08-2-081004	SW04-2-090711	SW04-2-090926	SW10-2-100909	SW2-120829	**SW13-2-130924**	SW04-3	SW04-3-050707	SW04-3-060717	SW04-3-060926	SW04-3-080619	SW08-3-081004	SW04-3-090711	SW04-3-090926	SW10-3-100909	SW3-120829	**SW13-3-130924**	**BCWQG Aquatic Life[b,c,h] (AW)**	**CCME CEQG Aquatic Life[h] (AW)**
Sample Date (yyyy mm dd)		2008 10 04	2009 07 11	2009 09 26	2010 09 09	2012 08 29	**2013 09 24**	2004 10 16	2005 07 07	2006 07 17	2006 09 26	2008 06 19	2008 10 04	2009 07 11	2009 09 26	2010 09 09	2012 08 29	**2013 09 24**		
Parameter	**Units**	**Analytical Results**																		
Physical Parameters																				
Hardness	mg/L	17.1	19.1	16.3	26.9	23.4	19.3	23.6	17.9	14	23.1	13.7	17.2	19.7	16.3	29.3	23.7	19.5	n/a	n/a
pH (field)	pH	7.26	8	7.81	8.69	7.11	7.58	-	-	-	-	-	7.27	8.25	8.01	8.62	7.06	7.6	n/a	n/a
Dissolved Inorganics																				
Ammonia Nitrogen	µg/L	10	< 10	< 10	50	< 10	< 5	< 10	-	-	< 10	< 10	20	< 10	< 10	70	< 10	< 5	n/a	n/a
Nitrate	µg/L	470	260	-	290	217	318	510	-	220	480	280	470	270	280	280	215	322	31,300 (max)	2,900
Nitrite	µg/L	< 2	< 2	-	< 5	< 5	< 1	< 2	-	< 2	< 2	< 2	< 2	< 2	< 2	< 5	< 5	< 1	60 (Cl<2.0)	60
Nitrate+Nitrite	µg/L	470	260	-	290			510	-	220	480	280	470	270	280	280			31,300 (max)	n/a
Chloride	mg/L	0.23	< 0.2	-	< 0.5	0.13	< 0.5	0.31	-	< 0.2	0.22	<0.2	0.23	< 0.2	< 0.2	< 0.5	0.13	< 0.5	600	n/a
Fluoride	µg/L	< 50	< 50	-	40	< 20	< 20	< 50	-	< 50	< 50	< 50	< 50	< 50	< 50	30	< 20	< 20	200 (H<50)	120
Sulphate	mg/L	1.44	2.09	-	2.3	1.9	1.82	2.8	-	1.64	2.06	1.30	1.43	2.04	1.3	2	1.9	2.23	100 (max)	n/a
Total Alkalinity (as CaCO3)	mg/L	-	-	-	27	23	17.3	26.5	-	-	22.2	-	-	-	-	28	23	17.6	n/a	n/a
Bicarbonate HCO3	mg/L	23.7	29.1	20.7	32	23	17.3	32.3	-	22.6	27.1	18.1	24.3	29.7	20.8	34	23	17.6	n/a	n/a
Carbonate CO3	mg/L	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 2	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 2	n/a	n/a
Hydroxide	mg/L	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 2	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 2	n/a	n/a
Total Metals																				
Aluminum	µg/L	94	26	**110**	37	68	46	24	32	22	20	53	97	30	89	30	**130**	56.9	n/a	100[f]
Antimony	µg/L	< 0.2	< 0.2	< 0.1	< 0.5	< 0.05	< 0.5	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.5	< 0.05	< 0.5	20	n/a
Arsenic	µg/L	< 0.2	< 0.2	< 0.2	< 0.1	< 0.1	< 0.5	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.1	< 0.5	5	5
Barium	µg/L	5.8	6.6	6	9	7.7	< 20	7	5.3	5	7.3	5	5.9	6.9	6	10	8.3	< 20	5,000 (max)	n/a
Beryllium	µg/L	< 0.2	< 0.2	< 0.1	< 0.1	< 0.05	< 1	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.1	< 0.05	< 1	5.3 (chronic)	n/a
Bismuth	µg/L	< 0.2	< 0.2	< 0.1	< 1	-	< 200	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 1	-	< 200	n/a	n/a
Boron	µg/L	< 10	< 10	< 5	< 50	< 2	< 100	< 10	< 10	< 50	< 10	< 10	< 10	< 10	< 5	< 50	< 2	< 100	1,200	n/a
Cadmium	µg/L	< 0.04[a]	< 0.04[a]	< 0.01[a]	***<u>0.02</u>***	< 0.01[a]	< 0.01	-	-	< 0.2[a]	< 0.04[a]	< 0.04[a]	< 0.04[a]	< 0.04[a]	< 0.01[a]	**0.01**	**0.01**	< 0.01	0.005 - 0.09[d]	0.005 - 0.09[d]
Calcium	µg/L	6,180	6,820	5,680	9,590	8,400	6,910	8,330	6,340	5,130	8,400	4,800	6,200	7,020	5,680	10,400	8,480	6,970	n/a	n/a
Chromium	µg/L	< 0.2	< 0.2	< 0.2	< 1	< 0.5	< 1	0.3	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 0.5	< 1	1 (Cr(+6))	1
Cobalt	µg/L	< 0.2	< 0.2	< 0.1	< 0.5	0.05	< 0.3	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.5	0.08	< 0.3	110	n/a
Copper	µg/L	0.4	0.2	0.4	< 0.2	< 0.5	< 1	0.5	0.3	< 1	0.5	0.4	0.4	0.2	0.4	< 0.2	< 0.5	< 1	3.2 - 4.8[e]	2 (H<120)
Iron	µg/L	20	< 10	< 10	13	80	< 30	< 10	10	< 50	30	20	20	< 10	20	8	100	< 30	1,000	300
Lead	µg/L	< 0.2	< 0.2	< 0.05	< 0.2	0.09	< 0.5	0.6	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.05	< 0.2	0.12	< 0.5	6.0 - 17.1 (max)[g]	1 (H<60)
Lithium	µg/L	< 0.2	< 0.2	< 0.1	< 5	< 0.1	< 5	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 5	< 0.1	< 5	870	n/a
Magnesium	µg/L	400	510	520	730	590	500	660	480	370	500	410	420	510	500	800	620	520	n/a	n/a
Manganese	µg/L	1.1	0.4	0.8	1	4	0.41	0.4	0.5	< 1	< 0.2	0.4	1.1	0.4	0.9	< 1	6	0.66	3.3 - 863 (acute ma	n/a
Mercury	µg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.003	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.003	< 0.01	0.1	0.026
Molybdenum	µg/L	0.2	0.3	0.2	< 1	0.3	< 1	0.3	0.2	< 0.5	0.3	< 0.1	0.2	0.2	0.2	< 1	0.3	< 1	2,000 (max)	73
Nickel	µg/L	< 0.2	< 0.2	< 0.2	< 1	< 0.5	< 1	< 0.2	< 0.2	< 1	< 0.2	0.4	< 0.2	< 0.2	< 0.2	< 1	< 0.5	< 1	25 (H 0-60)	25 (H<60)
Selenium	µg/L	< 0.2	< 0.2	< 0.2	< 0.1	< 0.3	< 0.1	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.3	< 0.1	2	1
Silver	µg/L	< 0.05	< 0.05	< 0.04	< 0.02	< 0.01	< 0.02	< 0.05	< 0.05	< 0.25[a]	< 0.05	3.9	< 0.05	< 0.05	< 0.04	< 0.02	< 0.01	< 0.02	0.1 (H<=100)	0.1
Thallium	µg/L	< 0.02	< 0.02	< 0.02	< 0.05	< 0.01	< 0.2	< 0.02	< 0.02	< 0.1	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.01	< 0.2	0.3	0.8
Titanium	µg/L	0.9	0.2	0.9	< 5	12	< 10	0.3	0.4	< 1	0.3	0.4	0.9	0.4	1	< 5	14	< 10	2,000	n/a
Uranium	µg/L	< 0.1	< 0.1	0.08	< 0.1	0.07	< 0.2	< 0.1	< 0.1	< 0.5	< 0.1	< 0.1	< 0.1	< 0.1	0.08	< 0.1	0.09	< 0.2	300 (max)	n/a
Vanadium	µg/L	0.2	0.3	0.3	< 5	< 0.5	< 1	< 0.2	0.2	< 1	< 0.2	< 0.2	0.2	0.3	0.3	< 5	< 0.5	< 1	6	n/a
Zinc	µg/L	< 1	< 1	< 1	< 5	< 5	< 5	< 1	< 1	< 5	< 1	3	< 1	< 1	< 1	< 5	< 5	< 5	33 (H<=90)	30

Associated CanTest/Maxxam files: 51020107, 60711045, 70720118, 70930027, 90623066, 91006094, 100714077, 100929013, B083828.

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[b] British Columbia Approved Water Quality Guidelines 2006 Edition, updated August 2006.

[c] A Compendium of Working Water Quality Guidelines for British Columbia, updated August 2006.

[d] Criterion for cadmium (µg/L) is determined using the following formula: 10^(0.86[log{hardness}]-3.2)

[e] Criterion for copper (µg/L) is determined using the following formula: [0.094*(hardness)+2]

[f] Guideline varies with pH. Since surface water pH has not been measured below 6.5, a guideline of 100 µg/L has been used for comparison.

[g] If hardness is <= 8mg/L CaCO3, guideline for Total Pb =3 µg/L, otherwise Total Pb (µg/L) = exp[1.273*ln(hardness)-1.460]

[h] Guideline to protect freshwater aquatic life.

TABLE 5 (Cont'd): Summary of Analytical Results for Surface Water - Inorganics

Sample Location		SW04-4 (Downstream)											**BC Standards**	**Federal Guidelines**
Sample ID		SW04-4	SW04-4-050707	SW04-4-060717	SW04-4-060926	SW04-4-080619	SW08-4-081004	SW04-4-090711	SW04-4-090926	SW10-4-100909	SW4-120829	**SW13-4-130924**	**BCWQG Aquatic Life[b,c,h] (AW)**	**CCME CEQG Aquatic Life[h] (AW)**
Sample Date (yyyy mm dd)		2004 10 16	2005 07 07	2006 07 17	2006 09 26	2008 06 19	2008 10 04	2009 07 11	2009 09 26	2010 09 09	2012 08 29	**2013 09 24**		
Parameter	**Units**	**Analytical Results**												
Physical Parameters														
Hardness	mg/L	22.9	18.3	15	23.5	13.9	18.3	20.7	16.5	27.7	23.5	19.7	n/a	n/a
pH (field)	pH	-	-	-	-	-	7.23	7.84	7.95	8.71	7.14	7.59	n/a	n/a
Dissolved Inorganics														
Ammonia Nitrogen	µg/L	< 10	-	-	< 10	20	40	< 10	< 10	< 50	< 10	< 5	n/a	n/a
Nitrate	µg/L	510	-	210	490	270	470	270	280	280	219	319	31,300 (max)	2,900
Nitrite	µg/L	< 2	-	< 2	< 2	< 2	< 2	< 2	< 2	< 5	< 5	< 1	60 (Cl<2.0)	60
Nitrate+Nitrite	µg/L	510	-	210	490	270	470	270	280	280			31,300 (max)	n/a
Chloride	mg/L	0.33	-	< 0.2	0.27	<0.2	0.33	< 0.2	< 0.2	< 0.5	0.12	< 0.5	600	n/a
Fluoride	µg/L	< 50	-	< 50	< 50	< 50	< 50	< 50	< 50	20	< 20	< 20	200 (H<50)	120
Sulphate	mg/L	2.9	-	1.65	2.06	1.3	1.46	2.11	1.28	2.1	2.2	1.84	100 (max)	n/a
Total Alkalinity (as CaCO3)	mg/L	25.9	-	-	22.8	-	-	-	-	28	23	17.7	n/a	n/a
Bicarbonate HCO3	mg/L	31.6	-	22.8	27.8	18.0	24.8	29.5	21.1	35	23	17.7	n/a	n/a
Carbonate CO3	mg/L	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 2	n/a	n/a
Hydroxide	mg/L	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 2	n/a	n/a
Total Metals														
Aluminum	µg/L	44	56	32	34	68	96	27	82	30	74	46.3	n/a	100[f]
Antimony	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.5	< 0.05	< 0.5	20	n/a
Arsenic	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.1	< 0.5	5	5
Barium	µg/L	6.9	5.6	6	7.6	5.2	6.4	7.4	6.1	9	8	< 20	5,000 (max)	n/a
Beryllium	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.1	< 0.05	< 1	5.3 (chronic)	n/a
Bismuth	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 1	-	< 200	n/a	n/a
Boron	µg/L	< 10	< 10	< 50	< 10	< 10	< 10	< 10	< 5	< 50	< 2	< 100	1,200	n/a
Cadmium	µg/L	-	-	< 0.2[a]	< 0.04[a]	< 0.04[a]	< 0.04[a]	< 0.04[a]	< 0.01[a]	***0.05***	< 0.01[a]	< 0.01	0.005 - 0.09[d]	0.005 - 0.09[d]
Calcium	µg/L	8,070	6,480	5,270	8,540	4,880	6,610	7,370	5,790	9,850	8,420	7,030	n/a	n/a
Chromium	µg/L	0.7	0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 1	< 0.5	< 1	1 (Cr(+6))	1
Cobalt	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.5	< 0.05	< 0.3	110	n/a
Copper	µg/L	0.6	0.6	< 1	0.6	1	0.4	0.2	0.5	< 0.2	< 0.5	1.5	3.2 - 4.8[e]	2 (H<120)
Iron	µg/L	20	30	< 50	30	30	20	< 10	< 10	17	80	< 30	1,000	300
Lead	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.05	< 0.2	0.08	< 0.5	6.0 - 17.1 (max)[g]	1 (H<60)
Lithium	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 5	< 0.1	< 5	870	n/a
Magnesium	µg/L	660	520	370	520	410	440	540	500	750	600	510	n/a	n/a
Manganese	µg/L	1	1.3	< 1	0.7	1	1.1	0.4	0.7	< 1	10	0.42	3.3 - 863 (acute ma	n/a
Mercury	µg/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.003	< 0.01	0.1	0.026
Molybdenum	µg/L	0.3	0.3	< 0.5	0.3	< 0.1	0.2	0.3	0.2	< 1	0.3	< 1	2,000 (max)	73
Nickel	µg/L	< 0.2	< 0.2	< 1	< 0.2	0.5	< 0.2	< 0.2	< 0.2	< 1	< 0.5	< 1	25 (H 0-60)	25 (H<60)
Selenium	µg/L	< 0.2	< 0.2	< 1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.3	< 0.1	2	1
Silver	µg/L	< 0.05	< 0.05	< 0.25[a]	< 0.05	< 0.05	< 0.05	< 0.05	< 0.04	< 0.02	< 0.01	< 0.02	0.1 (H<=100)	0.1
Thallium	µg/L	< 0.02	< 0.02	< 0.1	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.01	< 0.2	0.3	0.8
Titanium	µg/L	1	1.8	< 1	0.8	1.4	0.9	0.4	0.8	< 5	12	< 10	2,000	n/a
Uranium	µg/L	< 0.1	< 0.1	< 0.5	< 0.1	< 0.1	< 0.1	< 0.1	0.08	< 0.1	0.07	< 0.2	300 (max)	n/a
Vanadium	µg/L	0.2	0.3	< 1	< 0.2	0.2	0.2	0.3	0.3	< 5	< 0.5	< 1	6	n/a
Zinc	µg/L	1	1	< 5	< 1	4	< 1	< 1	< 1	< 5	< 5	< 5	33 (H<=90)	30

Associated CanTest/Maxxam files: 51020107, 60711045, 70720118, 70930027, 90623066, 91006094, 100714077, 100929013, B083828.

Associated AGAT file: 1289637605.

Associated ALS file: L1369090.

All terms defined within the body of SNC Lavalin's report.

<	Denotes concentration less than indicated detection limit or RPD less than indicated value.
-	Denotes analysis not conducted.
n/a	Denotes no applicable standard.

BOLDED sample denotes most recent sampling event

BOLD	Concentration greater than or equal to BCWQG Aquatic Life (AW) guideline.
SHADED	Concentration greater than or equal to CCME CEQG Aquatic Life (AW) guideline.

[a] Laboratory detection limit exceeds regulatory standard.

[b] British Columbia Approved Water Quality Guidelines 2006 Edition, updated August 2006.

[c] A Compendium of Working Water Quality Guidelines for British Columbia, updated August 2006.

[d] Criterion for cadmium (µg/L) is determined using the following formula: 10^(0.86[log{hardness}]-3.2)

[e] Criterion for copper (µg/L) is determined using the following formula: [0.094*(hardness)+2]

[f] Guideline varies with pH. Since surface water pH has not been measured below 6.5, a guideline of 100 µg/L has been used for comparison.

[g] If hardness is <= 8mg/L CaCO3, guideline for Total Pb =3 µg/L, otherwise Total Pb (µg/L) = exp[1.273*ln(hardness)-1.460]

[h] Guideline to protect freshwater aquatic life.

TABLE 6: Summary of Analytical Results for Soil - Agent Orange

Sample Location		2013 Surface Samples			BC Standards		
Sample ID		SS13-1-130925	SS13-2-130925	SS13-3-130925	CSR Commercial Land Use[a] (CL)	CSR Residential Land Use[b] (RL)	CCME CEQG Residential Land Use (RL)
Sample Date (yyyy mm dd)		2013 09 25	2013 09 25	2013 09 25			
Parameter	**Units**	**Analytical Results**					
Dioxins							
2,3,7,8-TCDD	µg/g	< 0.0000002	0.0000002	0.0000004	n/a	n/a	n/a
Total Tetra-Dioxins	µg/g	0.0000005	0.0000003	0.0000022	n/a	n/a	n/a
1,2,3,7,8-PeCDD	µg/g	< 0.0000002	0.0000005	0.0000008	n/a	n/a	n/a
Total Penta-Dioxins	µg/g	0.0000009	0.0000007	0.0000016	n/a	n/a	n/a
1,2,3,4,7,8-HxCDD	µg/g	0.0000004	0.0000004	0.0000011	n/a	n/a	n/a
1,2,3,6,7,8-HxCDD	µg/g	0.0000006	0.0000004	0.0000019	n/a	n/a	n/a
1,2,3,7,8,9-HxCDD	µg/g	0.0000006	0.0000006	0.0000015	n/a	n/a	n/a
Total Hexa-Dioxins	µg/g	0.0000031	0.0000022	0.0000078	n/a	n/a	n/a
1,2,3,4,6,7,8-HpCDD	µg/g	0.0000082	0.0000041	0.0000212	n/a	n/a	n/a
Total Hepta-Dioxins	µg/g	0.0000131	0.0000063	0.0000334	n/a	n/a	n/a
Total OCDD	µg/g	0.0000421	0.0000219	0.000123	n/a	n/a	n/a
Total PCDDs	µg/g	0.0000596	0.0000313	0.000168	n/a	n/a	n/a
Total PCDFs	µg/g	0.0000229	0.0000123	0.0000528	n/a	n/a	n/a
Total PCDD/PCDF INT-TEQ (ND=0)	µg/g	0.000000584	0.00000107	0.00000243	n/a	n/a	n/a
2,3,7,8-Tetra CDD (TEF 1.0)	µg/g	0	0.000000202	0.000000404	n/a	n/a	n/a
1,2,3,7,8-Penta CDD (TEF 0.5)	µg/g	0	0.000000265	0.000000412	n/a	n/a	n/a
1,2,3,4,7,8-Hexa CDD (TEF 0.1)	µg/g	4.14E-08	3.77E-08	0.000000113	n/a	n/a	n/a
1,2,3,6,7,8-Hexa CDD (TEF 0.1)	µg/g	5.52E-08	4.26E-08	0.000000189	n/a	n/a	n/a
1,2,3,7,8,9-Hexa CDD (TEF 0.1)	µg/g	5.52E-08	5.52E-08	0.000000146	n/a	n/a	n/a
1,2,3,4,6,7,8-Hepta CDD (TEF 0.01)	µg/g	8.16E-08	4.08E-08	0.000000212	n/a	n/a	n/a
Octa CDD (TEF 0.001)	µg/g	4.21E-08	2.19E-08	0.000000123	n/a	n/a	n/a
CDD TEF SUM	µg/g	0.00000028	0.00000067	0.00000160	0.001	0.00035	0.000004
Furans							
2,3,7,8-TCDF	µg/g	< 0.0000002	< 0.0000002	< 0.0000004	n/a	n/a	n/a
Total Tetra-Furans	µg/g	0.0000018	0.000001	0.0000033	n/a	n/a	n/a
1,2,3,7,8-PeCDF	µg/g	0.0000004	0.0000006	0.000001	n/a	n/a	n/a
2,3,4,7,8-PeCDF	µg/g	0.0000002	0.0000004	0.0000007	n/a	n/a	n/a
Total Penta-Furans	µg/g	0.0000011	0.000001	0.0000034	n/a	n/a	n/a
1,2,3,4,7,8-HxCDF	µg/g	0.0000004	0.0000004	0.000001	n/a	n/a	n/a
1,2,3,6,7,8-HxCDF	µg/g	0.0000004	0.0000004	0.000001	n/a	n/a	n/a
1,2,3,7,8,9-HxCDF	µg/g	0.0000003	0.0000006	0.0000006	n/a	n/a	n/a
2,3,4,6,7,8-HxCDF	µg/g	0.0000004	0.0000004	0.0000009	n/a	n/a	n/a
Total Hexa-Furans	µg/g	0.0000044	0.0000027	0.0000091	n/a	n/a	n/a
1,2,3,4,6,7,8-HpCDF	µg/g	0.0000031	0.0000014	0.0000059	n/a	n/a	n/a
1,2,3,4,7,8,9-HpCDF	µg/g	< 0.0000003	0.0000005	0.0000009	n/a	n/a	n/a
Total Hepta-Furans	µg/g	0.0000099	0.0000045	0.000021	n/a	n/a	n/a
Total OCDF	µg/g	0.0000057	0.000003	0.0000161	n/a	n/a	n/a
2,3,7,8-Tetra CDF (TEF 0.1)	µg/g	0	0	0	n/a	n/a	n/a
1,2,3,7,8-Penta CDF (TEF 0.05)	µg/g	1.75E-08	3.14E-08	5.01E-08	n/a	n/a	n/a
2,3,4,7,8-Penta CDF (TEF 0.5)	µg/g	0.000000106	0.000000178	0.000000356	n/a	n/a	n/a
1,2,3,4,7,8-Hexa CDF (TEF 0.1)	µg/g	4.14E-08	3.82E-08	0.000000097	n/a	n/a	n/a
1,2,3,6,7,8-Hexa CDF (TEF 0.1)	µg/g	3.51E-08	3.55E-08	0.000000097	n/a	n/a	n/a
2,3,4,6,7,8-Hexa CDF (TEF 0.1)	µg/g	4.49E-08	3.72E-08	8.57E-08	n/a	n/a	n/a
1,2,3,7,8,9 Hexa CDF (TEF 0.1)	µg/g	2.65E-08	6.39E-08	5.66E-08	n/a	n/a	n/a
1,2,3,4,6,7,8-Hepta CDF (TEF 0.01)	µg/g	3.12E-08	1.38E-08	5.89E-08	n/a	n/a	n/a
1,2,3,4,7,8,9-Hepta CDF (TEF 0.01)	µg/g	0	4.92E-09	9.38E-09	n/a	n/a	n/a
Octa CDF (TEF 0.001)	µg/g	5.72E-09	3.02E-09	1.61E-08	n/a	n/a	n/a
CDF TEF SUM	µg/g	0.00000031	0.00000041	0.00000083	0.001	0.00035	0.000004
Herbicides/Pesticides							
Diclofop-methyl	µg/g	< 0.1	< 0.1	< 0.2	n/a	n/a	n/a
2,4-Dichlorophenoxyacetic Acid	µg/g	< 0.1	< 0.1	< 0.2	7,700	690	n/a
2,4,5-Trichlorophenoxyacetic Acid	µg/g	< 0.1	< 0.1	< 0.2	6,200	610	n/a
2-(2,4,5-Trichlorophenoxy) propionic acid	µg/g	< 0.1	< 0.1	< 0.2	4,900	490	n/a
Dicamba	µg/g	< 0.1	< 0.1	< 0.2	18,000	1,800	n/a
Dichlorprop	µg/g	< 0.1	< 0.1	< 0.2	n/a	n/a	n/a
Dinoseb	µg/g	< 0.1	< 0.1	< 0.2	620	61	n/a
Picloram	µg/g	< 0.1	< 0.1	< 0.2	43,000	4,300	n/a

Associated AGAT file: 1386764328.

All terms defined within the body of SNC-Lavalin's report.

< Denotes concentration less than indicated detection limit or RPD less than indicated value.

n/a Denotes no applicable standard.

BOLD	Concentration greater than CSR Commercial Land Use (CL) standard.
SHADED	Concentration greater than CSR Residential Land Use (RL) standard.
SHADOW	Concentration greater than or equal to CCME CEQG Residential Land Use (RL) guideline.

DRAWINGS

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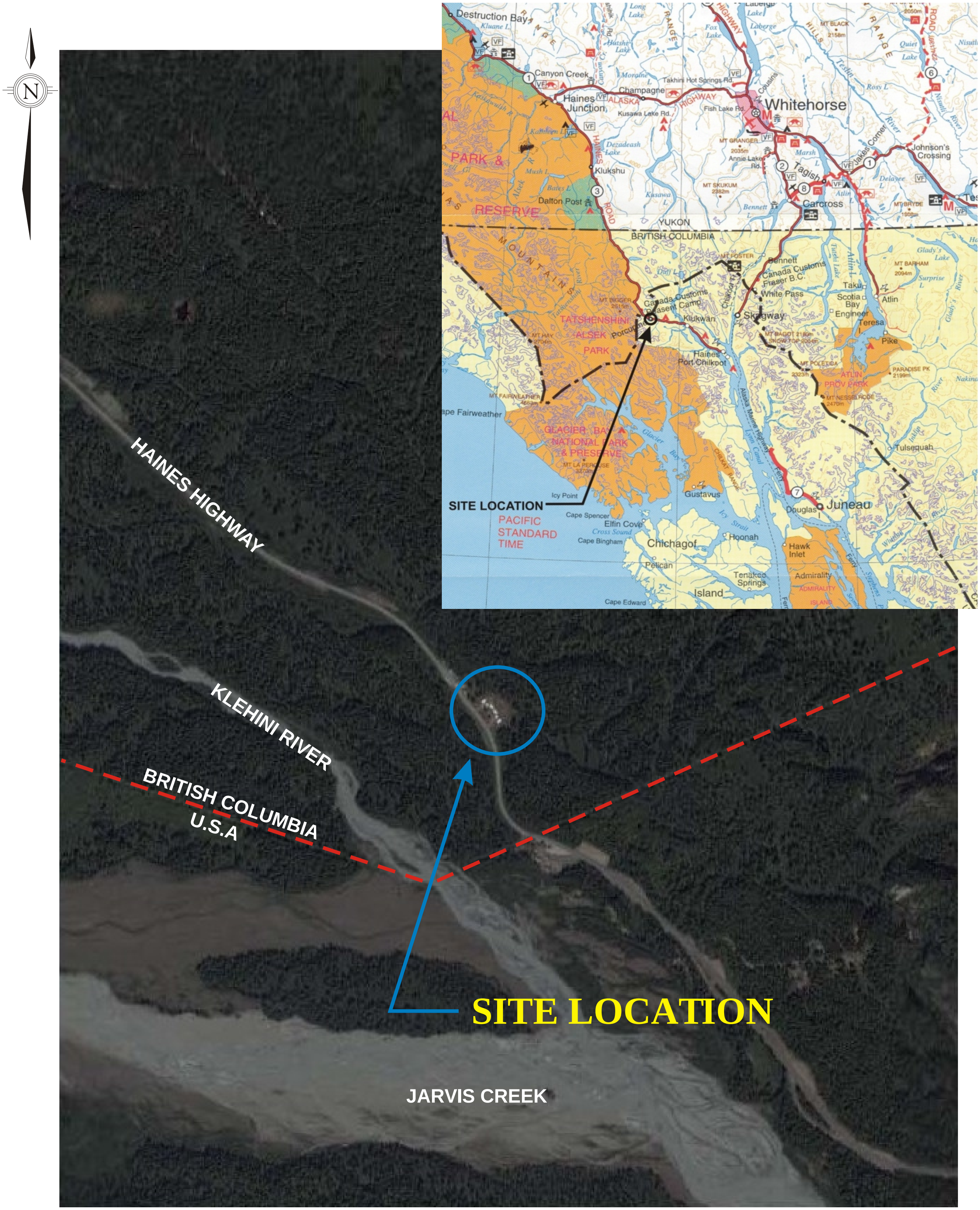
- 131416-L01 – Location Plan
- 131416-L02 – Site Plan
- 131416-L03 – Potentiometric Elevations & Inferred Contours (September 2013)
- 131416-L04A – Detailed Groundwater Analytical Results – Hydrocarbons (2013)
- 131416-L04B – Detailed Groundwater Analytical Results – Inorganics (2013)
- 131416-L05 – Detailed Surface Water Analytical Results (2013)



SNC•LAVALIN
Environment

DATE: 2011 03 31
SCALE: N.T.S
DRN BY: CP
CHK BY: DWB

CLIENT NAME:
PUBLIC WORKS
AND GOVERNMENT
SERVICES CANADA

PROJECT LOCATION:
CBSA BORDER CROSSING
PLEASANT CAMP, BC

LOCATION PLAN

DWG NO: 131416- L01
CORELFILE: 131416- L01.CDR

LEGEND

— - - —	LOT BOUNDARY
········	FORMER STRUCTURES
— T —	TELEPHONE LINE (UG)
— W —	WATER LINE
— W —	WATER LINE (REVISED LOCATION BASED ON FIELD OBSERVATIONS)
— E —	ELECTRICAL LINE
— E —	ELECTRICAL LINE (REVISED LOCATION BASED ON FIELD OBSERVATIONS)
— F —	FUEL LINE
— F —	FUEL LINE (REVISED LOCATION BASED ON FIELD OBSERVATIONS)
— HT —	ELECTRICAL/TELEPHONE LINE
— SE —	SEPTIC
— — —	AS/SVE SYSTEM PIPING
— — —	UTILITY CORRIDOR (2011)
Ⓞ	BOREHOLE (OTHER)
◓	MONITORING WELL (OTHER)
◕	MONITORING WELL
⊕	BOREHOLE
Ⓢ	AIR SPARGE WELL
Ⓥ	SOIL VAPOUR EXTRACTION WELL
Ⓦ	SOIL VAPOUR WELL
⊛	MULTI WELL
◪	TEST PIT
■	TRENCH SAMPLE
★	SURFICIAL SOIL SAMPLE
—	TOPOGRAPHIC MAJOR CONTOUR (2m)
—	TOPOGRAPHIC MINOR CONTOUR (0.5m)
✪	FLAGPOLE (ARBITRARY DATUM)
Ⓥ	SURFACE WATER SAMPLING LOCATION
◎	FIRE HYDRANT
⦶	DESTROYED MONITORING WELL

0 5 10 15
METRES

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

No.	DATE	DESCRIPTION
08059/08073	2008-06-28	UNDERHILL GEOMATICS LTD.

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
4	2014-04-26	ISSUED TO CLIENT	AJK	TDD
3	2014-02-19	ISSUED TO CLIENT	AJK	TD
2	2013-03-13	ISSUE AS FINAL	JEC	TL
1	2013-01-23	ISSUED TO CLIENT	AJK	DWB
0	2012-03-31	ISSUED TO CLIENT	AJK	PAC

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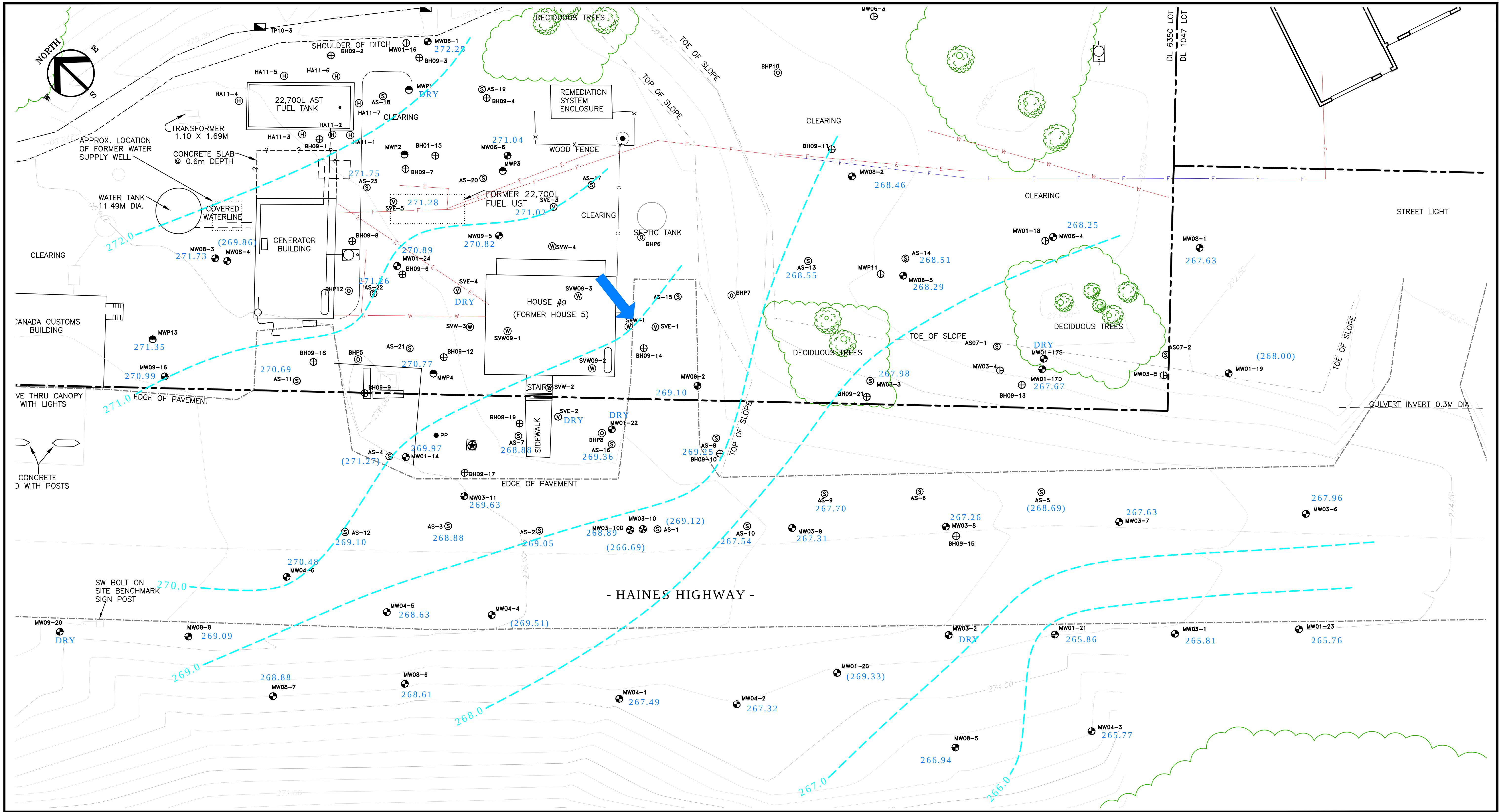
CLIENT NAME:
PUBLIC WORKS &
GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, BC

TITLE:
SITE PLAN

DWN BY: AJK
SCALE: 1:300
DATE: 2011-03-31
DWG No: 131416-L02
REV.: 4
CHK'D: DWB
PLOT: 20140425.1006
CADFILE: 131416R36

PATH: \\PROJ_SRV\PROJECTS\CURRENT PROJECTS\PUBLIC WORKS AND GOV'T SERVICES CANADA\131416\GEOMATICS\CAD\131416R36.DWG



LEGEND

LOT BOUNDARY
FORMER STRUCTURES
FUEL LINE
AS/SVE SYSTEM PIPING
TOPOGRAPHIC MAJOR CONTOUR (2m)
TOPOGRAPHIC MINOR CONTOUR (0.5m)
FOREST

0 5 10 15 METRES

○ BOREHOLE (OTHER)
◒ MONITORING WELL (OTHER)
◕ MONITORING WELL
⊕ BOREHOLE
Ⓢ AIR SPARGE WELL
Ⓥ SOIL VAPOUR EXTRACTION WELL
Ⓦ SOIL VAPOUR WELL
⊕ DESTROYED MONITORING WELL
⊗ MULTI WELL

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

INFERRED POTENTIOMETRIC CONTOUR
269.61 POTENTIOMETRIC ELEVATION (m) 2013-09-23
(269.33) POTENTIOMETRIC ELEVATION NOT USED IN CONTOURING
← ESTIMATED GROUNDWATER FLOW DIRECTION

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
	NOV. 2005	YUKON ENGINEERING SERVICES

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
5	2014-04-26	ISSUED TO CLIENT	AJK	TDD
4	2014-02-19	ISSUED TO CLIENT	AJK	TD

SNC·LAVALIN

CLIENT NAME:
PUBLIC WORKS & GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, BC

TITLE:
POTENTIOMETRIC ELEVATIONS & INFERRED CONTOURS (SEPTEMBER 23, 2013)

DWN BY: KGP	SCALE: 1:300	DATE: 2010-03-05	DWG No:	REV.: 5
CHK'D: DWB	PLOT: 20140425.1006	CADFILE: 131416R36	131416-L03	

PATH: \\PROJ_SRV\PROJECTS\CURRENT PROJECTS\PUBLIC WORKS AND GOV'T SERVICES CANADA\131416\GEOMATICS\CAD\131416R36.DWG

06-1	EPHw10-19	LEPHw	PAH
2006 10 01	<250	<250	–
2009 09 26	<250	<250	<STD

01-16	EPHw10-19	LEPHw	PAH
2001 09 28	1,100	1,100	–

06-6	EPHw10-19	LEPHw	PAH
2006 10 01	<250	<250	–
2007 09 26	<250	<250	–
2008 06 19	<250	<250	–
2008 10 02	<250	<250	–
2009 07 15	<100	<100	<STD

P3	EPHw10-19	LEPHw	PAH
2000 08 27	<100	<100	–
2001 09 28	1,000	1,000	–
2005 07 08	<250	<250	<STD

09-5	EPHw10-19	LEPHw	F1	F2	PAH
2009 09 26	14,000	14,000	–	–	>STD
DUPLICATE	17,000	17,000	–	–	>STD
2010 09 13	6,780	6,780	–	–	>STD
2011 09 29	8,900	8,900	–	–	>STD
2012 09 03	36,000	36,000	–	2,000	>STD
2013 09 24/25	47,600	47,600	1,220	34,900	>STD
DUPLICATE	22,800	22,800	–	–	>STD

AS-23	EPHw10-19	LEPHw	PAH
2008 10 02	360	360	–
2009 07 14	<100	<100	<STD
DUPLICATE	<100	<100	<STD

AS-22	EPHw10-19	LEPHw	F1	F2	PAH
2008 06 20	710	710	–	–	–
2008 10 04	1,600	1,600	–	–	–
2009 07 14	650	650	–	–	<STD
2009 09 27	1,900	1,900	–	–	<STD
2010 09 24	480	480	–	–	–
2011 09 29	630	630	–	–	–
2012 09 04	860	860	–	500	–
2013 09 24/25	1,130	1,130	<100	840	–

08-4	EPHw10-19	LEPHw	PAH
2008 08 22	<250	<250	–
2008 10 03	<250	<250	–
2009 09 27	<250	<250	<STD

08-3	EPHw10-19	LEPHw	PAH
2008 10 04	550	550	–
2009 07 15	180	180	<STD
2009 09 26	<250	<250	<STD
2010 09 24	<80	<80	–
2011 09 29	<200	<200	–

P4	EPHw10-19	LEPHw	F1	F2	PAH
2008 06 20	1,500	1,500	–	–	–
2008 09 08	2,300	2,300	–	–	–
2008 10 02	4,100	4,100	–	–	–
2009 09 27	3,700	3,700	–		>STD
2011 09 30	1,200	1,200	–		>STD
2012 10 06	820	820	–	1,000	>STD
2013 09 25	<250	<250	–	<300	STDª

AS-11	EPHw10-19	LEPHw	F1	F2	PAH
2008 10 02	2,800	2,800	–	–	–
2009 09 27	1,500	1,500	–	–	<STD
2011 09 29	240	240	–	–	–
2012 10 06	670	670	–	300	–
2013 09 24/25	830	830	<100	580	–

09-16	EPHw10-19	LEPHw	PAH
2009 09 27	<250	<250	<STD
2011 09 30	<200	<200	–
2013 09 25	830	830	–

AS-4	EPHw10-19	LEPHw	PAH
2008 06 20	<250	<250	–
2008 10 02	1,300	1,300	–
2009 09 27	1,600	1,600	STDª
2010 09 09	320	320	–
2011 09 30	<200	<200	–

03-11	EPHw10-19	LEPHw	PAH
2003 10 25	2,600	2,600	–
2004 10 19	1,300	1,300	–
2008 06 20	950	950	–
2008 10 04	1,600	1,600	–
2009 09 25	250	250	<STD
2011 09 30	560	560	–
2012 10 06	790	790	–
2013 09 24	670	670	–

AS-12	EPHw10-19	LEPHw	PAH
2008 09 30	<250	<250	–

04-6	EPHw10-19	LEPHw	PAH
2004 10 19	440	440	<STD
2005 07 07	<250	<250	–
2006 07 17	<250	<250	–
2006 09 30	<250	<250	–
2007 09 17	<250	<250	–
2008 06 18/19	<250	980	–
2008 09 30	<250	<250	–
2009 07 12	110	110	<STD
2009 09 25	<100	<100	<STD
2012 08 30	120	120	–
2013 09 24	<250	<250	–

08-8	EPHw10-19	LEPHw	PAH
2008 10 03	370	370	–
2009 07 12	580	580	<STD
2009 08 27	450	450	–
2009 09 26	<250	<250	<STD
2010 09 13	250	250	–
DUPLICATE	290	290	–
2011 10 01	<200	<200	–
DUPLICATE	<200	<200	–
2013 09 25	<250	<250	–

08-7	EPHw10-19	LEPHw	PAH
2008 10 03	<250	<250	–
DUPLICATE	<250	<250	–
2009 07 13	730	730	<STD
DUPLICATE	580	580	<STD
2009 08 27	410	410	–
2009 09 25	<100	<100	<STD
2010 09 06	260	260	–
2011 10 01	<200	<200	–
2012 09 03	330	330	–
2013 09 25	<250	<250	–

04-5	EPHw10-19	LEPHw	PAH
2004 10 19	1,400	1,400	<STD
DUPLICATE	1,100	1,100	<STD
2005 07 07	1,400	1,400	<STD
2005 07 08	810	810	–
2006 07 17	590	590	<STD
2006 10 01	1,100	1,100	–
2007 09 25	1,200	1,200	–
2008 06 18	470	470	–
2008 10 03	<250	<250	–
2009 09 25	<100	<100	<STD
2011 09 29	950	950	–
2012 10 05	1,200	1,200	–
2013 09 24	<250	<250	–

08-6	EPHw10-19	LEPHw	PAH
2008 10 03	<250	<250	–
2009 07 14	360	360	<STD
2009 08 27	370	370	–
2009 09 26	<250	<250	<STD
DUPLICATE	<250	<250	<STD
2012 09 03	110	110	–
2013 09 25	<250	<250	–

04-4	EPHw10-19	LEPHw	PAH
2004 10 19	<250	<250	<STD
DUPLICATE	<250	<250	<STD
2005 07 08	<250	<250	–
2006 07 17	<250	<250	–
2006 10 01	<250	<250	–
2007 09 17	<250	<250	–
2008 06 18	<250	<250	–
2008 10 03	<250	<250	–
2009 07 12	120	120	<STD
2009 09 25	<100	<100	<STD
2010 09 10	<80	<80	–
2011 09 30	250	250	–
2012 08 30	<100	<100	–
2013 09 24	<250	<250	–

06-2	EPHw10-19	LEPHw	F1	F2	PAH
2006 10 01	3,200	3,200	–	–	–
2007 09 26	1,100	1,100	–	–	–
2008 06 19	<250	<250	–	–	–
2008 10 02	1,100	1,100	–	–	–
2009 07 13	600	600	–	–	<STD
2009 09 26	330	330	–	–	<STD
2010 09 13	450	450	–	–	–
2011 09 29	330	330	–	–	–
2012 09 03	2,010	2,010	–	800	–
DUPLICATE	2,250	2,250	–	600	–
2013 09 24/25	460	460	<100	<300	–
DUPLICATE	480	480	<100	<300	–

AS-15	EPHw10-19	LEPHw	PAH
2008 06 20	<250	<250	–
2008 10 02	<250	<250	–
2009 09 27	<250	<250	<STD

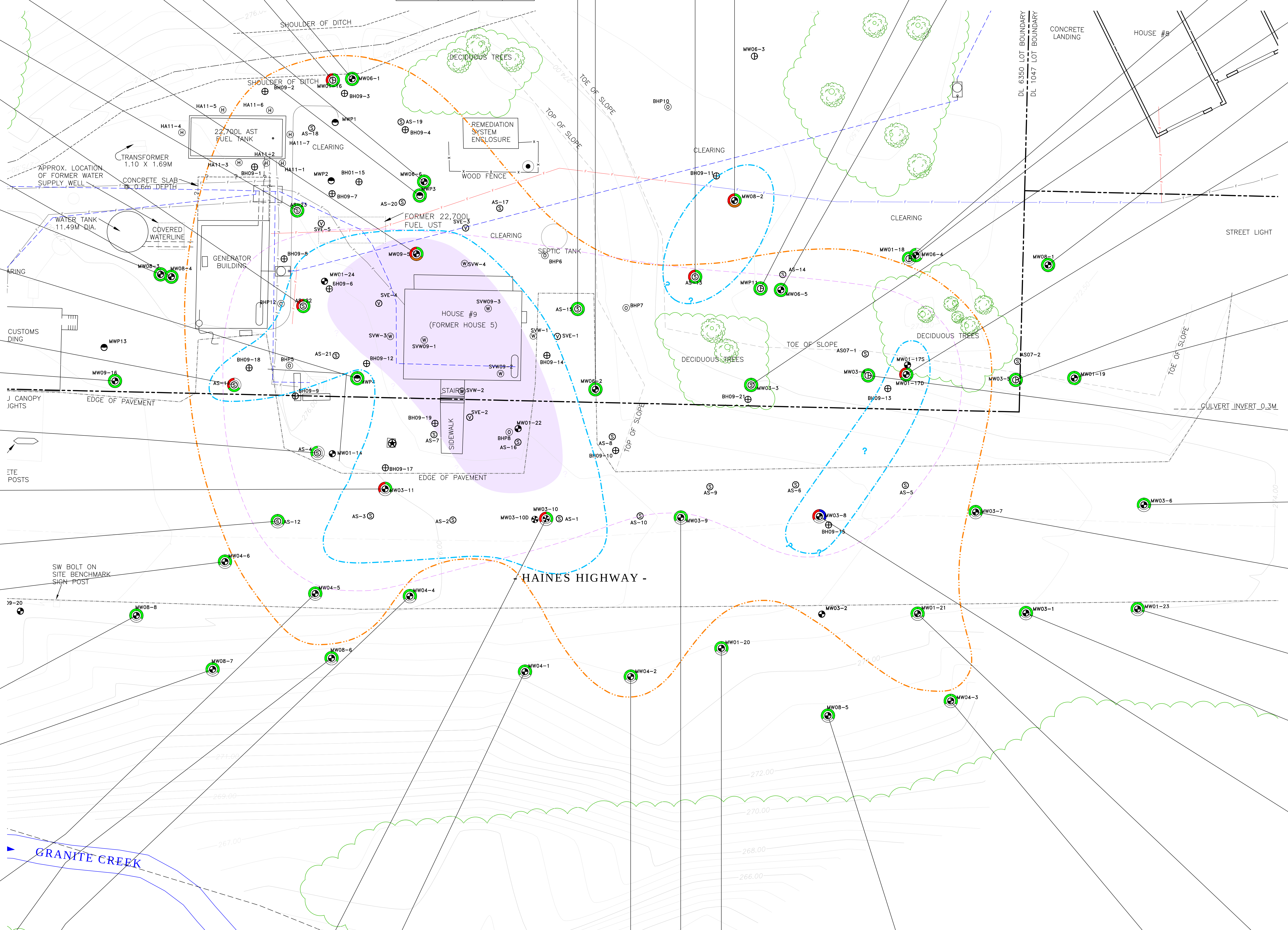
AS-13	EPHw10-19	LEPHw	F1	F2	PAH
2008 10 02	1,900	1,900	–	–	–
2009 07 14	430	430	–	–	>STD
2009 09 26	610	610	–	–	<STD
2010 09 06	870	870	–	–	–
2011 09 29	290	290	–	–	–
DUPLICATE	290	290	–	–	–
2012 09 04	620	620	–	400	–
2013 09 24/25	720	720	<100	580	–
DUPLICATE	670	670	–	–	–

08-2	EPHw10-19	LEPHw	F1	F2	PAH
2008 10 04	360	360	–	–	–
2009 07 12	2,200	2,200	–	–	>STD
2009 09 26	6,600	6,600	–	–	>STD
2010 09 13	9,200	9,200	–	–	>STD
2011 09 29	410	410	–	–	>STD
2012 09 04	1,260	1,260	–	600	>STD
2013 09 25	2,060	2,060	<100	1,370	STDª

MWP4-11	F1	F2
2013 09 24	<100	–

P11	EPHw10-19	LEPHw	PAH
2000 09 31	120,000	120,000	–
2001 09 29	5,000	5,000	–
DUPLICATE	4,200	4,200	–
2005 07 08	<250	<250	<STD

06-5	EPHw10-19	LEPHw	PAH
2006 10 01	9,000	9,000	–
DUPLICATE	10,000	10,000	–
2007 09 26	1,400	1,400	–
2008 06 19	<250	<250	–
2008 10 04	320	320	–
2009 07 13	120	120	<STD
2010 09 24	130	130	–
2011 09 29	<200	<200	–



06-4	EPHw10-19	LEPHw	PAH
2006 10 01	550	550	–
2007 09 26	<250	<250	–
2008 10 02	<250	<250	–

01-18	EPHw10-19	LEPHw	PAH
2001 09 28	<250	<250	–
2003 10 25	<250	<250	–

03-03	EPHw10-19	LEPHw	PAH
2003 09 10	6,700	6,700	>STD
2003 10 25	2,100	2,100	<STD
2008 06 20	280	280	–
2008 10 02	<250	<250	–
DUPLICATE	<250	<250	–
2009 07 13	170	170	<STD
2009 09 26	<250	<250	<STD

08-1	EPHw10-19	LEPHw	PAH
2008 10 04	310	310	–
2009 07 13	<100	<100	<STD

01-17D	EPHw10-19	LEPHw	F1	F2	PAH
2001 09 29	17,000	17,000	–	–	–
2003 09 10	700	700	–	–	–
2003 10 25	630	630	–	–	–
2006 10 01	2,300,000	2,300,000	–	–	–
2008 06 19	9,700	9,700	–	–	–
2008 10 04	7,200	7,200	–	–	–
2009 07 13	7,200	7,200	–	–	>STD
DUPLICATE	2,300	2,300	–	–	>STD
2009 09 26	72,000	72,000	–	–	STDª
DUPLICATE	170,000	170,000	–	–	STDª
2010 09 24	34,600	34,600	–	–	>STD
DUPLICATE	40,400	40,400	–	–	>STD
2011 09 30	1,000	1,000	–	–	<STD
DUPLICATE	2,900	2,900	–	–	>STD
2012 09 04	1,470	1,470	–	500	<STD
DUPLICATE	–	–	–		<STD
2013 09 24/25	860	860	<100	560	STDª

03-05	EPHw10-19	LEPHw	PAH
2003 09 10	350	350	>STD
2003 10 25	360	360	<STD

01-19	EPHw10-19	LEPHw	F1	F2	PAH
2001 09 29	<250	<250	–	–	–
2003 10 25	<250	<250	–	–	–
2006 10 01	<250	<250	–	–	–
2007 09 25	<250	<250	–	–	–
2008 06 19	<250	<250	–	–	–
DUPLICATE	<250	<250	–	–	–
2008 10 04	<250	<250	–	–	–
2009 07 12	<100	<100	–	–	<STD
DUPLICATE	<100	<100	–	–	<STD
2009 09 26	<250	<250	–	–	<STD
DUPLICATE	<250	<250	–	–	<STD
2010 09 24	<80	<80	–	–	–
2011 09 30	<200	<200	–	–	–
2012 09 04	<100	<100	–	<100	–
2013 09 24/25	<250	<250	<100	<300	STDª

03-04	EPHw10-19	LEPHw	PAH
2003 09 10	800	800	>STD
2003 10 25	<250	<250	<STD

03-06	EPHw10-19	LEPHw	PAH
2003 09 10	<250	<250	<STD
2003 10 25	<250	<250	<STD
2006 07 17	<250	<250	–
2006 09 30	<250	<250	–
2007 09 17	<250	<250	–
2008 06 18	<250	<250	–

03-07	EPHw10-19	LEPHw	PAH
2003 10 25	<250	<250	–
2004 10 19	<250	<250	–
2005 07 07	<250	<250	–
2006 07 17	<250	<250	STDª
2008 06 18	<250	<250	–
2008 09 30	<250	<250	–
2009 07 12	<100	<100	<STD
2009 09 25	<100	<100	<STD
2011 09 30	<200	<200	–
2012 08 30	<100	<100	–

01-23	EPHw10-19	LEPHw	PAH
2001 09 28	<250	<250	–
2003 10 25	<250	<250	<STD
2004 10 19	<250	<250	–
2005 07 08	<250	<250	–
2006 07 18	<250	<250	–
2006 10 01	<250	<250	–
2007 09 25	<250	<250	–

03-01	EPHw10-19	LEPHw	PAH
2003 09 10	<250	<250	<STD
2003 10 25	<250	<250	–
2005 07 08	<250	<250	–
2007 09 25	<250	<250	–
2008 06 19	<250	<250	–
2008 10 03	<250	<250	–
2009 07 14	<100	<100	<STD

03-08	EPHw10-19	LEPHw	PAH
2003 09 10	2,700	2,700	–
2003 10 25	3,800	3,800	–
2004 10 19	1,100	1,100	–
2005 07 07	810	810	–
2006 07 17	1,300	1,300	STDª
DUPLICATE	1,300	1,300	STDª
2006 09 30	4,200	4,200	–
2007 09 25	8,900	8,900	–
2008 06 18	1,500	1,500	–
2008 09 30	880	880	–
2009 07 12	540	540	<STD
2009 09 25	1,100	1,100	>STD
2010 09 09	350	350	–
2011 09 30	<200	<200	–
2012 08 30	440	440	–
2013 09 24	590	590	–

01-21	EPHw10-19	LEPHw	PAH
2001 09 28	370	370	–
DUPLICATE	390	390	–
2003 09 10	340	340	–
2003 10 25	500	500	<STD
2004 10 19	500	500	–
2005 07 08	590	580	<STD
2006 07 18	300	300	STDª
2006 10 01	310	310	–
2007 09 25	310	310	–
2008 06 19	830	830	–
2008 10 03	650	650	–
2009 07 14	420	420	<STD
2009 09 26	260	260	<STD
2010 09 24	170	170	<STD
DUPLICATE	80	80	–
2011 10 01	290	290	<STD
2012 09 03	430	430	–
DUPLICATE	400	400	–
2013 09 25	420	420	–

04-3	EPHw10-19	LEPHw	PAH
2004 10 19	<250	<250	<STD
2005 07 08	560	560	–
2005 07 08	420	420	–
2006 07 18	<250	<250	–
2006 10 01	<250	<250	–
2007 09 25	<250	<250	–
DUPLICATE	<250	<250	–
2008 10 03	<250	<250	–
2009 07 14	<100	<100	<STD

03-10	EPHw10-19	LEPHw	PAH
2003 09 10	6,600	6,600	–
2003 10 25	4,100	4,100	–
2006 09 30	11,000	11,000	–
2007 09 17	1,200	1,200	–
2008 06 18	2,300	2,300	–
2008 09 30	3,000	3,000	–
2009 07 12	34,000	34,000	>STD
2009 08 29	2,600	2,600	–
2009 09 25	3,900	3,900	<STD
2010 09 10	2,450	2,450	>STD
2011 09 30	710	710	<STD
2012 08 30	2,670	2,670	<STD
2013 09 24	4,560	4,560	STDª

03-10D	EPHw10-19	LEPHw	PAH
2012 10 06	350	350	–
2013 09 24	380	380	–

04-1	EPHw10-19	LEPHw	PAH
2004 10 19	<250	<250	<STD
2008 06 19	<250	<250	–
2008 10 03	<250	<250	–
2009 09 25	<100	<100	<STD
2011 10 01	<200	<200	–
2012 10 06	240	240	–

04-2	EPHw10-19	LEPHw	PAH
2004 10 19	750	750	<STD
2005 07 08	300	300	<STD
2006 07 18	<250	<250	STDª
2006 10 01	<250	<250	–
2007 09 25	<250	<250	–
2008 06 19	<250	<250	–
2008 10 03	<250	<250	–
2009 07 13	160	160	<STD
2009 09 25	<100	<100	<STD
2010 09 24	190	190	–
2011 10 01	<200	<200	–
2012 09 03	280	280	–
2013 09 25	260	260	–

03-9	EPHw10-19	LEPHw	PAH
2003 09 10	370	370	–
2003 10 25	<250	<250	–
2004 10 19	<250	<250	–
2005 07 07	800	800	–
2006 07 17	<250	<250	STDª
2006 09 30	250	250	–
2008 06 18	<250	<250	–
2009 07 12	490	490	<STD
2009 09 25	<100	<100	<STD
2010 09 08	320	320	–
2011 09 30	<200	<200	–

01-20	EPHw10-19	LEPHw	PAH
2001 09 29	<250	<250	–
2003 10 25	<250	<250	–
2004 10 19	<250	<250	–
2006 10 01	<250	<250	–
2008 06 19	<250	<250	–
2008 10 03	<250	<250	–
2009 09 25	<100	<100	<STD

08-5	EPHw10-19	LEPHw	PAH
2008 10 03	<250	<250	–
2009 07 14	120	120	<STD
2010 09 24	<80	<80	–
2011 10 01	<200	<200	–
2012 09 03	240	240	–
DUPLICATE	260	260	–
2013 09 25	<250	<250	–

LEGEND

0 1 2 10 METRES

- LOT BOUNDARY
- FORMER STRUCTURES
- FOREST
- ◎ BOREHOLE (OTHER)
- MONITORING WELL (OTHER)
- MONITORING WELL (SLE)
- ⊕ BOREHOLE (SLE)
- Ⓢ AIR SPARGE WELL (SLE)
- Ⓥ SOIL VAPOUR EXTRACTION WELL (SLE)
- Ⓦ SOIL VAPOUR WELL
- DESTROYED MONITORING WELL
- MULTI WELL
- SURFACE WATER SAMPLE
- F FUEL LINE
- F FUEL LINE (REVISED LOCATION BASED ON FIELD OBSERVATIONS)
- INFERRED POTENTIOMETRIC CONTOUR (m) 2013
- HISTORIC INFERRED DISSOLVED PHASE HYDROCARBON IMPACTED AREA GREATER THAN CSR AW STANDARDS (PRE-2006)
- CURRENT INFERRED DISSOLVED PHASE HYDROCARBON IMPACTED AREA GREATER THAN CSR AW/DW STANDARDS/FEDERAL GUIDELINES (2013)
- CURRENT INFERRED LNAPL PLUME (2013)
- HISTORIC INFERRED EXTENT OF LNAPL PLUME BASED ON EPH CONCENTRATIONS AND OBSERVATIONS (PRE 2006)

LOCATION — ANALYTICAL GROUNDWATER RESULTS

04-2	EPHw10-19	LEPHw	PAH
2004 10 19	750	750	>STD

SAMPLE DATE (YYYY MM DD)

- GREEN – CONCENTRATION LESS THAN OR EQUAL TO THE APPLICABLE STANDARDS/GUIDELINES
- RED – CONCENTRATION GREATER THAN THE APPLICABLE CSR AW STANDARDS
- BLUE – CONCENTRATION GREATER THAN THE APPLICABLE CSR DW STANDARDS
- BROWN – CONCENTRATION GREATER THAN THE APPLICABLE FGQ T2 RL OR CDWQ GUIDELINES

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.
3. FEDERAL GUIDELINES NOT APPLIED ON PROVINCIAL LANDS

PAH POLYCYLIIC AROMATIC HYDROCARBONS
LEPHw LIGHT EXTRACTABLE PETROLEUM HYDROCARBONS
EPHw10-19 EXTRACTABLE PETROLEUM HYDROCARBONS (C10-C19)
< DENOTES CONCENTRATION LESS THAN INDICATED DETECTION LIMIT
– NOT ANALYZED FOR
a MDL EXCEEDS GUIDELINES

	EPHw10-19	LEPHw	PAH
CSR AW STANDARDS (µg/L)	5,000	500	SEE TABLES
CSR DW STANDARDS (µg/L)	5,000	n/a	
FGQ T2 GUIDELINES (µg/L)	n/a	n/a	
CDWQ GUIDELINES (µg/L)	n/a	n/a	

REFERENCE DRAWINGS

No.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
3	2014-04-26	ISSUED TO CLIENT	AJK	TD
2	2013-03-12	ISSUE AS FINAL	JEC	TL
1	2013-01-23	ISSUED TO CLIENT	AJK	DWB
0	2012-03-31	ISSUED TO CLIENT	AJK	DWB

SNC·LAVALIN

CLIENT NAME:
PUBLIC WORKS &
GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, BC

TITLE:
DETAILED GROUNDWATER
ANALYTICAL RESULTS - HYDROCARBONS (2013)

DWN BY: AJK
SCALE: 1:200
DATE: 2008-10-05
DWG No: 131416-L04A
REV.: 3
CHK'D: DWB
PLOT: 20140425.1006
CADFILE: 131416R36

PATH: \\PROJ_SRV\PROJECTS\CURRENT PROJECTS\PUBLIC WORKS AND GOV'T SERVICES CANADA\131416\GEOMATICS\CAD\131416R36.DWG

06-6	Fe	Mn	NO3-N	SO4
2006 10 01	190	2.6	150	29.5
2007 09 26	<10	11	100	4.58
2008 06 18	280	30	<50	3.12

P13	Fe	Mn	NO3-N	SO4
2001 09 28	–	–	<50	5.9

09-5	Fe	Mn	NO3-N	SO4
2009 09 25	1,940	550	<50	11
2010 09 11/13	1,880	532	<20	4.5
2011 09 28	1,870	185	<20	2.3
2012 09 02	2,050	278	<5	4.4
2013 09 24	6,280	241	111	7.56
DUPLICATE	6,260	240	233	7.41

AS-22	Fe	Mn	NO3-N	SO4
2008 10 03	820	2,370	2,850	33.4
2010 09 23	18,800	2,300	50	2.7
2011 09 28	5,630	927	160	4.9
2012 09 03	9,600	1,140	<5	2.4
2013 09 24	5,620	675	689	10.5

08-4	Fe	Mn	NO3-N	SO4
2008 10 03	<10	88	<10	75.4
2009 09 26	<10	233	<50	46.1

08-3	Fe	Mn	NO3-N	SO4
2008 10 03	210	430	300	7.42
2009 07 14	60	160	<50	6
2009 09 25	<10	242	250	7.45
2010 09 23	7	30	<20	9.3
2011 09 28	9	172	80	3.6

P4	Fe	Mn	NO3-N	SO4
2011 09 29	4,040	671	<20	2
2012 10 05	6,730	883	9	5.7
2013 09 24	9,260	794	15.3	8.12

09-16	Fe	Mn	NO3-N	SO4
2009 09 26	<10	117	1,220	18

06-2	Fe	Mn	NO3-N	SO4
2007 09 26	1,010	457	<10	32.7
2010 09 11/13	2,900	1,190	40	16
2011 09 28	199	382	610	7.5
2012 09 02	5,650	701	6	2.3
DUPLICATE	6,220	714	25	2.1
2013 09 24	386	401	566	13.5
DUPLICATE	393	393	517	14.1

03-11	Fe	Mn	NO3-N	SO4
2004 10 18	17,300	1,030	<50	3.7
2008 10 03	490	1,170	20	30.3
2011 09 29	7,750	2,250	20	12
2012 10 05	1,230	917	42	14.6
2013 09 23	1,280	467	291	11.3

04-6	Fe	Mn	NO3-N	SO4
2004 10 18	80	340	2,300	29.2
2005 07 06	<50	2	70	7.2
2007 09 17	<50	110	30	13
2008 06 18	290	<1	<50	4.64

08-8	Fe	Mn	NO3-N	SO4
2008 10 02	<10	120	2,140	11.4
2009 07 11	110	641	<50	17.9
2009 08 26	2,920	800	<50	61.2
2009 09 26	<10	85	1,530	7.16
2010 09 11/13	1,290	790	<20	15
2010 09 13	1,270	788	–	–
2011 09 30	<5	9	870	7
2011 09 30	21	9	870	6.9

04-5	Fe	Mn	NO3-N	SO4
2004 10 18	7,120	1,080	140	4
2004 10 18	7,270	1,120	–	–
2005 07 07	10,500	660	<50	2.1
2006 07 15	3,380	600	<100	29.3
2006 10 01	310	338	140	168
2008 06 17	1,170	326	20	4.31
2008 10 02	790	310	680	14.6
2009 09 24	520	174	140	8.33
2011 09 29	9,670	1,750	30	5.6
2012 10 05	2,310	488	843	7.4
2013 09 23	4,280	650	143	8.88

08-7	Fe	Mn	NO3-N	SO4
2008 10 02	480	730	20	14.1
2008 10 02	480	730	30	14.1
2009 07 12	1,750	897	<50	4.74
2009 07 12	1,700	903	<50	4.7
2009 08 26	1,550	1,280	<50	7.6
2009 09 24	570	216	<50	8.26
2012 09 02	40	957	21	7.3
2013 09 24	7,180	700	84.8	4.93

04-4	Fe	Mn	NO3-N	SO4
2004 10 18	<50	150	290	11.3
2009 07 11	<10	87	80	23.6
2009 09 24	<10	3.7	380	11.8
2010 09 10	26	5	150	14
2011 09 29	<5	1	70	12
2012 08 29	<10	109	83	11.8
2013 09 23	<30	13.1	143	24

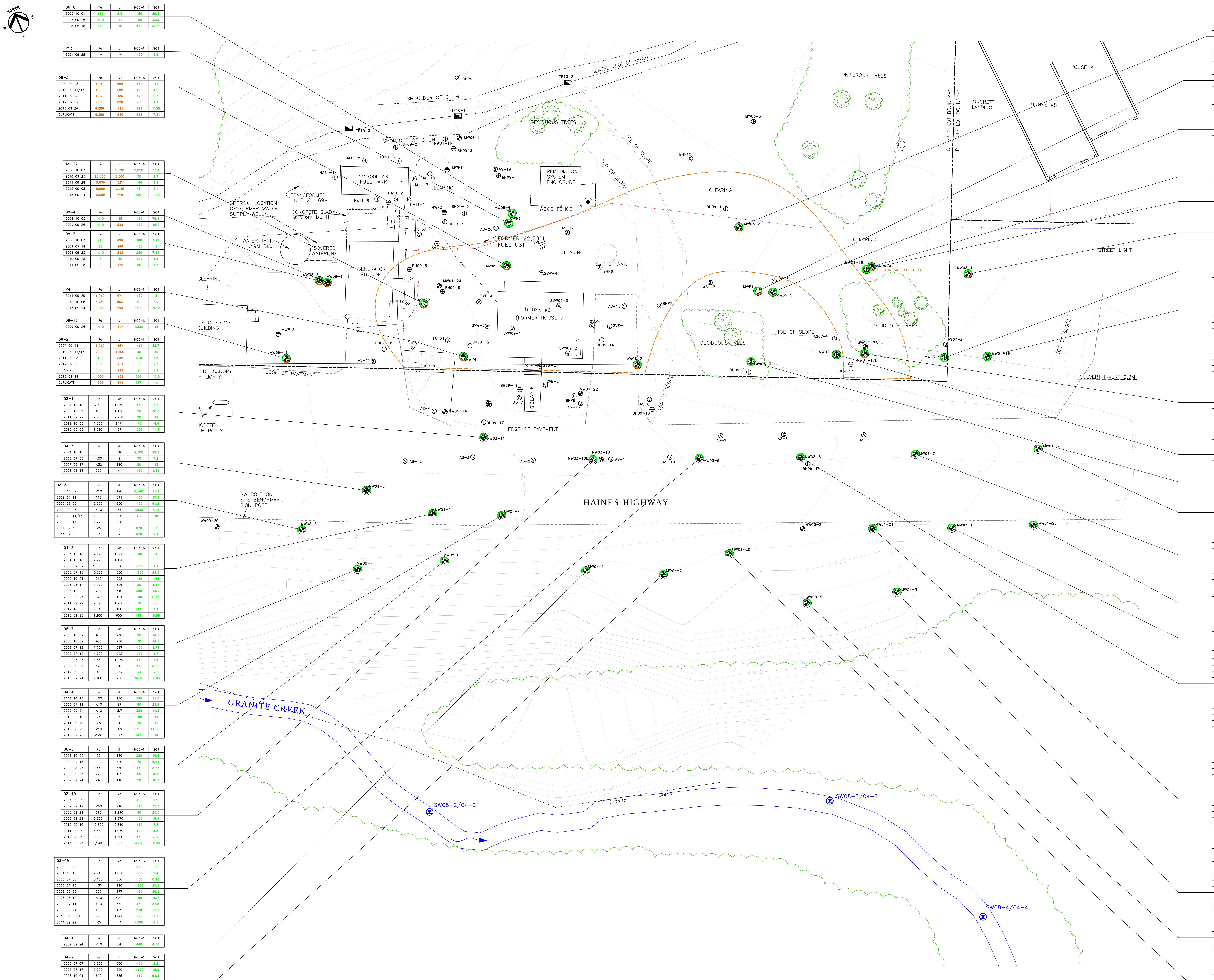
08-6	Fe	Mn	NO3-N	SO4
2008 10 02	20	180	330	16.5
2009 07 13	120	720	70	6.64
2009 08 26	1,450	660	<50	3.52
2009 09 24	220	109	80	10.8
2009 09 24	240	110	50	10.3

03-10	Fe	Mn	NO3-N	SO4
2003 09 09	–	–	<50	2.9
2007 09 17	<50	710	<10	37.3
2008 09 29	610	1,290	40	23.5
2009 08 28	6,000	1,370	<50	19.9
2010 09 10	10,600	2,660	<50	7.8
2011 09 29	3,630	1,060	<20	4.5
2012 08 29	13,200	1,660	<5	2.8
2013 09 23	1,540	693	40.5	6.88

03-09	Fe	Mn	NO3-N	SO4
2003 09 09	–	–	<50	3
2004 10 18	7,940	1,020	<50	2.4
2005 07 06	3,180	650	<50	0.96
2006 07 16	<50	220	<100	25.5
2006 09 30	250	177	<10	86.4
2008 06 17	<10	<0.2	150	10.7
2009 07 11	<10	362	<50	8.05
2009 09 24	100	179	230	13.1
2010 09 08/10	865	1,080	<20	2.7
2011 09 29	<5	<1	1,580	8.3

04-1	Fe	Mn	NO3-N	SO4
2009 09 24	<10	0.4	460	4.56

04-2	Fe	Mn	NO3-N	SO4
2005 07 07	6,630	600	<50	2.2
2006 07 17	2,720	600	<100	15.9
2006 10 01	690	355	<10	54.3
2007 09 25	1,210	233	20	27.3
2008 06 18	1,510	381	10	11
2008 10 02	290	150	50	13.6
2009 07 12	1,360	341	<50	9.03
2009 09 24	230	74	<50	11.8
2010 09 23	2,990	535	<20	6.7
2011 09 30	4,650	1,100	<20	5.3
2012 09 02	2,980	472	<5	4.3
2013 09 24	954	571	49.5	2.98



08-2	Fe	Mn	NO3-N	SO4
2008 10 03	40	510	<10	17.4
2009 07 12	6,090	1,290	<50	20.1
2010 09 11/13	7,860	814	<20	12
2011 09 28	7,200	703	<20	3.8
2012 09 03	6,190	613	<5	2.9
2013 09 24	7,730	880	6.7	6.07

P11	Fe	Mn	NO3-N	SO4
2001 09 29	300	120	<50	6.9
2001 09 29	250	110	<50	7
2005 07 07	<50	95	<50	8

06-5	Fe	Mn	NO3-N	SO4
2006 10 01	320	213	<10	243
2006 10 01	300	211	<10	245
2007 09 26	<10	36	<10	54.5
2008 06 18	380	9.5	<50	4.43
2008 10 03	<10	<3	660	10.2
2009 07 12	180	841	<50	9.91
2010 09 23	513	2,170	<20	6.3
2011 09 28	<5	3	440	6.2

01-18	Fe	Mn	NO3-N	SO4
2001 09 28	–	–	290	7.7

06-4	Fe	Mn	NO3-N	SO4
2006 10 01	280	347	<10	176
2009 09 25	<10	55	–	–

08-1	Fe	Mn	NO3-N	SO4
2008 10 03	<10	91	430	9.97

03-05	Fe	Mn	NO3-N	SO4
2003 09 09	–	–	<50	10.7

01-19	Fe	Mn	NO3-N	SO4
2001 09 29	80	46	190	11.5
2008 06 18	370	<1	190	8.57
2008 06 18	430	1.5	160	8.64
2008 10 03	<10	<3	360	11.1
2009 07 12	<10	0.8	240	10.3
2009 07 12	<10	0.9	240	10.5
2009 09 25	<10	1.2	300	8.64
2009 09 25	<10	0.2	–	–
2010 09 23	<5	5	100	13
2011 09 29	33	<1	680	8.6
2012 09 03	20	<1	245	9.7
2013 09 24	<30	0.419	301	8.8

01-17D	Fe	Mn	NO3-N	SO4
2001 09 29	–	–	<50	<0.5
2003 09 09	–	–	<50	<0.5
2008 06 18	630	343	<50	13.4
2008 10 03	2,910	920	<10	22.9
2010 09 23	2,100	1,300	<20	7.8
2010 09 23	2,140	1,350	<20	0.6
2011 09 29	483	473	120	2.6
2011 09 29	464	468	140	2.8
2012 09 03	2,200	895	<5	0.7
2013 09 24	3,420	1,050	<5	<0.5

03-04	Fe	Mn	NO3-N	SO4
2003 09 09	–	–	<50	6.7

03-03	Fe	Mn	NO3-N	SO4
2003 09 09	–	–	<50	0.8
2009 07 12	20	1,510	<50	8.97
2009 09 25	<10	15	–	–

03-06	Fe	Mn	NO3-N	SO4
2003 09 09	–	–	140	7.5
2007 09 17	<50	3	130	5.49

03-07	Fe	Mn	NO3-N	SO4
2004 10 18	<50	38	190	8.5
2006 07 16	<50	2	420	12.2
2009 07 11	<10	0.2	450	16
2009 09 24	<10	0.1	250	12.1
2010 09 10	18	4	420	11
2011 09 29	<5	<1	260	18

01-23	Fe	Mn	NO3-N	SO4
2001 09 28	–	–	60	12.9
2004 10 18	<50	1,340	<50	5.6

03-01	Fe	Mn	NO3-N	SO4
2003 09 09	–	–	80	4.1
2009 07 13	<50	1	60	10.6

03-08	Fe	Mn	NO3-N	SO4
2003 09 09	–	–	<50	1.4
2004 10 18	12,900	1,210	<50	1.3
2005 07 06	8,090	790	<50	<0.5
2006 07 16	2,090	660	<100	95.6
2006 07 16	2,060	660	<100	85.6
2006 09 30	1,190	623	<10	256
2007 09 17	160	690	<10	76.7
2008 06 17	260	294	50	17.6
2008 09 29	1,130	504	<10	30
2010 09 08/10	2,470	1,410	<20	0.6
2011 09 29	1,400	1,150	240	6.5
2012 08 29	870	1,030	<5	0.6
2013 09 23	5,980	1,430	<5	<0.5

01-21	Fe	Mn	NO3-N	SO4
2001 09 28	2,880	1,190	110	2.6
2001 09 28	2,870	1,190	90	2.5
2004 10 18	7,040	1,310	<50	4.5
2005 07 07	8,000	870	<50	1.4
2006 07 17	210	940	<100	41
2006 10 01	300	825	30	139
2007 09 25	<10	1,000	<10	54.1
2008 06 18	600	431	10	35.7
2008 10 02	430	1,550	50	25.2
2010 09 23	681	1,340	<20	2.8
2011 09 30	602	1,390	130	7.5
2012 09 02	1,350	1,450	5	1.9
DUPLICATE	1,320	1,440	72	2.4
2013 09 24	772	1,420	<5	2.06

04-3	Fe	Mn	NO3-N	SO4
2004 10 18	2,110	1,450	100	1.1
2005 07 07	6,860	870	–	–
2005 07 07	6,960	880	<50	1
2006 07 17	3,540	830	<100	19.3
2006 10 01	2,700	1,040	<10	64.8
2007 09 25	1,810	565	10	51.9
2007 09 25	1,820	565	10	51.8
2009 07 13	410	480	<50	13

08-5	Fe	Mn	NO3-N	SO4
2008 10 02	<10	200	60	24.2
2009 07 13	<50	250	<50	8.16
2010 09 23	8	773	40	2.5
2011 09 30	355	1,410	<20	3.9

01-20	Fe	Mn	NO3-N	SO4
2001 09 29	110	27	<50	3.2
2004 10 18	<50	<1	190	4.6
2009 09 24	<10	<0.1	190	5.15

LEGEND

0 5 10 15 METRES

- LOT BOUNDARY
- FORMER STRUCTURES
- FOREST
- AS/SVE SYSTEM PIPING
- BOREHOLE (OTHER)
- MONITORING WELL (OTHER)
- MONITORING WELL
- BOREHOLE
- AIR SPARGE WELL
- SOIL VAPOUR EXTRACTION WELL
- SOIL VAPOUR WELL
- DESTROYED MONITORING WELL
- MULTI WELL
- SURFACE WATER SAMPLE
- FUEL LINE
- FUEL LINE (REVISED LOCATION BASED ON FIELD OBSERVATIONS)
- CURRENT INFERRED DISSOLVED IRON IMPACTED AREA GREATER THAN FGQ T2 RL GUIDELINES

LOCATION
ANALYTICAL GROUNDWATER RESULTS

08-4	Fe	Mn	NO3-N	SO4
2008 10 03	<10	88	<10	75.4

SAMPLE DATE (YYYY MM DD)

BROWN – CONCENTRATION GREATER THAN THE APPLICABLE FGQ T2 RL GUIDELINES OR CDWQ GUIDELINES

GREEN – CONCENTRATION LESS THAN OR EQUAL TO THE APPLICABLE STANDARD/GUIDELINES

Fe IRON
Mn MANGANESE
NO3-N NITRATE
SO4 SULPAHTE

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

	Fe	Mn	NO3-N	SO4
CSR AW STANDARDS (µg/L)	n/a	n/a	400,000	1,000
CSR DW STANDARDS (µg/L)	n/a	n/a	10,000	500
CDWQ GUIDELINES (ug/L)	300**	50**	45,000	500
FGQ T2 RL GUIDELINES (ug/L)	300	n/a	13,000	100

*FEDERAL GUIDELINES NOT APPLIED ON PROVINCIAL LANDS
**GUIDELINE VALUES FOR THESE ARE AESTHETIC AND NOT HEALTH BASED MAXIMUM ALLOWABLE CONCENTRATIONS.

REFERENCE DRAWINGS

No.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
3	2014-04-26	ISSUED TO CLIENT	AJK	TD
2	2013-03-13	ISSUED TO CLIENT	JEC	TL
1	2013-01-23	FOR REVIEW	AJK	DWB
0	2012-03-31	ISSUED TO CLIENT	AJK	DWB

SNC·LAVALIN

CLIENT NAME:
PUBLIC WORKS &
GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, BC

TITLE:
DETAILED GROUNDWATER ANALYTICAL RESULTS - INORGANICS (2013)

DWN BY: AJK
CHK'D: DWB
SCALE: 1:200
PLOT: 20140425.1006
DATE: 2008-10-05
CADFILE: 131416R36
DWG No: 131416-L04B
REV.: 3

PATH: \\PROJ_SRV\PROJECTS\CURRENT PROJECTS\PUBLIC WORKS AND GOV'T SERVICES CANADA\131416\GEOMATICS\CAD\131416R36.DWG

SW04-1	EPHw10-19	Al	Fe	Mn
2004 10 16	<250	29	20	0.7
2005 07 07	<250	26	<10	0.5
2006 07 17	<250	15	<50	<1
2006 09 26	<250	22	20	0.3
2008 06 19	<250	51	20	0.4
2008 10 04	<250	100	20	1.1
2009 07 11	<100	25	<10	0.3
DUPLICATE	<000	26	<10	0.3
2009 09 26	<250	81	<10	0.6
2010 09 09	<80	29	10	<13
2012 08 29	<100	22	<10	<1
2013 09 24	<250	45.2	<30	0.41

SW04-2	EPHw10-19	Al	Fe	Mn
2004 10 16	<250	26	<10	0.5
2005 07 07	<250	26	<10	0.4
2006 07 17	<250	31	<50	<1
2006 09 26	<100	22	20	0.3
2008 06 19	<250	51	20	0.9
2008 10 04	<250	94	20	1.1
2009 07 11	<100	26	<10	0.4
2009 09 26	<250	26	<10	0.8
2010 09 09	<80	110	13	1
2012 08 29	<100	68	80	4
2013 09 24	<250	46	<30	0.41

SW04-3	EPHw10-19	Al	Fe	Mn
2004 10 16	<250	24	<10	0.4
2005 07 07	<250	32	10	0.5
2006 07 17	<250	22	<50	<1
2006 09 26	<100	20	30	<0.2
2008 06 19	<250	53	20	0.4
2008 10 04	<250	97	20	1.1
2009 07 11	<100	30	<10	0.4
2009 09 26	<250	89	20	0.9
2010 09 09	<80	30	8	<1
2012 08 29	<100	130	100	6
2013 09 24	<250	56.9	<30	0.66

SW04-4	EPHw10-19	Al	Fe	Mn
2004 10 16	<250	44	20	1
2005 07 07	<250	56	30	1.3
2006 07 17	<250	32	<50	<1
2006 09 26	<100	34	30	0.7
2008 06 19	<250	68	30	1
2008 10 04	<250	96	20	1.1
2009 07 11	<100	27	<10	0.4
2009 09 26	<250	82	<10	0.7
2010 09 09	<80	30	17	<1
2012 08 29	<100	74	80	10
2013 09 24	<250	46.3	<30	0.42

LEGEND

0 5 10 15 METRES

- LOT BOUNDARY
- FORMER STRUCTURES
- TELEPHONE LINE (UG)
- WATER LINE
- WATER LINE (REVISED LOCATION BASED ON FIELD OBSERVATIONS)
- ELECTRICAL LINE
- ELECTRICAL LINE (REVISED LOCATION BASED ON FIELD OBSERVATIONS)
- FUEL LINE
- FUEL LINE (REVISED LOCATION BASED ON FIELD OBSERVATIONS)
- ELECTRICAL/TELEPHONE LINE
- SEPTIC

- BOREHOLE (OTHER)
- MONITORING WELL (OTHER)
- MONITORING WELL
- BOREHOLE
- AIR SPARGE WELL
- SOIL VAPOUR EXTRACTION WELL
- SOIL VAPOUR WELL
- MULTI WELL
- TEST PIT
- TRENCH SAMPLE
- TOPOGRAPHIC MAJOR CONTOUR (2m)
- TOPOGRAPHIC MINOR CONTOUR (0.5m)

- FLAGPOLE (ARBITRARY DATUM)
- SURFACE WATER SAMPLING LOCATION
- FIRE HYDRANT
- DESTROYED MONITORING WELL

- CURRENT INFERRED DISSOLVED MANGANESE IMPACTED AREA GREATER THAN CSR DW STANDARDS
- CURRENT INFERRED DISSOLVED IRON IMPACTED AREA GREATER THAN CSR DW STANDARDS
- CURRENT INFERRED DISSOLVED IRON IMPACTED AREA GREATER THAN FGQ T2 RL GUIDELINES
- CURRENT INFERRED DISSOLVED PHASE HYDROCARBON IMPACTED AREA GREATER THAN CSR AW/DW STANDARDS/FEDERAL GUIDELINES (2013)

LOCATION — ANALYTICAL GROUNDWATER RESULTS

SW04-2	EPHw10-19	Al	Fe	Mn
2010 09 09	<80	110	13	1

SAMPLE DATE (YYYY MM DD)

GREEN – CONCENTRATION LESS THAN OR EQUAL TO THE APPLICABLE GUIDELINES

BROWN – CONCENTRATION GREATER THAN THE APPLICABLE BCWQG AW AND/OR CCME CEQG AW GUIDELINES

	EPHw10-19	Al	Fe	Mn
BCWQG AW	N/A	N/A	1,000	683
CCME CEQG AW	N/A	100	300	N/A

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

No.	DATE	DESCRIPTION
08059/08073	2008-06-28	UNDERHILL GEOMATICS LTD.

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
2	2014-04-26	ISSUED TO CLIENT	AJK	TD
1	2013-03-13	ISSUED TO CLIENT	JEC	TL
0	2013-01-23	ISSUED TO CLIENT	AJK	PAC

SNC · LAVALIN

CLIENT NAME:
PUBLIC WORKS &
GOVERNMENT SERVICES CANADA

PROJECT LOCATION:
CANADA BORDER SERVICES AGENCY
PORT OF PLEASANT CAMP, BC

TITLE:
DETAILED SURFACE WATER
ANALYTICAL RESULTS (2013)

DWN BY: AJK
SCALE: 1:200
DATE: 2011-03-31
DWG No: REV.: 2
CHK'D: DWB
PLOT: 20140425.1006
CADFILE: 131416R36
131416-L05

PATH: \\PROJ_SRV\PROJECTS\CURRENT PROJECTS\PUBLIC WORKS AND GOV'T SERVICES CANADA\131416\GEOMATICS\CAD\131416R36.DWG

APPENDIX I

Regulatory Framework

REGULATORY FRAME WORK

Federal

The Port of Pleasant Camp is located on federal land; accordingly, the analytical results for soil, groundwater, and surface water samples have been evaluated based on the guidelines, criteria and standards in the following documents:

Canadian Environmental Quality Guidelines (CEQG), Canadian Council of Ministers of the Environment (CCME), Winnipeg MB, including updates to 2012.

Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites (FGQG), prepared for Environment Canada by Meridian Environmental Inc., November 2012.

Canadian Drinking Water Quality Guidelines (CDWQG), Health Canada, August 2012.

CCME CEQG - Soil

For soil, the guidelines listed in the federal CEQG provide numerical concentrations for the evaluation of soil quality and the identification of remediation requirements. The historical, current and anticipated future land use of the site is for residential use by CBSA staff; as such, the land use is zoned residential and analytical results for soil were compared to federal guidelines and standards for residential land use (RL).

Federal Interim Groundwater Quality Guidelines

The interim FGQG were developed to assist federal custodians in assessing, remediating/risk managing federal contaminated sites funded under the Federal Contaminated Sites Action Plan (FCSAP). The guidelines are intended to be used by federal custodians as an interim measure until Canadian Council of Ministers of the Environment (CCME) groundwater quality guidelines are available. A draft protocol for the derivation of guidelines was issued by CCME for public comment in the fall of 2010 and was reissued in November of 2012.

The FGQG follow a tiered framework and the analytical data for the site were applied within this framework as follows:

- *Tier 1*: Direct application of generic numerical guidelines which are the lowest guideline for any pathway.
- *Tier 2*: Modified numerical guidelines based on site-specific conditions, and exposure pathways and receptors applicable to the site.
- *Tier 3*: Use of site-specific risk assessment to develop site-specific remediation objectives.

Based on the historic, current and future land use of the site as an operating border crossing facility with residential housing, the federal guidelines for residential/parkland land use were applied. The water use / exposure pathways used for determining the guidelines for this site include the most stringent of inhalation, direct contact by soil organisms and freshwater aquatic life; this results in the application of site specific conditions for the Tier 2 groundwater quality guidelines. The marine life pathway was eliminated (no marine water bodies within 500 m of the site), resulting in the elimination of the Tier 1 groundwater quality guidelines, which represent the most stringent of all water use / exposure pathways.

It is noted that for the protection of aquatic life exposure pathway, it is assumed that there is a minimum 10 m lateral separation between the point of measurement (i.e., the monitoring well) and the surface water body; this distance can be modified in Tier 2 by the application of a dilution factor for lateral transport.

Health Canada Guidelines for Drinking Water Quality

The 2012 Health Canada DW guidelines are applied to groundwater that is either used as a potable water source or to groundwater defined as a potential potable water source by the province or other agency with jurisdiction over drinking water issues. Groundwater at the Site would likely be considered a potable water source by the BC Ministry of Environment (MoE) (as per below).

Although groundwater is not currently extracted for potable use at the Site, the Health Canada DW guidelines were considered applicable based on potential for groundwater at the Site to be used as a potable water source in the future.

The federal guidelines/standards do not apply on provincially owned land; therefore, only provincial Contaminated Sites Regulation (CSR) standards apply for off-site locations.

CCME CEQG for Protection of Aquatic Life - Groundwater

The CCME CEQG guidelines for the protection of aquatic life (AW) were considered to be not applicable to groundwater at the site. As outlined in the November 2012 FGQG Guidance Document, these guidelines apply only to the receiving water body (i.e., Granite Creek), groundwater within 10 m of a surface water body, or to the groundwater-surface water transition zone.

The CCME CEQG AW guidelines were therefore compared to the surface water analytical results from Granite Creek for reference purposes only.

Provincial

The off-site areas where impacts on properties under provincial jurisdiction have been identified (i.e., under Haines Highway), the analytical results were also compared to BC provincial standards and guidelines contained in the following documents:

- *Contaminated Sites Regulation (CSR), B.C. Reg. 375/96,* includes amendments up to B.C. Reg. 4/2014, January 31, 2014.
- *British Columbia Approved Water Quality Guidelines (Criteria), updated 2011, includes [A Compendium of Working Water Quality Guidelines for BC, 2006] (BCWQG).* BC MoE, September 2011.

BC CSR Schedule 10 Provincial Standards

The historical, current and antincipated future land use of the site is for residential use by CBSA staff; as such, the land use is zoned residential and analytical results for soil were compared to provincial standards for residential land use (RL). The sampling locations are located on Federal land; however, no current Federal standards or guidelines exist for the contaminants of concern (dioxins, furans, herbicides and pesticides) and as a result, provincial standards were used for comparison purposes.

BC CSR Schedule 6 Provincial Standards

Provincial CSR standards for the protection of freshwater aquatic life (AW) were applied based on the short distance of the dissolved phase hydrocarbon plume to Granite Creek located approximately 30 m south (downgradient) of the site. Although there is no current extraction of groundwater from the site for drinking water use, DW standards were conservatively applied based on protection of future use of groundwater for drinking water as per recent BC MoE Technical Guidance Document 6[1] TG6.

The provincial CSR non-aqueous phase liquid (NAPL) indicator standards apply irrespective of water use at all sites. No other potential groundwater uses (i.e., irrigation, livestock watering, etc.) were identified.

BC Water Quality Guidelines

For surface water samples collected from Granite Creek, analytical results were compared to approved and working guidelines for the protection of freshwater aquatic life contained in the BCAWQG and Compendium reports referenced above (collectively referenced as BCWQG). According to MoE Technical Guidance document #15 (TG15 – *Concentration Limits for the Protection of Aquatic Receiving Environments,* effective April 2013), groundwater aquatic life standards apply to groundwater located 10 m to 500 m from the closet aquatic life receptor and BCWQG apply to the surface water to the high water mark.

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[1] *Technical Guidance Document 6: Water Use Determination*, BC Ministry of Environment, Version 2 July 2010, Effective Date February 1, 2011.

It is noted in TG15 that BCWQ guidelines do not exist for VPHw or LEPHw and that an acceptable concentration limit of 1/10th the CSR AW standards be used for comparison. Since this was introduced in April 2013, a number of laboratories have not yet adjusted method detection limits (MDLs) to lower than 50 µg/L for LEPHw and 150 µg/L for VPHw as such, the MDL for a number of water samples exceeded the acceptable concentration limit in 2013.

APPENDIX II

SNC·LAVALIN

Quality Assurance / Quality Control (QA/QC)

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

The Environment & Water business unit of SNC-Lavalin Inc. (SNC-Lavalin) follows strict QA/QC protocols for all sampling and analysis and ensures that all data is handled accordingly. As a minimum, the QA/QC program included the following.

- Senior supervision of field staff.
- Use of in house trained personnel.
- Implementation of SNC-Lavalin preferred operating procedures (POPs).
- Written field instructions.
- Documentation of all field activities:
  - Samples will be collected in a manner appropriate for the prevention of cross-contamination and other field sampling errors. Samples will be collected using an appropriate contaminant-free utensil and placed in contaminant-free containers specifically designed for such use and appropriate to the subsequent analyses.
- Chain-of-custody documentation for sample submission:
  - Use of an appropriate coding system for submitting samples to the analytical laboratory to ensure that information concerning location or expected concentration is unavailable to the analyst(s). A chain-of-custody form will be established to trace the movement and handling of samples from the field to their final destination.
- Use of a Canadian Association of Laboratory Accreditation (CALA) accredited laboratory (ALS Laboratory).
- Adherence to laboratory sampling and analysis protocols (e.g., hold times, sample containers, preservatives, detection limits, approved methodology).
- Procedures to confirm accurate transcription of laboratory data into tables.
- Review of laboratory QC performance (standards, spike recoveries etc.) to confirm results are within acceptable limits.

- Analysis of samples in batches of no more than ten (10) samples for organic substances. Batch by batch review will be completed of the analytical data produced in concert with all internal QA data for that batch. Failure to achieve appropriate QA will require additional analysis to rectify the problem on a batch by batch basis.
- At least one analytical (lab) duplicate for each batch of analyses.
- Results of the laboratory's internal checks will be included in the analytical report.
- Decontamination of monitoring/sampling equipment between sample locations.
- Use of dedicated well sampling equipment.
- Submission of field QC samples at a rate of 10% of total samples. Implementation of corrective action plans (CAP) when acceptable limits are exceeded.

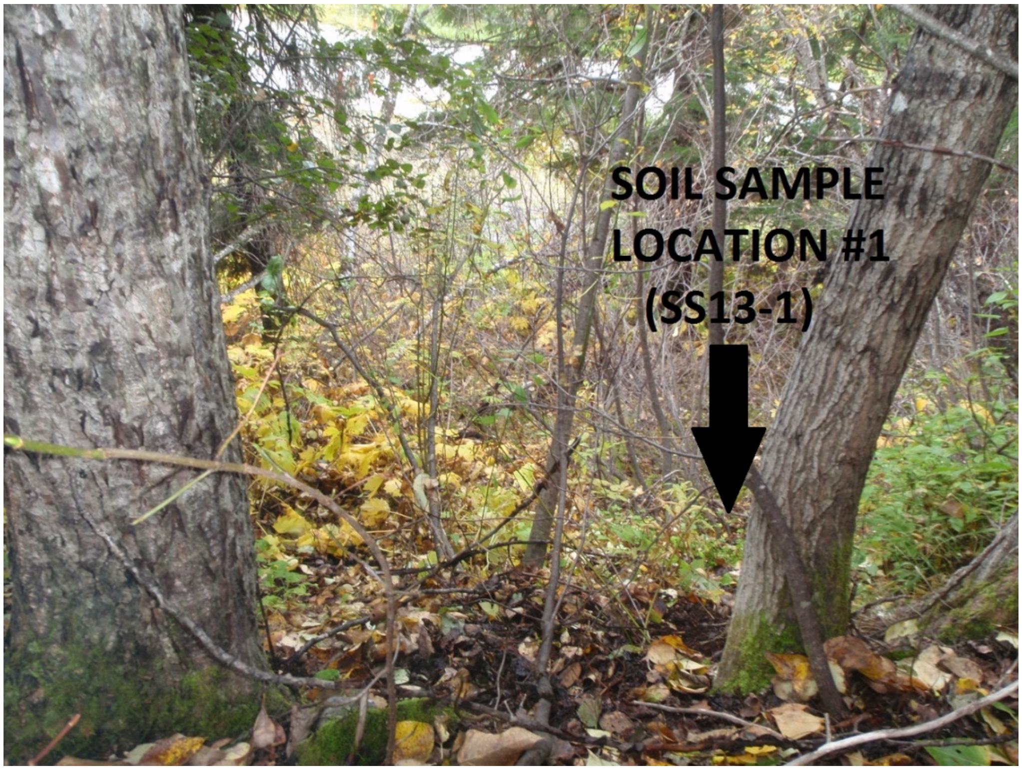
A common measurement used for comparison of duplicate laboratory results is the RPD_{DUP}, which is defined as the absolute value of the difference between a sample set, divided by the average. Because analytical error increases near the method detection limit (MDL), RPD_{DUP} is typically only calculated where the concentrations are above the practical quantitation limit (PQL) (defined as five [5] times the detection limit). An RPD_{DUP} value is not calculated for parameters with concentrations less than five times the detection limit.

Table G in the letter report indicates the acceptable RPD_{DUP} criteria used by SLE in their QA/QC analysis.

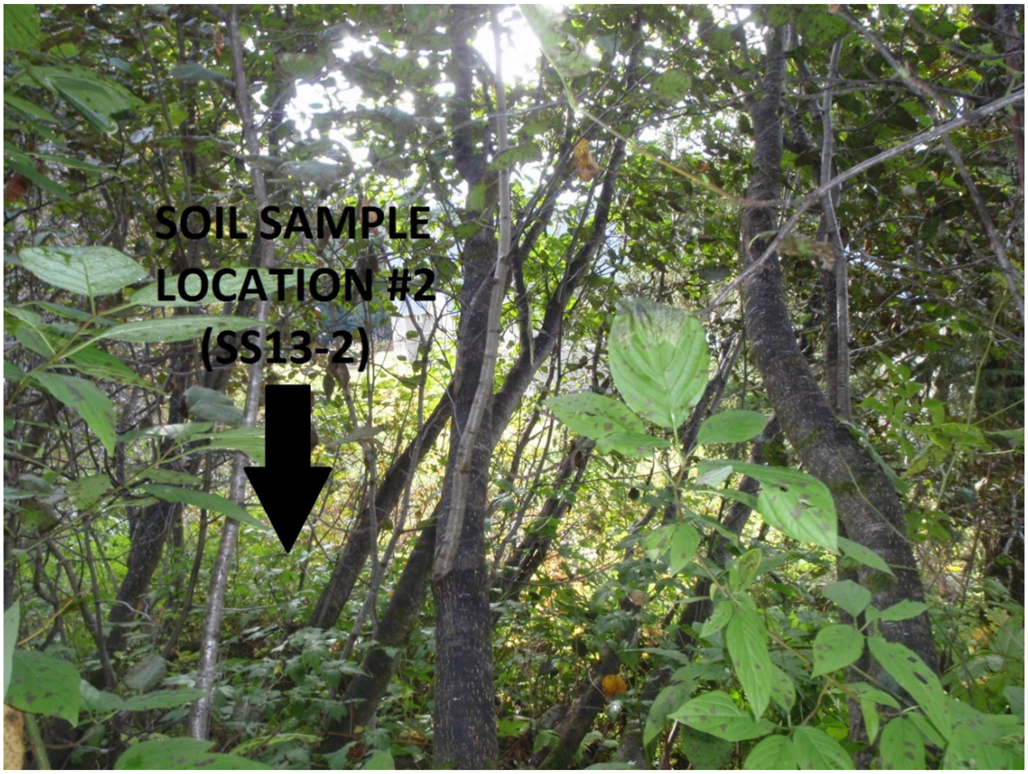
APPENDIX III

SNC · LAVALIN

Photographs



Photograph 1: Soil Sample Location #1 (SS13-1) – Facing southwest between the Pumphouse (right) and the Maintenance Shop (left).



Photograph 2: Soil Sample Location #2 (SS13-2) – Facing southwest at the Customs Office.

Photograph 3: Soil Sample Location #3 – Facing Southwest between House #9 (right) and House #8 (left).

Photograph 4: General view of the levelled pipeline right-of-way – Facing northwest.

Photograph 5: Abandoned section of pipeline identified within the right-of-way.

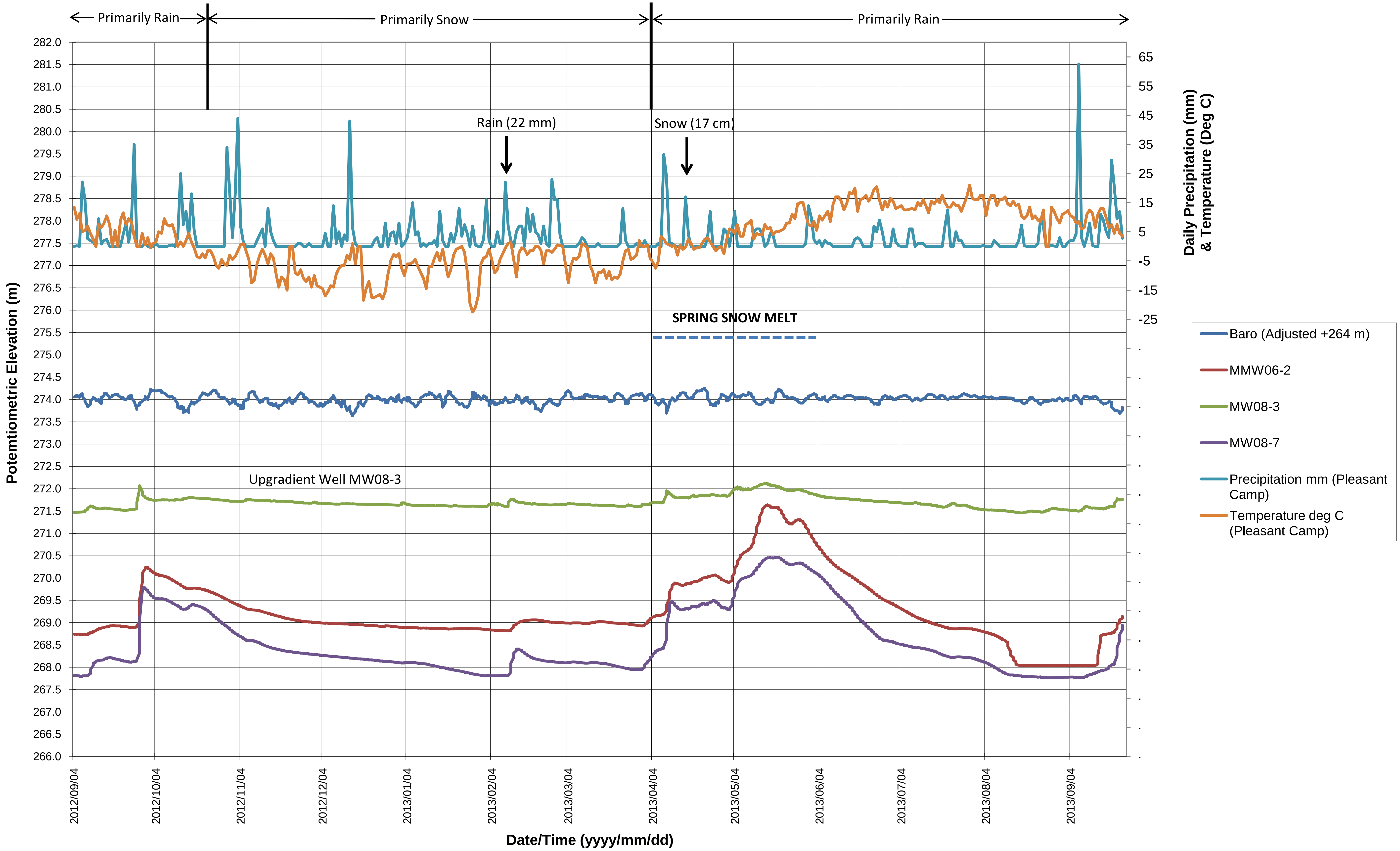
Photograph 6: Close-up of vegetation within the pipeline right-of-way near Soil Sample Location #1 (SS13-1).

APPENDIX IV

SNC·LAVALIN

Groundwater vs. Time in Selected Monitoring Wells

Figure 1: Groundwater Levels vs Time in Selected Monitoring Wells



APPENDIX V

SNC·LAVALIN

Monitoring Report and Groundwater Sampling Records

SNC·LAVALIN

MONITORING REPORT

Project No.: 131416
Date: 2013/09/23
Observer: MC/TDD
Weather: Cloud/Rain
Time: 9:00 AM
Approved by:

Public Works and Gov't Services Canada
Pleasant Camp
Pleasant Camp, BC

Monitoring Well No.	Reference Elevation^{1} (m)	Depth to NAPL ^{2} (m)	Apparent NAPL ^{2} Thickness (mm)	Depth to Water (m)	Potentio-Metric Elevation^{3} (m)	Depth to Bottom (m)	Measured Vapour Conc.	Calculated Vapour Conc. (ppm)^{4}	TIME (hh:mm)	Comments
P1	-	-	-	-	-	3.50	10 ppm	10	16:30	Dry
P4	275.471	-	0	4.706	270.77	5.52	0 ppm	0	16:45	*
P13	276.101	-	-	-	-	4.77	0 ppm	0	-	* Dry @ 4.750 m
01-14	275.766	-	-	-	-	5.80	5 ppm	5	-	* Dry @ 5.792 m
01-17D	272.991	-	0	5.325	267.67	6.61	0 ppm	0	15:20	* HC odour and sheen
01-17S	272.891	-	-	-	-	4.87	0 ppm	0	15:30	Dry
01-19	272.131	-	0	4.132	268.00	5.59	15 ppm	15	15:02	*
01-20	274.346	-	0	5.013	269.33	5.87	0 ppm	0	14:32	*
01-21	274.246	-	0	8.390	265.86	9.65	0 ppm	0	14:45	*
01-22	275.106	-	-	-	-	5.42	0 ppm	0	-	* Dry
01-23	273.791	-	0	8.032	265.76	9.21	0 ppm	0	-	
01-24	275.386	-	0	4.501	270.89	4.70	160 ppm	160	16:40	Almost Dry
03-01	273.992	-	0	8.185	265.81	9.55	0 ppm	0	14:55	*
03-02	274.582	-	-	-	-	6.31	0 ppm	0	14:38	* Dry
03-03	273.850	-	0	5.866	267.98	6.56	0 ppm	0	15:35	
03-06	273.992	-	0	6.034	267.96	8.59	160 ppm	160	09:12	*
03-07	274.477	-	0	6.848	267.63	6.98	150 ppm	150	-	* Almost Dry
03-08	274.819	-	0	7.558	267.26	8.63	160 ppm	160	-	* HC sheen
03-09	275.085	-	0	7.775	267.31	8.31	0 ppm	0	10:00	*
03-10D	275.459	-	0	8.768	266.69	10.30	25 ppm	25	-	*
03-10	275.459	-	0	6.568	268.89	8.31	110 ppm	110	-	* HC odour and sheen
03-11	275.715	-	0	6.082	269.63	6.89	20 ppm	20	11:18	* HC odour and sheen
04-1	274.060	-	-	-	-	6.57	0 ppm	0	-	* Dry
04-2	274.245	-	0	6.928	267.32	7.30	0 ppm	0	14:26	*
04-3	272.760	-	0	6.986	265.77	9.12	0 ppm	0	-	*
04-4	275.687	-	0	6.174	269.51	7.35	5 ppm	5	12:40	*
04-5	275.940	-	0	7.314	268.63	8.14	0 ppm	0	-	*
04-6	276.092	-	0	5.611	270.48	8.02	30 ppm	30	12:20	*
06-1	274.991	-	0	2.743	272.25	3.19	15 ppm	15	16:24	*
06-2	275.051	-	0	5.950	269.10	7.18	50 ppm	50	15:56	Remove datalogger: M6075, HC odour and sheen
06-4	273.041	-	0	4.792	268.25	6.38	70 ppm	70	15:14	*
06-5	273.286	-	0	4.993	268.29	6.39	0 ppm	0	15:22	*
06-6	275.101	-	0	4.064	271.04	4.77	0 ppm	0	16:20	*
07-2	-	-	0	4.901	-	9.27	0 ppm	0	-	
08-1	272.517	-	0	4.883	267.63	5.50	0 ppm	0	15:08	
08-2	273.466	-	0	5.003	268.46	6.13	0 ppm	0	15:40	* HC odour and sheen
08-3	275.860	-	0	4.126	271.73	5.90	0 ppm	0	17:06	Remove datalogger: M5981
08-4	275.932	-	0	6.074	269.86	42.33	0 ppm	0	17:00	
08-5	274.036	-	0	7.096	266.94	9.49	0 ppm	0	-	Remove barologger: L8482
08-6	274.434	-	0	5.820	268.61	7.72	0 ppm	0	-	*
08-7	275.224	-	0	6.341	268.88	9.09	0 ppm	0	14:13	Remove datalogger: M6022
08-8	276.358	-	0	7.265	269.09	8.19	0 ppm	0	-	*
09-5	275.136	-	0	4.318	270.82	5.65	5 ppm	5	-	* HC odour and sheen
09-16	276.343	-	0	5.350	270.99	5.58	5 ppm	5	-	*
09-20	276.414	-	-	-	-	6.75	0 ppm	0	14:08	Dry
AS-1	275.453	-	0	6.329	269.12	7.60	20 ppm	20	10:29	
AS-2	275.675	-	0	6.622	269.05	8.78	25 ppm	25	10:42	
AS-3	275.826	-	0	6.946	268.88	7.99	35 ppm	35	11:03	
AS-4	275.665	-	0	4.395	271.27	7.06	0 ppm	0	16:50	*
AS-5	275.940	-	0	7.249	268.69	8.61	0 ppm	0	09:15	
AS-7	275.270	-	0	6.392	268.88	8.10	0 ppm	0		
AS-8	274.795	-	0	5.542	269.25	6.85	45 ppm	45	15:45	
AS-9	275.184	-	0	7.484	267.70	9.38	0 ppm	0	09:52	
AS-10	275.424	-	-	-	-	7.89	0 ppm	0	10:05	Dry
AS-11	275.579	-	0	4.894	270.69	5.33	0 ppm	0	16:57	* HC odour
AS-12	276.166	-	0	7.062	269.10	7.53	75 ppm	75	11:14	
AS-13	273.481	-	0	4.932	268.55	6.57	0 ppm	0	-	* HC odour
AS-14	273.261	-	0	4.748	268.51	6.38	20 ppm	20	15:30	
AS-15	-	-	0	5.395	-	5.67	-	-	-	
AS-16	275.322	-	0	5.959	269.36	6.54	0 ppm	0	-	
AS-17	275.202	-	-	-	-	-	-	-	-	Glued
AS-18	275.166	-	-	-	-	-	-	-	-	Glued
AS-19	275.210	-	-	-	-	-	-	-	-	Glued
AS-20	275.287	-	-	-	-	-	-	-	-	Glued
AS-22	275.633	-	0	4.375	271.26	5.38	150 ppm	150	16:44	* HC odour
AS-23	275.416	-	0	3.667	271.75	5.40	10 ppm	10	16:33	
SVE-1	275.229	-	-	-	-	-	-	-	-	Could not access
SVE-2	275.159	-	-	-	-	5.49	5 ppm	5	-	Dry
SVE-3	275.226	-	0	4.210	271.02	4.90	65 ppm	65	16:12	
SVE-4	275.436	-	-	-	-	3.29	95 ppm	95	16:52	Dry
SVE-5	275.429	-	0	4.148	271.28	4.55	130 ppm	130	16:37	

NOTES: * Waterra in well during measurements.

[1] Reference Elevation is a mark on the rim of the monitoring well standpipe surveyed with respect to geodetic datum.

[2] Non-Aqueous Phase Liquid.

[3] NAPL specific gravity assumed to be 0.80.

[4] 1% LEL is approximately equivalent to 110 ppm.

P4

SNC·LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MWP4 **Weather:** sun/cloud. **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 5.520
Depth to Water h_s (m): 4.706
Saturated Thickness (m): 0.814
Depth to Screen (m):
Screen Length (m):
Borehole Diameter d_b (m):
Standpipe Diameter d_w (m):

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	16:45	—	4.706	—	0	—

PURGING RECORD

Minimum Purge Volume = V_P (L) = 3 * V_c = 3 * π/4 * d_w^2 * (h_b-h_s) * (1,000 L/m^3)
for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

Date: 13-09-24 Time Began: 12:45 Time Ended:

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (°C)	DO (mg/L)	Redox (mV)
0.814 6 4.884L	0-1	12:46	6.81	549	12.6	—	—
	2-DRY	12:49	6.86	573	10.4	—	—
	~~3~~ 3.5-DRY	13:06	6.82	574	10.2	—	—
	5-DRY	13:20	6.76	582	10.4	—	—

Notes (recharge, sheen, odour, turbidity, etc.):
Initial: slight turbidity, lt. brown, no odour, no sheen, slow/med recharge
Final: same as initial

SAMPLING RECORD[1]

Date: 13-09-24-25 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
F1	2×40mL P+T	NaHSO4	Waterra loop	13:40	MWP4-130924
EPH/PAH/F2	2×500mL AG	NaHSO4	Bailer	10:08	MWP4-130925
Anions	500mL P	—	Waterra	13:40	MWP4-130924
DISS. Fe+Mn	125mL P	HNO3+FF	Waterra	13:40	MWP4-130924

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

clear, no colour, no s/o.

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

AS-11

SNC • LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416
Client: PWGSC
Location: Pleasant Camp
Monitoring Well ID: AS-11
Weather: sun/cloud
Staff Member(s): TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 5.330
Depth to Screen (m):
Borehole Diameter d_b (m):
Depth to Water h_s (m): 4.894
Screen Length (m):
Standpipe Diameter d_w (m):
Saturated Thickness (m): 0.436

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	16:57	–	4.894	–	0	–

PURGING RECORD

Minimum Purge Volume = $V_P (L) = 3 * V_c = 3 * \pi/4 * d_w^2 * (h_b-h_s) * (1{,}000\ L/m^3)$
for 2" well: $V_P (L) = 3 * 2 *$ (sat. thickness [m]) for 4" well: $V_P (L) = 3 * 8 *$ (sat. thickness [m])

Date: 13-09-24
Time Began: 12:52
Time Ended: 12:59

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (°C)	DO (mg/L)	Redox (mV)
0.436 $\times 6$ 2.616	0.1	12:53	6.58	679	10.3	–	–
	1	12:55	6.60	676	9.2	–	–
	2	12:57	6.60	662	8.3	–	–
	2.5	12:59	6.60	670	8.0	–	–

Notes (recharge, sheen, odour, turbidity, etc.):
Initial: brown, turbid, HC odour, no HC sheen, fast recharge/med recharge
Final: lt. brown, slight turbidity, HC odour, no HC sheen, fast/med recharge

SAMPLING RECORD[1]

Date: 13-09-24/25
Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
F1	2x40mL P+T	NaHSO4	Waterra loop	13:01	AS-11-130924
F2/EPH	2x500mL AG	NaHSO4	Bailer	09:47	AS-11-130925

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

EPH: clear/colourless → 2 bails

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

AS-13
+DUP C

SNC•LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416
Client: PWGSC
Location: Pleasant Camp
Monitoring Well ID: AS-13
Weather: Sunny/overcast
Staff Member(s): TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 6.570
Depth to Screen (m):
Borehole Diameter d_b (m):
Depth to Water h_s (m): 4.932
Screen Length (m):
Standpipe Diameter d_w (m):
Saturated Thickness (m): 1.638

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	—	—	4.932	—	0	—

PURGING RECORD

Minimum Purge Volume = V_P (L) = $3 * V_c = 3 * \pi/4 * d_w^2 * (h_b - h_s) * (1{,}000\ L/m^3)$
for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

Date: 13/09/24
Time Began: 11:54
Time Ended: 12:04

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (°C)	DO (mg/L)	Redox (mV)
1.638 × 6 9.828 ~10L	0.1	11:57	7.38	776	7.9	–	–
	2.5	11:58	7.31	808	7.3	–	–
	5	12:00	7.24	811	7.0	–	–
	7.5	12:02	7.24	815	6.9	–	–
	10	12:04	7.25	806	6.9	–	–

Notes (recharge, sheen, odour, turbidity, etc.):

Initial: very slightly turbid, brown, no sheen, slight odour
Final: clear, no colour, no sheen, slight odour

SAMPLING RECORD[1]

Date: 13/09/24-25
Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
F1	2×40mL P+T	NaHSO4	Waterra loop	12:07	AS-13-130924
F2/EPH	2×500mL AG	NaHSO4	Bailer	9:40	AS-13-130925
~~[illegible]~~ "	"	"	"	"	MWC-130925

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

DUP: EPH - MWC-130925

Do NOT DUP F1, F2

F2/EPH: clear, very light brown, no odour, very slight odour

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

AS-22

SNC•LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416
Client: PWGSC
Location: Pleasant Camp
Monitoring Well ID: AS-22
Weather: cloud/sun
Staff Member(s): TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 5.880
Depth to Screen (m):
Borehole Diameter d_b (m):
Depth to Water h_s (m): 4.375
Screen Length (m):
Standpipe Diameter d_w (m):
Saturated Thickness (m): 1.005

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
130923	16:44	—	4.375	—	150	—

PURGING RECORD

Minimum Purge Volume = V_P (L) = 3 * V_c = 3 * π/4 * d_w^2 * (h_b-h_s) * (1,000 L/m^3)
for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

Date: 13/09/24
Time Began: 13:~~35~~ 27
Time Ended: 13:43

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (°C)	DO (mg/L)	Redox (mV)
~6L	0.1	13:31	6.92	837	10.4	—	—
	2.5	13:32	6.94	900	9.8	—	—
	4	13:34	6.91	955	8.8	—	—
	6	13:43	6.85	951	9.4	—	—

Notes (recharge, sheen, odour, turbidity, etc.):
Initial: clear, very light brown, no sheen, very slight odour
Final: clear, no colour, no sheen, very slight odour

SAMPLING RECORD[1]

Date: 130924/25
Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
F1	2x40mL PrT	NaHSO4	Waterra loop	13:45	AS-22-130924
F2/EPH	2x500mL AG	NaHSO4	Bailer	09:39	AS-22-130925
Anions	500mL P	—	Waterra	13:45	AS-22-130924
Diss. Mn+Fe	125mL P	HNO3+FF	Waterra	13:45	AS-22-130924

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

EPH = clear/colourless

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

01-17D

SNC•LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW01-17D **Weather:** cloud/rain **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 6.610
Depth to Water h_s (m): 5.325
Saturated Thickness (m): 1.285
Depth to Screen (m):
Screen Length (m):
Borehole Diameter d_b (m):
Standpipe Diameter d_w (m):

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	15:20	—	5.325	—	0	—

PURGING RECORD

Minimum Purge Volume = V_P (L) = 3 * V_c = 3 * $\pi/4$ * d_w^2 * (h_b-h_s) * (1,000 L/m^3)
for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

Date: 13-09-24 Time Began: 11:32 Time Ended: 11:43

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (μS/cm)	Temp. (^{0}C)	DO (mg/L)	Redox (mV)
<3 1.285 × 6 7.710 ~8L	0.1	11:33	7.24	548	7.3	—	—
	2	11:35	7.12	517	7.0	—	—
	4	11:37	7.12	529	6.8	—	—
	6	11:40	7.15	512	6.6	—	—
	8	11:43	7.15	518	6.6	—	—

Notes (recharge, sheen, odour, turbidity, etc.):
Initial: V. lt. brown, slight turbidity, HC odour, HC sheen, med-fast recharge
Final: same as initial

SAMPLING RECORD[1]

Date: 13-09-24/25 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
F1	2×40mL P+T	NaHSO4	Waterra Loop	11:45	MW01-17D-130924
EPH/PAH/F2	2×500mL AG	NaHSO4	Bailer	09:19	MW01-17D-130925
Anions	500mL P	—	Waterra	11:45	MW01-17D-130924
Diss. Mn+Fe	125mL P	HNO3+FF	waterra	11:45	MW01-17D-130924

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

EPH = clear/colourless

---

[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

01-19

SNC • LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW01-19 **Weather:** cloud/rain **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 5.590
Depth to Water h_s (m): 4.132
Saturated Thickness (m): 1.458
Depth to Screen (m):
Screen Length (m):
Borehole Diameter d_b (m):
Standpipe Diameter d_w (m):

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	15:02	—	4.132	—	15	—

PURGING RECORD

Minimum Purge Volume = $V_P (L) = 3 * V_c = 3 * \pi/4 * d_w^2 * (h_b - h_s) * (1{,}000\ L/m^3)$
for 2" well: $V_P (L) = 3 * 2 *$ (sat. thickness [m]) for 4" well: $V_P (L) = 3 * 8 *$ (sat. thickness [m])

Date: 13-09-24 Time Began: 11:24 Time Ended: 11:52

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (°C)	DO (mg/L)	Redox (mV)
3 4 1.458 × 6 8.748 ~ 9L	0.1	11:25	7.35	555	7.2	—	—
	3	11:28	7.32	557	7.0	—	—
	6 ~ Dry.	11:31	7.32	548	7.0	—	—
	~~8~~ 8 - Dry	11:52	7.38	537	7.0	—	—

Notes (recharge, sheen, odour, turbidity, etc.):
Initial: v. lt. brown, low turbidity, no sheen, no odour, slow recharge.
Final: Same as initial.

SAMPLING RECORD[1]

Date: 13-09-24/25 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
F1	2×40mL P+T	NaHSO₄	Waterra Loop	12:00	MW01-19-130924
EPH/PAH/F2	2×500mL AG	NaHSO₄	Bailer	09:13	MW01-19-130925
Anions	500mL P	—	Waterra	12:00	MW01-19-130924
Diss. Mn+Fe	125mL P	HNO₃ + FF	Waterra	12:00	MW01-19-130924

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

EPH = clear/colourless

---

[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

01-21

SNC • LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW01-21 **Weather:** Sunny / overcast **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 9.650 Depth to Screen (m): Borehole Diameter d_b (m):

Depth to Water h_s (m): 8.390 Screen Length (m): Standpipe Diameter d_w (m):

Saturated Thickness (m): 1.260

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	14:45	—	8.390	—	0	—

PURGING RECORD

Minimum Purge Volume = V_P (L) = 3 * V_c = 3 * π/4 * d_w^2 * (h_b-h_s) * (1,000 L/m^3)

for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

Date: 13-09-24 Time Began: 11:20 Time Ended: 11:39

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (^{0}C)	DO (mg/L)	Redox (mV)
1.260 x 6 7.560 ≈ 7.5L	0.1	11:24	7.23	540	7.9		
	2.5	11:34	7.50	586	7.2		
	5	11:37	7.33	607	6.1		
	7.5	11:39	7.31	613	6.4		

Notes (recharge, sheen, odour, turbidity, etc.):

Initial: Very turbid, orange-brown, no s/o.

Final: clear, very slight brown, no s/o, good recharge

SAMPLING RECORD[1]

Date: 13/09/24-25 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH	2x500mL AG	NaHSO4	Bailer	9:07	MW01-21-130925
Anions	500mL P	—	Waterra	11:45	MW01-21-130924
DBr. Mn+Fe	125mL P	HNO3+FF	Waterra	11:45	MW01-21-130924

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

EPH: clear, no colour, no s/o

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

93-7

SNC·LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW03-7 **Weather:** cloud/rain **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 6.930
Depth to Water h_s (m): 6.848
Saturated Thickness (m): 0.082
Depth to Screen (m):
Screen Length (m):
Borehole Diameter d_b (m):
Standpipe Diameter d_w (m):

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13/09/23	9:10	—	6.848	—	150	—

PURGING RECORD

Minimum Purge Volume = V_P (L) = 3 * V_c = 3 * π/4 * d_w^2 * (h_b-h_s) * (1,000 L/m^3)
for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

Date: 13/09/23 Time Began: 9:20 Time Ended: 9:25

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (°C)	DO (mg/L)	Redox (mV)
0.082 × 6 0.492	0.1						
	0.3		Volume	too low	for		
	0.5						
				Sampling	/	Purging	

Notes (recharge, sheen, odour, turbidity, etc.):
Initial: 8 cm of water - not enough for sampling
Final:

SAMPLING RECORD[1]

Date: Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH	2×500mL AG	NaHSO4	~~Bailer~~		MW03-7-1309

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

cannot sample (low recharge)

---

[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

03-8

SNC·LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW03-8 **Weather:** cloud 10°C **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 8.630 Depth to Screen (m): Borehole Diameter d_b (m):

Depth to Water h_s (m): 7.558 Screen Length (m): Standpipe Diameter d_w (m):

Saturated Thickness (m): 1.072

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13/09/23	9:30	–	7.558	–	160ppm	–
					"	

Minimum Purge Volume = $V_P (L) = 3 * V_c = 3 * \pi/4 * d_w^2 * (h_b-h_s) * (1,000\ L/m^3)$

PURGING RECORD

for 2" well: $V_P (L) = 3 * 2 *$ (sat. thickness [m]) for 4" well: $V_P (L) = 3 * 8 *$ (sat. thickness [m])

Date: 13/09/23 Time Began: 9:40 Time Ended: 10:15

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (μS/cm)	Temp. (°C)	DO 5.95 (mg/L)	Redox (mV)
~ 6.5L	0-1	9:42	7.62	914	8.1	~~[illegible]~~	54.7
	2	10:00	7.08	738	9.1	5.45	57.5
	4	10:10	6.98	755	8.1	5.09	34.0
	6.5	10:15	6.91	727	7.8	4.03	0.4

Notes (recharge, sheen, odour, turbidity, etc.):

Initial: slight turbidity, light brown, no odour, trace sheen

Final: " " " " slight ~~sheen~~ odours trace sheen

SAMPLING RECORD[1]

Date: 13/09/23 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH	2×500mL AG	NaHSO4	Bailer	9:33	MW03-8-130924
Anions	500mL P	–	Waterra	12:20	MW03-8-130923
Diss. Mn+Fe	125mL P	HNO3 + FF	Waterra	12:20	MW03-8-130923

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.): EPH = clear / colourless

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

03-10

SNC•LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW03-10 **Weather:** cloud/rain **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 8.310
Depth to Water h_s (m): 6.568
Saturated Thickness (m): 1.742
Depth to Screen (m):
Screen Length (m):
Borehole Diameter d_b (m):
Standpipe Diameter d_w (m):

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13/09/23	11:16	—	6.568	—	1.0 ppm	—

Minimum Purge Volume = V_P (L) = 3 * V_c = 3 * π/4 * d_w^2 * (h_b-h_s) * (1,000 L/m^3)
for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

PURGING RECORD

Date: 13/09/23 Time Began: 11:20 Time Ended: 11:38

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (°C)	DO (mg/L)	Redox (mV)
1.742 × 6 10.4526	0.1	11:25	7.40	933	9.7	/	/
	2.5	11:28	7.24	882	8.5	/	/
	5	11:~~28~~30	7.20	883	8.1	/	/
	7.5	11:31	7.17	884	7.8	/	/
	10.5	11:36	7.06	897	8.1	/	/

Notes (recharge, sheen, odour, turbidity, etc.):
Initial: ~~slightly~~ clear ~~turbid~~, ~~grey~~ slight sheen/odour
Final: clear, slightly grey, slight s/o.

SAMPLING RECORD[1]

Date: 13/09/23 /24 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH/PAH	2×500mL AG	NaHSO4	Bailer	[illegible]:07	MW03-10-130924
Anions	500mL P	—	waterra	12:10	MW03-10-130923
Diss. Mn+Fe	125mL P	HNO3+FF	waterra	12:10	MW03-10-130923

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

EPH = clear, sheen & odour

bailer, 1x gloves, string

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

03-10D

SNC+LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW03-10D **Weather:** clouds/sun **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 10.300
Depth to Water h_s (m): 8.768
Saturated Thickness (m): 1.532
Depth to Screen (m):
Screen Length (m):
Borehole Diameter d_b (m):
Standpipe Diameter d_w (m):

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13/09/23	10:30	–	8.768	–	25	–

Minimum Purge Volume = $V_P (L) = 3 * V_c = 3 * \pi/4 * d_w^2 * (h_b - h_s) * (1{,}000\ L/m^3)$

for 2" well: $V_P (L) = 3 * 2 *$ (sat. thickness [m]) for 4" well: $V_P (L) = 3 * 8 *$ (sat. thickness [m])

PURGING RECORD

Date: 13-09-23 Time Began: 10:40 Time Ended: 11:15

oxycell malfunction

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (°C)	DO (mg/L)	Redox (mV)
1.532	0.1	10:48	7.21	1046	8.5	5.63	51.1
* 6	~~7~~1.0	10:55	7.34	1029	8.9	–	18.9
9.192L	~~6~~1.5	11:15	7.38	985	9.9	3.69	54.3
	~~9~~						
dry @1.5L							

Notes (recharge, sheen, odour, turbidity, etc.):
Initial: turbid, grey, no s/o.
Final: " " " "

SAMPLING RECORD[1]

Date: 13-09-24 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH	2×500mL AG	NaHSO4	Bailer	8:55	MW03-10D-130924

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

* only able to get ~ 100mL of clear sample before sample became turbid *

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

03-11

SNC·LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416
Client: PWGSC
Location: Pleasant Camp
Monitoring Well ID: MW03-11
Weather: sun/cloud
Staff Member(s): TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 6.890
Depth to Water h_s (m): 6,082
Saturated Thickness (m): 0.708
Depth to Screen (m):
Screen Length (m):
Borehole Diameter d_b (m):
Standpipe Diameter d_w (m):

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	11:18	—	6.982	—	20 ppm	—

PURGING RECORD

Minimum Purge Volume = V_P (L) = $3 * V_c = 3 * \pi/4 * d_w^2 * (h_b - h_s) * (1{,}000\ L/m^3)$
for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

Date: 13-09-23
Time Began: 11:43
Time Ended: 11:57

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (°C)	DO (mg/L)	Redox (mV)
~4.5L	0.1	11:46	7.68	909	10.6	/	/
	1	11:49	7.30	929	9.7	/	/
	2	11:52	7.22	938	9.3	/	/
	3	11:55	7.18	940	9.1	/	/
	4	11:57	7.25	936	9.1	/	/

Notes (recharge, sheen, odour, turbidity, etc.):
Initial: ~~slightly~~ trace turbid, orange brown, slight odour, trace sheen
Final: " " " " " " no sheen

SAMPLING RECORD[1]

Date: 13/09/23 /24
Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH	2×500mL AG	NaHSO4	Bailer	8:43	MW03-11-130924
Anions	500mL P	—	Waterra	12:00	MW03-11-130923
Dis. Fe+Mn	125mL P	HNO_3 + FF	Waterra	12:00	MW03-11-130923

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):
EPH: clear/colourless

---

[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

04-1

CNS

SNC·LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW04-1 **Weather:** cloud/rain. **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 6.574
Depth to Water h_s (m): 6.567
Saturated Thickness (m): 0.007
Depth to Screen (m):
Screen Length (m):
Borehole Diameter d_b (m):
Standpipe Diameter d_w (m):

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
1309-23		—	6.567	—	0	—

PURGING RECORD

<u>Minimum Purge Volume</u> = V_P (L) = 3 * V_c = 3 * π/4 * d_w^2 * (h_b-h_s) * (1,000 L/m^3)
<u>for 2" well:</u> V_P (L) = 3 * 2 * (sat. thickness [m]) <u>for 4" well:</u> V_P (L) = 3 * 8 * (sat. thickness [m])

Date: Time Began: Time Ended:

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (°C)	DO (mg/L)	Redox (mV)
0.007 × 6 0.042							

Notes (recharge, sheen, odour, turbidity, etc.): cannot sample (volume too low)

Initial:

Final:

SAMPLING RECORD[1]

Date: Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH	2×500mL AG	NaHSO4	Bailer		MW04-1-1309

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

---

[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

04-2

SNC•LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW04-2 **Weather:** cloud/rain **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 7.300 Depth to Screen (m): Borehole Diameter d_b (m):

Depth to Water h_s (m): 6.928 Screen Length (m): Standpipe Diameter d_w (m):

Saturated Thickness (m): 0.370

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	14:26	–	6.928	–	0	–

Minimum Purge Volume = $V_P (L) = 3 * V_c = 3 * \pi/4 * d_w^2 * (h_b-h_s) * (1{,}000\ L/m^3)$

PURGING RECORD for 2" well: $V_P (L) = 3 * 2 *$ (sat. thickness [m]) for 4" well: $V_P (L) = 3 * 8 *$ (sat. thickness [m])

Date: 13-09-24 Time Began: 10:34 Time Ended: 10:39

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (°C)	DO (mg/L)	Redox (mV)
0.370 x 6 2.220L	0.1	10:35	7.13	546	7.0	–	–
	1	10:37	7.06	567	6.6	–	–
	2	10:38	7.06	568	6.5	–	–
	3	10:39	7.06	559	6.4	–	–

Notes (recharge, sheen, odour, turbidity, etc.):

Initial: brown, turbid, no sheen, no odour, fast recharge

Final: v. lt. brown, nearly clear, no sheen, no odour, fast recharge

SAMPLING RECORD[1]

Date: 13-09-24/25 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH	2x500mL AG	NaHSO$_4$	Bailer	08:45	MW04-2-130925
Anions	500mL P	–	waterra	10:40	MW04-2-130924
Diss. Mn+Fe	125mL P	HNO$_3$ + FF	waterra	10:40	MW04-2-130924

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

EPH = clear/colourless

---

[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO$_3$. Check pH with pH paper, pH should be <2.

04-4

SNC•LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW04-4 **Weather:** sun/cloud **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 7.350 Depth to Screen (m): Borehole Diameter d_b (m):

Depth to Water h_s (m): 6.174 Screen Length (m): Standpipe Diameter d_w (m):

Saturated Thickness (m): 1.176

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	12:40	—	6.174	—	5 ppm	—

Minimum Purge Volume = V_P (L) = 3 * V_c = 3 * $\pi/4$ * d_w^2 * (h_b-h_s) * (1,000 L/m^3)

PURGING RECORD

for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

Date: 13-09-23 Time Began: 12:45 Time Ended: 12:58

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (^{0}C)	DO (mg/L)	Redox (mV)
~7L	3	12:47	7.14	631	9.1	—	139.1
	5-Dry	12:50	7.13	642	8.9	—	104.1
	7-DRY	12:58	7.11	648	9.0	—	27.1

Notes (recharge, sheen, odour, turbidity, etc.):

Initial: slightly turbid, lt. brown, no sheen, no odour, slow recharge/med recharge

Final: same as initial

SAMPLING RECORD[1]

Date: 130923/24 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH	2x500mL AG	NaHSO4	Baler	9:15	MW04-4-130924
Anions	500mL P	—	Waterra	13:20	MW04-4-130923
Diss. Fe+Mn	125mL P	HNO3+FF	Waterra	13:20	MW04-4-130923

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

EPH: clear, no s/o.

---

[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

04-5

SNC·LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW04-5 **Weather:** cloud/rain **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 8.140 Depth to Screen (m): Borehole Diameter d_b (m):
Depth to Water h_s (m): 7.314 Screen Length (m): Standpipe Diameter d_w (m):
Saturated Thickness (m): 0.826

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13/09/23	12:40	–	7.314	–	0ppm	–

Minimum Purge Volume = V_P (L) = 3 * V_c = 3 * π/4 * d_w^2 * (h_b-h_s) * (1,000 L/m^3)
for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

PURGING RECORD

Date: 13/09/23 Time Began: 12:47 Time Ended: 13:11

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (^{0}C)	DO (mg/L)	Redox (mV)
0.826 x 6 4.956L	0.1	12:47	7.40	786	9.6	/	152.8
	2	13:03	7.30	909	8.6	/	1~~0~~28.9
	3.5	13:11	7.81	800	8.9	/	109.8
	~~8~~					/	

Notes (recharge, sheen, odour, turbidity, etc.):

Initial: slightly turbid, greyish brown, no s/o
Final: " " "

SAMPLING RECORD[1]

Date: 130923/24 Laboratory: ALS

Parameter	1 Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH	~~2~~×500mL AG	NaHSO4	Bailer	08:55	MW04-5-130924
Anions	500mL P	–	Waterra	13:15	MW04-5-130923
Diss. Fe+Mn	125mL P	HNO3+FF	Waterra	13:15	MW04-5-130923

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

EPH= clear/colourless
→ 1 bottle only

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

04-6

SNC·LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW04-6 **Weather:** sun/cloud/rain **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 8.020 Depth to Screen (m): Borehole Diameter d_b (m):

Depth to Water h_s (m): 5.611 Screen Length (m): Standpipe Diameter d_w (m):

Saturated Thickness (m): 2.409

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	12:20	—	5.611	—	30 ppm	—

PURGING RECORD

Minimum Purge Volume = V_P (L) = 3 * V_c = 3 * $\pi/4$ * d_w^2 * (h_b-h_s) * (1,000 L/m^3)

for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

Date: 13-09-23 Time Began: 12:23 Time Ended: 13:35

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (^{0}C)	DO (mg/L)	Redox (mV)
~15	5	12:27	6.78	726	9.4	—	140.9
	10 - Dry	12:32	6.77	743	9.6	—	92.8
	13.5 dry	13:35	7.26	878	11.0	—	105.9

Notes (recharge, sheen, odour, turbidity, etc.):

Initial: v. light brown, no sheen, no odour, slow-mod recharge, low turbidity

Final: light brown, " " " " " "

SAMPLING RECORD[1]

Date: 13-09-24 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH	2×500mL AG	NaHSO4	Bailer	906	MW04-6-130924

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

EPH: clear/colourless

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

06-2
+DUP A

SNC•LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW06-2 **Weather:** Cloud. **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 7.180 Depth to Screen (m): Borehole Diameter d_b (m):
Depth to Water h_s (m): 5.950 Screen Length (m): Standpipe Diameter d_w (m):
Saturated Thickness (m): 1.230

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	15:56	—	5.950	—	50	—

Minimum Purge Volume = V_P (L) = 3 * V_c = 3 * $\pi/4$ * d_w^2 * (h_b-h_s) * (1,000 L/m^3)

PURGING RECORD

for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

Date: 13-09-24 Time Began: 12:15 Time Ended: 12:24

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (^{0}C)	DO (mg/L)	Redox (mV)
1.230 x 6 7.380 ~ 7.5L	0.1	12:16	6.68	792	12.8	—	—
	2.5	12:18	6.68	820	9.9	—	—
	5	12:21	6.67	837	9.7	—	—
	7.5	12:24	6.65	847	9.0	—	—

Notes (recharge, sheen, odour, turbidity, etc.):
Initial: lt. brown, slight turbidity, HC odour, HC sheen, fast recharge
Final: Same as initial

SAMPLING RECORD[1]

Date: 13-09-24/25 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
F1	2x40mL P+T	NaHSO4	Waterra Loop	12:25	MW06-2-130924
EPH/F2	2x500mL AG	NaHSO4	Bailer	09:27	MW06-2-130925
Anions	500mL P	—	Waterra	12:25	MW06-2-130924
Diss. Fe+Mn	125mL P	HNO_3 + FF	Waterra	12:25	MW06-2-130924

} +DU
AL

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

EPH/F2 DUP = MWA-130925
F1, Anions, Diss. Fe+Mn DUP = MWA-130924

EPH = clear/colourless → 2 bails

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

08-2

SNC•LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416
Client: PWGSC
Location: Pleasant Camp
Monitoring Well ID: MW08-2
Weather: cloud/rain
Staff Member(s): TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 6.130
Depth to Screen (m):
Borehole Diameter d_b (m):
Depth to Water h_s (m): 5.003
Screen Length (m):
Standpipe Diameter d_w (m):
Saturated Thickness (m): 1.127

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	15:40	–	5.003	–	0	–

PURGING RECORD

Minimum Purge Volume = V_P (L) = 3 * V_c = 3 * π/4 * d_w^2 * (h_b-h_s) * (1,000 L/m^3)
for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

Date: 13/09/24
Time Began: 12:20
Time Ended: 12:43

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (^{0}C)	DO (mg/L)	Redox (mV)
4 1.127 × 6 6.762 ~ 6.5L	0.1	12:24	7.21	686	9.5	–	–
	~~2.5~~ 2	12:31	7.13	722	8.4	–	–
	~~7~~ 4	12:34	7.18	786	8.8	–	–
	6.5	12:43	7.18	793	8.3	–	–

Notes (recharge, sheen, odour, turbidity, etc.):
Initial: slightly turbid, light orange-brown, slight s/o.
Final: clear, ~~to~~ very light orange-brown, slight s/o.

SAMPLING RECORD[1]

Date: 13/09/24-25
Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
F1	2 × 40mL PT	$NaHSO_4$	Waterra Loop	12:45	MW08-2-130924
EPH/PAH/F2	2×500mL AG	$NaHSO_4$	Bailer	9:25	MW08-2-130925
Anions	500mL P	–	Waterra	12:45	MW08-2-130924
Diss. Fe + Mn	125mL P	HNO_3 + FP	Waterra	12:45	MW08-2-130924

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

EPH: clear, no colour, slight sheen/odour

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

08-5

SNC • LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW08-5 **Weather:** cloud/rain **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 9.490 Depth to Screen (m): Borehole Diameter d_b (m):
Depth to Water h_s (m): 7.096 Screen Length (m): Standpipe Diameter d_w (m):
Saturated Thickness (m): 2.394

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	—	—	7.096	—	0	—

PURGING RECORD

Minimum Purge Volume = $V_P (L) = 3 * V_c = 3 * \pi/4 * d_w^2 * (h_b-h_s) * (1,000 L/m^3)$
for 2" well: $V_P (L) = 3 * 2 *$ (sat. thickness [m]) for 4" well: $V_P (L) = 3 * 8 *$ (sat. thickness [m])

Date: 130924 Time Began: 10:51 Time Ended: 11:20

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (^{0}C)	DO (mg/L)	Redox (mV)
2.394 × 6 14.364 14L	0.1	10:52	7.19	550	7.7	—	—
	5	10:56	7.19	542	7.2	—	—
	8-Dry	10:59	7.15	546	6.8	—	—
	11-Dry	11:08	7.14	544	6.7	—	—
	14-Dry	11:20	7.15	550	6.7	—	—

Notes (recharge, sheen, odour, turbidity, etc.):
Initial: brown/red, v. turbid, no sheen, no odour, slow-med. recharge
Final: lt. brown, low turbidity, no sheen, no odour, slow-med recharge.

SAMPLING RECORD[1]

Date: 130925 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH	2×500mL AG	NaHSO4	Bailer	08:52	MW08-5-130925

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

clear/colourless

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

08-6

SNC•LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW08-6 **Weather:** cloud/rain **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 7.721
Depth to Water h_s (m): 5.820
Saturated Thickness (m): 1.901
Depth to Screen (m):
Screen Length (m):
Borehole Diameter d_b (m):
Standpipe Diameter d_w (m):

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	—	—	5.820	—	0	—

PURGING RECORD

Minimum Purge Volume = $V_P (L) = 3 * V_c = 3 * \pi/4 * d_w^2 * (h_b-h_s) * (1,000 L/m^3)$

for 2" well: $V_P (L) = 3 * 2 *$ (sat. thickness [m]) for 4" well: $V_P (L) = 3 * 8 *$ (sat. thickness [m])

Date: 13-09-24 Time Began: 10:40 Time Ended: 11:05

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (^{0}C)	DO (mg/L)	Redox (mV)
1.901 x 6 11.406	0.1	10:50	7.23	695	7.9		
	3	10:54	7.33	684	7.8		
	6	10:59	7.39	693	7.7		
	9	11:02	7.39	687	8.1		
	11.5	11:05	7.50	687	8.4		

Notes (recharge, sheen, odour, turbidity, etc.):

Initial: slightly turbid, light brown, no s/o

Final: very slightly turbid " , "

SAMPLING RECORD[1]

Date: 13/09/25 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH	2x500mL AG	NaHSO4	Bailer	9:00	MW08-6-130925

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

No turbidity (clear), no colour, no s/o.

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

98-7

SNC·LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW08-7 **Weather:** cloud/rain **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 9.090 Depth to Screen (m): Borehole Diameter d_b (m):

Depth to Water h_s (m): 6.341 Screen Length (m): Standpipe Diameter d_w (m):

Saturated Thickness (m): 1.749

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
130923	14:13	—	6.341	—	0	—

PURGING RECORD

Minimum Purge Volume = $V_P (L) = 3 * V_c = 3 * \pi/4 * d_w^2 * (h_b-h_s) * (1{,}000\ L/m^3)$

for 2" well: $V_P (L) = 3 * 2 *$ (sat. thickness [m]) for 4" well: $V_P (L) = 3 * 8 *$ (sat. thickness [m])

Date: 13-09-24 Time Began: 10:15 Time Ended: 10:26

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (°C)	DO (mg/L)	Redox (mV)
2 5 1.749 × 6 10.494	0.1	10:16	7.06	694	8.3	—	—
	2.5	10:19	6.98	688	7.2	—	—
	5	10:21	6.97	704	6.6	—	—
	7.5	10:23	6.95	727	6.3	—	—
	10.5	10:26	6.94	735	6.2	—	—

Notes (recharge, sheen, odour, turbidity, etc.):

Initial: slight turbidity, lt. brown, no sheen, no odour, fast recharge

Final: same as initial

SAMPLING RECORD[1]

Date: 13-09-24/25 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH	2 x 500mL AG	$NaHSO_4$	Bailer	08:34	MW08-7-130925
Anions	500mL P	—	Waterra	10:27	MW08-7-130924
Diss. Fe+Mn	125mL P	HNO_3 + FF	Waterra	10:27	MW08-7-130924

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

EPH: clear/colourless

---

[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

08-48

SNC•LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416 **Client:** PWGSC **Location:** Pleasant Camp

Monitoring Well ID: MW08-8 **Weather:** cloud/rain **Staff Member(s):** TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 8.193
Depth to Screen (m):
Borehole Diameter d_b (m):
Depth to Water h_s (m): 7.265
Screen Length (m):
Standpipe Diameter d_w (m):
Saturated Thickness (m): 0.928

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
13-09-23	–	–	7.265	–	8.193	–

PURGING RECORD

Minimum Purge Volume = V_P (L) = 3 * V_c = 3 * π/4 * d_w^2 * (h_b-h_s) * (1,000 L/m^3)
for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

Date: 13/09/24 Time Began: 10:20 Time Ended: 10:35

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (°C)	DO (mg/L)	Redox (mV)
0.928 × 6 5.568 ~5.5	0.1	10:24	7.52	833	8.4	–	–
	2	10:26	7.29	803	7.8	–	–
	4	10:28	7.19	813	7.5	–	–
	5.5	10:30	7.08	815	7.3	–	–

Notes (recharge, sheen, odour, turbidity, etc.):

Initial: very trace turbidity, light brown, no S/O

Final: clear, light brown, no S/O.

SAMPLING RECORD[1]

Date: 13/09/25 Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
EPH	2x 500mL AG	NaHSO4	Bailer	8:45	MW08-8-130925

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

clear, no S/O no colour

---

[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO_3. Check pH with pH paper, pH should be <2.

09-5
+Dup B

SNC•LAVALIN

MONITORING WELL SAMPLING RECORD – no low flow

Project No.: 131416
Client: PWGSC
Location: Pleasant Camp
Monitoring Well ID: MW09-5
Weather: cloud/rain
Staff Member(s): TDD/MC

WELL INFORMATION

Depth to Well Bottom h_b (m): 5.650
Depth to Screen (m):
Borehole Diameter d_b (m):
Depth to Water h_s (m): 4.318
Screen Length (m):
Standpipe Diameter d_w (m):
Saturated Thickness (m): 1.332

MONITORING INFORMATION

Date	Time	Depth to LNAPL (m)	Depth to Water h_s (m)	Depth to DNAPL (m)	Organic Vapour (ppm or % LEL)	DO (mg/L)
130923	–	—	4.318	—	5p	–

PURGING RECORD

Minimum Purge Volume = V_P (L) = 3 * V_c = 3 * π/4 * d_w^2 * (h_b-h_s) * (1,000 L/m^3)
for 2" well: V_P (L) = 3 * 2 * (sat. thickness [m]) for 4" well: V_P (L) = 3 * 8 * (sat. thickness [m])

Date: 13-09-24
Time Began: 12:56
Time Ended: 13:20

Calculated Minimum Pipe Volume V_P (L)	Cumulative Volume Removed (L)	Readings During Purging					
		Time	pH	Cond. (µS/cm)	Temp. (^{0}C)	DO (mg/L)	Redox (mV)
1.332 x 6 7.992 ~ 8L	0.1	12:59	6.98	733	10.3		
	2	13:02	6.989	716	9.6		
	4	13:04	6.98	728	9.0		
	6	13:09	6.92	739	8.6		
	8	13:20	6.90	743	9.3		

Notes (recharge, sheen, odour, turbidity, etc.):

Initial: very slightly turbid, very light brown, slight sheen/odour
Final: clear, very light brown, slight sheen/odour

SAMPLING RECORD[1]

Date: 130924/25
Laboratory: ALS

Parameter	Containers	Preservative	Sample Collection Method	Time	Sample ID
F1	2x40mL P+T	NaHSO4	Waterra loop	13:18	MW09-5-130924
EPH/PAH/F2	2x500mL AG	NaHSO4	Bailer	~~13~~ 9:55	MW09-5-130925
Anions	500mL P	—	Waterra	13:18	MW09-5-130924
Dissolved Fe+Mn	125mL P	HNO3+FF	waterra	13:18	MW09-5-130924
EPH/PAH/F2	2x500mL AG	NaHSO4	"	9:55	MWB-130925

Notes (sheen, odour, turbidity, appearance after filtering, duplicates, etc.):

Dup: EPH/PAH = MWB-130925
Anions, Dissolved Fe+Mn = MWB-130924

* Do not Dup F1, F2

EPH/PAH/F2:
clear, no colour, slight sheen/odour

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[1] For dissolved metals, pre-rinse filter 2 x filter volume of groundwater prior to sample collection. Preserve with HNO3. Check pH with pH paper, pH should be <2.

APPENDIX VI

Relocation Permit

Yukon
Environment

Permit No: 4201-45-037

SPECIAL WASTE RELOCATION PERMIT

Issued for the Relocation of Contaminated Material Pursuant to the Environment Act, the Contaminated Sites Regulation, and the Special Waste Regulations

Permittee: **SNC-Lavaline Inc., Environment and Water**

Mailing Address: **8648 Commerce Court, Burnaby, BC V5A 4N6**

Authorized Representative: **Tim Drozda**

Phone/Fax: **(604) 515-5151 / (604) 515-5150**

Email: **tim.drozda@snclavalin.com**

Effective Date: **Date of Director's signature**
Expiry Date: **December 31, 2014**

Removal Location: **Canada Border Services Agency, Pleasant Camp Border Crossing Facility, Pleasant Camp, BC, Haines Road (Lots 6350 and 1047)**

Receiving Location: **Arctic Backhoe Services' Land Treatment Facility at McLean Lake (permit #4202-24-002)**

Scope of Authorization: In accordance with your application, **SNC-Lavalin, Inc.**, represented by yourself, is hereby permitted to relocate

- liquid contaminated with petroleum hydrocarbons in excess of special waste criteria; and
- liquid contaminated with petroleum hydrocarbons below special waste criteria,

hereinafter referred to as contaminated material, from the removal location to the receiving location, both as specified above, as set out in the terms and conditions of this permit.

Dated this 16th day of January, 2014

Director, Environmental Programs Branch
Environment Yukon

DEPARTMENT OF ENVIRONMENT
ENVIRONMENTAL PROGRAMS
Whitehorse, Yukon
Certified true copy of original
Date: 16 Jan 14 Initials: JCKM

PART 1. DEFINITIONS

1. In this permit,

   "Act" means the *Environment Act*, R.S.Y. 2002, c. 76;

   "associated personnel" means all employees, contractors and volunteers involved in the permitted activities;

   "Branch" means the Environmental Programs Branch, Environment Yukon;

   "Duty to Mitigate letter" means a direction in writing from an environmental protection officer outlining the requirements to restore or rehabilitate the natural environment to a condition reasonably equivalent to the condition that existed immediately before the spill occurred;

   "environmental protection analyst" means an employee of the Branch so designated by the Minister of Environment under the Act;

   "environmental protection officer" means an employee of the Government of Yukon so designated by the Minister of Environment under the Act;

   "figure" means a drawing showing the three-dimensional boundaries of the excavation with the dimensions clearly marked, and the locations depicting where the confirmatory samples were taken, including the sample names as provided to the laboratory;

   "listed special waste" means water contaminated with petroleum hydrocarbons in excess of the special waste criteria;

   "Regulations" means the *Contaminated Sites Regulations*, O.I.C. 2002/171 and the *Special Waste Regulations*, O.I.C. 1995/047;

   "site" means the removal location, as noted above, that contains any contaminant with a concentration greater than the standards listed in Schedules 1, 2, or 3 of the *Contaminates Sites Regulation*;

   "vehicle" has the same meaning as in the *Motor Vehicles Act*, R.S.Y. 2002, c. 153; and

   "waste manifest" means the shipping document required to be completed by the permittee as set out in this permit in the form approved by an environmental protection analyst.

2. Any term not defined in this permit that is defined in the Act or the Regulations has the same meaning as in the Act or the Regulations.

PART 2. GENERAL

1. No condition of this permit limits the applicability of any other law or bylaw.

2. The permittee shall ensure that all activities authorized by this permit occur on property that the permittee has the right to enter upon and use for that purpose.

3. The permittee shall ensure that all associated personnel:
   a) have access to a copy of this permit;

   b) are knowledgeable of the terms and conditions of this permit; and
   c) receive the appropriate training for the purposes of carrying out the requirements of this permit.

4. The permittee shall provide notice in writing to an environmental protection analyst prior to any significant change of circumstances at the site, including without limitation:
   a) a change in the receiving location; or
   b) the relocation of material contaminated with substances other than those authorized by this permit.

5. Where conflicts exist between this permit, the permit application, or elements of any plan pertaining to any activity regulated under the Act, this permit shall prevail.

6. For clarity, all obligations of the permittee under this permit survive the expiry date.

PART 3. RELOCATION OF CONTAMINATED MATERIAL

1. This permit is valid only for the one-time relocation of contaminated material from the removal location to the receiving location, as noted above.

2. The permittee shall ensure that all contaminated material is transported and transferred in such a manner as to prevent its release into the environment.

3. The maximum volume of contaminated material that may be relocated under this permit without undertaking an environmental screening pursuant to the *Yukon Environmental and Socio-economic Assessment Act* is 2,999m^3.

PART 4. SAMPLING AND ANALYSIS

1. The permittee shall ensure that all contaminated material covered by this permit is sampled and analyzed for all contaminants of concern, and that this sampling and analysis is undertaken in accordance with all protocols pursuant to the *Contaminated Sites Regulation* that pertain to sampling and analysis.

2. Following excavation of the contaminated material, the permittee shall ensure that confirmatory samples are taken and analyzed, in accordance with all protocols pursuant to the *Contaminated Sites Regulation* that pertain to sampling and analysis, in order to demonstrate that all contaminated material has been removed from the removal location or to identify any contaminated material remaining at the removal location.

3. All analyses performed in accordance with this Part must be acceptable to the Branch. In particular, the permittee shall ensure that the detection limit of the test method(s) used is lower than the standards in the *Contaminated Sites Regulations*.

DEPARTMENT OF ENVIRONMENT
ENVIRONMENTAL PROGRAMS
Whitehorse, Yukon
Certified true copy of original
Date: 14 Jan 14 Initials: JC/M

PART 5. INSPECTIONS, RECORD KEEPING & REPORTING

1. The permittee shall keep records of all analysis results (including raw analytical data), including those from in-situ, ex-situ, and confirmatory sampling, as applicable, for a minimum of 3 years and make them available for inspection by an environmental protection officer upon request. Records shall be kept in a format acceptable to the Branch.

2. If an inspection reveals that the permittee is in any way not in compliance with this permit, the permittee shall take actions as required to bring the site into compliance.

3. The permittee shall submit the following to the Branch:
    a) analytical results of the relocated material;
    b) analytical results of confirmatory samples from the removal location;
    c) actual volume of contaminated material relocated;
    d) a figure; and
    e) a document tracking form provided by the Branch accompanying items a) through d), submitted as instructed on that form.

4. The items submitted in 5.3 must be submitted on or before the latter of:
    f) 60 days following the date of issuance of this permit;
    g) the date outlined in a Duty to Mitigate letter provided by the Branch (if applicable); or
    h) as directed in writing by an environmental protection officer.

5. Failure to submit confirmatory sampling results and the accompanying figure may result in the site continuing to be identified as contaminated by the Environmental Programs Branch and inclusion of the site on the Public Registry of contaminated sites.

PART 6. TRANSPORT AND TRANSFER OF SPECIAL WASTE

1. The permittee shall ensure that all listed special wastes are transported and transferred in such a manner as to prevent their release into the environment.

2. A waste manifest shall be completed to document each shipment of contaminated material considered to be special waste, and copies of the waste manifest shall be distributed in the manner described thereon.

3. The permit number **YG45-037** shall be used as the Provincial Identification Number on waste manifests used for the transport of the contaminated material.

4. The permittee shall ensure that all vehicles carrying any contaminated material considered to be special waste are secured to prevent access by unauthorized persons.

5. The permittee shall ensure that special wastes are transported to a special waste management facility in the Yukon or another jurisdiction that is permitted to receive the listed special wastes.

DEPARTMENT OF ENVIRONMENT
ENVIRONMENTAL PROGRAMS
Whitehorse, Yukon
Certified true copy of original
Date: 16 Jan 14 Initials: JWM

6. The permittee shall ensure that special wastes are transported by a carrier permitted in the Yukon to transport the listed special wastes.

PART 8. SPILLS

1. The permittee shall contact either an environmental protection officer, or the 24-hour Yukon Spill Report Centre (**867-667–7244**) as soon as possible under the circumstances in the event of a release, spill, unauthorized emission, discharge, or escape of any contaminated material.

2. The permittee shall ensure that appropriate clean-up equipment (such as sorbent, shovel, broom, bucket, gloves, boots, etc.) is in a readily available location at all locations where contaminated material is handled or stored and in all vehicles transporting contaminated material.

3. The permittee shall ensure that emergency spill procedures are posted at all locations where contaminated material is handled or stored and carried in all vehicles transporting contaminated material, and that all personnel (employees, contractors or volunteers) are familiar with those procedures.

DEPARTMENT OF ENVIRONMENT
ENVIRONMENTAL PROGRAMS
Whitehorse, Yukon
Certified true copy of original
Date: 16 Jan 14 Initials:

APPENDIX VII

SNC · LAVALIN

Laboratory Analytical Reports and Chromatographs

SNC-LAVALIN INC., ENVIRONMENT DIVISION
ATTN: David Bridger
8648 Commerce Court
Burnaby BC V5A 4N6

Date Received: 25-SEP-13
Report Date: 07-OCT-13 15:57 (MT)
Version: FINAL

Client Phone: 604-515-5151

Certificate of Analysis

Lab Work Order #: L1368607

Project P.O. #:	NOT SUBMITTED
Job Reference:	131416 (SEPTEMBER 2013)
C of C Numbers:	10-218595, 10-218597, 10-218599, 10-218600
Legal Site Desc:	

Selam Worku
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1368607-1	L1368607-2	L1368607-3	L1368607-4	L1368607-5
	Description	WTR	WTR	WTR	WTR	WTR
	Sampled Date	23-SEP-13	23-SEP-13	23-SEP-13	23-SEP-13	23-SEP-13
	Sampled Time	12:20	12:10	12:00	13:20	13:15
	Client ID	MW03-8-130923	MW03-10-130923	MW03-11-130923	MW04-4-130923	MW04-5-130923
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Chloride (Cl) (mg/L)	3.08	11.5	22.6	8.19	10.3
	Fluoride (F) (mg/L)	0.040	<0.020	<0.020	<0.020	0.023
	Nitrate (as N) (mg/L)	<0.0050	0.0405	0.291	0.143	0.143
	Nitrite (as N) (mg/L)	<0.0010	0.0069	0.0024	<0.0010	0.0099
	Sulfate (SO4) (mg/L)	<0.50	6.88	11.3	24.0	8.88
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Iron (Fe)-Dissolved (mg/L)	5.98	1.54	1.28	<0.030	4.28
	Manganese (Mn)-Dissolved (mg/L)	1.43	0.693	0.467	0.0131	0.650
Volatile Organic Compounds	F1 (C6-C10) (mg/L)					
Hydrocarbons	EPH10-19 (mg/L)					
	EPH19-32 (mg/L)					
	F2 (C10-C16) (mg/L)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)					
	Acenaphthylene (mg/L)					
	Acridine (mg/L)					
	Anthracene (mg/L)					
	Benz(a)anthracene (mg/L)					
	Benzo(a)pyrene (mg/L)					
	Benzo(b)fluoranthene (mg/L)					
	Benzo(g,h,i)perylene (mg/L)					
	Benzo(k)fluoranthene (mg/L)					
	Chrysene (mg/L)					
	Dibenz(a,h)anthracene (mg/L)					
	Fluoranthene (mg/L)					
	Fluorene (mg/L)					
	Indeno(1,2,3-c,d)pyrene (mg/L)					
	Naphthalene (mg/L)					
	Phenanthrene (mg/L)					
	Pyrene (mg/L)					
	Quinoline (mg/L)					
	Surrogate: Acenaphthene d10 (%)					
	Surrogate: Acridine d9 (%)					
	Surrogate: Chrysene d12 (%)					
	Surrogate: Naphthalene d8 (%)					
	Surrogate: Phenanthrene d10 (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1368607-6	L1368607-7	L1368607-8	L1368607-9	L1368607-10
	Description	WTR	WTR	WTR	WTR	WTR
	Sampled Date	24-SEP-13	24-SEP-13	24-SEP-13	24-SEP-13	24-SEP-13
	Sampled Time	09:06	08:55	09:15	08:43	08:55
	Client ID	MW04-6-130924	MW04-5-130924	MW04-4-130924	MW03-11-130924	MW03-10D-130924
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Chloride (Cl) (mg/L)					
	Fluoride (F) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Sulfate (SO4) (mg/L)					
Dissolved Metals	Dissolved Metals Filtration Location					
	Iron (Fe)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
Volatile Organic Compounds	F1 (C6-C10) (mg/L)					
Hydrocarbons	EPH10-19 (mg/L)	<0.25	<0.25	<0.25	0.67	0.38
	EPH19-32 (mg/L)	<0.25	<0.25	<0.25	0.27	<0.25
	F2 (C10-C16) (mg/L)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)					
	Acenaphthylene (mg/L)					
	Acridine (mg/L)					
	Anthracene (mg/L)					
	Benz(a)anthracene (mg/L)					
	Benzo(a)pyrene (mg/L)					
	Benzo(b)fluoranthene (mg/L)					
	Benzo(g,h,i)perylene (mg/L)					
	Benzo(k)fluoranthene (mg/L)					
	Chrysene (mg/L)					
	Dibenz(a,h)anthracene (mg/L)					
	Fluoranthene (mg/L)					
	Fluorene (mg/L)					
	Indeno(1,2,3-c,d)pyrene (mg/L)					
	Naphthalene (mg/L)					
	Phenanthrene (mg/L)					
	Pyrene (mg/L)					
	Quinoline (mg/L)					
	Surrogate: Acenaphthene d10 (%)					
	Surrogate: Acridine d9 (%)					
	Surrogate: Chrysene d12 (%)					
	Surrogate: Naphthalene d8 (%)					
	Surrogate: Phenanthrene d10 (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1368607-11	L1368607-12	L1368607-13	L1368607-14	L1368607-15
	Description	WTR	WTR	WTR	WTR	WTR
	Sampled Date	24-SEP-13	24-SEP-13	24-SEP-13	24-SEP-13	24-SEP-13
	Sampled Time	09:07	08:33	13:45	12:07	11:45
	Client ID	MW03-10-130924	MW03-8-130924	AS-22-130924	AS-13-130924	MW01-21-130924
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Chloride (Cl) (mg/L)			10.1		3.32
	Fluoride (F) (mg/L)			0.024		0.031
	Nitrate (as N) (mg/L)			0.689		<0.0050
	Nitrite (as N) (mg/L)			0.0450		0.0016
	Sulfate (SO4) (mg/L)			10.5		2.06
Dissolved Metals	Dissolved Metals Filtration Location			FIELD		FIELD
	Iron (Fe)-Dissolved (mg/L)			5.62		0.772
	Manganese (Mn)-Dissolved (mg/L)			0.675		1.42
Volatile Organic Compounds	F1 (C6-C10) (mg/L)			<0.10	<0.10	
Hydrocarbons	EPH10-19 (mg/L)	4.56	0.59			
	EPH19-32 (mg/L)	0.81	<0.25			
	F2 (C10-C16) (mg/L)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)	<0.000050				
	Acenaphthylene (mg/L)	<0.000050				
	Acridine (mg/L)	<0.00070 DLM				
	Anthracene (mg/L)	<0.000050				
	Benz(a)anthracene (mg/L)	<0.000050				
	Benzo(a)pyrene (mg/L)	<0.000010				
	Benzo(b)fluoranthene (mg/L)	<0.000050				
	Benzo(g,h,i)perylene (mg/L)	<0.000050				
	Benzo(k)fluoranthene (mg/L)	<0.000050				
	Chrysene (mg/L)	<0.000050				
	Dibenz(a,h)anthracene (mg/L)	<0.000050				
	Fluoranthene (mg/L)	<0.000050				
	Fluorene (mg/L)	<0.000050				
	Indeno(1,2,3-c,d)pyrene (mg/L)	<0.000050				
	Naphthalene (mg/L)	<0.000050				
	Phenanthrene (mg/L)	<0.000090 DLM				
	Pyrene (mg/L)	0.000147				
	Quinoline (mg/L)	<0.000050				
	Surrogate: Acenaphthene d10 (%)	72.5				
	Surrogate: Acridine d9 (%)	75.9				
	Surrogate: Chrysene d12 (%)	82.5				
	Surrogate: Naphthalene d8 (%)	75.9				
	Surrogate: Phenanthrene d10 (%)	83.9				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1368607-16	L1368607-17	L1368607-18	L1368607-19	L1368607-20
	Description	WTR	WTR	WTR	WTR	WTR
	Sampled Date	24-SEP-13	24-SEP-13	24-SEP-13	24-SEP-13	24-SEP-13
	Sampled Time	12:45	13:18		13:40	13:01
	Client ID	MW08-2-130924	MW09-5-130924	MWA-130924	MWP4-11-130924	AS-11-130924
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Chloride (Cl) (mg/L)	10.4	0.72	1.25	7.75	
	Fluoride (F) (mg/L)	0.050	<0.020	<0.020	0.023	
	Nitrate (as N) (mg/L)	0.0067	0.111	0.517	0.0153	
	Nitrite (as N) (mg/L)	0.0010	0.0226	<0.0010	0.0026	
	Sulfate (SO4) (mg/L)	6.07	7.56	14.1	8.12	
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Iron (Fe)-Dissolved (mg/L)	7.73	6.28	0.393	9.26	
	Manganese (Mn)-Dissolved (mg/L)	0.880	0.241	0.393	0.794	
Volatile Organic Compounds	F1 (C6-C10) (mg/L)	<0.10	1.22	<0.10	<0.10	<0.10
Hydrocarbons	EPH10-19 (mg/L)					
	EPH19-32 (mg/L)					
	F2 (C10-C16) (mg/L)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)					
	Acenaphthylene (mg/L)					
	Acridine (mg/L)					
	Anthracene (mg/L)					
	Benz(a)anthracene (mg/L)					
	Benzo(a)pyrene (mg/L)					
	Benzo(b)fluoranthene (mg/L)					
	Benzo(g,h,i)perylene (mg/L)					
	Benzo(k)fluoranthene (mg/L)					
	Chrysene (mg/L)					
	Dibenz(a,h)anthracene (mg/L)					
	Fluoranthene (mg/L)					
	Fluorene (mg/L)					
	Indeno(1,2,3-c,d)pyrene (mg/L)					
	Naphthalene (mg/L)					
	Phenanthrene (mg/L)					
	Pyrene (mg/L)					
	Quinoline (mg/L)					
	Surrogate: Acenaphthene d10 (%)					
	Surrogate: Acridine d9 (%)					
	Surrogate: Chrysene d12 (%)					
	Surrogate: Naphthalene d8 (%)					
	Surrogate: Phenanthrene d10 (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1368607-21	L1368607-22	L1368607-23	L1368607-24	L1368607-25
	Description	WTR	WTR	WTR	WTR	WTR
	Sampled Date	24-SEP-13	24-SEP-13	24-SEP-13	24-SEP-13	24-SEP-13
	Sampled Time	12:25		11:45	12:00	10:40
	Client ID	MW06-2-130924	MWB-130924	MW01-17D	MW01-19-130924	MW04-2-130924
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Chloride (Cl) (mg/L)	<2.5 DLA	0.72	1.83	2.96	3.90
	Fluoride (F) (mg/L)	<0.10 DLA	<0.020	0.063	<0.020	0.030
	Nitrate (as N) (mg/L)	0.566	0.233	<0.0050	0.301	0.0495
	Nitrite (as N) (mg/L)	<0.0050 DLA	0.0372	<0.0010	<0.0010	0.0016
	Sulfate (SO4) (mg/L)	13.5	7.41	<0.50	8.80	2.98
Dissolved Metals	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Iron (Fe)-Dissolved (mg/L)	0.386	6.26	3.42	<0.030	0.954
	Manganese (Mn)-Dissolved (mg/L)	0.401	0.240	1.05	0.000419	0.571
Volatile Organic Compounds	F1 (C6-C10) (mg/L)	<0.10		<0.10	<0.10	
Hydrocarbons	EPH10-19 (mg/L)					
	EPH19-32 (mg/L)					
	F2 (C10-C16) (mg/L)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)					
	Acenaphthylene (mg/L)					
	Acridine (mg/L)					
	Anthracene (mg/L)					
	Benz(a)anthracene (mg/L)					
	Benzo(a)pyrene (mg/L)					
	Benzo(b)fluoranthene (mg/L)					
	Benzo(g,h,i)perylene (mg/L)					
	Benzo(k)fluoranthene (mg/L)					
	Chrysene (mg/L)					
	Dibenz(a,h)anthracene (mg/L)					
	Fluoranthene (mg/L)					
	Fluorene (mg/L)					
	Indeno(1,2,3-c,d)pyrene (mg/L)					
	Naphthalene (mg/L)					
	Phenanthrene (mg/L)					
	Pyrene (mg/L)					
	Quinoline (mg/L)					
	Surrogate: Acenaphthene d10 (%)					
	Surrogate: Acridine d9 (%)					
	Surrogate: Chrysene d12 (%)					
	Surrogate: Naphthalene d8 (%)					
	Surrogate: Phenanthrene d10 (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1368607-26	L1368607-27	L1368607-28	L1368607-29	L1368607-30
	Description	WTR	WTR	WTR	WTR	WTR
	Sampled Date	24-SEP-13	25-SEP-13	25-SEP-13	25-SEP-13	25-SEP-13
	Sampled Time	10:27	08:45	09:00	09:07	08:52
	Client ID	MW08-7-130924	MW08-8-130925	MW08-6-130925	MW01-21-130925	MW08-5-130925
WATER						
Anions and Nutrients	Chloride (Cl) (mg/L)	13.7				
	Fluoride (F) (mg/L)	0.027				
	Nitrate (as N) (mg/L)	0.0848				
	Nitrite (as N) (mg/L)	0.0046				
	Sulfate (SO4) (mg/L)	4.93				
Dissolved Metals	Dissolved Metals Filtration Location	FIELD				
	Iron (Fe)-Dissolved (mg/L)	7.18				
	Manganese (Mn)-Dissolved (mg/L)	0.700				
Volatile Organic Compounds	F1 (C6-C10) (mg/L)					
Hydrocarbons	EPH10-19 (mg/L)		<0.25	<0.25	0.42	<0.25
	EPH19-32 (mg/L)		<0.25	<0.25	<0.25	<0.25
	F2 (C10-C16) (mg/L)					
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)					
	Acenaphthylene (mg/L)					
	Acridine (mg/L)					
	Anthracene (mg/L)					
	Benz(a)anthracene (mg/L)					
	Benzo(a)pyrene (mg/L)					
	Benzo(b)fluoranthene (mg/L)					
	Benzo(g,h,i)perylene (mg/L)					
	Benzo(k)fluoranthene (mg/L)					
	Chrysene (mg/L)					
	Dibenz(a,h)anthracene (mg/L)					
	Fluoranthene (mg/L)					
	Fluorene (mg/L)					
	Indeno(1,2,3-c,d)pyrene (mg/L)					
	Naphthalene (mg/L)					
	Phenanthrene (mg/L)					
	Pyrene (mg/L)					
	Quinoline (mg/L)					
	Surrogate: Acenaphthene d10 (%)					
	Surrogate: Acridine d9 (%)					
	Surrogate: Chrysene d12 (%)					
	Surrogate: Naphthalene d8 (%)					
	Surrogate: Phenanthrene d10 (%)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1368607-31	L1368607-32	L1368607-33	L1368607-34	L1368607-35
	Description	WTR	WTR	WTR	WTR	WTR
	Sampled Date	25-SEP-13	25-SEP-13	25-SEP-13	25-SEP-13	25-SEP-13
	Sampled Time	08:34	08:45	09:13	09:19	09:27
	Client ID	MW08-7-130925	MW04-2-130925	MW01-19-130925	MW01-17D-130925	MW06-2-130925
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Chloride (Cl) (mg/L)					
	Fluoride (F) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Sulfate (SO4) (mg/L)					
Dissolved Metals	Dissolved Metals Filtration Location					
	Iron (Fe)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
Volatile Organic Compounds	F1 (C6-C10) (mg/L)					
Hydrocarbons	EPH10-19 (mg/L)	<0.25	0.26	<0.25	0.86	0.46
	EPH19-32 (mg/L)	<0.25	<0.25	<0.25	<0.25	<0.25
	F2 (C10-C16) (mg/L)			<0.30	0.56	<0.30
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)			<0.000050	<0.00020$^{\text{DLM}}$	
	Acenaphthylene (mg/L)			<0.000050	<0.000050	
	Acridine (mg/L)			<0.000050	<0.00020$^{\text{DLM}}$	
	Anthracene (mg/L)			<0.000050	<0.000050	
	Benz(a)anthracene (mg/L)			<0.000050	<0.000050	
	Benzo(a)pyrene (mg/L)			<0.000010	<0.000010	
	Benzo(b)fluoranthene (mg/L)			<0.000050	<0.000050	
	Benzo(g,h,i)perylene (mg/L)			<0.000050	<0.000050	
	Benzo(k)fluoranthene (mg/L)			<0.000050	<0.000050	
	Chrysene (mg/L)			<0.000050	<0.000050	
	Dibenz(a,h)anthracene (mg/L)			<0.000050	<0.000050	
	Fluoranthene (mg/L)			<0.000050	<0.000050	
	Fluorene (mg/L)			<0.000050	0.000313	
	Indeno(1,2,3-c,d)pyrene (mg/L)			<0.000050	<0.000050	
	Naphthalene (mg/L)			<0.000050	<0.00020$^{\text{DLM}}$	
	Phenanthrene (mg/L)			<0.000050	<0.000050	
	Pyrene (mg/L)			<0.000050	<0.000050	
	Quinoline (mg/L)			<0.000050	<0.00010$^{\text{DLM}}$	
	Surrogate: Acenaphthene d10 (%)			92.4	87.9	
	Surrogate: Acridine d9 (%)			82.0	87.4	
	Surrogate: Chrysene d12 (%)			92.5	93.3	
	Surrogate: Naphthalene d8 (%)			90.6	91.3	
	Surrogate: Phenanthrene d10 (%)			92.9	88.0	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1368607-36	L1368607-37	L1368607-38	L1368607-39	L1368607-40
	Description	WTR	WTR	WTR	WTR	WTR
	Sampled Date	25-SEP-13	25-SEP-13	25-SEP-13	25-SEP-13	25-SEP-13
	Sampled Time	09:39	09:47		10:08	09:25
	Client ID	AS-22-130925	AS-11-130925	MWA-130925	MWP4-130925	MW08-2-130925
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Chloride (Cl) (mg/L)					
	Fluoride (F) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Sulfate (SO4) (mg/L)					
Dissolved Metals	Dissolved Metals Filtration Location					
	Iron (Fe)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
Volatile Organic Compounds	F1 (C6-C10) (mg/L)					
Hydrocarbons	EPH10-19 (mg/L)	1.13	0.83	0.48	<0.25	2.06
	EPH19-32 (mg/L)	0.27	0.52	<0.25	<0.25	0.38
	F2 (C10-C16) (mg/L)	0.84	0.58	<0.30	<0.30	1.37
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)				<0.000050	DLM <0.00020
	Acenaphthylene (mg/L)				<0.000050	<0.000050
	Acridine (mg/L)				<0.000050	<0.000050
	Anthracene (mg/L)				<0.000050	DLM <0.00010
	Benz(a)anthracene (mg/L)				<0.000050	<0.000050
	Benzo(a)pyrene (mg/L)				<0.000010	<0.000010
	Benzo(b)fluoranthene (mg/L)				<0.000050	<0.000050
	Benzo(g,h,i)perylene (mg/L)				<0.000050	<0.000050
	Benzo(k)fluoranthene (mg/L)				<0.000050	<0.000050
	Chrysene (mg/L)				<0.000050	<0.000050
	Dibenz(a,h)anthracene (mg/L)				<0.000050	<0.000050
	Fluoranthene (mg/L)				<0.000050	<0.000050
	Fluorene (mg/L)				0.000054	0.000211
	Indeno(1,2,3-c,d)pyrene (mg/L)				<0.000050	<0.000050
	Naphthalene (mg/L)				<0.000050	DLM <0.00020
	Phenanthrene (mg/L)				<0.000050	DLM <0.00010
	Pyrene (mg/L)				<0.000050	<0.000050
	Quinoline (mg/L)				<0.000050	DLM <0.00020
	Surrogate: Acenaphthene d10 (%)				89.0	110.7
	Surrogate: Acridine d9 (%)				86.7	83.6
	Surrogate: Chrysene d12 (%)				93.0	98.0
	Surrogate: Naphthalene d8 (%)				86.9	92.9
	Surrogate: Phenanthrene d10 (%)				87.3	86.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

	Sample ID	L1368607-41	L1368607-42	L1368607-43	L1368607-44	
	Description	WTR	WTR	WTR	WTR	
	Sampled Date	25-SEP-13	25-SEP-13	25-SEP-13	25-SEP-13	
	Sampled Time	09:40	09:55			
	Client ID	AS-13-130925	MW09-5-130925	MWB-130925	MWC-130925	
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Chloride (Cl) (mg/L)					
	Fluoride (F) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Sulfate (SO4) (mg/L)					
Dissolved Metals	Dissolved Metals Filtration Location					
	Iron (Fe)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
Volatile Organic Compounds	F1 (C6-C10) (mg/L)					
Hydrocarbons	EPH10-19 (mg/L)	0.72	47.6	22.8	0.67	
	EPH19-32 (mg/L)	<0.25	5.62	2.75	<0.25	
	F2 (C10-C16) (mg/L)	0.58	34.9			
Polycyclic Aromatic Hydrocarbons	Acenaphthene (mg/L)		<0.00040 DLM	<0.00050 DLM		
	Acenaphthylene (mg/L)		<0.00050 DLM	<0.00040 DLM		
	Acridine (mg/L)		<0.00050 DLM	<0.00070 DLM		
	Anthracene (mg/L)		<0.00080 DLM	<0.0020 DLM		
	Benz(a)anthracene (mg/L)		<0.000050	<0.000050		
	Benzo(a)pyrene (mg/L)		0.000042	0.000025		
	Benzo(b)fluoranthene (mg/L)		0.000053	<0.000050		
	Benzo(g,h,i)perylene (mg/L)		<0.000050	<0.000050		
	Benzo(k)fluoranthene (mg/L)		<0.000050	<0.000050		
	Chrysene (mg/L)		<0.000050	<0.000050		
	Dibenz(a,h)anthracene (mg/L)		<0.000050	<0.000050		
	Fluoranthene (mg/L)		<0.00020 DLM	<0.00020 DLM		
	Fluorene (mg/L)		0.000710	0.00122		
	Indeno(1,2,3-c,d)pyrene (mg/L)		<0.000050	<0.000050		
	Naphthalene (mg/L)		<0.00040 DLM	<0.00060 DLM		
	Phenanthrene (mg/L)		0.00185	0.00302		
	Pyrene (mg/L)		0.000396	0.000430		
	Quinoline (mg/L)		<0.00070 DLM	<0.0020 DLM		
	Surrogate: Acenaphthene d10 (%)		127.8	Not Reportable SMI		
	Surrogate: Acridine d9 (%)		85.3	106.6		
	Surrogate: Chrysene d12 (%)		73.1	79.6		
	Surrogate: Naphthalene d8 (%)		117.8	Not Reportable SMI		
	Surrogate: Phenanthrene d10 (%)		85.7	120.7		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Sulfate (SO4)	MS-B	L1368607-1, -13, -15, -16, -17, -18, -19, -2, -21, -22, -23, -24, -25, -26, -3, -4, -5
Matrix Spike	Sulfate (SO4)	MS-B	L1368607-1, -13, -15, -16, -17, -18, -19, -2, -21, -22, -23, -24, -25, -26, -3, -4, -5
Matrix Spike	Iron (Fe)-Dissolved	MS-B	L1368607-1, -13, -15, -16, -17, -18, -19, -2, -21, -22, -23, -24, -25, -26, -3, -4, -5
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1368607-1, -13, -15, -16, -17, -18, -19, -2, -21, -22, -23, -24, -25, -26, -3, -4, -5
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1368607-1, -13, -15, -16, -17, -18, -19, -2, -21, -22, -23, -24, -25, -26, -3, -4, -5

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit Adjusted For required dilution
DLM	Detection Limit Adjusted For Sample Matrix Effects
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
SMI	Surrogate recovery could not be measured due to sample matrix interference.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ANIONS-CL-IC-WR	Water	Chloride by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.

ANIONS-F-IC-WR	Water	Fluoride by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.

ANIONS-NO2-IC-WR	Water	Nitrite Nitrogen by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.

ANIONS-NO3-IC-WR	Water	Nitrate Nitrogen by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.

ANIONS-SO4-IC-WR	Water	Sulphate by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.

EPH-SF-FID-VA	Water	EPH in Water by Tumbler and GCFID	BC MOE EPH GCFID

Analysis is in accordance with BC MOE Lab Manual method "Extractable Petroleum Hydrocarbons in Water by GC/FID", v2.1, July 1999. Whole water samples are extracted with DCM prior to gas chromatography with flame ionization detection (GC-FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

F1-HSFID-VA	Water	CCME F1 By Headspace with GCFID	CCME PHC TIER 1

This analysis is based on the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." For F1 (C6-C10), the sample undergoes a headspace purge prior to analysis by GC/FID.

F1 (C6-C10): Sum of all hydrocarbons that elute between nC6 and nC10.

F2-F3-SF-FID-VA	Water	Extractable Hydrocanbons in water GCFID	CWS (CCME)

Petroleum Hydrocarbons (F2-F3) in Water

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, published by the United States Environmental Protection Agency (EPA) and the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." The procedure involves a liquid-liquid extraction of the entire water sample using dichloromethane prior to capillary column gas chromatography with flame ionization detection (GC/FID).

A silica gel cleanup procedure is applied before GC analysis, which is intended to selectively remove most naturally occurring organics.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

Reference Information

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

PAH-SF-MS-VA	Water	PAH in Water by GCMS	EPA 3510, 8270

The entire water sample is extracted with dichloromethane, prior to analysis by gas chromatography with mass spectrometric detection (GC/MS). Because the two isomers cannot be readily chromatographically separated, benzo(j)fluoranthene is reported as part of the benzo(b)fluoranthene parameter.

PAH-SURR-MS-VA	Water	PAH Surrogates for Waters	EPA 3510, 8270

Analysed as per the corresponding PAH test method. Known quantities of surrogate compounds are added prior to analysis to each sample to demonstrate analytical accuracy.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WR	ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

10-218595 10-218597 10-218599 10-218600

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1368607   Report Date: 07-OCT-13

Client: SNC-LAVALIN INC., ENVIRONMENT DIVISION
8648 Commerce Court
Burnaby BC V5A 4N6
Contact: David Bridger

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-CL-IC-WR	**Water**							
Batch R2702670								
WG1756317-15 DUP		**L1368607-5**						
Chloride (Cl)		10.3	10.3		mg/L	0.0	20	26-SEP-13
WG1756317-10 LCS								
Chloride (Cl)			100.8		%		85-115	26-SEP-13
WG1756317-14 LCS								
Chloride (Cl)			101.0		%		85-115	26-SEP-13
WG1756317-2 LCS								
Chloride (Cl)			100.8		%		85-115	26-SEP-13
WG1756317-6 LCS								
Chloride (Cl)			100.8		%		85-115	26-SEP-13
WG1756317-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-13 MB								
Chloride (Cl)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-12 MS		**L1368584-3**						
Chloride (Cl)			98.6		%		75-125	26-SEP-13
WG1756317-16 MS		**L1368607-13**						
Chloride (Cl)			97.6		%		75-125	26-SEP-13
WG1756317-4 MS		**L1368575-2**						
Chloride (Cl)			98.6		%		75-125	26-SEP-13
WG1756317-8 MS		**L1368575-13**						
Chloride (Cl)			97.2		%		75-125	26-SEP-13
ANIONS-F-IC-WR	**Water**							
Batch R2702670								
WG1756317-15 DUP		**L1368607-5**						
Fluoride (F)		0.023	0.023		mg/L	0.3	20	26-SEP-13
WG1756317-10 LCS								
Fluoride (F)			102.0		%		85-115	26-SEP-13
WG1756317-14 LCS								
Fluoride (F)			102.2		%		85-115	26-SEP-13
WG1756317-2 LCS								
Fluoride (F)			102.1		%		85-115	26-SEP-13
WG1756317-6 LCS								
Fluoride (F)			101.5		%		85-115	26-SEP-13
WG1756317-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-F-IC-WR	**Water**							
Batch R2702670								
WG1756317-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	26-SEP-13
WG1756317-13 MB								
Fluoride (F)			<0.020		mg/L		0.02	26-SEP-13
WG1756317-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	26-SEP-13
WG1756317-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	26-SEP-13
WG1756317-12 MS		**L1368584-3**						
Fluoride (F)			99.4		%		75-125	26-SEP-13
WG1756317-16 MS		**L1368607-13**						
Fluoride (F)			99.2		%		75-125	26-SEP-13
WG1756317-4 MS		**L1368575-2**						
Fluoride (F)			100.5		%		75-125	26-SEP-13
WG1756317-8 MS		**L1368575-13**						
Fluoride (F)			95.9		%		75-125	26-SEP-13
ANIONS-NO2-IC-WR	**Water**							
Batch R2702670								
WG1756317-15 DUP		**L1368607-5**						
Nitrite (as N)		0.0099	0.0104		mg/L	4.2	20	26-SEP-13
WG1756317-10 LCS								
Nitrite (as N)			101.2		%		85-115	26-SEP-13
WG1756317-14 LCS								
Nitrite (as N)			101.3		%		85-115	26-SEP-13
WG1756317-2 LCS								
Nitrite (as N)			101.2		%		85-115	26-SEP-13
WG1756317-6 LCS								
Nitrite (as N)			101.1		%		85-115	26-SEP-13
WG1756317-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	26-SEP-13
WG1756317-13 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	26-SEP-13
WG1756317-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	26-SEP-13
WG1756317-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	26-SEP-13
WG1756317-12 MS		**L1368584-3**						
Nitrite (as N)			101.3		%		75-125	26-SEP-13
WG1756317-16 MS		**L1368607-13**						

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-NO2-IC-WR	**Water**							
Batch R2702670								
WG1756317-16 MS		**L1368607-13**						
Nitrite (as N)			97.9		%		75-125	26-SEP-13
WG1756317-4 MS		**L1368575-2**						
Nitrite (as N)			101.9		%		75-125	26-SEP-13
WG1756317-8 MS		**L1368575-13**						
Nitrite (as N)			100.2		%		75-125	26-SEP-13
ANIONS-NO3-IC-WR	**Water**							
Batch R2702670								
WG1756317-15 DUP		**L1368607-5**						
Nitrate (as N)		0.143	0.143		mg/L	0.1	20	26-SEP-13
WG1756317-10 LCS								
Nitrate (as N)			101.7		%		85-115	26-SEP-13
WG1756317-14 LCS								
Nitrate (as N)			102.0		%		85-115	26-SEP-13
WG1756317-2 LCS								
Nitrate (as N)			101.6		%		85-115	26-SEP-13
WG1756317-6 LCS								
Nitrate (as N)			101.7		%		85-115	26-SEP-13
WG1756317-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	26-SEP-13
WG1756317-13 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	26-SEP-13
WG1756317-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	26-SEP-13
WG1756317-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	26-SEP-13
WG1756317-12 MS		**L1368584-3**						
Nitrate (as N)			98.3		%		75-125	26-SEP-13
WG1756317-16 MS		**L1368607-13**						
Nitrate (as N)			96.4		%		75-125	26-SEP-13
WG1756317-4 MS		**L1368575-2**						
Nitrate (as N)			98.6		%		75-125	26-SEP-13
WG1756317-8 MS		**L1368575-13**						
Nitrate (as N)			96.8		%		75-125	26-SEP-13
ANIONS-SO4-IC-WR	**Water**							

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-SO4-IC-WR	**Water**							
Batch R2702670								
WG1756317-15 DUP		**L1368607-5**						
Sulfate (SO4)		8.88	8.87		mg/L	0.1	20	26-SEP-13
WG1756317-10 LCS								
Sulfate (SO4)			99.3		%		85-115	26-SEP-13
WG1756317-14 LCS								
Sulfate (SO4)			99.3		%		85-115	26-SEP-13
WG1756317-2 LCS								
Sulfate (SO4)			99.5		%		85-115	26-SEP-13
WG1756317-6 LCS								
Sulfate (SO4)			99.3		%		85-115	26-SEP-13
WG1756317-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-13 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-5 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-9 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-12 MS		**L1368584-3**						
Sulfate (SO4)			N/A	MS-B	%		-	26-SEP-13
WG1756317-16 MS		**L1368607-13**						
Sulfate (SO4)			95.4		%		75-125	26-SEP-13
WG1756317-4 MS		**L1368575-2**						
Sulfate (SO4)			93.5		%		75-125	26-SEP-13
WG1756317-8 MS		**L1368575-13**						
Sulfate (SO4)			N/A	MS-B	%		-	26-SEP-13
EPH-SF-FID-VA	**Water**							
Batch R2707089								
WG1759220-1 MB								
EPH10-19			<0.25		mg/L		0.25	02-OCT-13
EPH19-32			<0.25		mg/L		0.25	02-OCT-13
WG1759220-3 MB								
EPH10-19			<0.25		mg/L		0.25	03-OCT-13
EPH19-32			<0.25		mg/L		0.25	03-OCT-13
Batch R2707793								
WG1760177-1 MB								
EPH10-19			<0.25		mg/L		0.25	03-OCT-13
EPH19-32			<0.25		mg/L		0.25	03-OCT-13

Quality Control Report

Workorder: L1368607 Report Date: 07-OCT-13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EPH-SF-FID-VA	**Water**							
Batch R2709208								
WG1760177-3 MB								
EPH10-19			<0.25		mg/L		0.25	04-OCT-13
EPH19-32			<0.25		mg/L		0.25	04-OCT-13
F1-HSFID-VA	**Water**							
Batch R2703221								
WG1757743-2 LCS								
F1 (C6-C10)			105.9		%		50-150	01-OCT-13
WG1757743-1 MB								
F1 (C6-C10)			<0.10		mg/L		0.1	01-OCT-13
Batch R2705789								
WG1757743-3 DUP		**L1368607-17**						
F1 (C6-C10)		1.22	1.50		mg/L	21	50	02-OCT-13
WG1758744-2 LCS								
F1 (C6-C10)			110.8		%		50-150	02-OCT-13
WG1758744-1 MB								
F1 (C6-C10)			<0.10		mg/L		0.1	02-OCT-13
F2-F3-SF-FID-VA	**Water**							
Batch R2707392								
WG1760177-1 MB								
F2 (C10-C16)			<0.30		mg/L		0.3	04-OCT-13
WG1760177-3 MB								
F2 (C10-C16)			<0.30		mg/L		0.3	04-OCT-13
MET-D-CCMS-VA	**Water**							
Batch R2704140								
WG1756003-1 MB								
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	27-SEP-13
Manganese (Mn)-Dissolved			<0.000050		mg/L		0.00005	27-SEP-13
Batch R2704185								
WG1756003-2 CRM		**VA-HIGH-WATRM**						
Iron (Fe)-Dissolved			101.4		%		80-120	27-SEP-13
Manganese (Mn)-Dissolved			99.5		%		80-120	27-SEP-13
Batch R2710595								
WG1756003-25 MS		**L1369720-2**						
Iron (Fe)-Dissolved			95.9		%		70-130	04-OCT-13
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	04-OCT-13

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R2710606								
WG1756003-10 MS		**L1369397-6**						
Iron (Fe)-Dissolved			N/A	MS-B	%		-	05-OCT-13
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	05-OCT-13
PAH-SF-MS-VA	**Water**							
Batch R2706104								
WG1759220-2 LCS								
Acenaphthene			96.2		%		60-130	03-OCT-13
Acenaphthylene			100.1		%		60-130	03-OCT-13
Acridine			98.3		%		60-130	03-OCT-13
Anthracene			94.5		%		60-130	03-OCT-13
Benz(a)anthracene			87.6		%		60-130	03-OCT-13
Benzo(a)pyrene			100.9		%		60-130	03-OCT-13
Benzo(b)fluoranthene			107.3		%		60-130	03-OCT-13
Benzo(g,h,i)perylene			95.2		%		60-130	03-OCT-13
Benzo(k)fluoranthene			111.5		%		60-130	03-OCT-13
Chrysene			94.7		%		60-130	03-OCT-13
Dibenz(a,h)anthracene			94.0		%		60-130	03-OCT-13
Fluoranthene			99.0		%		60-130	03-OCT-13
Fluorene			97.2		%		60-130	03-OCT-13
Indeno(1,2,3-c,d)pyrene			95.7		%		60-130	03-OCT-13
Naphthalene			95.4		%		50-130	03-OCT-13
Phenanthrene			102.7		%		60-130	03-OCT-13
Pyrene			99.5		%		60-130	03-OCT-13
Quinoline			93.7		%		60-130	03-OCT-13
WG1759220-1 MB								
Acenaphthene			<0.000050		mg/L		0.00005	03-OCT-13
Acenaphthylene			<0.000050		mg/L		0.00005	03-OCT-13
Acridine			<0.000050		mg/L		0.00005	03-OCT-13
Anthracene			<0.000050		mg/L		0.00005	03-OCT-13
Benz(a)anthracene			<0.000050		mg/L		0.00005	03-OCT-13
Benzo(a)pyrene			<0.000010		mg/L		0.00001	03-OCT-13
Benzo(b)fluoranthene			<0.000050		mg/L		0.00005	03-OCT-13
Benzo(g,h,i)perylene			<0.000050		mg/L		0.00005	03-OCT-13
Benzo(k)fluoranthene			<0.000050		mg/L		0.00005	03-OCT-13
Chrysene			<0.000050		mg/L		0.00005	03-OCT-13

Quality Control Report

Workorder: L1368607 Report Date: 07-OCT-13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-SF-MS-VA	**Water**							
Batch R2706104								
WG1759220-1 MB								
Dibenz(a,h)anthracene			<0.000050		mg/L		0.00005	03-OCT-13
Fluoranthene			<0.000050		mg/L		0.00005	03-OCT-13
Fluorene			<0.000050		mg/L		0.00005	03-OCT-13
Indeno(1,2,3-c,d)pyrene			<0.000050		mg/L		0.00005	03-OCT-13
Naphthalene			<0.000050		mg/L		0.00005	03-OCT-13
Phenanthrene			<0.000050		mg/L		0.00005	03-OCT-13
Pyrene			<0.000050		mg/L		0.00005	03-OCT-13
Quinoline			<0.000050		mg/L		0.00005	03-OCT-13
WG1759220-3 MB								
Acenaphthene			<0.000050		mg/L		0.00005	03-OCT-13
Acenaphthylene			<0.000050		mg/L		0.00005	03-OCT-13
Acridine			<0.000050		mg/L		0.00005	03-OCT-13
Anthracene			<0.000050		mg/L		0.00005	03-OCT-13
Benz(a)anthracene			<0.000050		mg/L		0.00005	03-OCT-13
Benzo(a)pyrene			<0.000010		mg/L		0.00001	03-OCT-13
Benzo(b)fluoranthene			<0.000050		mg/L		0.00005	03-OCT-13
Benzo(g,h,i)perylene			<0.000050		mg/L		0.00005	03-OCT-13
Benzo(k)fluoranthene			<0.000050		mg/L		0.00005	03-OCT-13
Chrysene			<0.000050		mg/L		0.00005	03-OCT-13
Dibenz(a,h)anthracene			<0.000050		mg/L		0.00005	03-OCT-13
Fluoranthene			<0.000050		mg/L		0.00005	03-OCT-13
Fluorene			<0.000050		mg/L		0.00005	03-OCT-13
Indeno(1,2,3-c,d)pyrene			<0.000050		mg/L		0.00005	03-OCT-13
Naphthalene			<0.000050		mg/L		0.00005	03-OCT-13
Phenanthrene			<0.000050		mg/L		0.00005	03-OCT-13
Pyrene			<0.000050		mg/L		0.00005	03-OCT-13
Quinoline			<0.000050		mg/L		0.00005	03-OCT-13
Batch R2708063								
WG1760177-2 LCS								
Acenaphthene			98.8		%		60-130	03-OCT-13
Acenaphthylene			105.8		%		60-130	03-OCT-13
Acridine			110.2		%		60-130	03-OCT-13
Anthracene			101.8		%		60-130	03-OCT-13
Benz(a)anthracene			93.6		%		60-130	03-OCT-13
Benzo(a)pyrene			99.0		%		60-130	03-OCT-13

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-SF-MS-VA	**Water**							
Batch R2708063								
WG1760177-2 LCS								
Benzo(b)fluoranthene			92.2		%		60-130	03-OCT-13
Benzo(g,h,i)perylene			105.5		%		60-130	03-OCT-13
Benzo(k)fluoranthene			104.7		%		60-130	03-OCT-13
Chrysene			103.5		%		60-130	03-OCT-13
Dibenz(a,h)anthracene			89.6		%		60-130	03-OCT-13
Fluoranthene			105.3		%		60-130	03-OCT-13
Fluorene			101.8		%		60-130	03-OCT-13
Indeno(1,2,3-c,d)pyrene			93.8		%		60-130	03-OCT-13
Naphthalene			100.5		%		50-130	03-OCT-13
Phenanthrene			109.3		%		60-130	03-OCT-13
Pyrene			103.5		%		60-130	03-OCT-13
Quinoline			100.2		%		60-130	03-OCT-13
WG1760177-4 LCS								
Acenaphthene			94.5		%		60-130	04-OCT-13
Acenaphthylene			103.8		%		60-130	04-OCT-13
Acridine			106.4		%		60-130	04-OCT-13
Anthracene			100.8		%		60-130	04-OCT-13
Benz(a)anthracene			98.5		%		60-130	04-OCT-13
Benzo(a)pyrene			99.1		%		60-130	04-OCT-13
Benzo(b)fluoranthene			94.9		%		60-130	04-OCT-13
Benzo(g,h,i)perylene			99.1		%		60-130	04-OCT-13
Benzo(k)fluoranthene			99.9		%		60-130	04-OCT-13
Chrysene			100.6		%		60-130	04-OCT-13
Dibenz(a,h)anthracene			90.8		%		60-130	04-OCT-13
Fluoranthene			103.1		%		60-130	04-OCT-13
Fluorene			101.3		%		60-130	04-OCT-13
Indeno(1,2,3-c,d)pyrene			93.1		%		60-130	04-OCT-13
Naphthalene			100.4		%		50-130	04-OCT-13
Phenanthrene			107.1		%		60-130	04-OCT-13
Pyrene			101.1		%		60-130	04-OCT-13
Quinoline			98.4		%		60-130	04-OCT-13
WG1760177-1 MB								
Acenaphthene			<0.000050		mg/L		0.00005	03-OCT-13
Acenaphthylene			<0.000050		mg/L		0.00005	03-OCT-13
Acridine			<0.000050		mg/L		0.00005	03-OCT-13

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-SF-MS-VA	**Water**							
Batch R2708063								
WG1760177-1 MB								
Anthracene			<0.000050		mg/L		0.00005	03-OCT-13
Benz(a)anthracene			<0.000050		mg/L		0.00005	03-OCT-13
Benzo(a)pyrene			<0.000010		mg/L		0.00001	03-OCT-13
Benzo(b)fluoranthene			<0.000050		mg/L		0.00005	03-OCT-13
Benzo(g,h,i)perylene			<0.000050		mg/L		0.00005	03-OCT-13
Benzo(k)fluoranthene			<0.000050		mg/L		0.00005	03-OCT-13
Chrysene			<0.000050		mg/L		0.00005	03-OCT-13
Dibenz(a,h)anthracene			<0.000050		mg/L		0.00005	03-OCT-13
Fluoranthene			<0.000050		mg/L		0.00005	03-OCT-13
Fluorene			<0.000050		mg/L		0.00005	03-OCT-13
Indeno(1,2,3-c,d)pyrene			<0.000050		mg/L		0.00005	03-OCT-13
Naphthalene			<0.000050		mg/L		0.00005	03-OCT-13
Phenanthrene			<0.000050		mg/L		0.00005	03-OCT-13
Pyrene			<0.000050		mg/L		0.00005	03-OCT-13
Quinoline			<0.000050		mg/L		0.00005	03-OCT-13
WG1760177-3 MB								
Acenaphthene			<0.000050		mg/L		0.00005	04-OCT-13
Acenaphthylene			<0.000050		mg/L		0.00005	04-OCT-13
Acridine			<0.000050		mg/L		0.00005	04-OCT-13
Anthracene			<0.000050		mg/L		0.00005	04-OCT-13
Benz(a)anthracene			<0.000050		mg/L		0.00005	04-OCT-13
Benzo(a)pyrene			<0.000010		mg/L		0.00001	04-OCT-13
Benzo(b)fluoranthene			<0.000050		mg/L		0.00005	04-OCT-13
Benzo(g,h,i)perylene			<0.000050		mg/L		0.00005	04-OCT-13
Benzo(k)fluoranthene			<0.000050		mg/L		0.00005	04-OCT-13
Chrysene			<0.000050		mg/L		0.00005	04-OCT-13
Dibenz(a,h)anthracene			<0.000050		mg/L		0.00005	04-OCT-13
Fluoranthene			<0.000050		mg/L		0.00005	04-OCT-13
Fluorene			<0.000050		mg/L		0.00005	04-OCT-13
Indeno(1,2,3-c,d)pyrene			<0.000050		mg/L		0.00005	04-OCT-13
Naphthalene			<0.000050		mg/L		0.00005	04-OCT-13
Phenanthrene			<0.000050		mg/L		0.00005	04-OCT-13
Pyrene			<0.000050		mg/L		0.00005	04-OCT-13
Quinoline			<0.000050		mg/L		0.00005	04-OCT-13

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1368607 were received on 25-SEP-13 16:00.

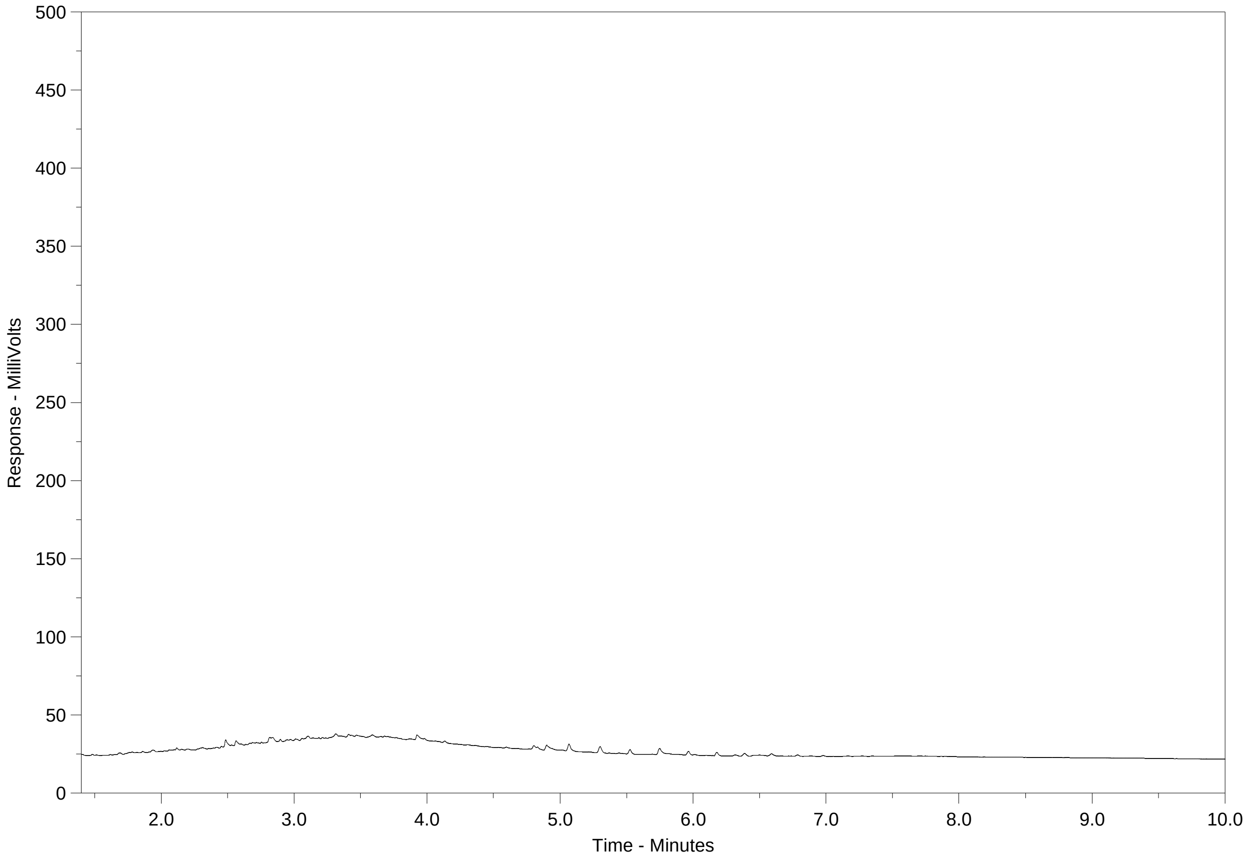
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-6
Client Sample ID: MW04-6-130924



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F

← Gasoline → ← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

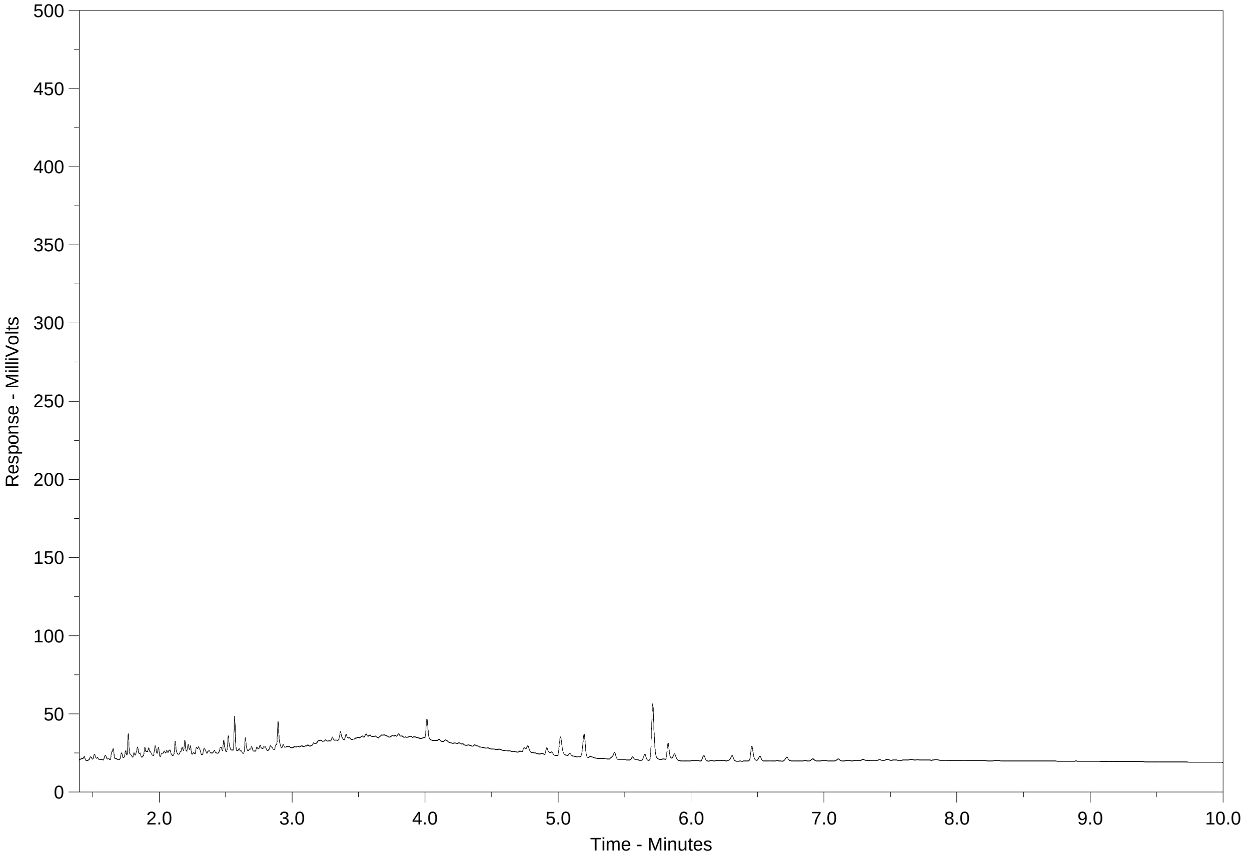
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-7
Client Sample ID: MW04-5-130924



nC10	nC19	nC32
174°C 346°F	330°C 626°F	467°C 873°F

← Gasoline → ← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

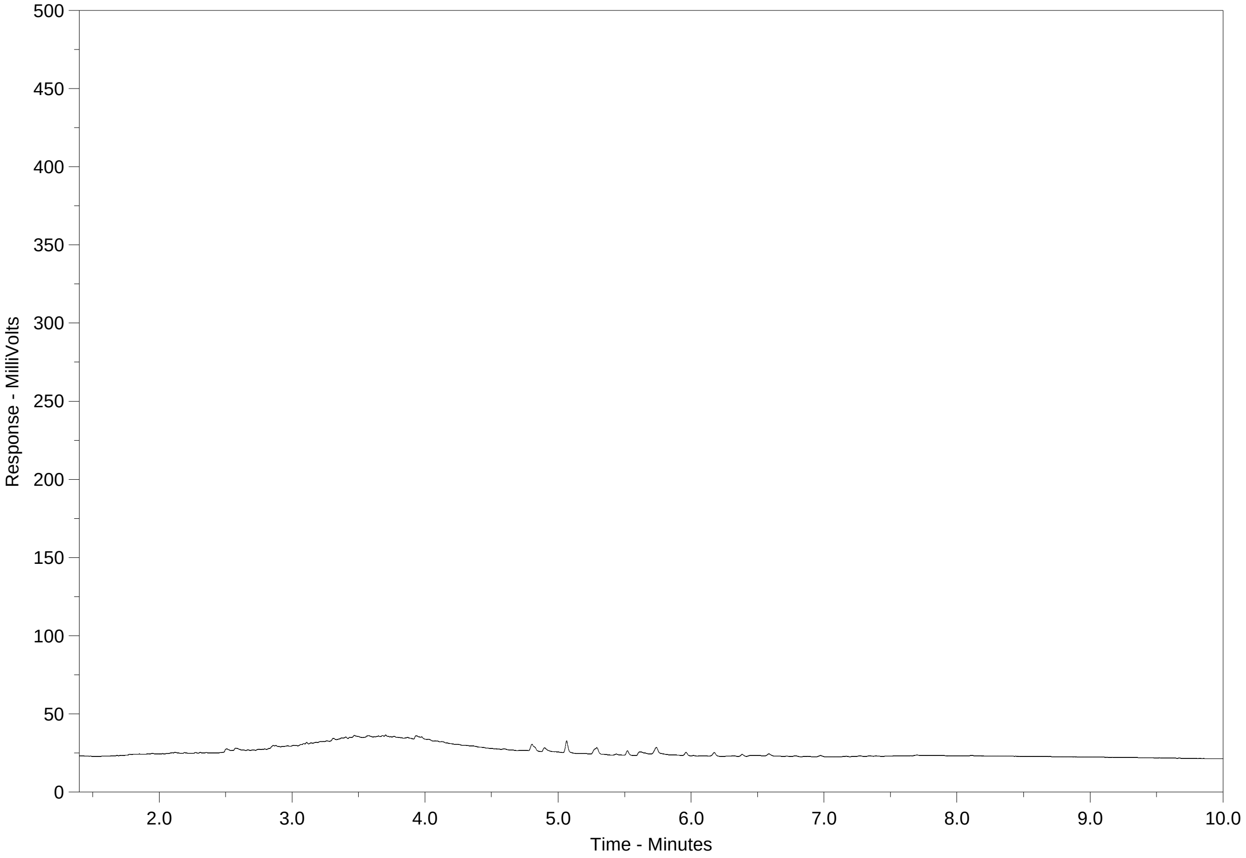
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-8
Client Sample ID: MW04-4-130924



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F

← Gasoline → ← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

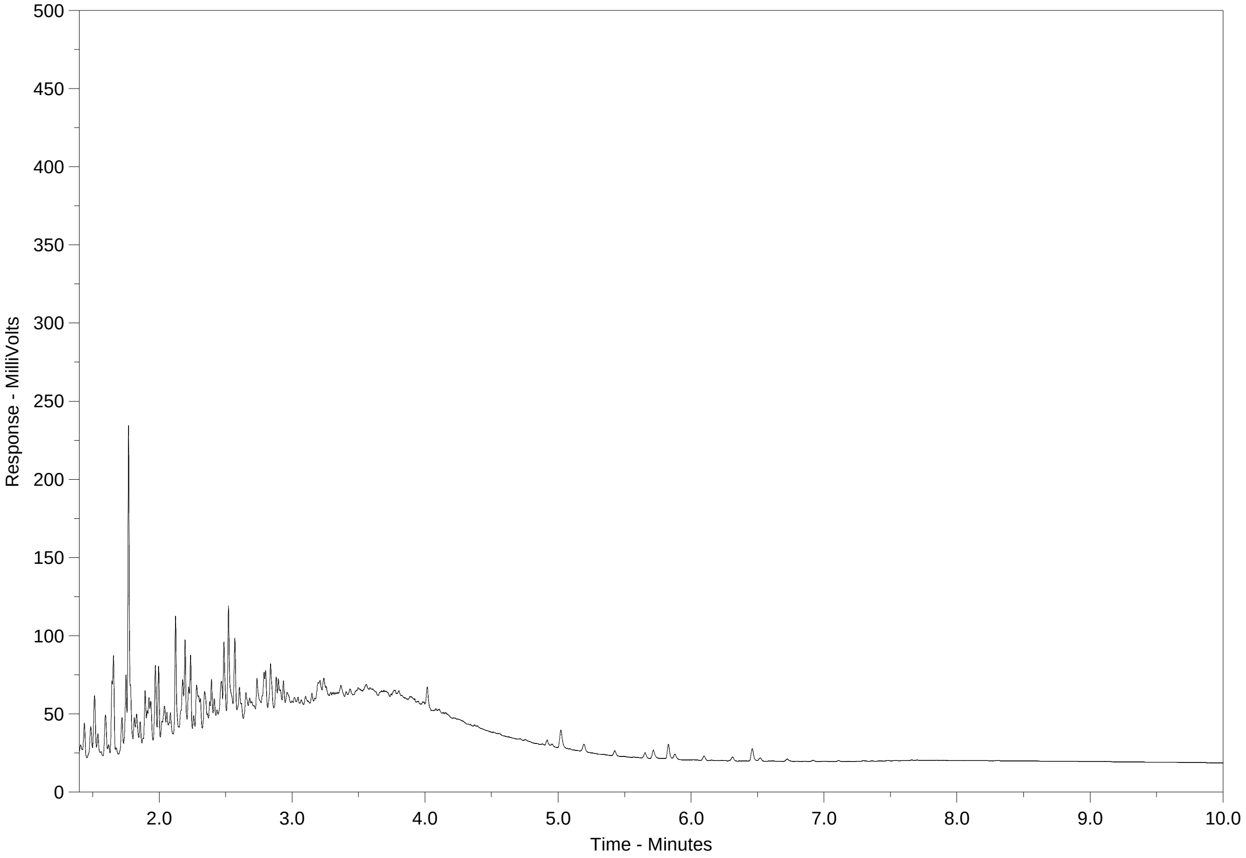
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-9
Client Sample ID: MW03-11-130924



nC10	nC19	nC32
174°C 346°F	330°C 626°F	467°C 873°F

← Gasoline → ←——— Motor Oils / Lube Oils / Grease ———→
←——— Diesel / Jet Fuels ———→

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

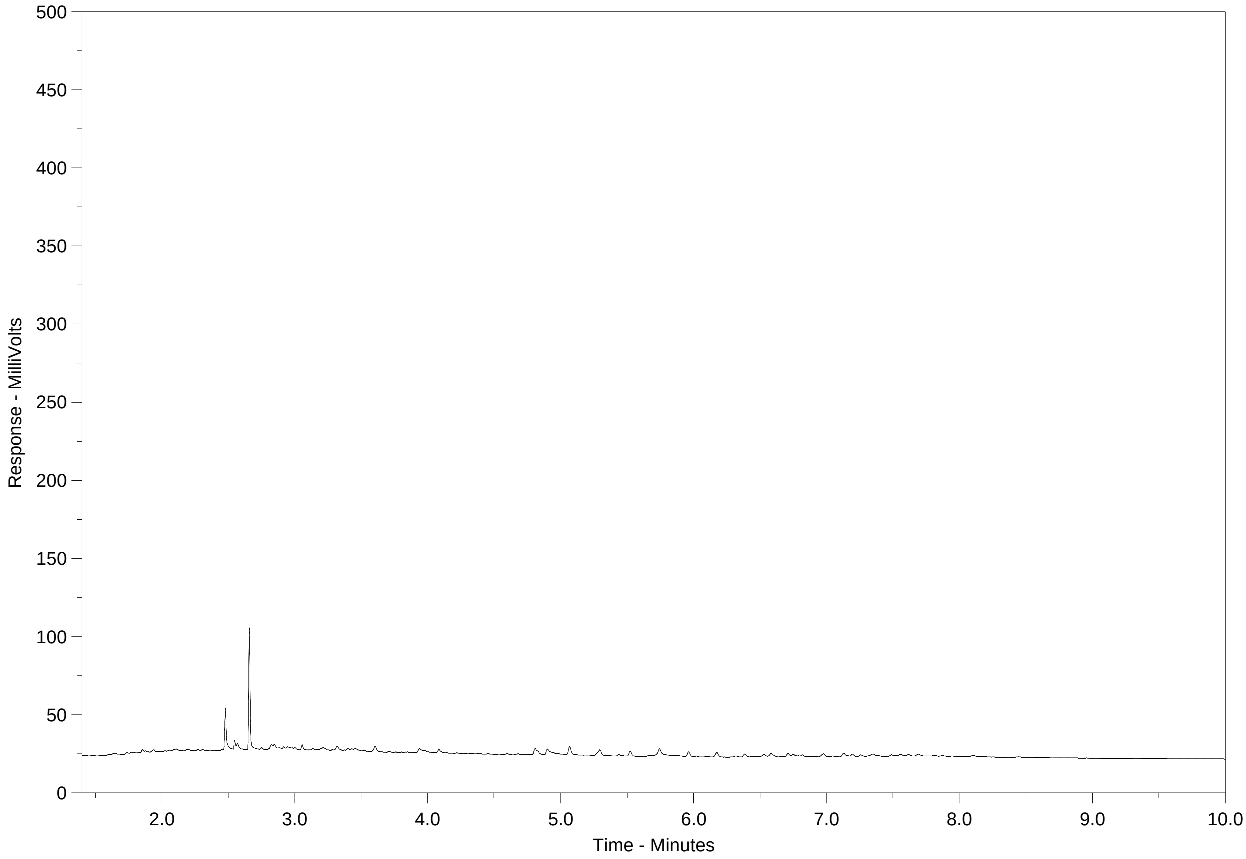
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-10
Client Sample ID: MW03-10D-130924



nC10	nC19	nC32
174°C 346°F	330°C 626°F	467°C 873°F

←— Gasoline —→ ←— Motor Oils / Lube Oils / Grease —→
←— Diesel / Jet Fuels —→

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

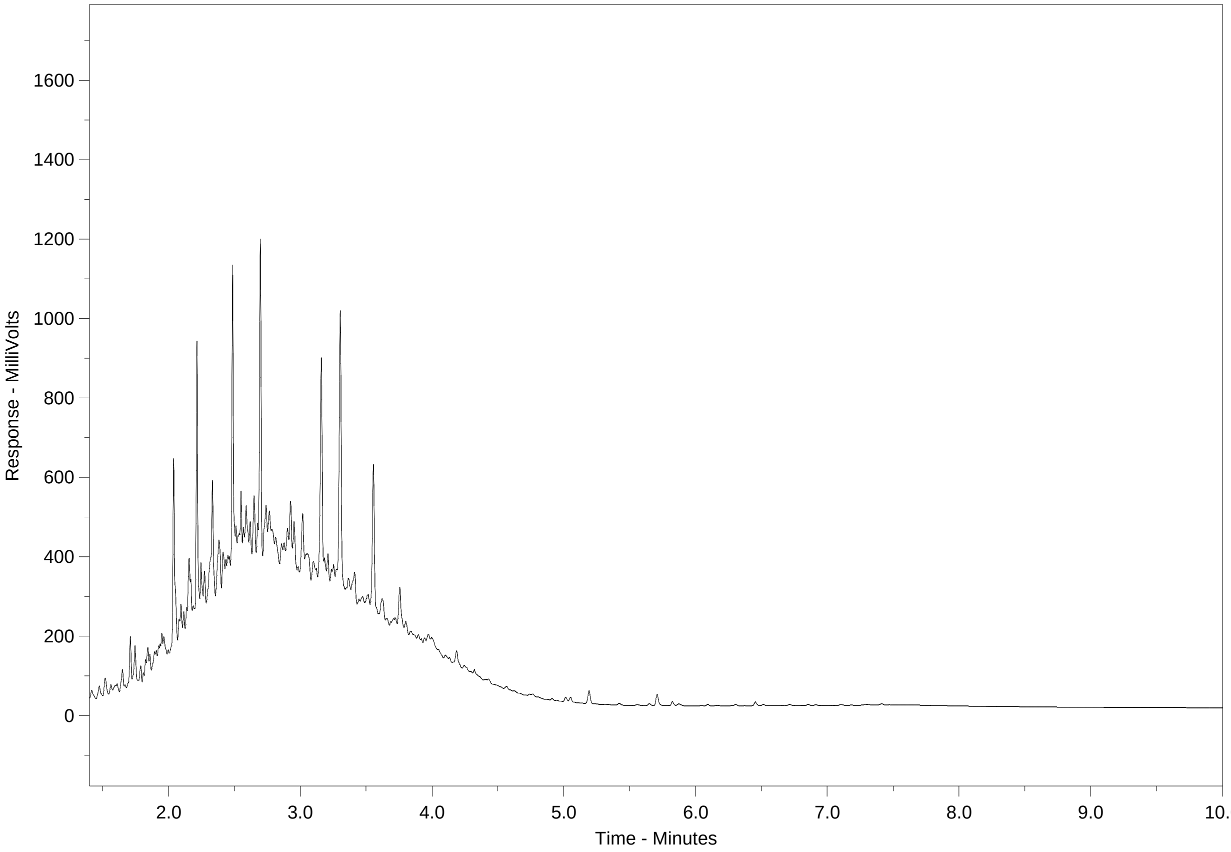
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-11
Client Sample ID: MW03-10-130924



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
←— Gasoline —→	←—— Motor Oils / Lube Oils / Grease ——→	
←—— Diesel / Jet Fuels ——→		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

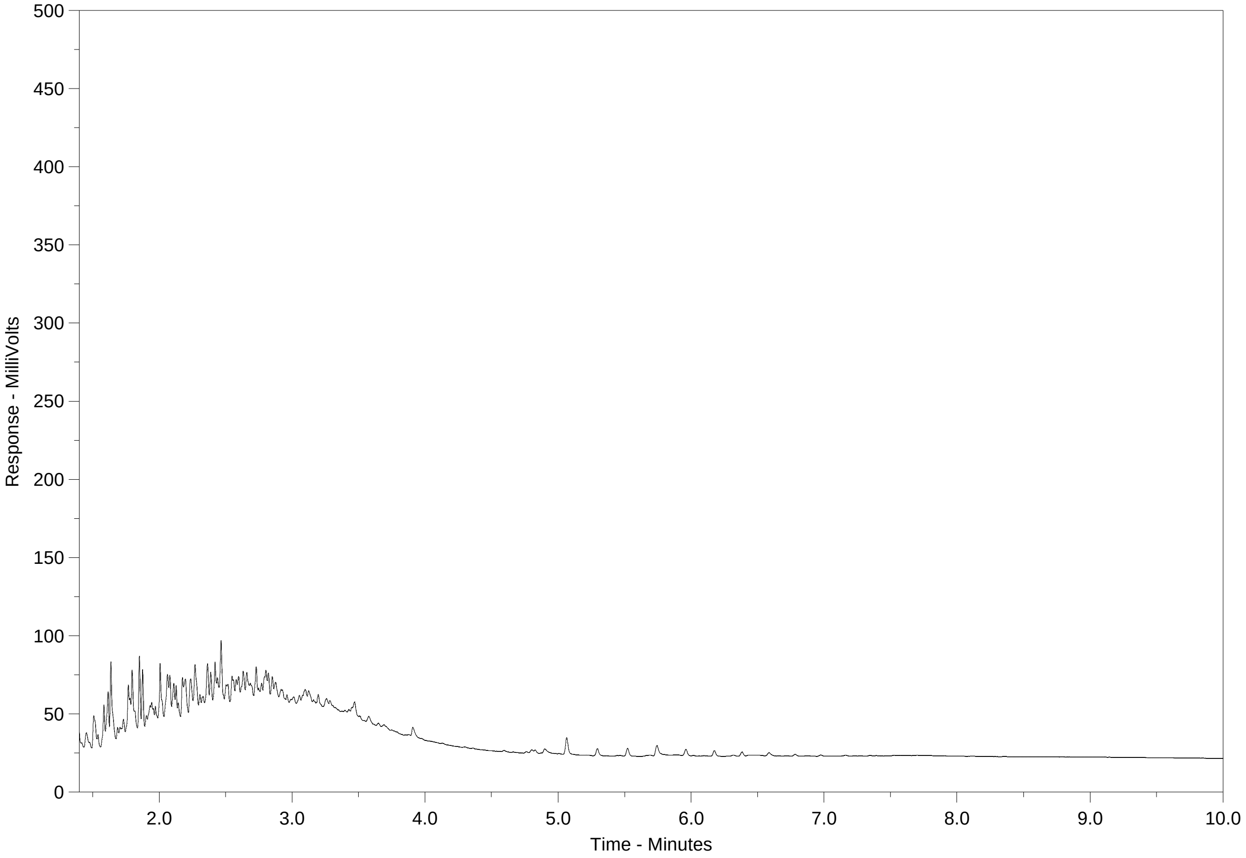
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-12
Client Sample ID: MW03-8-130924



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F

←— Gasoline —→ ←— Motor Oils / Lube Oils / Grease —→
←— Diesel / Jet Fuels —→

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

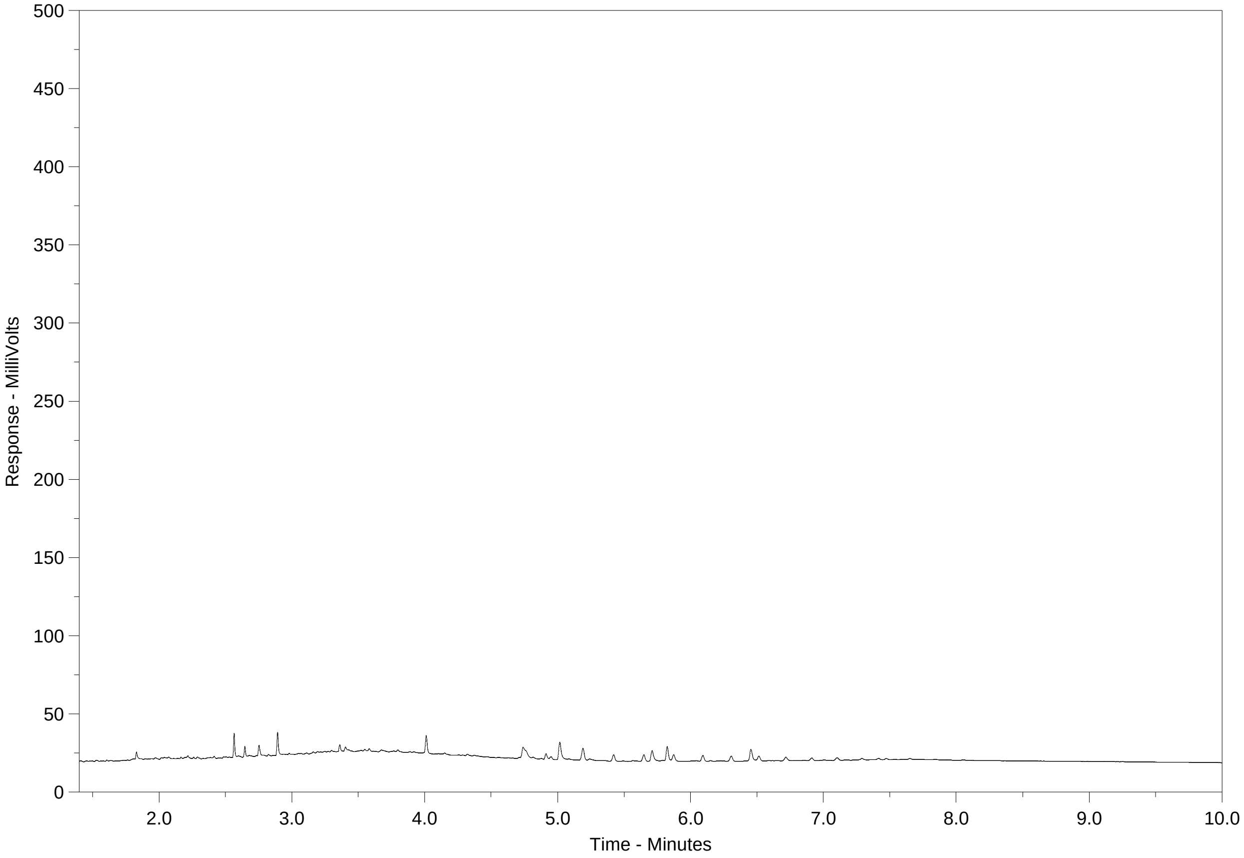
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-27
Client Sample ID: MW08-8-130925



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F
← Gasoline →	← Motor Oils / Lube Oils / Grease →	
← Diesel / Jet Fuels →		

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

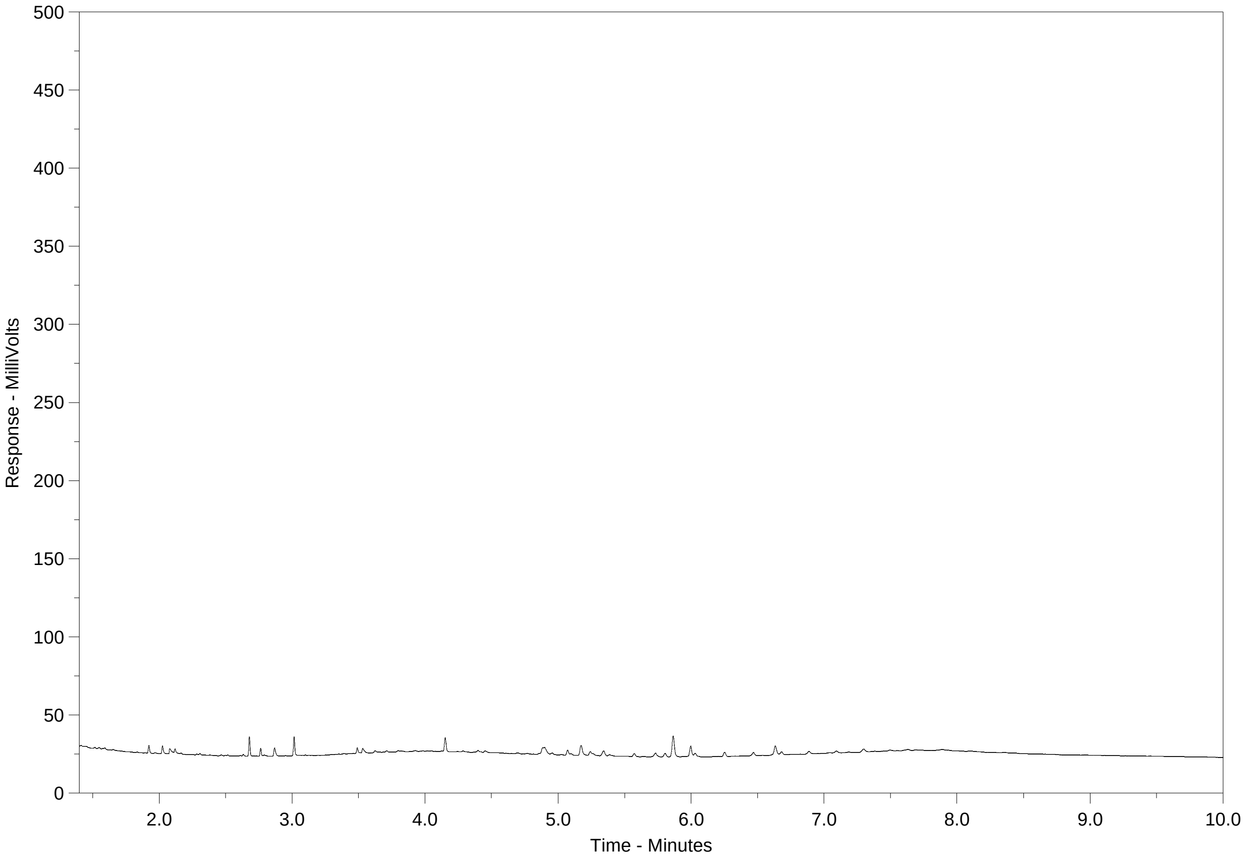
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-28
Client Sample ID: MW08-6-130925



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F

← Gasoline → ← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

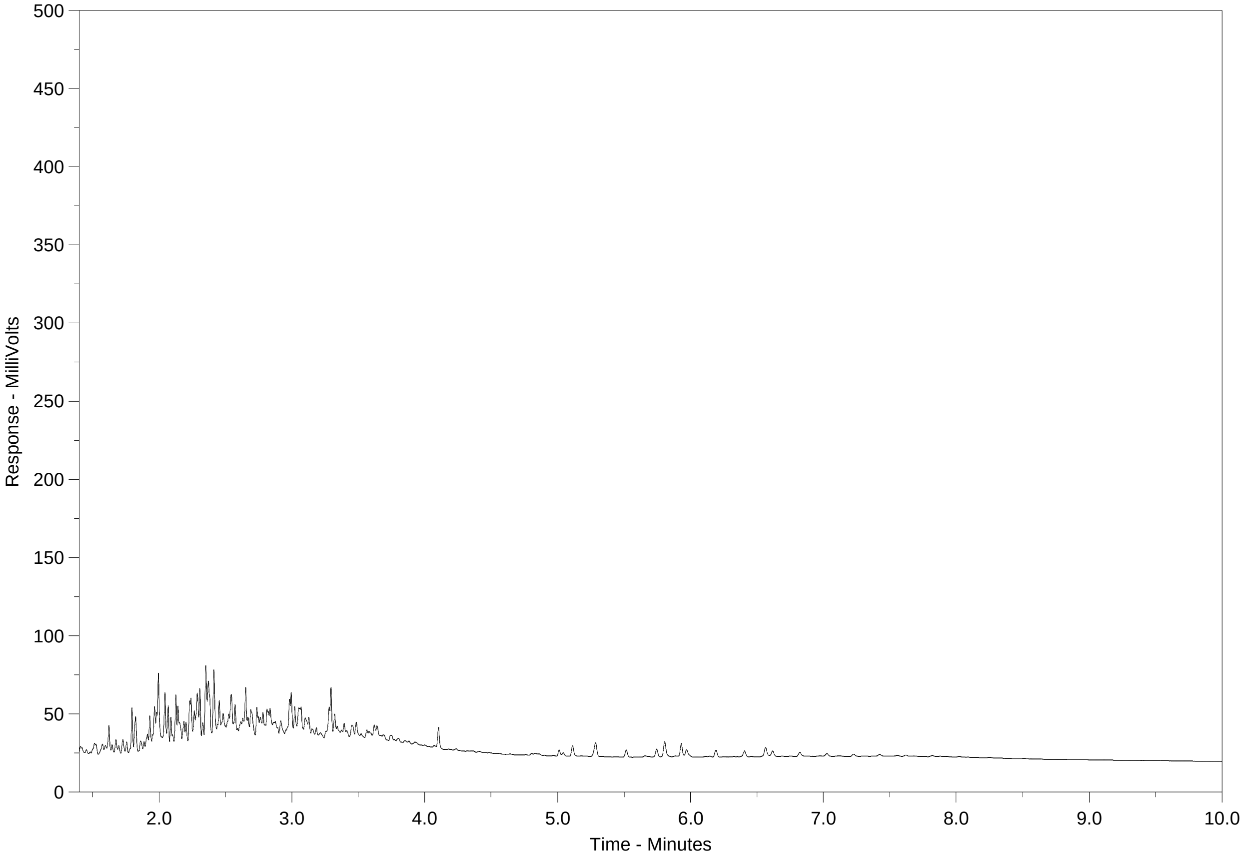
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-29
Client Sample ID: MW01-21-130925



nC10	nC19	nC32
174°C 346°F	330°C 626°F	467°C 873°F

← Gasoline →
← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

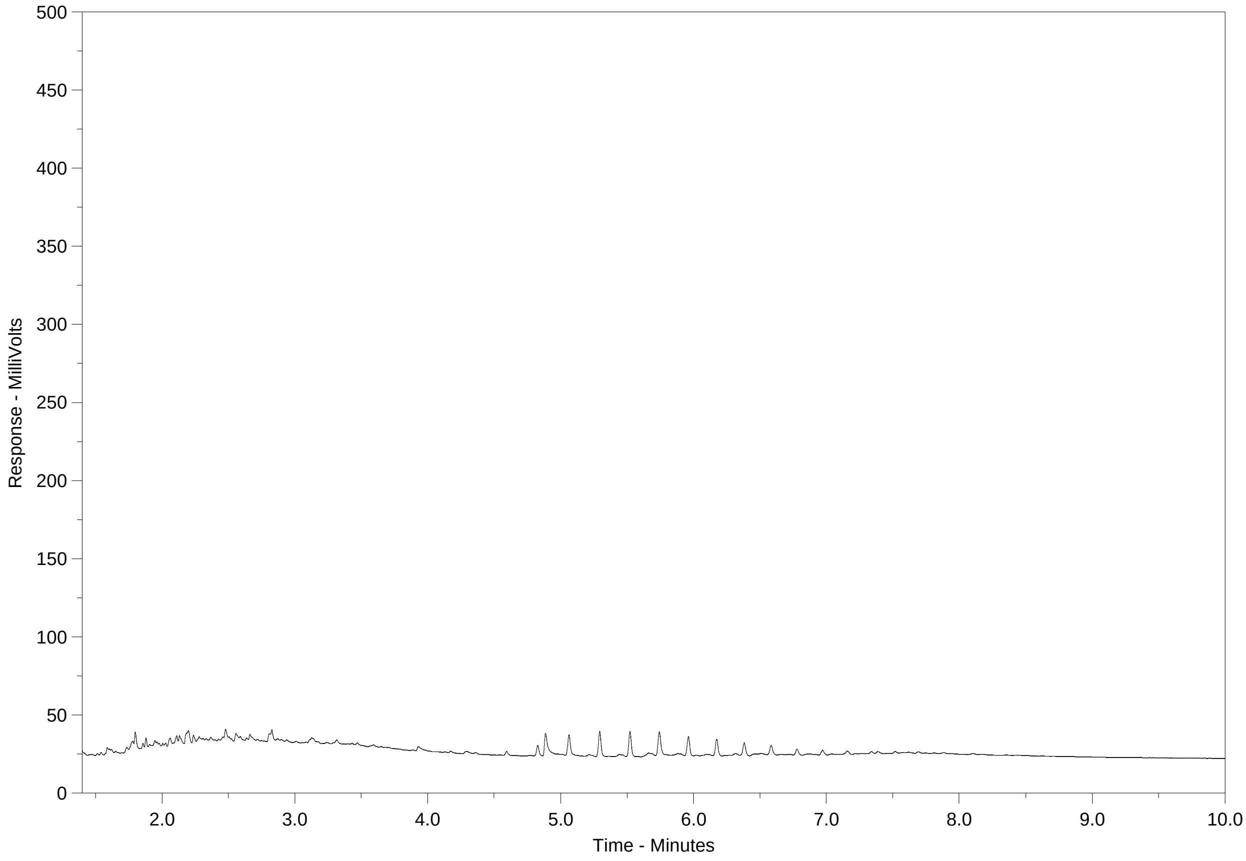
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-30
Client Sample ID: MW08-5-130925



nC10	nC19	nC32
174°C 346°F	330°C 626°F	467°C 873°F

← Gasoline → ← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

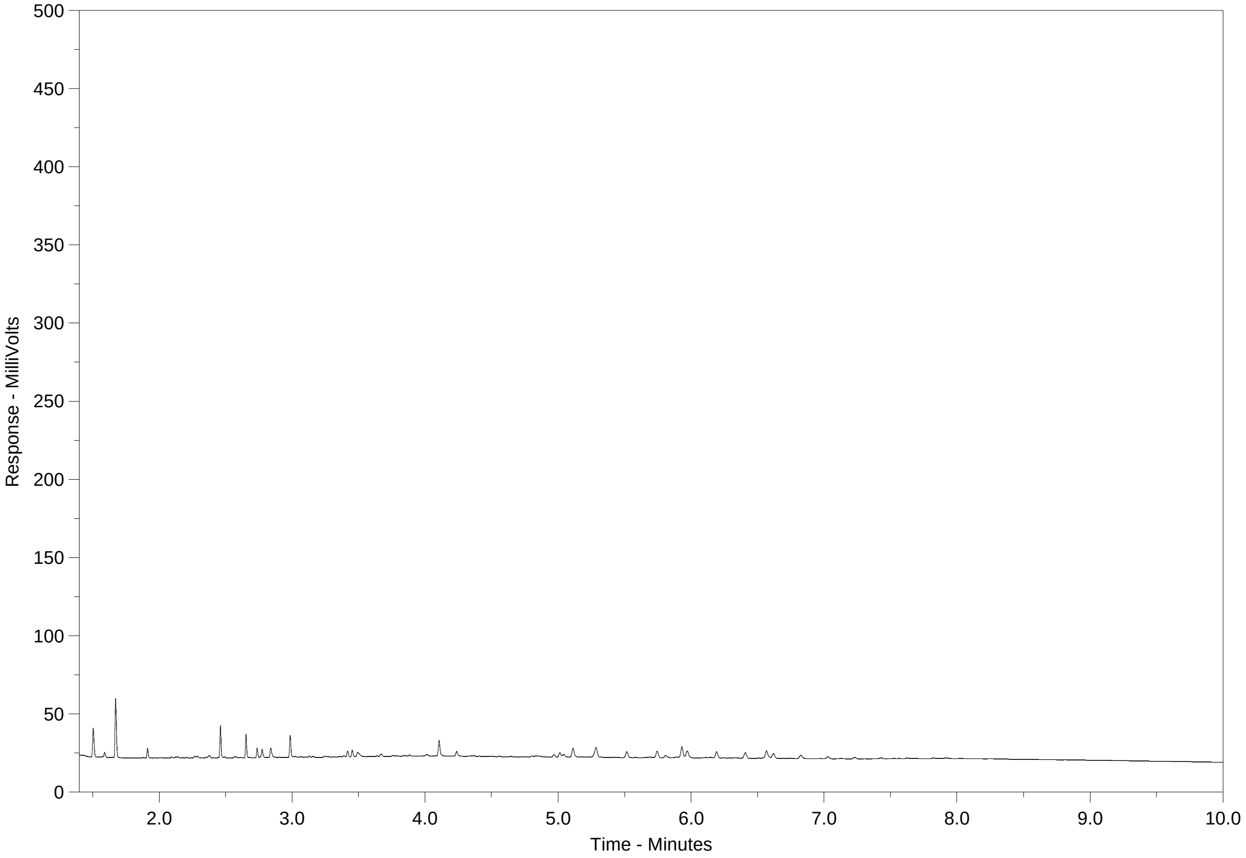
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-31
Client Sample ID: MW08-7-130925



nC10	nC19	nC32
174°C 346°F	330°C 626°F	467°C 873°F

←— Gasoline —→ ←————— Motor Oils / Lube Oils / Grease —————→
←———— Diesel / Jet Fuels ————→

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

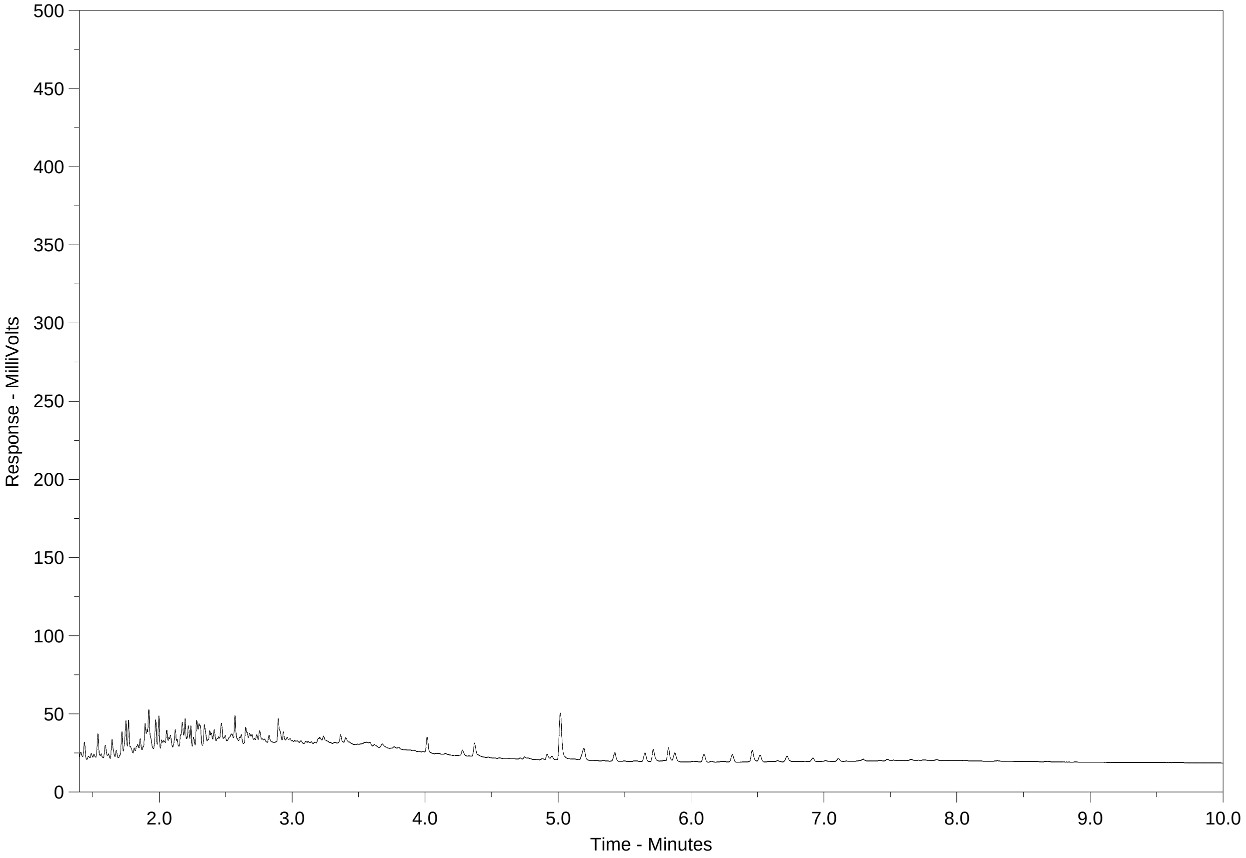
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-32
Client Sample ID: MW04-2-130925



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F

← Gasoline → ← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

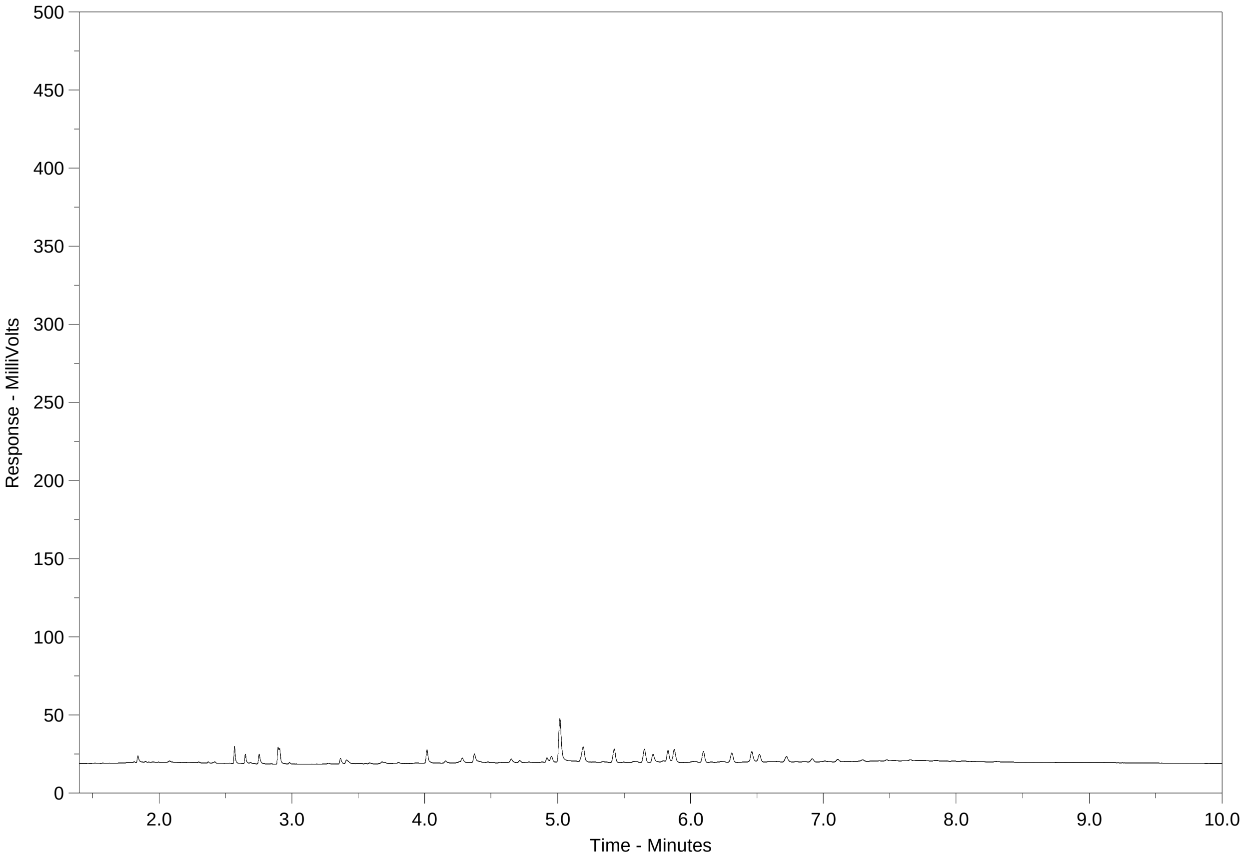
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-33
Client Sample ID: MW01-19-130925



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F

←— Gasoline —→ ←—— Motor Oils / Lube Oils / Grease ——→
←—— Diesel / Jet Fuels ——→

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

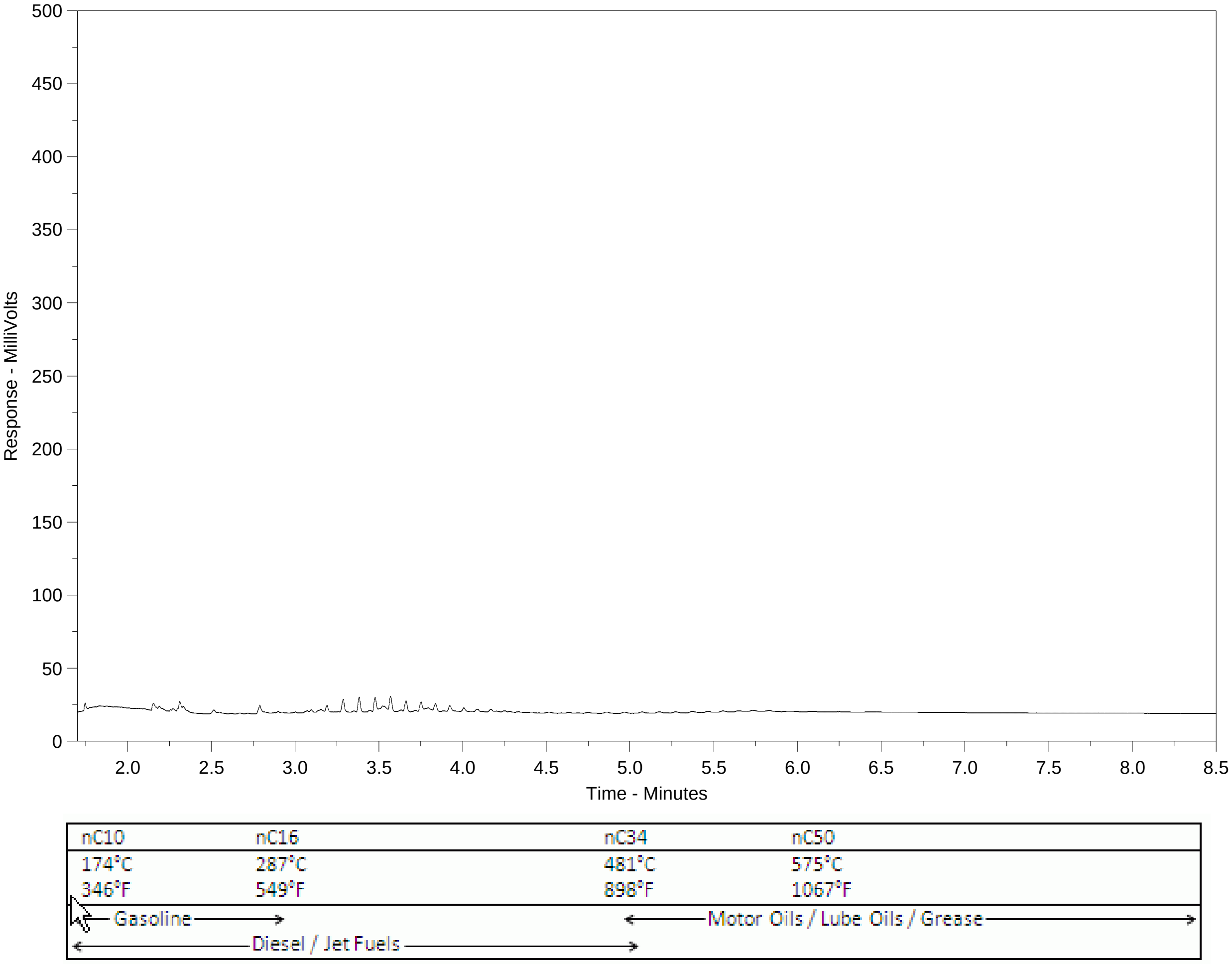
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

CCME F2F4 Hydrocarbon Distribution Report

ALS Sample ID: L1368607-C-33
Client Sample ID: MW01-19-130925



The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

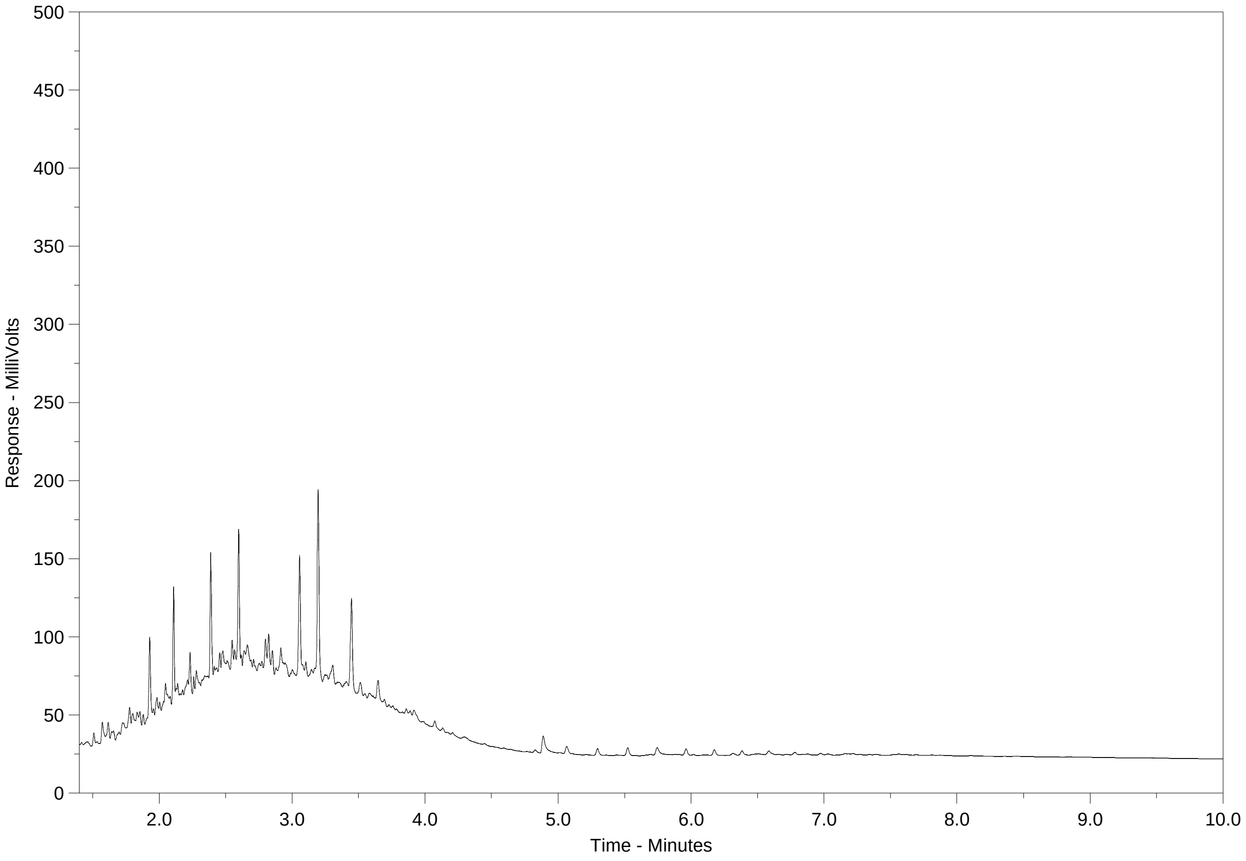
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at left.

Note: This chromatogram was produced using GC conditions that are specific to the CCME F2-F4 method (December 2007 version). Chromatograms generated using this method will resemble those found in the ALS-Vancouver HDR library, though they will appear compressed as the F2-F4 analysis covers a broader range of boiling points. The HDR library can be found at www.alsglobal.com.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-34
Client Sample ID: MW01-17D-130925



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F

← Gasoline → ← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

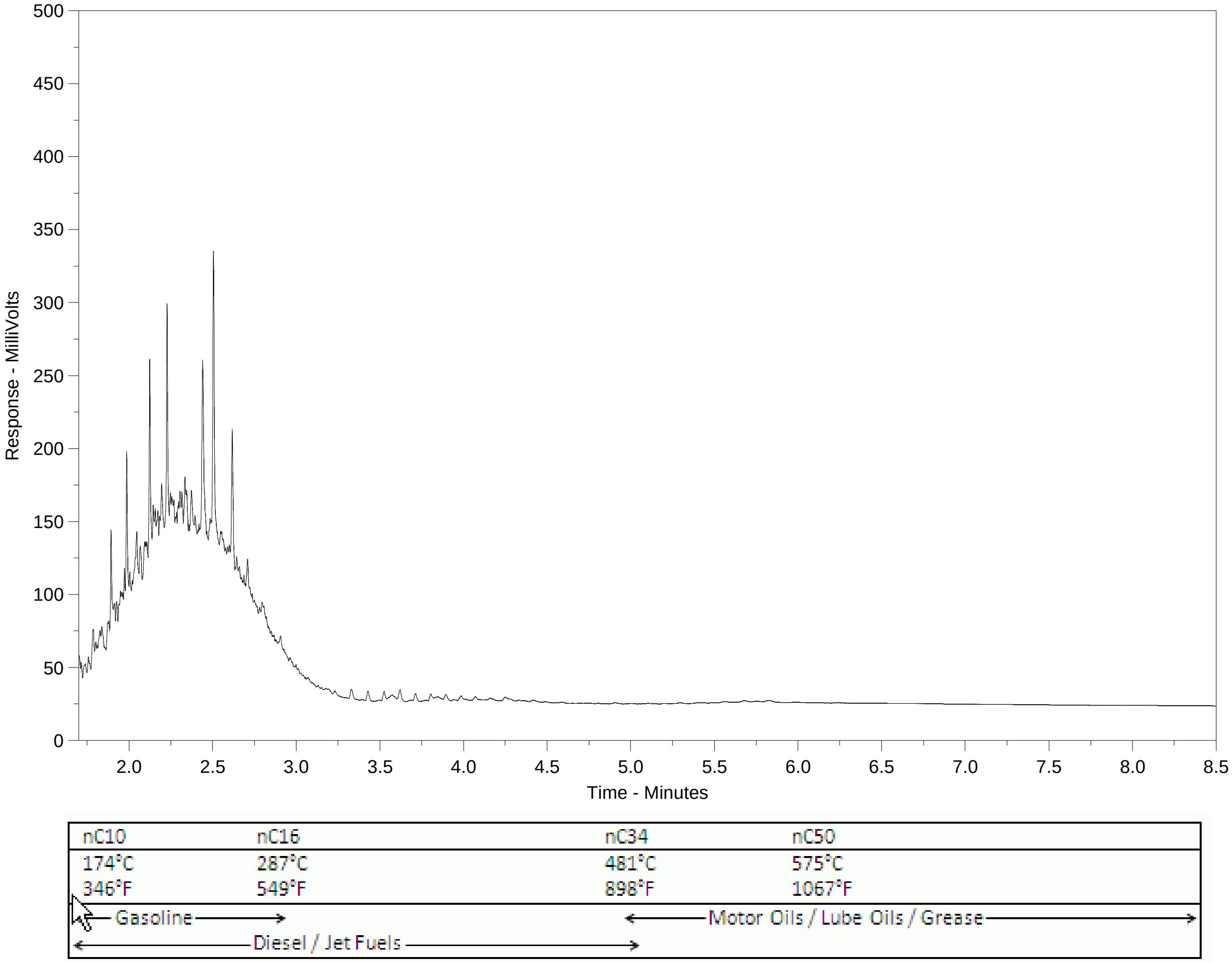
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

CCME F2F4 Hydrocarbon Distribution Report

ALS Sample ID: L1368607-C-34
Client Sample ID: MW01-17D-130925



The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

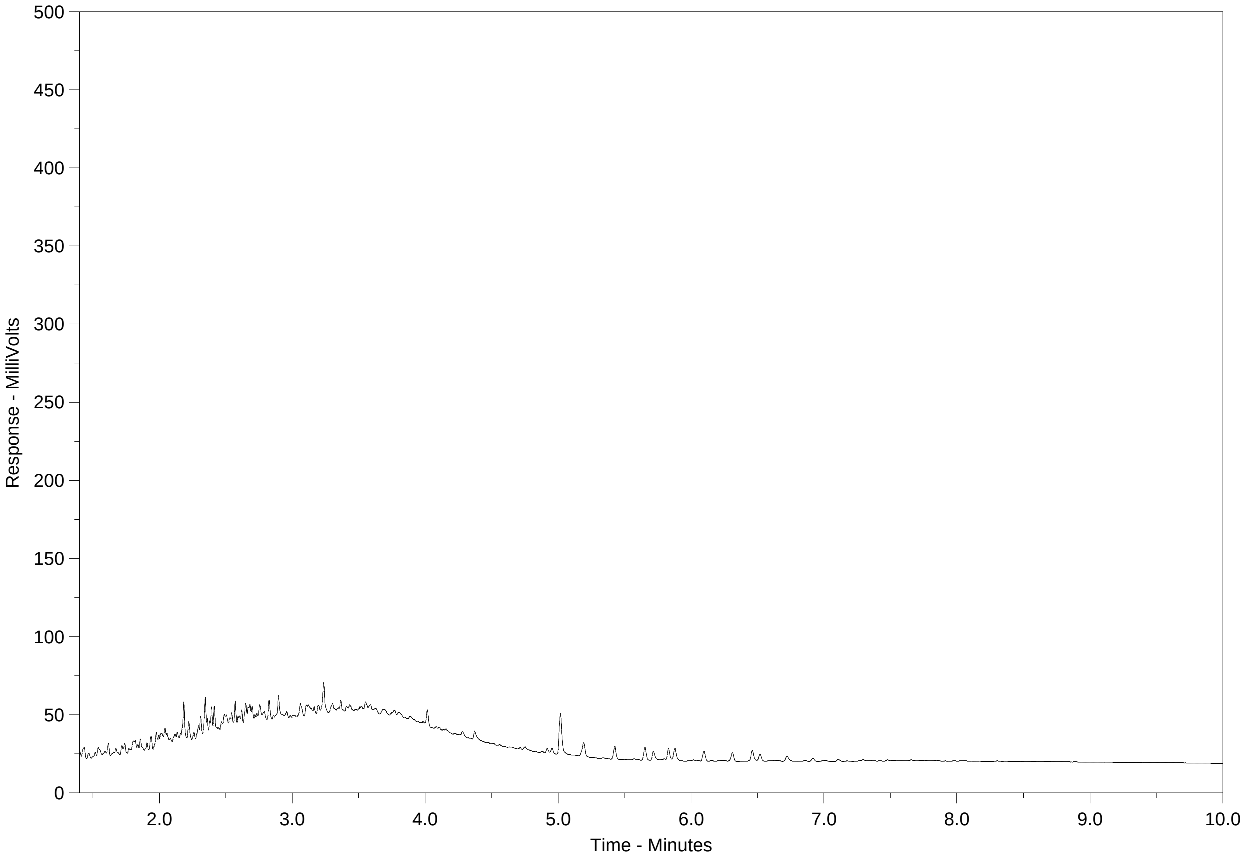
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at left.

Note: This chromatogram was produced using GC conditions that are specific to the CCME F2-F4 method (December 2007 version). Chromatograms generated using this method will resemble those found in the ALS-Vancouver HDR library, though they will appear compressed as the F2-F4 analysis covers a broader range of boiling points. The HDR library can be found at www.alsglobal.com.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-35
Client Sample ID: MW06-2-130925



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F

←— Gasoline—→ ←——— Motor Oils / Lube Oils / Grease——→
←——— Diesel / Jet Fuels———→

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

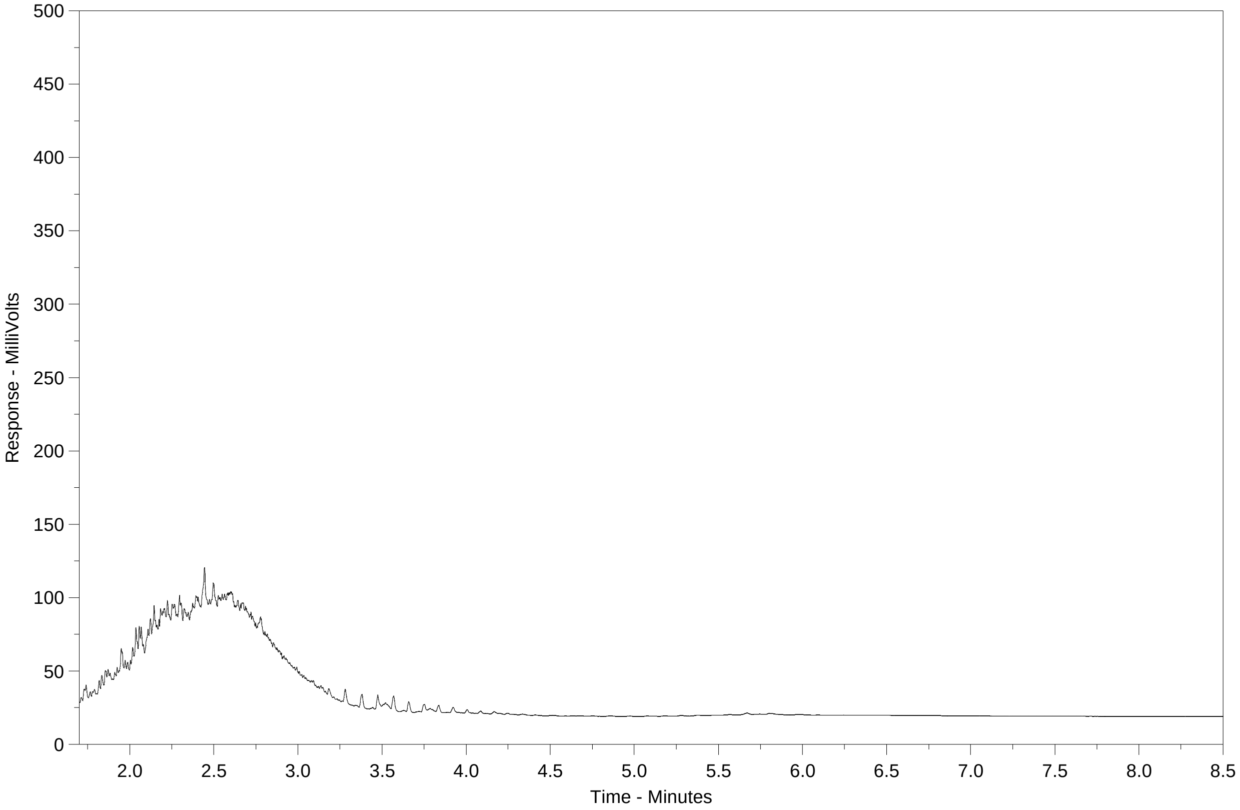
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

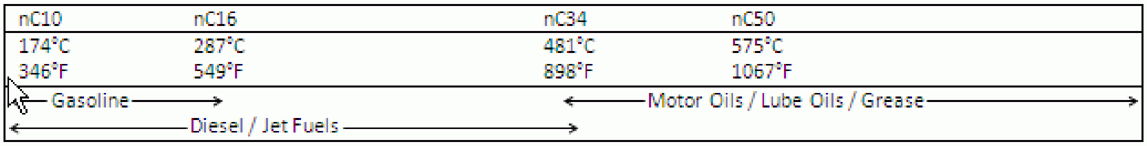
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

CCME F2F4 Hydrocarbon Distribution Report

ALS Sample ID: L1368607-C-35
Client Sample ID: MW06-2-130925





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

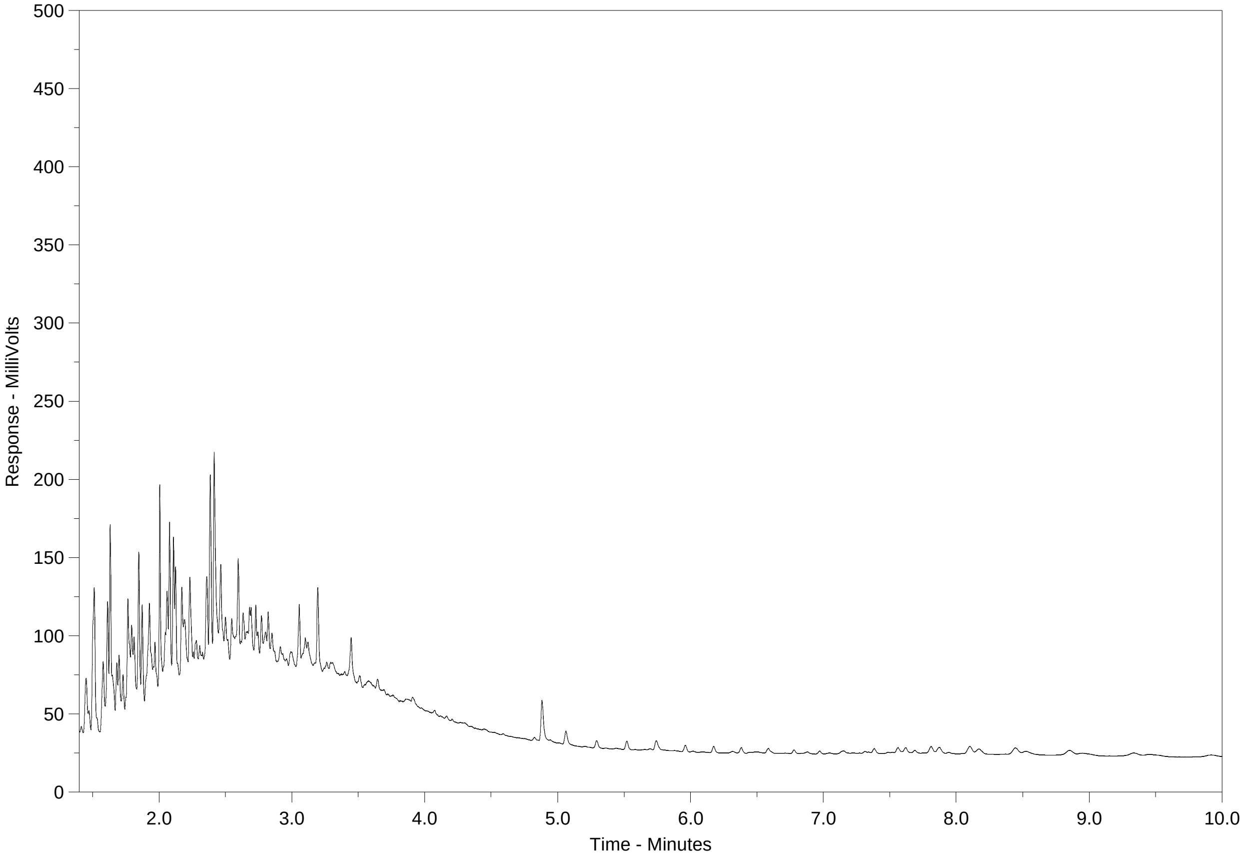
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at left.

Note: This chromatogram was produced using GC conditions that are specific to the CCME F2-F4 method (December 2007 version). Chromatograms generated using this method will resemble those found in the ALS-Vancouver HDR library, though they will appear compressed as the F2-F4 analysis covers a broader range of boiling points. The HDR library can be found at www.alsglobal.com.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-36
Client Sample ID: AS-22-130925



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F

←— Gasoline —→ ←— Motor Oils / Lube Oils / Grease —→
←— Diesel / Jet Fuels —→

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

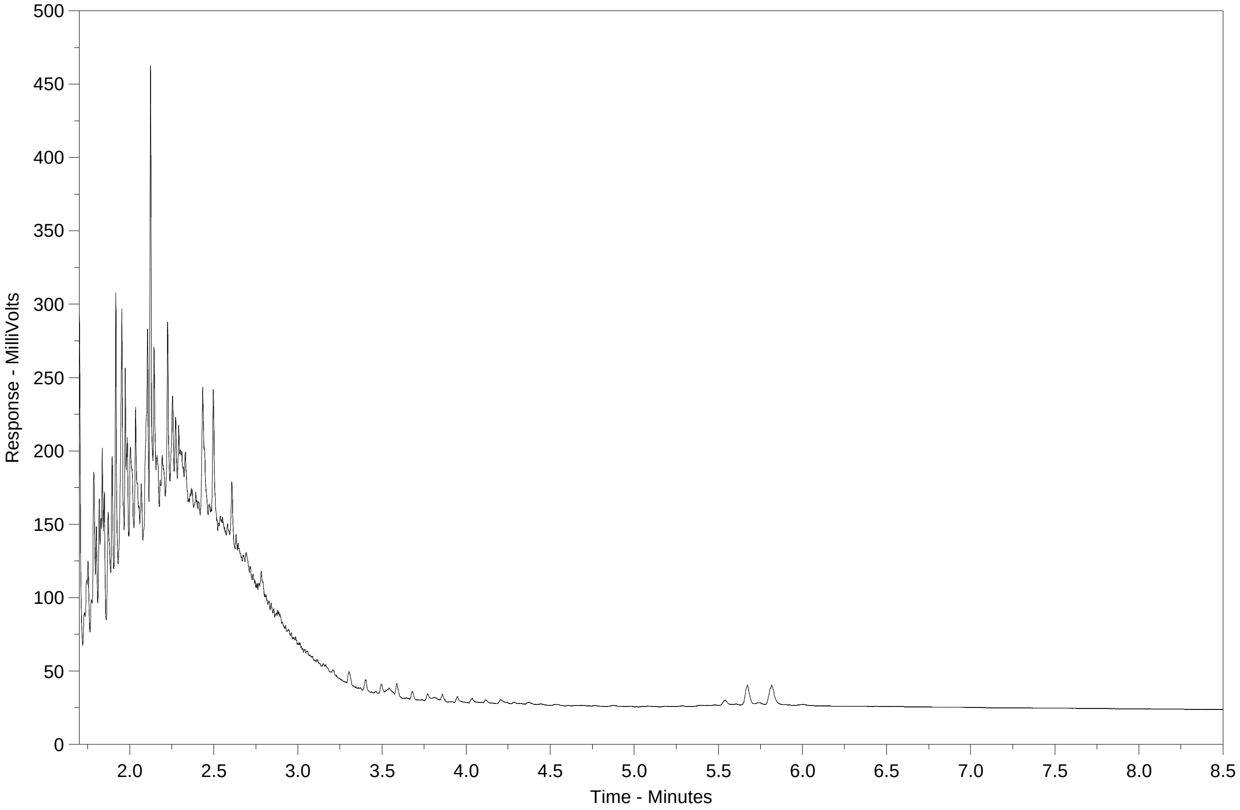
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

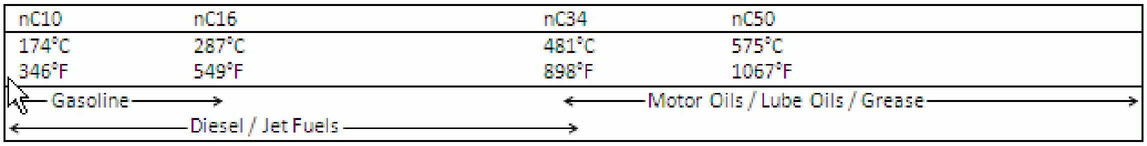
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

CCME F2F4 Hydrocarbon Distribution Report

ALS Sample ID: L1368607-C-36
Client Sample ID: AS-22-130925





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

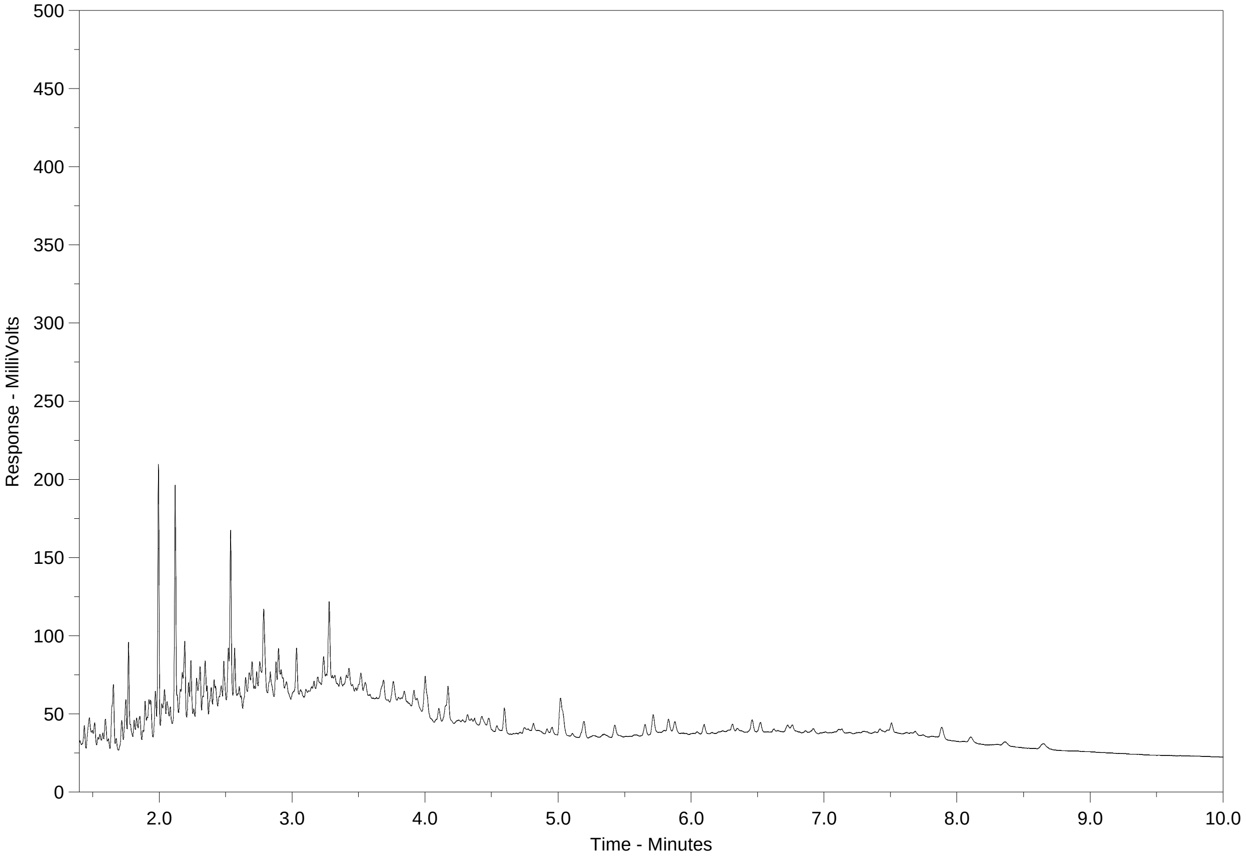
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at left.

Note: This chromatogram was produced using GC conditions that are specific to the CCME F2-F4 method (December 2007 version). Chromatograms generated using this method will resemble those found in the ALS-Vancouver HDR library, though they will appear compressed as the F2-F4 analysis covers a broader range of boiling points. The HDR library can be found at www.alsglobal.com.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-37
Client Sample ID: AS-11-130925



nC10	nC19	nC32
174°C 346°F	330°C 626°F	467°C 873°F

← Gasoline → ← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

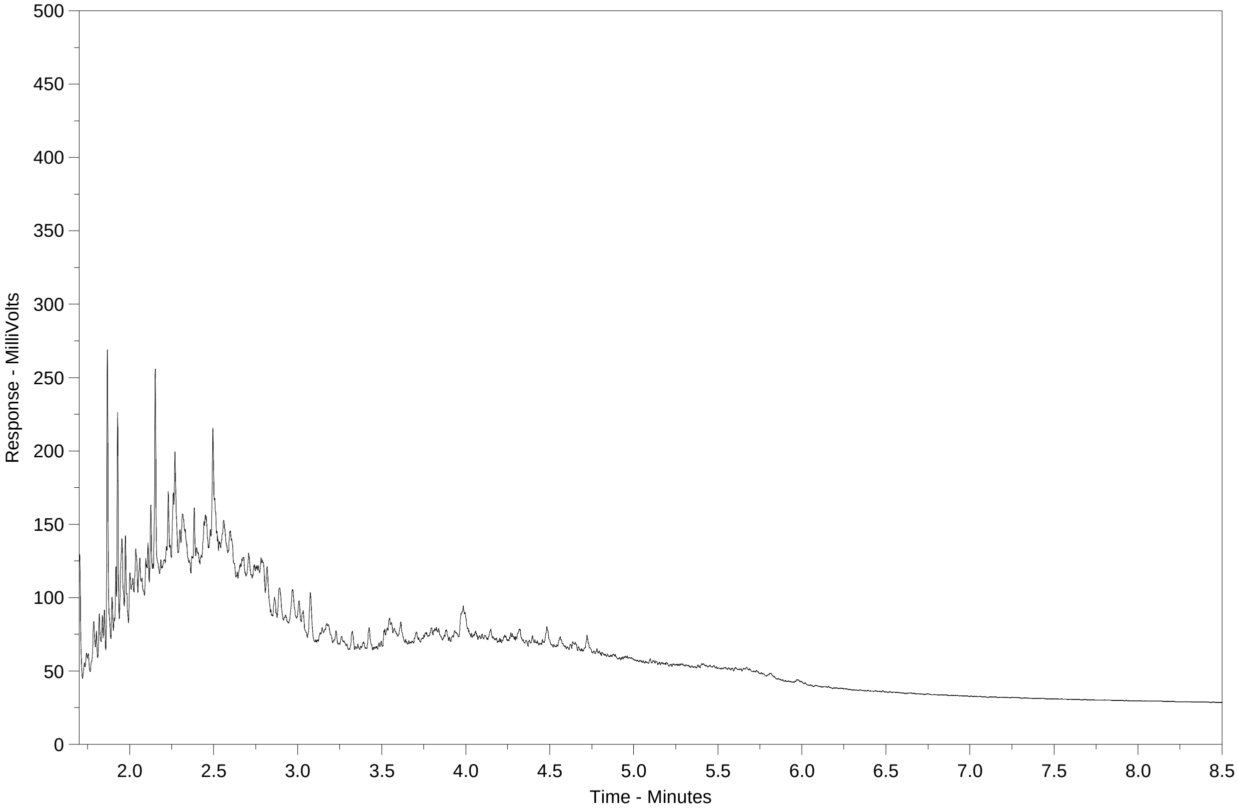
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

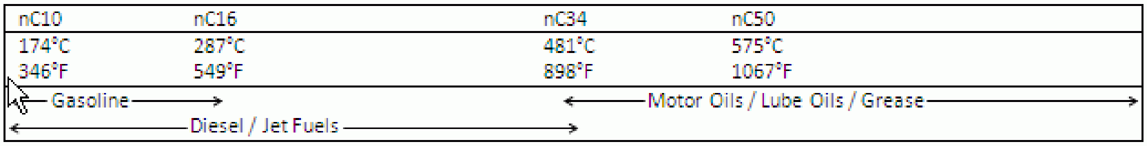
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

CCME F2F4 Hydrocarbon Distribution Report

ALS Sample ID: L1368607-C-37
Client Sample ID: AS-11-130925





nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

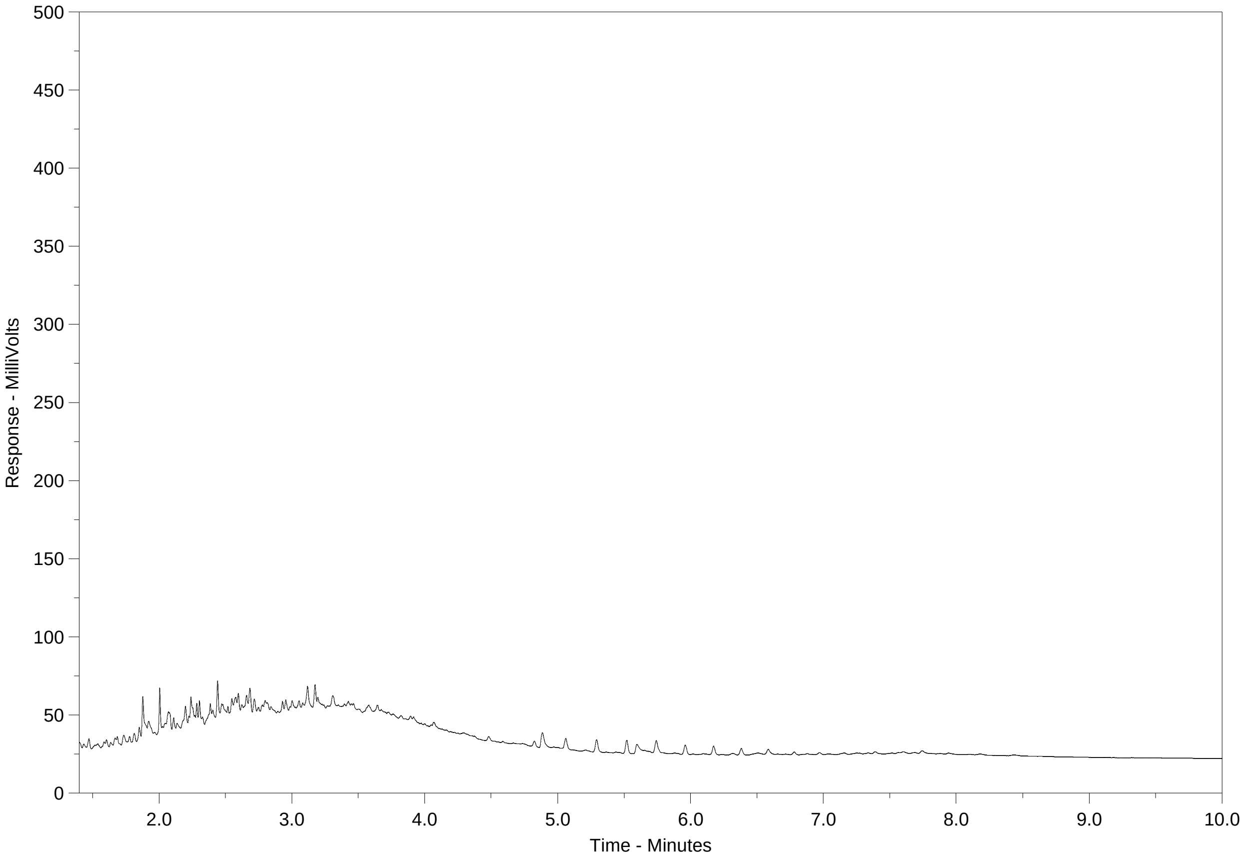
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at left.

Note: This chromatogram was produced using GC conditions that are specific to the CCME F2-F4 method (December 2007 version). Chromatograms generated using this method will resemble those found in the ALS-Vancouver HDR library, though they will appear compressed as the F2-F4 analysis covers a broader range of boiling points. The HDR library can be found at www.alsglobal.com.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-38
Client Sample ID: MWA-130925



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F

← Gasoline →
← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

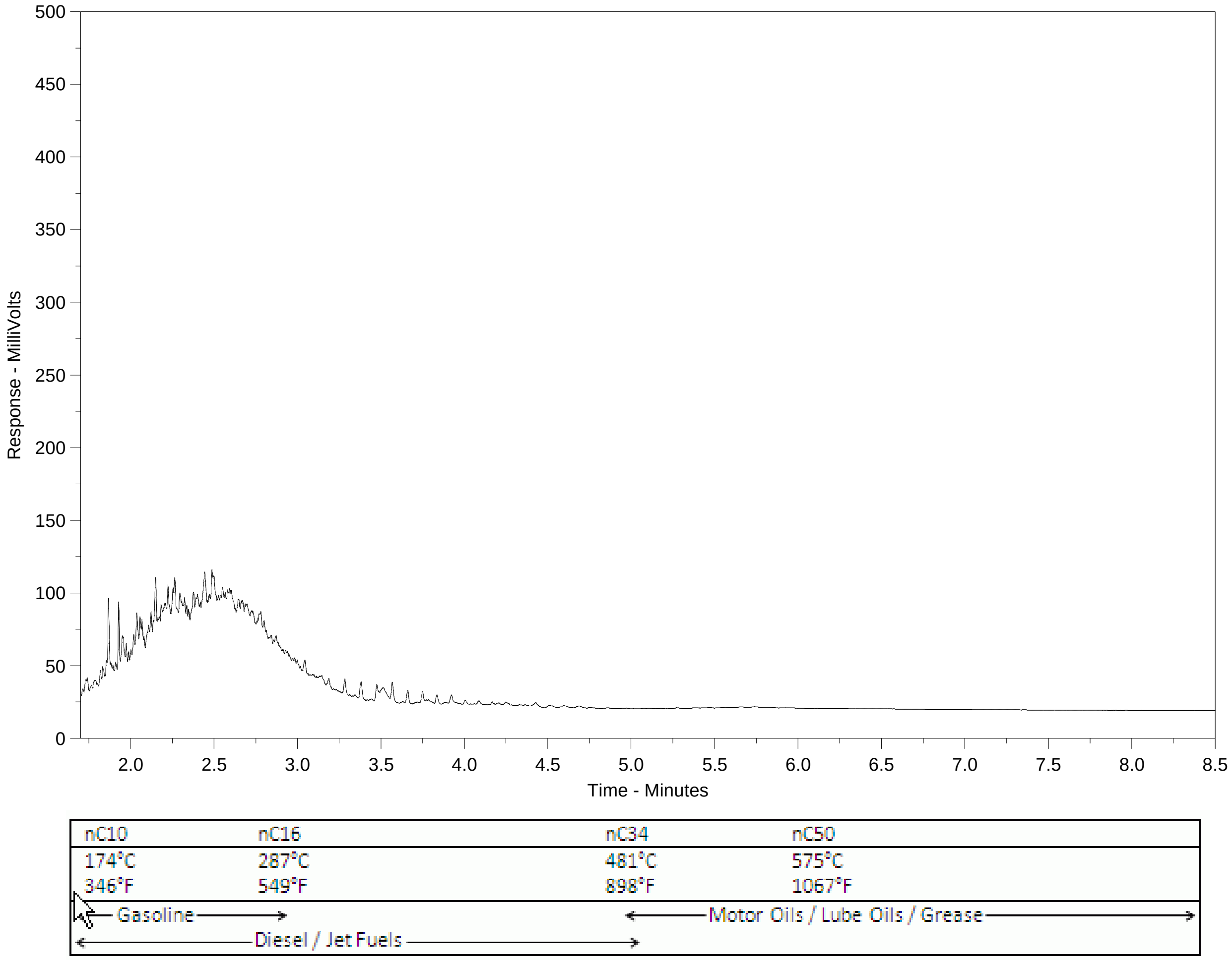
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

CCME F2F4 Hydrocarbon Distribution Report

ALS Sample ID: L1368607-C-38
Client Sample ID: MWA-130925



The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

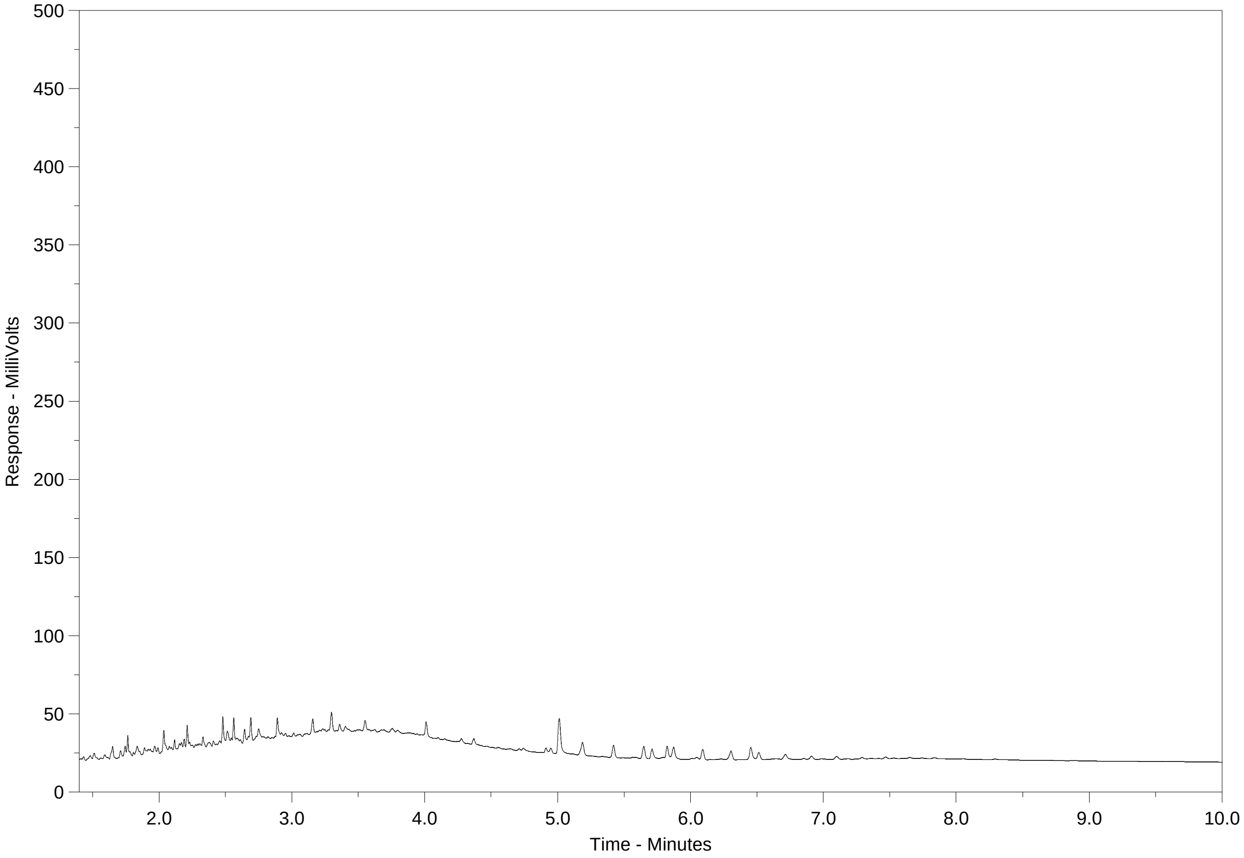
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at left.

Note: This chromatogram was produced using GC conditions that are specific to the CCME F2-F4 method (December 2007 version). Chromatograms generated using this method will resemble those found in the ALS-Vancouver HDR library, though they will appear compressed as the F2-F4 analysis covers a broader range of boiling points. The HDR library can be found at www.alsglobal.com.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-39
Client Sample ID: MWP4-130925



nC10	nC19	nC32
174°C 346°F	330°C 626°F	467°C 873°F

← Gasoline → ← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

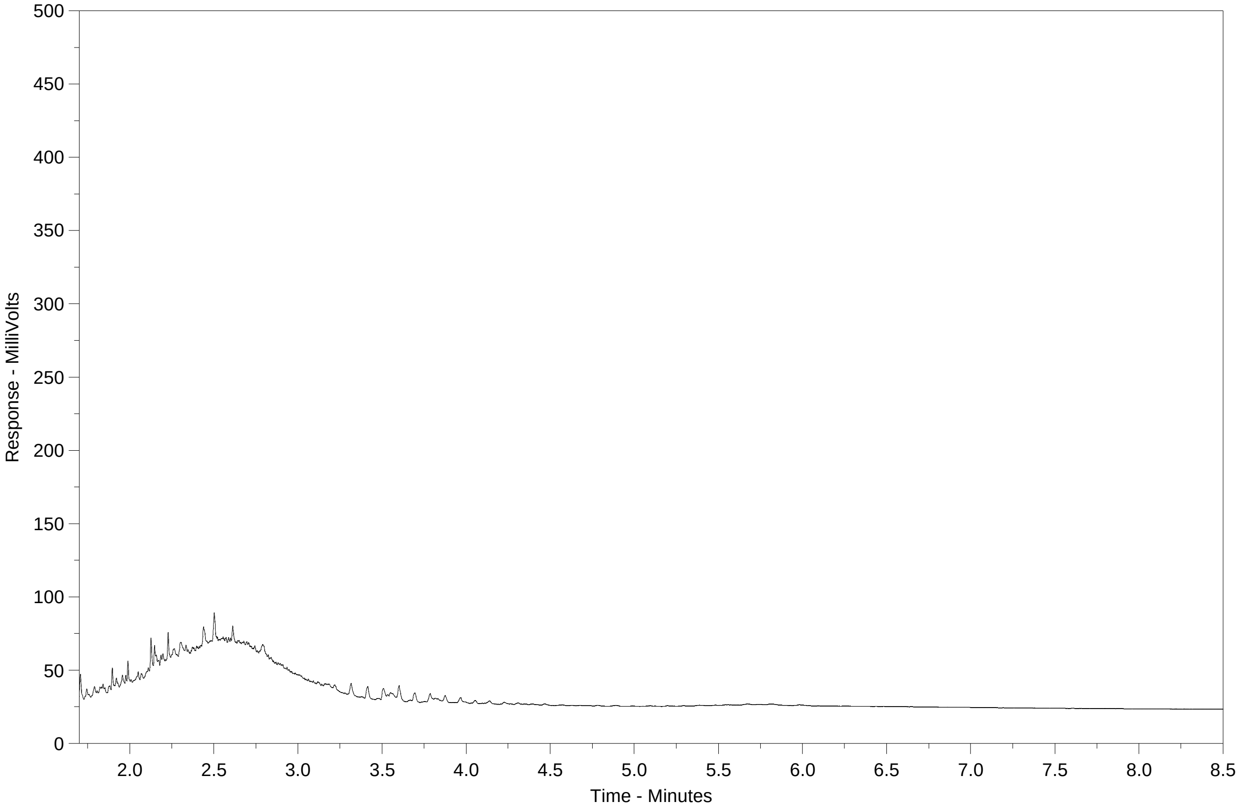
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

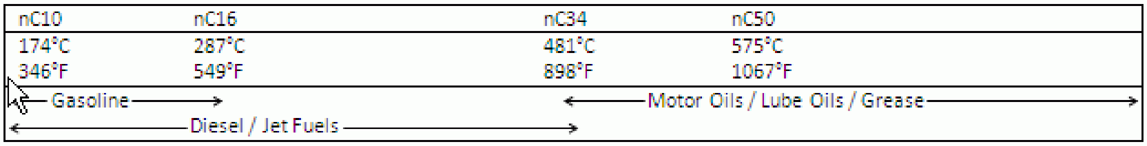
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

CCME F2F4 Hydrocarbon Distribution Report

ALS Sample ID: L1368607-C-39
Client Sample ID: MWP4-130925





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

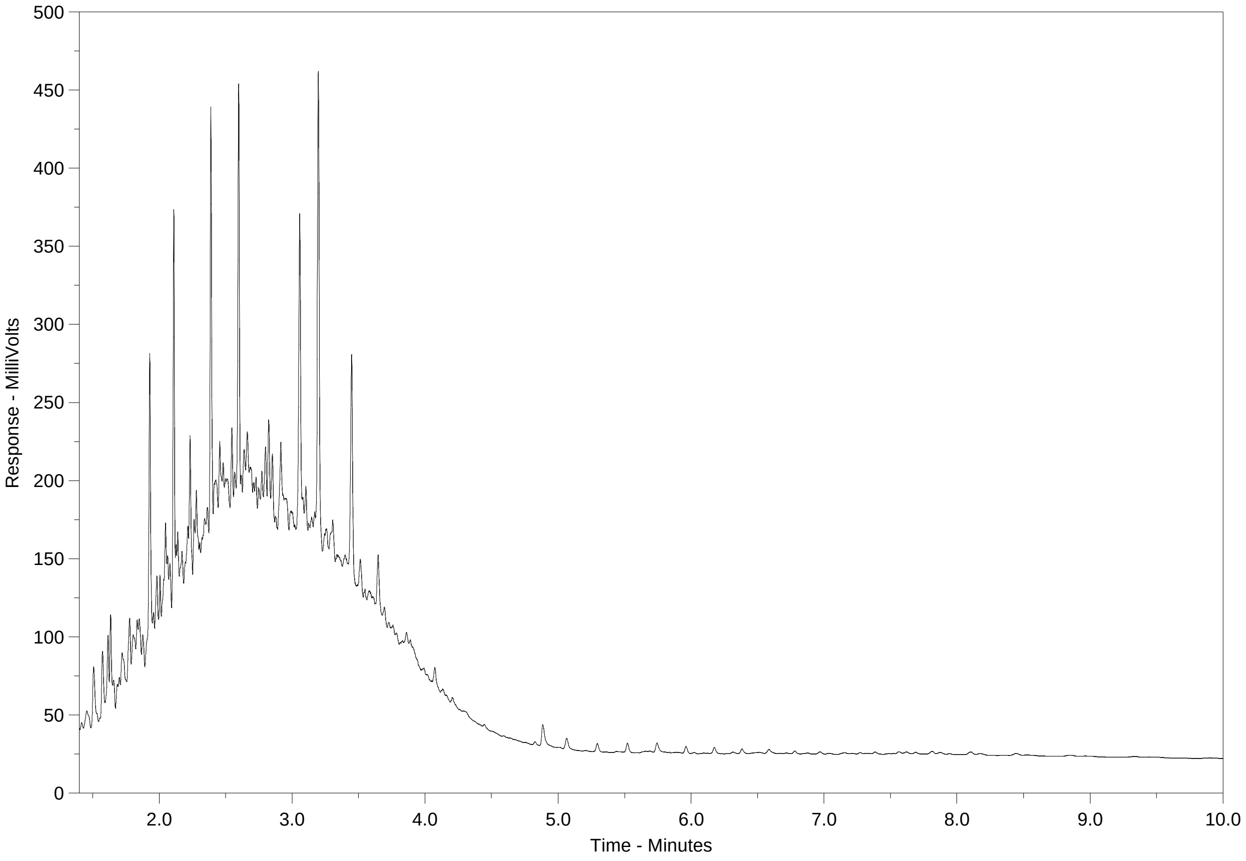
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at left.

Note: This chromatogram was produced using GC conditions that are specific to the CCME F2-F4 method (December 2007 version). Chromatograms generated using this method will resemble those found in the ALS-Vancouver HDR library, though they will appear compressed as the F2-F4 analysis covers a broader range of boiling points. The HDR library can be found at www.alsglobal.com.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-40
Client Sample ID: MW08-2-130925



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F

←— Gasoline —→ ←— Motor Oils / Lube Oils / Grease —→
←— Diesel / Jet Fuels —→

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

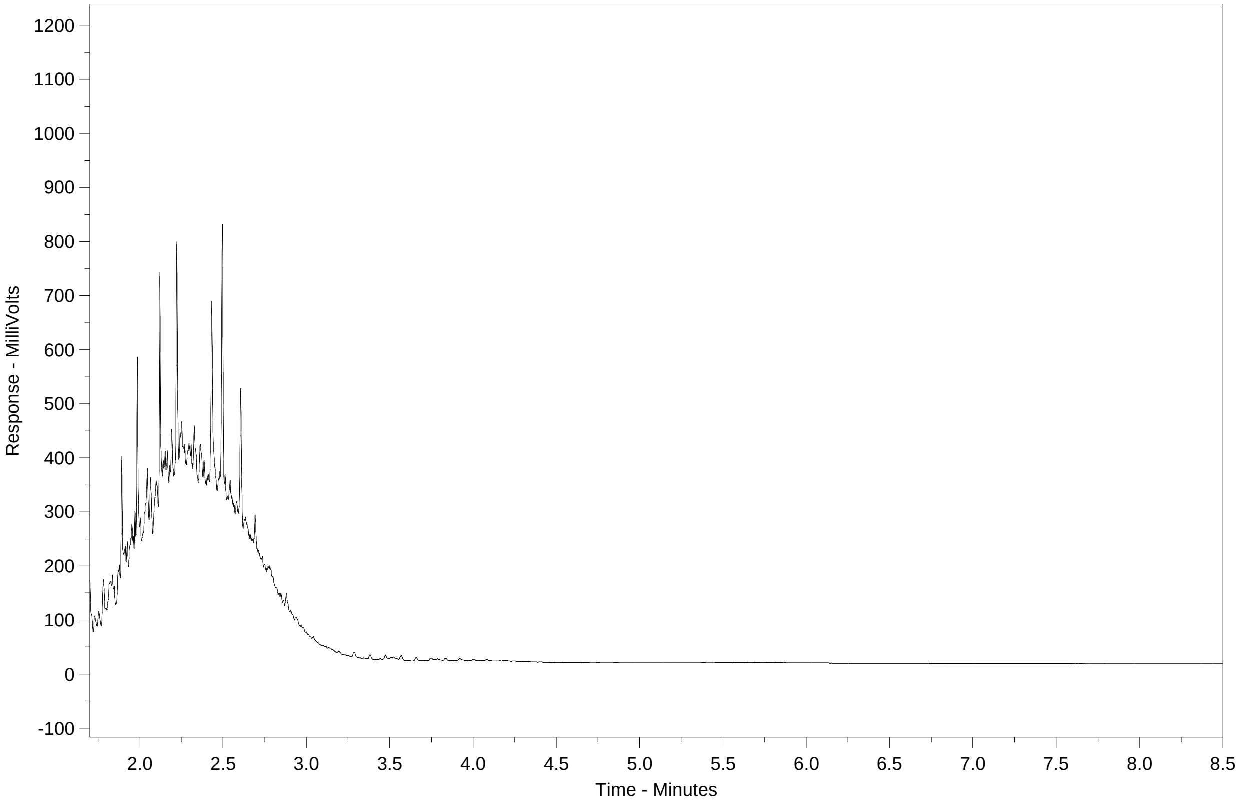
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

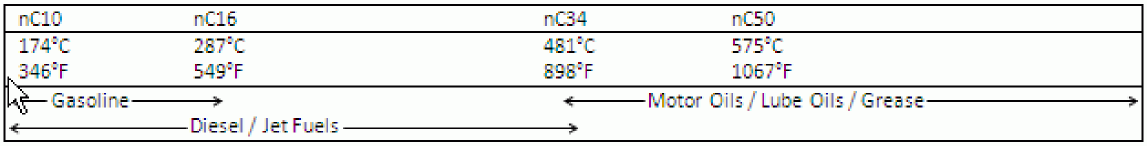
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

CCME F2F4 Hydrocarbon Distribution Report

ALS Sample ID: L1368607-C-40
Client Sample ID: MW08-2-130925





The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

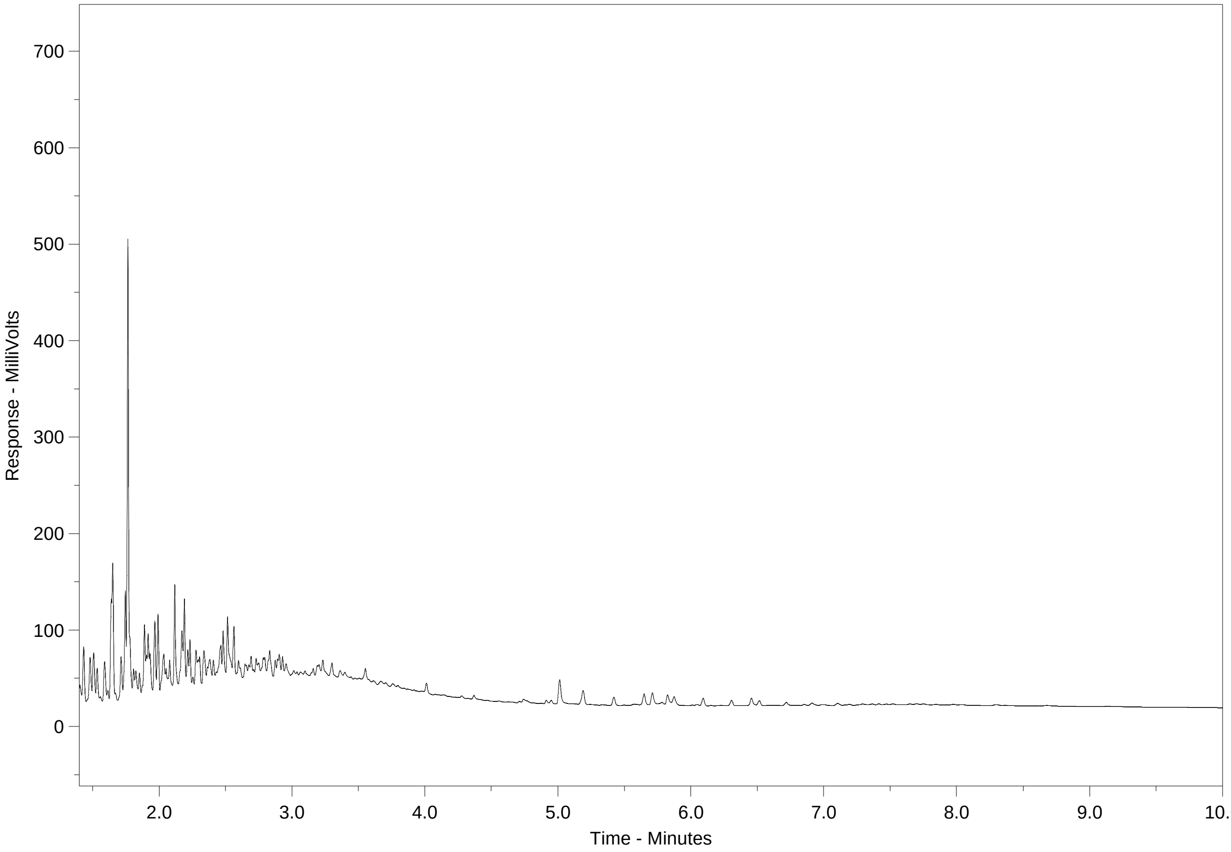
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at left.

Note: This chromatogram was produced using GC conditions that are specific to the CCME F2-F4 method (December 2007 version). Chromatograms generated using this method will resemble those found in the ALS-Vancouver HDR library, though they will appear compressed as the F2-F4 analysis covers a broader range of boiling points. The HDR library can be found at www.alsglobal.com.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-41
Client Sample ID: AS-13-130925



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F

← Gasoline → ← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

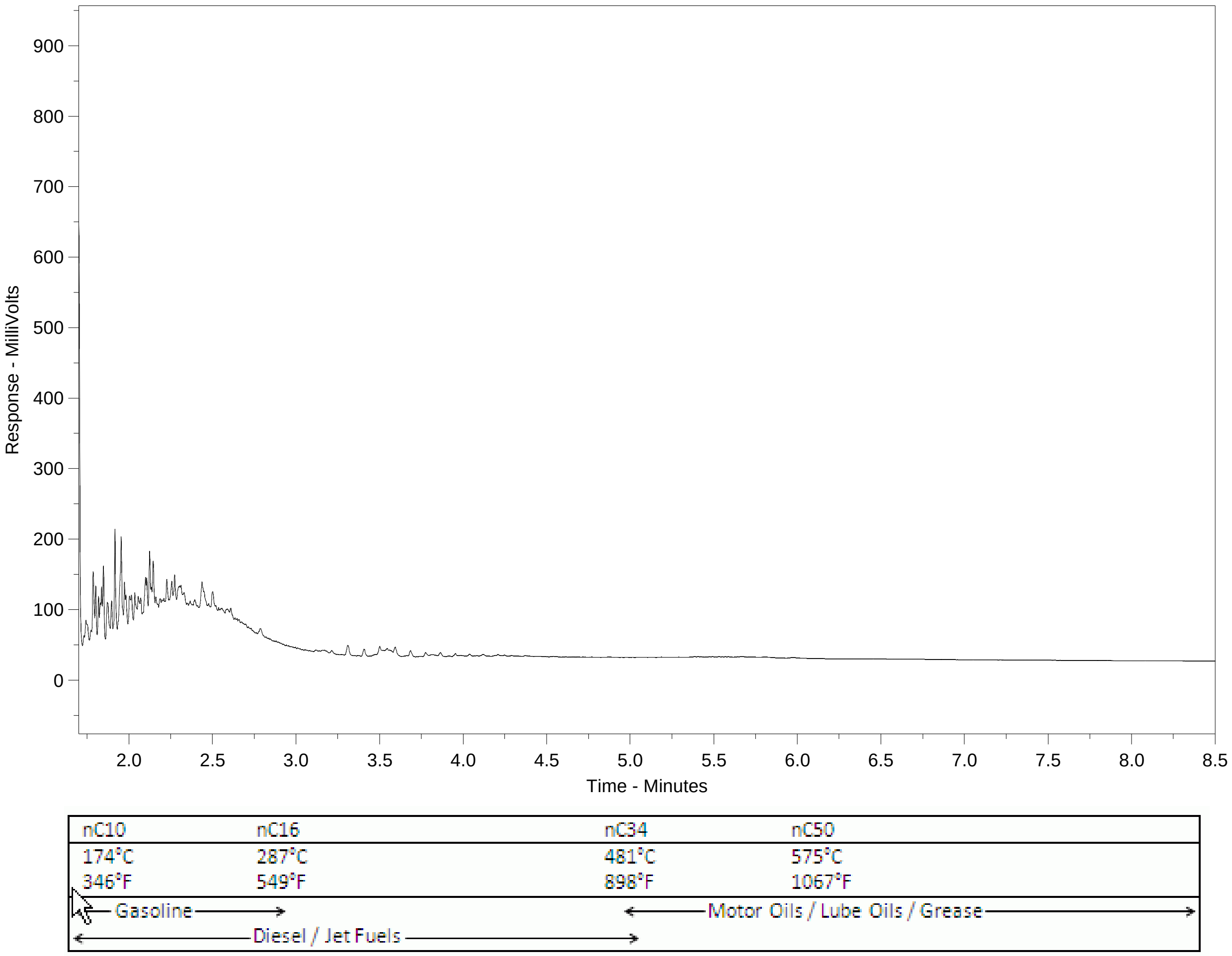
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

CCME F2F4 Hydrocarbon Distribution Report

ALS Sample ID: L1368607-C-41
Client Sample ID: AS-13-130925



The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

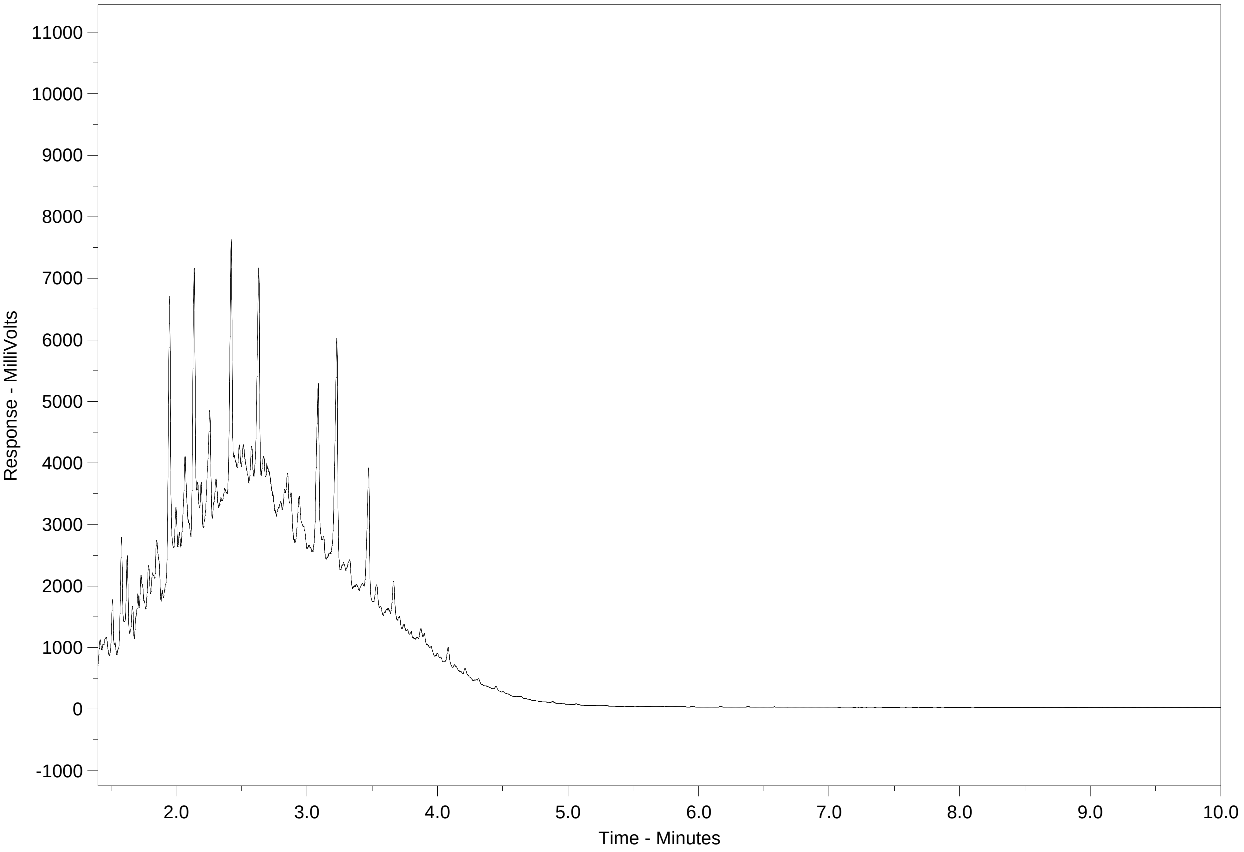
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at left.

Note: This chromatogram was produced using GC conditions that are specific to the CCME F2-F4 method (December 2007 version). Chromatograms generated using this method will resemble those found in the ALS-Vancouver HDR library, though they will appear compressed as the F2-F4 analysis covers a broader range of boiling points. The HDR library can be found at www.alsglobal.com.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-42
Client Sample ID: MW09-5-130925



nC10	nC19	nC32
174°C 346°F	330°C 626°F	467°C 873°F

← Gasoline → ← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

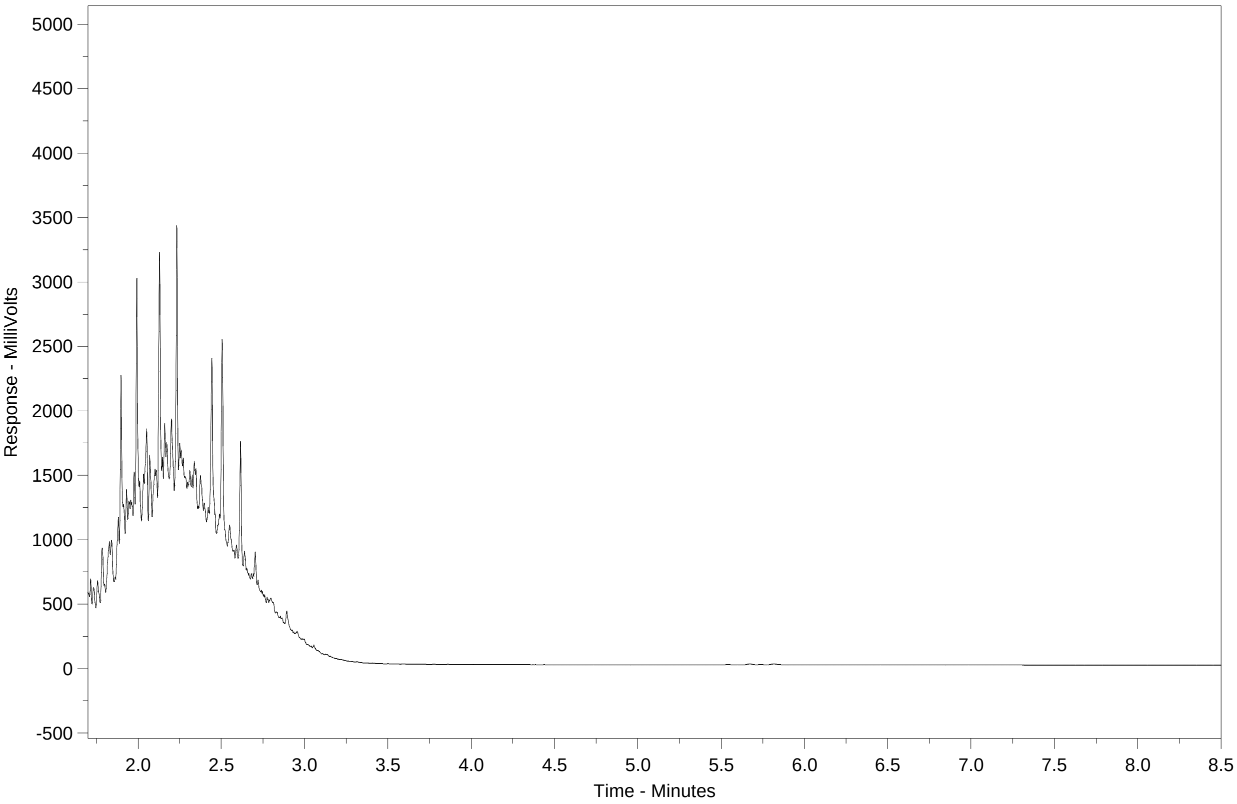
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

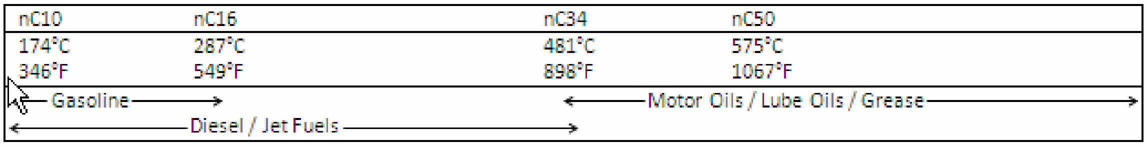
Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

CCME F2F4 Hydrocarbon Distribution Report

ALS Sample ID: L1368607-C-42
Client Sample ID: MW09-5-130925





nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F

← Gasoline →
← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

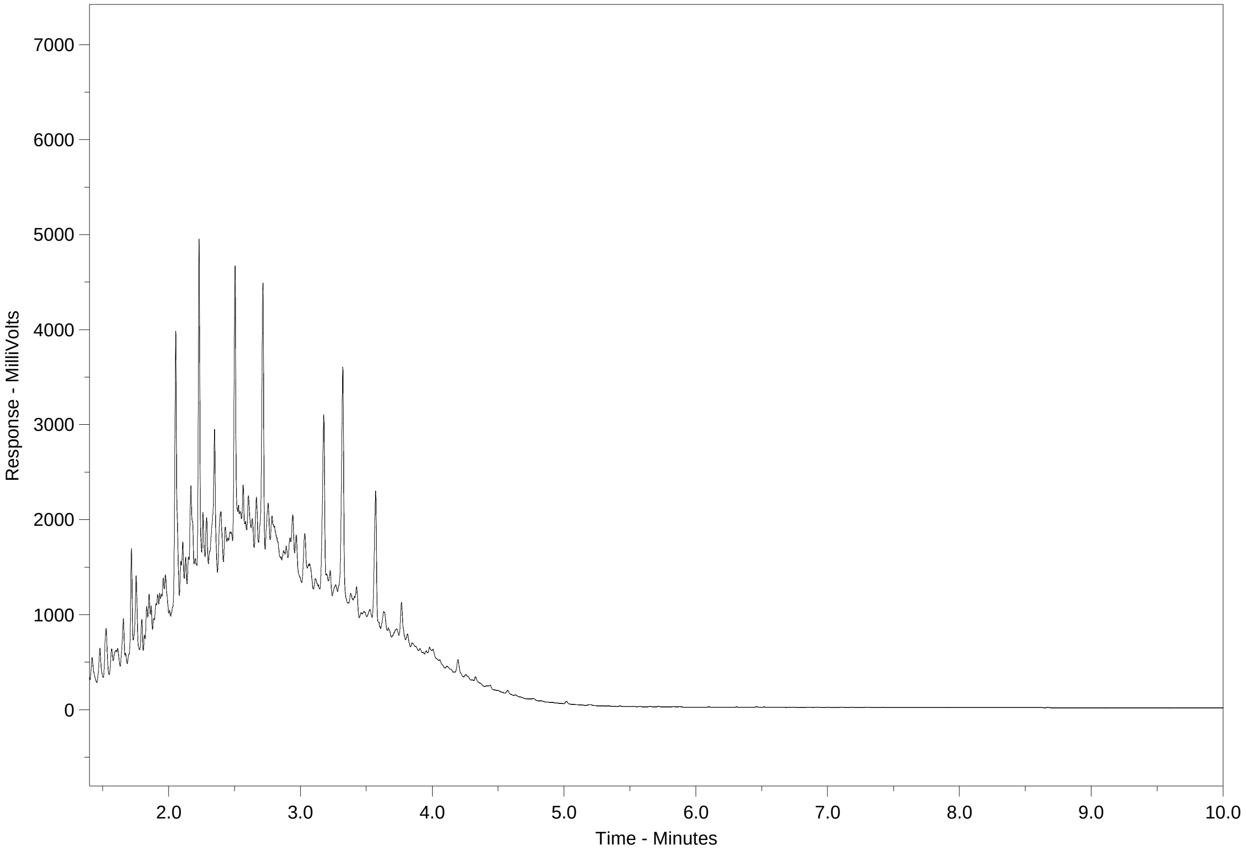
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at left.

Note: This chromatogram was produced using GC conditions that are specific to the CCME F2-F4 method (December 2007 version). Chromatograms generated using this method will resemble those found in the ALS-Vancouver HDR library, though they will appear compressed as the F2-F4 analysis covers a broader range of boiling points. The HDR library can be found at www.alsglobal.com.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-43
Client Sample ID: MWB-130925



nC10	nC19	nC32
174°C 346°F	330°C 626°F	467°C 873°F

← Gasoline →   ← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

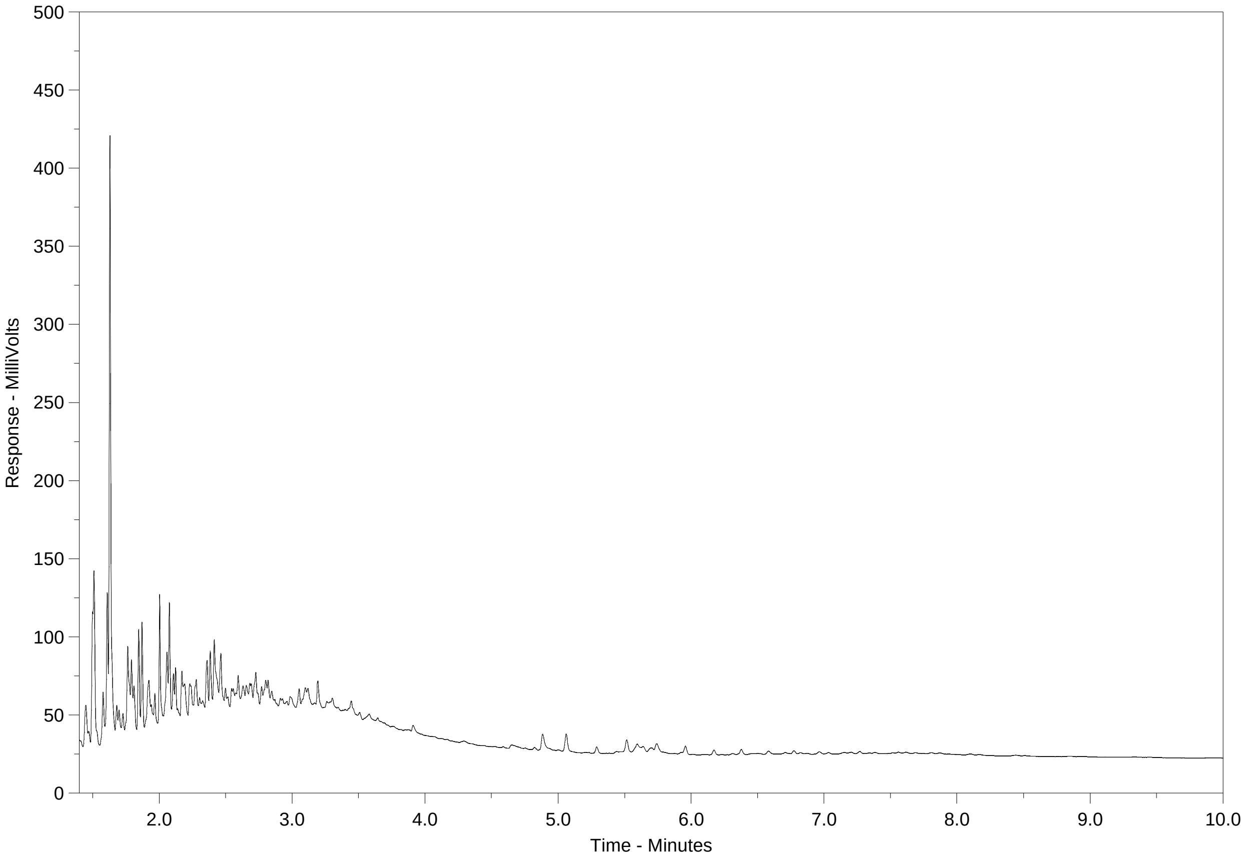
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1368607-44
Client Sample ID: MWC-130925



nC10	nC19	nC32
174°C	330°C	467°C
346°F	626°F	873°F

←— Gasoline —→ ←— Motor Oils / Lube Oils / Grease —→
←— Diesel / Jet Fuels —→

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

10- 218600

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Page 1 of 4

ALS Environmental

eport To
ompany: SNC-LAVALIN INC.
ontact: Dave Bridger
ddress: 8648-Commerce Court
Bby, BC V5A 4N6
hone: 604-515-5151 Fax: 604-515-5150

voice To Same as Report ? (circle) [✓ Yes] or No (if No, provide details)
Copy of Invoice with Report? (circle) [✓ Yes] or No
ompany:
ontact:
ddress:
hone: Fax:

ab Work Order # (lab use only)

Report Format / Distribution
Standard: ✓ Other (specify):
Select: PDF ✓ Excel ✓ Digital ✓ Fax
Email 1: Dave.Bridger@snclavalin.com
Email 2: Mia.Sakelariou@snclavalin.com
Tim.Drozda@snclavalin.com

Client / Project Information
Job #: 131416 (September 2013)
PO / AFE:
LSD:
Quote #: PWGSC

ALS Contact: Selam Worku
Sampler: TDD / MC

Service Request:(Rush subject to availability - Contact ALS to confirm TAT)
☒ Regular (Standard Turnaround Times - Business Days)
☐ Priority(2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT
☐ Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT
☐ Same Day or Weekend Emergency - Contact ALS to confirm TAT

Analysis Request
(Indicate Filtered or Preserved, F/P)

L1368607-COFC

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Anions	P Dissolved Fe + Mn	P EPH	P PAH	Number of Containers
	MW03-8-130923	23-SEP-13	12:20	WTR	X	X			2
	MW03-10-130923	↓	12:10	↓	X	X			2
	MW03-[illegible] 11-130923		12:00		X	X			2
	MW04-4-130923		13:20		X	X			2
	MW04-5-130923		13:15		X	X			2
	MW04-6-130924	24-SEP-13	09:06				X		2
	MW04-5-130924	↓	08:15				X		1
	MW04-4-130924		09:15				X		2
	MW03-11-130924		08:43				X		2
	MW03-10D-130924		08:55				X	⊛ only 1/4 full ⊛	1
	MW03-10-130924		09:07				X	X	2
	MW03-8-130924		08:33				X		2

Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)
Released by: TDD
Date: 25-SEP-13
Time: 15:50

SHIPMENT RECEPTION (lab use only)
Received by:
Date: 25-Sept-13
Time: 4:00
Temperature: °C

SHIPMENT VERIFICATION (lab use only)
Verified by:
Date:
Time:
Observations: Yes / No ? If Yes add SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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10- 218599

ALS Environmental

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Page 2 of 4

eport To
ompany: SNC-LAVALIN INC.
ontact: Dave Bridger
ddress: 8648 - commerce Court
Bby, BC V5A 4N6
hone: 604-515-5151 Fax: 604-515-5150

nvoice To Same as Report ? (circle) [✓ Yes] or No (if No, provide details)
Copy of Invoice with Report? (circle) [✓ Yes] or No
ompany:
ontact:
ddress:
hone: Fax:

ab Work Order # (lab use only)

Report Format / Distribution
Standard: ✓ Other (specify):
Select: PDF ✓ Excel ✓ Digital ✓ Fax
Email 1: Dave.Bridger@snclavalin.com
Email 2: Mia.Sakelariou@snclavalin.com
Tim.Drozda@snclavalin.com

Client / Project Information
Job #: 506381 (September 2013)
PO / AFE:
LSD:
Quote #: PWGSC
ALS Contact: Selam Worku
Sampler: TDD/MC

Service Request:(Rush subject to availability - Contact ALS to confirm TAT)
☒ Regular (Standard Turnaround Times - Business Days)
☐ Priority(2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT
☐ Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT
☐ Same Day or Weekend Emergency - Contact ALS to confirm TAT

Analysis Request
(Indicate Filtered or Preserved, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	P F1	Anions	P Dissolved Mn+Fe	Number of Containers
	AS-22-130924	24-SEP-13	13:45	WTR	X	X	X	4
	AS-13-130924	↓	12:07	↓	X			2
	MW01-21-130924		11:45			X	X	2
	MW08-2-130924		12:45		X	X	X	4
	MW09-5-130924		13:18		X	X	X	4
	MWA-130924		[illegible]		X	X	X	4
	MWP4-130924		13:40		X	X	X	4
	AS-11-130924		13:01		X			2
	MW06-2-130924		12:25		X	X	X	4
	MWB-130924		—			X	X	2
	[illegible] MW01-17D		11:45		X	X	X	4
	MW01-19-130924	↓	12:00	↓	X	X	X	4

L1368607-COFC

Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date: 25-SEP-13	Time: 15:50	Received by:	Date: 25-Sept-13	Time: 4:00	Temperature: °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

GENF 18.01 Front

4.1, 1.1, 0.6, 2.4, 3.4 °C

10- 218597

ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

Page 3 of 4

Report To
Company: SNC-LAVALIN INC.
Contact: Dave Bridger
Address: 8648- commerce Court
Bby BC V5A 4N6
Phone: 604-575-5151 Fax: 604-575-5150

Invoice To Same as Report ? (circle) [✓ Yes] or No (if No, provide details)
Copy of Invoice with Report? (circle) [✓ Yes] or No
Company:
Contact:
Address:
Phone: Fax:

Lab Work Order # (lab use only)

Report Format / Distribution
Standard: ✓ Other (specify):
Select: PDF ✓ Excel ✓ Digital ✓ Fax
Email 1: Dave.Bridger@snclavalin.com
Email 2: Mia.Sakelariou@snclavalin.com
Tim.Drozda@snclavalin.com

Client / Project Information
Job #: 131416 (September 2013)
PO / AFE:
LSD:
Quote #: PWGSC

ALS Contact: Selam Worku
Sampler: TDD / MC

Service Request:(Rush subject to availability - Contact ALS to confirm TAT)
☒ Regular (Standard Turnaround Times - Business Days)
☐ Priority(2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT
☐ Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT
☐ Same Day or Weekend Emergency - Contact ALS to confirm TAT

Analysis Request
(Indicate Filtered or Preserved, F/P)

L1368607-COFC

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Anions	Dissolved Mn+Fe	EPH	PAH	F2	Number of Containers
						P	P	P	P	
	MW04-2-130924	24-SEP-13	10:40	WTR	X	X				2
	MW08-7-130924	↓	10:27	↓	X	X				2
	MW08-8-130925	25-SEP-13	08:45	WTR			X			2
	MW08-6-130925	↓	09:00	↓			X			2
	MW01-21-130925		09:07				X			2
	MW08-5-130925		08:52				X			2
	MW08-7-130925		08:34				X			2
	MW04-2-130925		08:45				X			2
	MW01-19-130925		09:13				X	X	X	2
	MW01-17D-130925		09:19				X	X	X	2
	MW06-2-130925		09:27				X		X	2
	AS-22-130925		09:39				X		X	2

Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)
Released by: Date: 25-SEP-13 Time: 15:50

SHIPMENT RECEPTION (lab use only)
Received by: Date: 25-Sept-13 Time: 4:00 Temperature: °C

SHIPMENT VERIFICATION (lab use only)
Verified by: Date: Time: Observations: Yes / No ? If Yes add SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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4.1, 1.1, 0.6, 2.4, 3.4 °C

10- 218595

ALS Environmental

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878
www.alsglobal.com

Page 4 of 4

eport To
ompany: SNC-LAVALIN INC.
ontact: Dave Bridger
ddress: 8648 - Commerce Court
Bby, BC V5A 4N6
hone: 604-515-5151 Fax: 604-515-5150

nvoice To Same as Report ? (circle) [✓ Yes] or No (if No, provide details)
Copy of Invoice with Report? (circle) [✓ Yes] or No
ompany:
ontact:
ddress:
hone: Fax:

ab Work Order # (lab use only)

Report Format / Distribution
Standard: ✓ Other (specify):
Select: PDF ✓ Excel ✓ Digital ✓ Fax
Email 1: Dave.Bridger@snclavalin.com
Email 2: Mia.Sakelariou@snclavalin.com
Tim.Drozda@snclavalin.com

Client / Project Information
Job #: 131416 (September 2013)
PO / AFE:
LSD:

Quote #: PWGSC
ALS Contact: Selam Worku
Sampler: TDD / MC

Service Request:(Rush subject to availability - Contact ALS to confirm TAT)
☒ Regular (Standard Turnaround Times - Business Days)
☐ Priority(2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT
☐ Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT
☐ Same Day or Weekend Emergency - Contact ALS to confirm TAT

Analysis Request
(Indicate Filtered or Preserved, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	EPH (P)	F2 (P)	PAH (P)	Number of Containers
	AS-11-130925	25-SEP-13	09:47	WTR	X	X		2
	MWA-130925	↓	—	↓	X	X		2
	MWP4-130925		10:08		X	X	X	2
	MW08-2-130925		09:25		X	X	X	2
	AS-13-130925		09:40		X	X		2
	MW09-5-130925		09:55		X	X	X	2
	MWB-130925		=		X		X	2
	MWC-130925		—		X			2

L1368607-COFC

Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by: ZOL	Date: 25-SEP-13	Time: 15:50	Received by:	Date: 25-Sept-13	Time: 4:00	Temperature: °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY GENF 18.01 Front

4.1, 1.1, 0.6, 2.4, 3.4 °C

SNC-LAVALIN INC., ENVIRONMENT DIVISION
ATTN: David Bridger
8648 Commerce Court
Burnaby BC V5A 4N6

Date Received: 25-SEP-13
Report Date: 04-OCT-13 18:01 (MT)
Version: FINAL

Client Phone: 604-515-5151

Certificate of Analysis

Lab Work Order #:	**L1369090**
Project P.O. #:	NOT SUBMITTED
Job Reference:	131416 (SEPTEMBER 2013)
C of C Numbers:	10-218596
Legal Site Desc:	

Selam Worku
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1369090-1	L1369090-2	L1369090-3	L1369090-4	
	Description	WTR	WTR	WTR	WTR	
	Sampled Date	24-SEP-13	24-SEP-13	24-SEP-13	24-SEP-13	
	Sampled Time	12:00	12:00	12:00	12:00	
	Client ID	SW13-1-130924	SW13-2-130924	SW13-3-130924	SW13-4-130924	
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	17.7	19.3	19.5	19.7	
	pH (pH)	7.52	7.58	7.60	7.59	
Anions and Nutrients	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	16.1	17.3	17.6	17.7	
	Alkalinity, Carbonate (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Alkalinity, Hydroxide (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Alkalinity, Total (as CaCO3) (mg/L)	16.1	17.3	17.6	17.7	
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	<0.020	
	Nitrate (as N) (mg/L)	0.315	0.318	0.322	0.319	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Sulfate (SO4) (mg/L)	1.75	1.82	2.23	1.84	
Total Metals	Aluminum (Al)-Total (mg/L)	0.0452	0.0460	0.0569	0.0463	
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Arsenic (As)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	
	Beryllium (Be)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Bismuth (Bi)-Total (mg/L)	<0.20	<0.20	<0.20	<0.20	
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	
	Cadmium (Cd)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Calcium (Ca)-Total (mg/L)	6.34	6.91	6.97	7.03	
	Chromium (Cr)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Cobalt (Co)-Total (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010	<0.0010	0.0015	
	Iron (Fe)-Total (mg/L)	<0.030	<0.030	<0.030	<0.030	
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Lithium (Li)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Magnesium (Mg)-Total (mg/L)	0.46	0.50	0.52	0.51	
	Manganese (Mn)-Total (mg/L)	0.00041	0.00041	0.00066	0.00042	
	Mercury (Hg)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Molybdenum (Mo)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Nickel (Ni)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30	<0.30	<0.30	
	Potassium (K)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Selenium (Se)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Silicon (Si)-Total (mg/L)	2.09	2.09	2.12	2.15	
	Silver (Ag)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1369090-1	L1369090-2	L1369090-3	L1369090-4	
	Description	WTR	WTR	WTR	WTR	
	Sampled Date	24-SEP-13	24-SEP-13	24-SEP-13	24-SEP-13	
	Sampled Time	12:00	12:00	12:00	12:00	
	Client ID	SW13-1-130924	SW13-2-130924	SW13-3-130924	SW13-4-130924	
Grouping	**Analyte**					
WATER						
Total Metals	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	
	Strontium (Sr)-Total (mg/L)	0.0142	0.0154	0.0152	0.0155	
	Thallium (Tl)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Tin (Sn)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010	<0.010	<0.010	
	Uranium (U)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Vanadium (V)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Zinc (Zn)-Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
Hydrocarbons	EPH10-19 (mg/L)	<0.25	<0.25	<0.25	<0.25	
	EPH19-32 (mg/L)	<0.25	<0.25	<0.25	<0.25	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Sulfate (SO4)	MS-B	L1369090-1, -2, -3, -4
Matrix Spike	Sulfate (SO4)	MS-B	L1369090-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-SCR-VA	Water	Alkalinity by colour or titration	EPA 310.2 OR APHA 2320

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.
OR
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ANIONS-CL-IC-WR	Water	Chloride by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.

ANIONS-F-IC-WR	Water	Fluoride by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.

ANIONS-NO2-IC-WR	Water	Nitrite Nitrogen by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.

ANIONS-NO3-IC-WR	Water	Nitrate Nitrogen by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.

ANIONS-SO4-IC-WR	Water	Sulphate by Ion Chromatography	EPA 300.1

This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.

EPH-SF-FID-VA	Water	EPH in Water by Tumbler and GCFID	BC MOE EPH GCFID

Analysis is in accordance with BC MOE Lab Manual method "Extractable Petroleum Hydrocarbons in Water by GC/FID", v2.1, July 1999. Whole water samples are extracted with DCM prior to gas chromatography with flame ionization detection (GC-FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-TOT-LOW-CVAFS-VA	Water	Total Mercury in Water by CVAFS(Low)	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method

Reference Information

6010B).

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WR	ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

10-218596

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1369090 Report Date: 04-OCT-13

Client: SNC-LAVALIN INC., ENVIRONMENT DIVISION
8648 Commerce Court
Burnaby BC V5A 4N6
Contact: David Bridger

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-SCR-VA	**Water**							
Batch R2702795								
WG1756332-2 CRM		**VA-ALKL-CONTROL**						
Alkalinity, Total (as CaCO3)			98.7		%		85-115	27-SEP-13
WG1756332-5 CRM		**VA-ALKM-CONTROL**						
Alkalinity, Total (as CaCO3)			99.3		%		85-115	27-SEP-13
WG1756332-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	27-SEP-13
WG1756332-4 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	27-SEP-13
WG1756332-7 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	27-SEP-13
ANIONS-CL-IC-WR	**Water**							
Batch R2702670								
WG1756317-10 LCS								
Chloride (Cl)			100.8		%		85-115	26-SEP-13
WG1756317-14 LCS								
Chloride (Cl)			101.0		%		85-115	26-SEP-13
WG1756317-2 LCS								
Chloride (Cl)			100.8		%		85-115	26-SEP-13
WG1756317-6 LCS								
Chloride (Cl)			100.8		%		85-115	26-SEP-13
WG1756317-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-13 MB								
Chloride (Cl)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-9 MB								
Chloride (Cl)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-12 MS		**L1368584-3**						
Chloride (Cl)			98.6		%		75-125	26-SEP-13
WG1756317-16 MS		**L1368607-13**						
Chloride (Cl)			97.6		%		75-125	26-SEP-13
WG1756317-4 MS		**L1368575-2**						
Chloride (Cl)			98.6		%		75-125	26-SEP-13
WG1756317-8 MS		**L1368575-13**						
Chloride (Cl)			97.2		%		75-125	26-SEP-13
ANIONS-F-IC-WR	**Water**							

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-F-IC-WR	**Water**							
Batch R2702670								
WG1756317-10 LCS								
Fluoride (F)			102.0		%		85-115	26-SEP-13
WG1756317-14 LCS								
Fluoride (F)			102.2		%		85-115	26-SEP-13
WG1756317-2 LCS								
Fluoride (F)			102.1		%		85-115	26-SEP-13
WG1756317-6 LCS								
Fluoride (F)			101.5		%		85-115	26-SEP-13
WG1756317-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	26-SEP-13
WG1756317-13 MB								
Fluoride (F)			<0.020		mg/L		0.02	26-SEP-13
WG1756317-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	26-SEP-13
WG1756317-9 MB								
Fluoride (F)			<0.020		mg/L		0.02	26-SEP-13
WG1756317-12 MS		**L1368584-3**						
Fluoride (F)			99.4		%		75-125	26-SEP-13
WG1756317-16 MS		**L1368607-13**						
Fluoride (F)			99.2		%		75-125	26-SEP-13
WG1756317-4 MS		**L1368575-2**						
Fluoride (F)			100.5		%		75-125	26-SEP-13
WG1756317-8 MS		**L1368575-13**						
Fluoride (F)			95.9		%		75-125	26-SEP-13
ANIONS-NO2-IC-WR	**Water**							
Batch R2702670								
WG1756317-10 LCS								
Nitrite (as N)			101.2		%		85-115	26-SEP-13
WG1756317-14 LCS								
Nitrite (as N)			101.3		%		85-115	26-SEP-13
WG1756317-2 LCS								
Nitrite (as N)			101.2		%		85-115	26-SEP-13
WG1756317-6 LCS								
Nitrite (as N)			101.1		%		85-115	26-SEP-13
WG1756317-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	26-SEP-13
WG1756317-13 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	26-SEP-13
WG1756317-5 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-NO2-IC-WR	**Water**							
Batch R2702670								
WG1756317-5 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	26-SEP-13
WG1756317-9 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	26-SEP-13
WG1756317-12 MS		**L1368584-3**						
Nitrite (as N)			101.3		%		75-125	26-SEP-13
WG1756317-16 MS		**L1368607-13**						
Nitrite (as N)			97.9		%		75-125	26-SEP-13
WG1756317-4 MS		**L1368575-2**						
Nitrite (as N)			101.9		%		75-125	26-SEP-13
WG1756317-8 MS		**L1368575-13**						
Nitrite (as N)			100.2		%		75-125	26-SEP-13
ANIONS-NO3-IC-WR	**Water**							
Batch R2702670								
WG1756317-10 LCS								
Nitrate (as N)			101.7		%		85-115	26-SEP-13
WG1756317-14 LCS								
Nitrate (as N)			102.0		%		85-115	26-SEP-13
WG1756317-2 LCS								
Nitrate (as N)			101.6		%		85-115	26-SEP-13
WG1756317-6 LCS								
Nitrate (as N)			101.7		%		85-115	26-SEP-13
WG1756317-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	26-SEP-13
WG1756317-13 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	26-SEP-13
WG1756317-5 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	26-SEP-13
WG1756317-9 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	26-SEP-13
WG1756317-12 MS		**L1368584-3**						
Nitrate (as N)			98.3		%		75-125	26-SEP-13
WG1756317-16 MS		**L1368607-13**						
Nitrate (as N)			96.4		%		75-125	26-SEP-13
WG1756317-4 MS		**L1368575-2**						
Nitrate (as N)			98.6		%		75-125	26-SEP-13
WG1756317-8 MS		**L1368575-13**						
Nitrate (as N)			96.8		%		75-125	26-SEP-13

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ANIONS-SO4-IC-WR	**Water**							
Batch R2702670								
WG1756317-10 LCS								
Sulfate (SO4)			99.3		%		85-115	26-SEP-13
WG1756317-14 LCS								
Sulfate (SO4)			99.3		%		85-115	26-SEP-13
WG1756317-2 LCS								
Sulfate (SO4)			99.5		%		85-115	26-SEP-13
WG1756317-6 LCS								
Sulfate (SO4)			99.3		%		85-115	26-SEP-13
WG1756317-1 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-13 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-5 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-9 MB								
Sulfate (SO4)			<0.50		mg/L		0.5	26-SEP-13
WG1756317-12 MS		**L1368584-3**						
Sulfate (SO4)			N/A	MS-B	%		-	26-SEP-13
WG1756317-16 MS		**L1368607-13**						
Sulfate (SO4)			95.4		%		75-125	26-SEP-13
WG1756317-4 MS		**L1368575-2**						
Sulfate (SO4)			93.5		%		75-125	26-SEP-13
WG1756317-8 MS		**L1368575-13**						
Sulfate (SO4)			N/A	MS-B	%		-	26-SEP-13
EPH-SF-FID-VA	**Water**							
Batch R2707089								
WG1759220-1 MB								
EPH10-19			<0.25		mg/L		0.25	02-OCT-13
EPH19-32			<0.25		mg/L		0.25	02-OCT-13
WG1759220-3 MB								
EPH10-19			<0.25		mg/L		0.25	03-OCT-13
EPH19-32			<0.25		mg/L		0.25	03-OCT-13
Batch R2707793								
WG1760177-1 MB								
EPH10-19			<0.25		mg/L		0.25	03-OCT-13
EPH19-32			<0.25		mg/L		0.25	03-OCT-13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EPH-SF-FID-VA	**Water**							
Batch R2709208								
WG1760177-3 MB								
EPH10-19			<0.25		mg/L		0.25	04-OCT-13
EPH19-32			<0.25		mg/L		0.25	04-OCT-13
HG-TOT-LOW-CVAFS-VA	**Water**							
Batch R2705914								
WG1758968-2 LCS								
Mercury (Hg)-Total			94.9		%		80-120	01-OCT-13
WG1758968-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	01-OCT-13
WG1758968-10 MS		**L1369090-4**						
Mercury (Hg)-Total			100.6		%		70-130	01-OCT-13
WG1758968-4 MS		**L1370598-5**						
Mercury (Hg)-Total			91.4		%		70-130	01-OCT-13
MET-T-CCMS-VA	**Water**							
Batch R2706938								
WG1756922-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	02-OCT-13
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	02-OCT-13
Arsenic (As)-Total			<0.00010		mg/L		0.0001	02-OCT-13
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	02-OCT-13
Cadmium (Cd)-Total			<0.000010		mg/L		0.00001	02-OCT-13
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	02-OCT-13
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	02-OCT-13
Copper (Cu)-Total			<0.00050		mg/L		0.0005	02-OCT-13
Lead (Pb)-Total			<0.000050		mg/L		0.00005	02-OCT-13
Lithium (Li)-Total			<0.00050		mg/L		0.0005	02-OCT-13
Manganese (Mn)-Total			<0.000050		mg/L		0.00005	02-OCT-13
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	02-OCT-13
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	02-OCT-13
Selenium (Se)-Total			<0.00010		mg/L		0.0001	02-OCT-13
Silver (Ag)-Total			<0.000010		mg/L		0.00001	02-OCT-13
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	02-OCT-13
Tin (Sn)-Total			<0.00010		mg/L		0.0001	02-OCT-13
Uranium (U)-Total			<0.000010		mg/L		0.00001	02-OCT-13
Vanadium (V)-Total			<0.0010		mg/L		0.001	02-OCT-13
MET-TOT-ICP-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-TOT-ICP-VA	**Water**							
Batch R2703781								
WG1756922-3 CRM		**VA-HIGH-WATRM**						
Barium (Ba)-Total			101.5		%		80-120	28-SEP-13
Bismuth (Bi)-Total			96.8		%		80-120	28-SEP-13
Boron (B)-Total			99.4		%		80-120	28-SEP-13
Calcium (Ca)-Total			102.6		%		80-120	28-SEP-13
Iron (Fe)-Total			98.4		%		80-120	28-SEP-13
Magnesium (Mg)-Total			101.2		%		80-120	28-SEP-13
Phosphorus (P)-Total			100.1		%		80-120	28-SEP-13
Potassium (K)-Total			105.7		%		80-120	28-SEP-13
Silicon (Si)-Total			104.2		%		80-120	28-SEP-13
Sodium (Na)-Total			94.9		%		80-120	28-SEP-13
Strontium (Sr)-Total			100.2		%		80-120	28-SEP-13
Titanium (Ti)-Total			102.0		%		80-120	28-SEP-13
Zinc (Zn)-Total			98.0		%		80-120	28-SEP-13
WG1756922-1 MB								
Barium (Ba)-Total			<0.010		mg/L		0.01	28-SEP-13
Bismuth (Bi)-Total			<0.20		mg/L		0.2	28-SEP-13
Boron (B)-Total			<0.10		mg/L		0.1	28-SEP-13
Calcium (Ca)-Total			<0.050		mg/L		0.05	28-SEP-13
Iron (Fe)-Total			<0.030		mg/L		0.03	28-SEP-13
Magnesium (Mg)-Total			<0.10		mg/L		0.1	28-SEP-13
Phosphorus (P)-Total			<0.30		mg/L		0.3	28-SEP-13
Potassium (K)-Total			<2.0		mg/L		2	28-SEP-13
Silicon (Si)-Total			<0.050		mg/L		0.05	28-SEP-13
Sodium (Na)-Total			<2.0		mg/L		2	28-SEP-13
Strontium (Sr)-Total			<0.0050		mg/L		0.005	28-SEP-13
Titanium (Ti)-Total			<0.010		mg/L		0.01	28-SEP-13
Zinc (Zn)-Total			<0.0050		mg/L		0.005	28-SEP-13
NH3-F-VA	**Water**							
Batch R2706014								
WG1758233-2 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			95.8		%		85-115	01-OCT-13
WG1758233-4 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			95.9		%		85-115	01-OCT-13
WG1758233-6 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			99.7		%		85-115	01-OCT-13

Quality Control Report

Workorder: L1369090 Report Date: 04-OCT-13

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-VA	**Water**							
Batch R2706014								
WG1758233-8 CRM		**VA-NH3-F**						
Ammonia, Total (as N)			90.3		%		85-115	01-OCT-13
WG1758233-1 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	01-OCT-13
WG1758233-3 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	01-OCT-13
WG1758233-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	01-OCT-13
WG1758233-7 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	01-OCT-13
WG1758233-10 MS		**L1368426-1**						
Ammonia, Total (as N)			98.3		%		75-125	01-OCT-13
WG1758233-12 MS		**L1368305-1**						
Ammonia, Total (as N)			92.7		%		75-125	01-OCT-13
PH-PCT-VA	**Water**							
Batch R2702959								
WG1756997-25 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	28-SEP-13
WG1756997-26 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	28-SEP-13
WG1756997-27 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	28-SEP-13
WG1756997-28 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	28-SEP-13
WG1756997-29 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	28-SEP-13
WG1756997-30 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	28-SEP-13
WG1756997-31 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	28-SEP-13
WG1756997-32 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	28-SEP-13

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH by Meter (Automated)							
	1	24-SEP-13 12:00	28-SEP-13 23:00	0.25	107	hours	EHTR-FM
	2	24-SEP-13 12:00	28-SEP-13 23:00	0.25	107	hours	EHTR-FM
	3	24-SEP-13 12:00	28-SEP-13 23:00	0.25	107	hours	EHTR-FM
	4	24-SEP-13 12:00	28-SEP-13 23:00	0.25	107	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1369090 were received on 25-SEP-13 15:50.

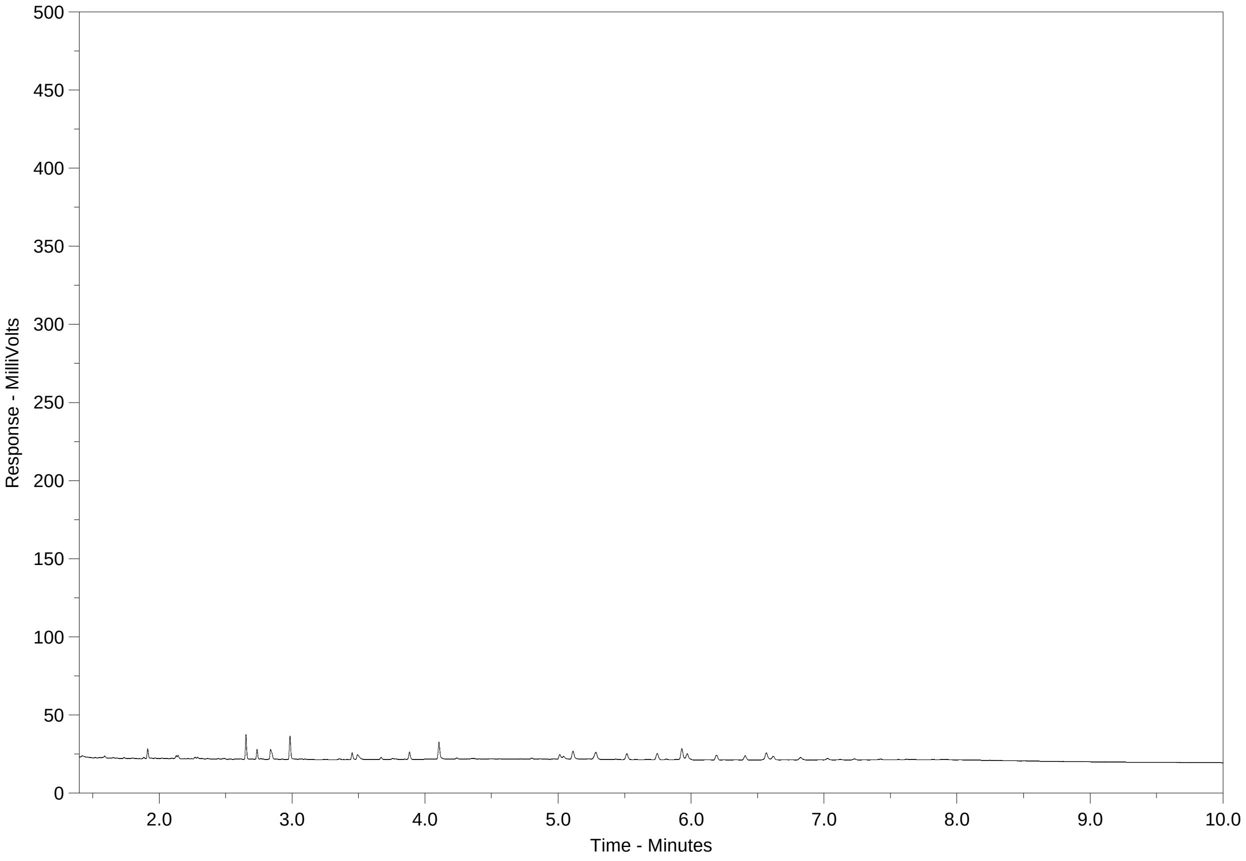
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Hydrocarbon Distribution Report

ALS Sample ID: L1369090-1
Client Sample ID: SW13-1-130924



nC10	nC19	nC32
174°C 346°F	330°C 626°F	467°C 873°F

←— Gasoline —→ ←—— Motor Oils / Lube Oils / Grease ——→
←—— Diesel / Jet Fuels ——→

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

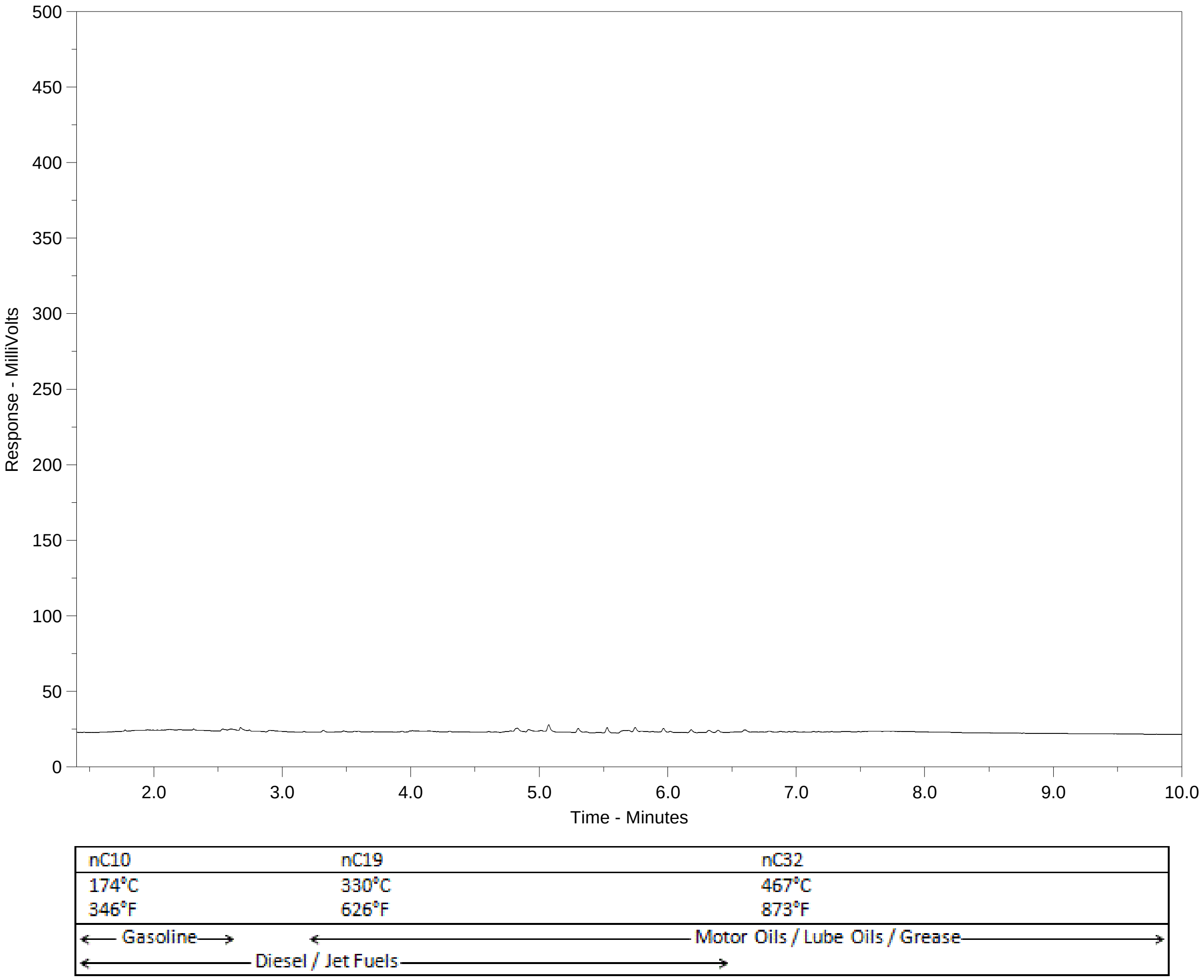
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1369090-2
Client Sample ID: SW13-2-130924



The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

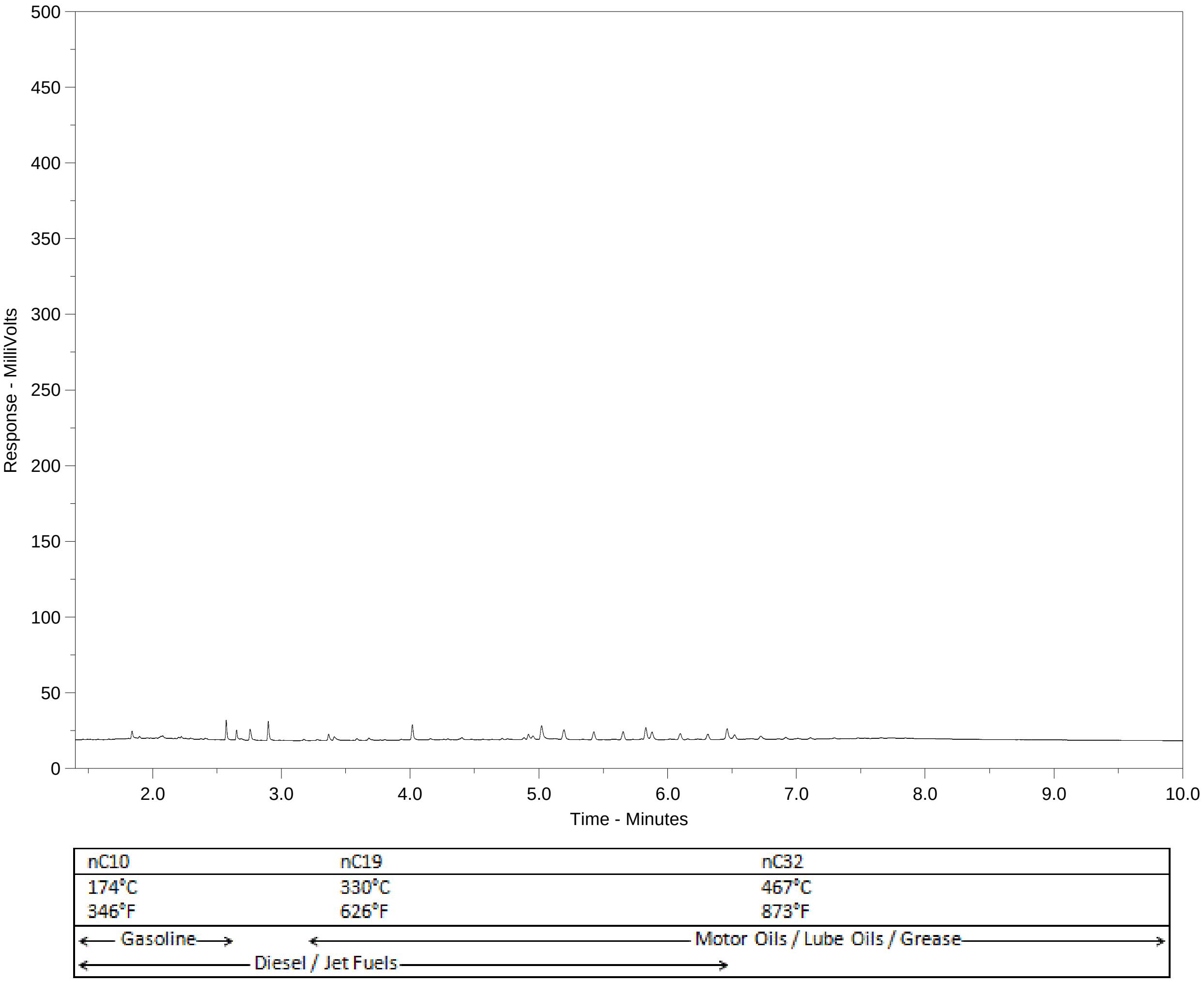
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1369090-3
Client Sample ID: SW13-3-130924



The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

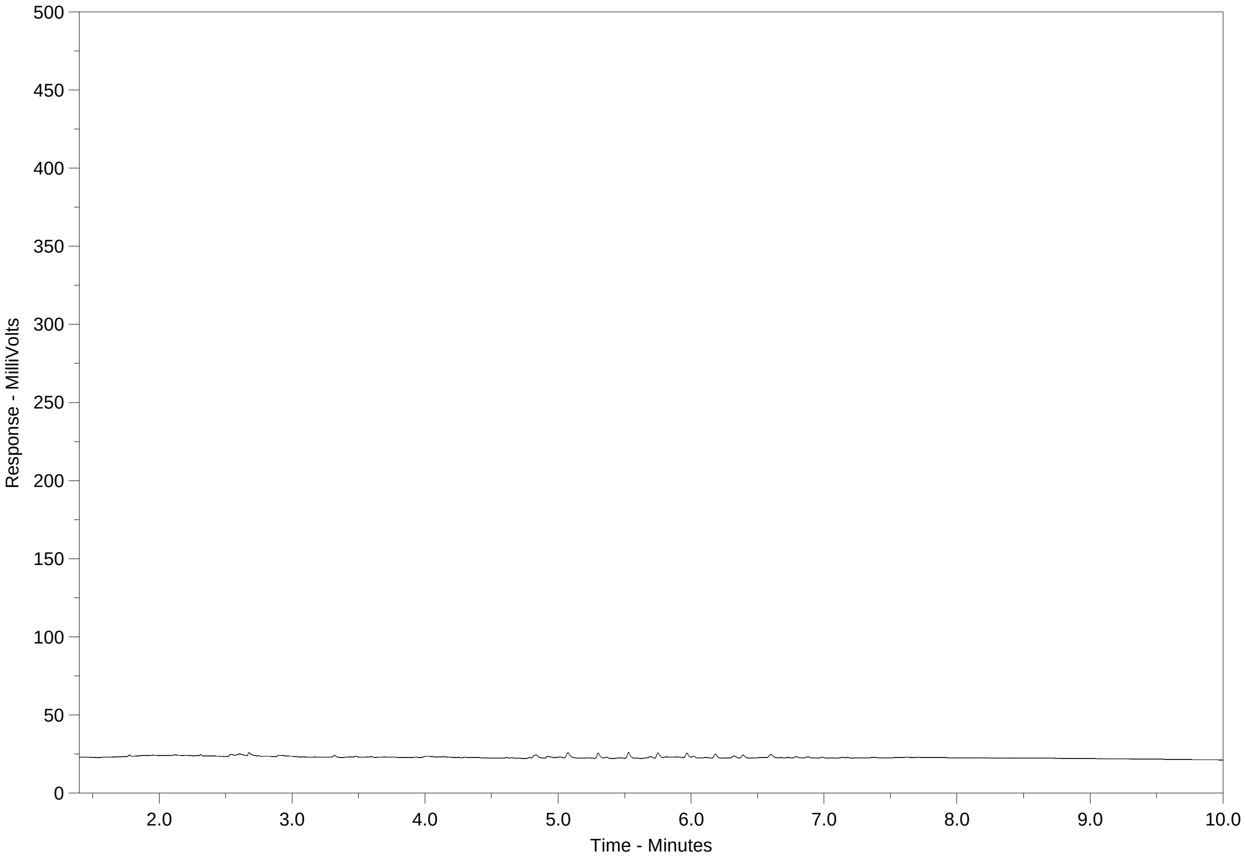
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

Hydrocarbon Distribution Report

ALS Sample ID: L1369090-4
Client Sample ID: SW13-4-130924



nC10	nC19	nC32
174°C 346°F	330°C 626°F	467°C 873°F

← Gasoline → ← Motor Oils / Lube Oils / Grease →
← Diesel / Jet Fuels →

The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

10- 218596

ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

Page 1 of 1

Report To
Company: SNC-LAVALIN INC
Contact: Dave Bridger
Address: 8648 - commerce Court
Bby, BC V5A 4N6
Phone: 604-515-5151 Fax: 604-515-5150

Invoice To Same as Report ? (circle) [✓ Yes] or No (if No, provide details)
Copy of Invoice with Report? (circle) [✓ Yes] or No
Company:
Contact:
Address:
Phone: Fax:

Lab Work Order # (lab use only)

Report Format / Distribution
Standard: ✓ Other (specify):
Select: PDF ✓ Excel ✓ Digital ✓ Fax
Email 1: Dave.Bridger@snclavalin.com
Email 2: Mia.Sakelariou@snclavalin.com
Tim.Drozda@snclavalin.com

Client / Project Information
Job #: 131416 (september 2013)
PO / AFE:
LSD:
Quote #: PWGSC

ALS Contact: Selam Worku
Sampler: TDD / MC

Service Request: (Rush subject to availability - Contact ALS to confirm TAT)
- ☒ Regular (Standard Turnaround Times - Business Days)
- ☐ Priority (2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT
- ☐ Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT
- ☐ Same Day or Weekend Emergency - Contact ALS to confirm TAT

Analysis Request
(Indicate Filtered or Preserved, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	EPH (P)	Anions	Speciated Alkalinity	Ammonia (P)	Total metals (P)	Number of Containers
	SW13-1-130924	24-SEP-13	pm	WTR	X	X	X	X	X	5
	SW13-2-130924	↓	↓	↓	X	X	X	X	X	5
	SW13-3-130924				X	X	X	X	X	5
	SW13-4-130924				X	X	X	X	X	5

L1369090-COFC

Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details

- BCWQG (surface water samples)

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)
Released by: Date: 25-SEP-13 Time: 15:50

SHIPMENT RECEPTION (lab use only)
Received by: Date: 25-Sept-13 Time: 4:00 Temperature: °C

SHIPMENT VERIFICATION (lab use only)
Verified by: Date: Time: Observations: Yes / No ? If Yes add SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

GENF 18.01 Front

4.1 1.1, 0.6, 2.4, 3.4 °C

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

CLIENT NAME: SNC LAVALIN INC.
8648 COMMERCE COURT
BURNABY, BC V5A4N6
(604) 515-5108

ATTENTION TO: Dave Bridger

PROJECT NO: 131416

AGAT WORK ORDER: 13V764328

TRACE ORGANICS REVIEWED BY: Jacky Takeuchi, BScH (Chem Eng), BSc (Bio), C.Chem, Laboratory Manager

ULTRA TRACE REVIEWED BY: Philippe Morneau, chimiste

DATE REPORTED: Oct 07, 2013

PAGES (INCLUDING COVER): 10

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 13V764328
PROJECT NO: 131416

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

CLIENT NAME: SNC LAVALIN INC.

ATTENTION TO: Dave Bridger

Herbicides (soil)

DATE RECEIVED: 2013-09-27

DATE REPORTED: 2013-10-07

			SAMPLE DESCRIPTION:	SS13-1-130925	SS13-2-130925		SS13-3-130925
			SAMPLE TYPE:	Soil	Soil		Soil
			DATE SAMPLED:	9/25/2013	9/25/2013		9/25/2013
Parameter	Unit	G / S	RDL	4788075	4788077	RDL	4788078
2,4-D	ug/g		0.10	<0.10	<0.10	0.20	<0.20
2,4,5-T	ug/g		0.10	<0.10	<0.10	0.20	<0.20
2,4,5-TP (Silvex)	ug/g		0.10	<0.10	<0.10	0.20	<0.20
Dicamba	ug/g		0.10	<0.10	<0.10	0.20	<0.20
Dichlorprop	ug/g		0.10	<0.10	<0.10	0.20	<0.20
Dinoseb	ug/g		0.10	<0.10	<0.10	0.20	<0.20
Picloram	ug/g		0.10	<0.10	<0.10	0.20	<0.20
Diclofop-methyl	ug/g		0.10	<0.10	<0.10	0.20	<0.20
Moisture Content	%		0.1	29.3	22.3	0.1	69.1
Surrogate	Unit	Acceptable Limits					
DCAA	%	50-130		67	79		73

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
4788075-4788077 Results are based on the dry weight of soil extracted.
4788078 Results are based on the dry weight of soil extracted.
Due to the high moisture content the reporting detection limit has been raised.

Certified By: Jody Takeuchi

AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 13V764328
PROJECT NO: 131416

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

CLIENT NAME: SNC LAVALIN INC.

ATTENTION TO: Dave Bridger

Dioxins & Furans (Soil, NATO 1988)

DATE RECEIVED: 2013-09-27

DATE REPORTED: 2013-10-07

			SAMPLE DESCRIPTION:	SS13-1-130925		SS13-2-130925		SS13-3-130925
			SAMPLE TYPE:	Soil		Soil		Soil
			DATE SAMPLED:	9/25/2013		9/25/2013		9/25/2013
Parameter	Unit	G / S	RDL	4788075	RDL	4788077	RDL	4788078
2,3,7,8-Tetra CDD	ng/kg		0.2	<0.2	0.2	0.2	0.3	0.4
1,2,3,7,8-Penta CDD	ng/kg		0.2	<0.2	0.2	0.5	0.4	0.8
1,2,3,4,7,8-Hexa CDD	ng/kg		0.3	0.4	0.2	0.4	0.5	1.1
1,2,3,6,7,8-Hexa CDD	ng/kg		0.2	0.6	0.2	0.4	0.5	1.9
1,2,3,7,8,9-Hexa CDD	ng/kg		0.3	0.6	0.2	0.6	0.5	1.5
1,2,3,4,6,7,8-Hepta CDD	ng/kg		0.3	8.2	0.2	4.1	0.5	21.2
Octa CDD	ng/kg		1	42.1	1	21.9	1	123
2,3,7,8-Tetra CDF	ng/kg		0.2	<0.2	0.2	<0.2	0.4	<0.4
1,2,3,7,8-Penta CDF	ng/kg		0.2	0.4	0.2	0.6	0.4	1.0
2,3,4,7,8-Penta CDF	ng/kg		0.1	0.2	0.1	0.4	0.3	0.7
1,2,3,4,7,8-Hexa CDF	ng/kg		0.1	0.4	0.1	0.4	0.2	1.0
1,2,3,6,7,8-Hexa CDF	ng/kg		0.1	0.4	0.1	0.4	0.2	1.0
2,3,4,6,7,8-Hexa CDF	ng/kg		0.1	0.4	0.1	0.4	0.2	0.9
1,2,3,7,8,9-Hexa CDF	ng/kg		0.2	0.3	0.1	0.6	0.3	0.6
1,2,3,4,6,7,8-Hepta CDF	ng/kg		0.2	3.1	0.1	1.4	0.3	5.9
1,2,3,4,7,8,9-Hepta CDF	ng/kg		0.3	<0.3	0.2	0.5	0.5	0.9
Octa CDF	ng/kg		0.3	5.7	0.3	3.0	0.4	16.1
Total Tetrachlorodibenzodioxins	ng/kg		0.2	0.5	0.2	0.3	0.3	2.2
Total Pentachlorodibenzodioxins	ng/kg		0.2	0.9	0.2	0.7	0.4	1.6
Total Hexachlorodibenzodioxins	ng/kg		0.3	3.1	0.2	2.2	0.5	7.8
Total Heptachlorodibenzodioxins	ng/kg		0.3	13.1	0.2	6.3	0.5	33.4
Total PCDDs	ng/kg		1	59.6	1	31.3	1	168
Total Tetrachlorodibenzofurans	ng/kg		0.2	1.8	0.2	1.0	0.4	3.3
Total Pentachlorodibenzofurans	ng/kg		0.2	1.1	0.2	1.0	0.4	3.4
Total Hexachlorodibenzofurans	ng/kg		0.2	4.4	0.1	2.7	0.3	9.1
Total Heptachlorodibenzofurans	ng/kg		0.3	9.9	0.2	4.5	0.5	21.0
Total PCDFs	ng/kg		0.3	22.9	0.3	12.3	0.5	52.8
2,3,7,8-Tetra CDD (TEF 1.0)	TEQ			0		0.202		0.404
1,2,3,7,8-Penta CDD (TEF 0.5)	TEQ			0		0.265		0.412
1,2,3,4,7,8-Hexa CDD (TEF 0.1)	TEQ			0.0414		0.0377		0.113
1,2,3,6,7,8-Hexa CDD (TEF 0.1)	TEQ			0.0552		0.0426		0.189

Certified By: JPMorneau

Jean Philippe Morneau
2007-094

Certificate of Analysis

AGAT WORK ORDER: 13V764328
PROJECT NO: 131416

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

CLIENT NAME: SNC LAVALIN INC.

ATTENTION TO: Dave Bridger

Dioxins & Furans (Soil, NATO 1988)

DATE RECEIVED: 2013-09-27

DATE REPORTED: 2013-10-07

			SAMPLE DESCRIPTION:	SS13-1-130925		SS13-2-130925		SS13-3-130925
			SAMPLE TYPE:	Soil		Soil		Soil
			DATE SAMPLED:	9/25/2013		9/25/2013		9/25/2013
Parameter	Unit	G / S	RDL	4788075	RDL	4788077	RDL	4788078
1,2,3,7,8,9-Hexa CDD (TEF 0.1)	TEQ			0.0552		0.0552		0.146
1,2,3,4,6,7,8-Hepta CDD (TEF 0.01)	TEQ			0.0816		0.0408		0.212
Octa CDD (TEF 0.001)	TEQ			0.0421		0.0219		0.123
2,3,7,8-Tetra CDF (TEF 0.1)	TEQ			0		0		0
1,2,3,7,8-Penta CDF (TEF 0.05)	TEQ			0.0175		0.0314		0.0501
2,3,4,7,8-Penta CDF (TEF 0.5)	TEQ			0.106		0.178		0.356
1,2,3,4,7,8-Hexa CDF (TEF 0.1)	TEQ			0.0414		0.0382		0.0970
1,2,3,6,7,8-Hexa CDF (TEF 0.1)	TEQ			0.0351		0.0355		0.0970
2,3,4,6,7,8-Hexa CDF (TEF 0.1)	TEQ			0.0449		0.0372		0.0857
1,2,3,7,8,9-Hexa CDF (TEF 0.1)	TEQ			0.0265		0.0639		0.0566
1,2,3,4,6,7,8-Hepta CDF (TEF 0.01)	TEQ			0.0312		0.0138		0.0589
1,2,3,4,7,8,9-Hepta CDF (TEF 0.01)	TEQ			0		0.00492		0.00938
Octa CDF (TEF 0.001)	TEQ			0.00572		0.00302		0.0161
Total PCDDs and PCDFs (TEQ)	TEQ			0.584		1.07		2.43
Surrogate	Unit	Acceptable Limits						
13C-2378-TCDF	%	30-140		49		43		44
13C-12378-PeCDF	%	30-140		53		53		51
13C-23478-PeCDF	%	30-140		56		57		60
13C-123478-HxCDF	%	30-140		58		64		57
13C-123678-HxCDF	%	30-140		62		65		63
13C-234678-HxCDF	%	30-140		59		63		62
13C-123789-HxCDF	%	30-140		65		67		63
13C-1234678-HpCDF	%	30-140		56		60		55
13C-1234789-HpCDF	%	30-140		57		60		53
13C-2378-TCDD	%	30-140		70		65		66
13C-12378-PeCDD	%	30-140		72		75		77
13C-123478-HxCDD	%	30-140		78		82		80
13C-123678-HxCDD	%	30-140		83		88		86
13C-1234678-HpCDD	%	30-140		77		81		70
13C-OCDD	%	30-140		71		76		65

Certified By: JPMorneau

Jean Philippe Morneau
2007-094

Certificate of Analysis

AGAT WORK ORDER: 13V764328

PROJECT NO: 131416

CLIENT NAME: SNC LAVALIN INC.

ATTENTION TO: Dave Bridger

Dioxins & Furans (Soil, NATO 1988)

DATE RECEIVED: 2013-09-27

DATE REPORTED: 2013-10-07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4788075-4788078 The results have been corrected based on the surrogate percent recoveries.

Certified By: JPMorneau

Jean Philippe Morneau
2007-094

Quality Assurance

CLIENT NAME: SNC LAVALIN INC.
AGAT WORK ORDER: 13V764328
PROJECT NO: 131416
ATTENTION TO: Dave Bridger

Trace Organics Analysis

RPT Date: Oct 07, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Herbicides (soil)															
2,4-D	1		< 0.10	< 0.10	0.0%	< 0.10	82%	50%	130%	115%	50%	130%	NA	50%	130%
2,4,5-T	1		< 0.10	< 0.10	0.0%	< 0.10	108%	50%	130%	90%	50%	130%	NA	50%	130%
2,4,5-TP (Silvex)	1		< 0.10	< 0.10	0.0%	< 0.10	119%	50%	130%	80%	50%	130%	NA	50%	130%
Dicamba	1		< 0.10	< 0.10	0.0%	< 0.10	108%	50%	130%	116%	50%	130%	NA	50%	130%
Dichlorprop	1		< 0.10	< 0.10	0.0%	< 0.10	91%	50%	130%	102%	50%	130%	NA	50%	130%
Dinoseb	1		< 0.10	< 0.10	0.0%	< 0.10	111%	50%	130%	64%	50%	130%	NA	50%	130%
Picloram	1		< 0.10	< 0.10	0.0%	< 0.10	86%	50%	130%	101%	50%	130%	NA	50%	130%
Diclofop-methyl	1		< 0.10	< 0.10	0.0%	< 0.10	110%	50%	130%	87%	50%	130%	NA	50%	130%

Certified By: Jody Takeuchi

Quality Assurance

CLIENT NAME: SNC LAVALIN INC.
AGAT WORK ORDER: 13V764328
PROJECT NO: 131416
ATTENTION TO: Dave Bridger

Ultra Trace Analysis

RPT Date: Oct 07, 2013			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dioxins & Furans (Soil, NATO 1988)															
2,3,7,8-Tetra CDD	1	4653392	3.8	3.7	2.7%	< 0.2	70%	70%	130%	NA	70%	130%	76%	70%	130%
1,2,3,7,8-Penta CDD	1	4653392	16.0	16.2	1.2%	< 0.2	80%	70%	130%	NA	70%	130%	82%	70%	130%
1,2,3,4,7,8-Hexa CDD	1	4653392	26.4	26.2	0.8%	< 0.2	88%	70%	130%	NA	70%	130%	90%	70%	130%
1,2,3,6,7,8-Hexa CDD	1	4653392	52.5	50.1	4.7%	< 0.1	81%	70%	130%	NA	70%	130%	81%	70%	130%
1,2,3,7,8,9-Hexa CDD	1	4653392	70.3	70.0	0.4%	< 0.2	111%	70%	130%	NA	70%	130%	102%	70%	130%
1,2,3,4,6,7,8-Hepta CDD	1	4653392	1770	1710	3.4%	< 0.2	85%	70%	130%	NA	70%	130%	102%	70%	130%
Octa CDD	1	4653392	14700	14400	2.1%	< 1	83%	70%	130%	NA	70%	130%	NA	70%	130%
2,3,7,8-Tetra CDF	1	4653392	0.4	0.4	0.0%	< 0.2	81%	70%	130%	NA	70%	130%	81%	70%	130%
1,2,3,7,8-Penta CDF	1	4653392	0.5	0.6	18.2%	< 0.2	88%	70%	130%	NA	70%	130%	89%	70%	130%
2,3,4,7,8-Penta CDF	1	4653392	0.8	0.9	11.8%	< 0.1	82%	70%	130%	NA	70%	130%	83%	70%	130%
1,2,3,4,7,8-Hexa CDF	1	4653392	7.9	8.0	1.3%	< 0.1	88%	70%	130%	NA	70%	130%	88%	70%	130%
1,2,3,6,7,8-Hexa CDF	1	4653392	6.0	7.1	16.8%	< 0.1	94%	70%	130%	NA	70%	130%	92%	70%	130%
2,3,4,6,7,8-Hexa CDF	1	4653392	6.4	5.8	9.8%	< 0.1	98%	70%	130%	NA	70%	130%	96%	70%	130%
1,2,3,7,8,9-Hexa CDF	1	4653392	< 0.3	0.3	NA	< 0.1	94%	70%	130%	NA	70%	130%	90%	70%	130%
1,2,3,4,6,7,8-Hepta CDF	1	4653392	241	236	2.1%	< 0.1	96%	70%	130%	NA	70%	130%	100%	70%	130%
1,2,3,4,7,8,9-Hepta CDF	1	4653392	20.1	19.5	3.0%	< 0.2	98%	70%	130%	NA	70%	130%	94%	70%	130%
Octa CDF	1	4653392	905	866	4.4%	< 0.3	75%	70%	130%	NA	70%	130%	80%	70%	130%

Certified By: JPMorneau

Jean Philippe Morneau
2007-094

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
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Method Summary

CLIENT NAME: SNC LAVALIN INC.
AGAT WORK ORDER: 13V764328
PROJECT NO: 131416
ATTENTION TO: Dave Bridger

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
2,4-D	ORG-91-5110	EPA SW-846 8151A	GC/ECD
2,4,5-T	ORG-91-5110	EPA SW-846 8151A	GC/ECD
2,4,5-TP (Silvex)	ORG-91-5110	EPA SW-846 8151A	GC/ECD
Dicamba	ORG-91-5110	EPA SW-846 8151A	GC/ECD
Dichlorprop	ORG-91-5110	EPA SW-846 8151A	GC/ECD
Dinoseb	ORG-91-5110	EPA SW-846 8151A	GC/ECD
Picloram	ORG-91-5110	EPA SW-846 8151A	GC/ECD
Diclofop-methyl	ORG-91-5110	EPA SW-846 8151A	GC/ECD
DCAA	ORG-91-5110	EPA SW-846 8151	GC/ECD
Moisture Content		MOE E3139	BALANCE

Method Summary

CLIENT NAME: SNC LAVALIN INC. AGAT WORK ORDER: 13V764328

PROJECT NO: 131416 ATTENTION TO: Dave Bridger

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Ultra Trace Analysis			
2,3,7,8-Tetra CDD	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,7,8-Penta CDD	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,4,7,8-Hexa CDD	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,6,7,8-Hexa CDD	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,7,8,9-Hexa CDD	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,4,6,7,8-Hepta CDD	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Octa CDD	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
2,3,7,8-Tetra CDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,7,8-Penta CDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
2,3,4,7,8-Penta CDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,4,7,8-Hexa CDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,6,7,8-Hexa CDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
2,3,4,6,7,8-Hexa CDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,7,8,9-Hexa CDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,4,6,7,8-Hepta CDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,4,7,8,9-Hepta CDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Octa CDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Total Tetrachlorodibenzodioxins	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Total Pentachlorodibenzodioxins	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Total Hexachlorodibenzodioxins	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Total Heptachlorodibenzodioxins	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Total PCDDs	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Total Tetrachlorodibenzofurans	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Total Pentachlorodibenzofurans	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Total Hexachlorodibenzofurans	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Total Heptachlorodibenzofurans	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Total PCDFs	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
2,3,7,8-Tetra CDD (TEF 1.0)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,7,8-Penta CDD (TEF 0.5)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,4,7,8-Hexa CDD (TEF 0.1)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,6,7,8-Hexa CDD (TEF 0.1)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,7,8,9-Hexa CDD (TEF 0.1)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,4,6,7,8-Hepta CDD (TEF 0.01)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Octa CDD (TEF 0.001)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
2,3,7,8-Tetra CDF (TEF 0.1)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,7,8-Penta CDF (TEF 0.05)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
2,3,4,7,8-Penta CDF (TEF 0.5)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,4,7,8-Hexa CDF (TEF 0.1)	HR_151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,6,7,8-Hexa CDF (TEF 0.1)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
2,3,4,6,7,8-Hexa CDF (TEF 0.1)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,7,8,9-Hexa CDF (TEF 0.1)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,4,6,7,8-Hepta CDF (TEF 0.01)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
1,2,3,4,7,8,9-Hepta CDF (TEF 0.01)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Octa CDF (TEF 0.001)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
Total PCDDs and PCDFs (TEQ)	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
13C-2378-TCDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
13C-12378-PeCDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
13C-23478-PeCDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
13C-123478-HxCDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS

Unit 120, 8600 Glenlyon Parkway
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Method Summary

CLIENT NAME: SNC LAVALIN INC.
AGAT WORK ORDER: 13V764328
PROJECT NO: 131416
ATTENTION TO: Dave Bridger

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
13C-123678-HxCDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
13C-234678-HxCDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
13C-123789-HxCDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
13C-1234678-HpCDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
13C-1234789-HpCDF	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
13C-2378-TCDD	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
13C-12378-PeCDD	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
13C-123478-HxCDD	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
13C-123678-HxCDD	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
13C-1234678-HpCDD	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS
13C-OCDD	HR-151-5400	MA.400 DF 1.0/EPA 1613	HRMS

CHAIN OF CUSTODY RECORD

AGAT Laboratories Limited
2910-12th Street NE
Calgary, Alberta T2E 7P7
http://webearth.agatlabs.com

Phone: 403-735-2005
Fax: 403-735-2771
Toll free: 800-661-7174
environmental.agatlabs.com

RUSH TURNAROUND REQUESTS

Upon filling out this section, client accepts that surcharges will be attached to this analysis. If NOT completed, regular TAT will be default.

☐ **Less than 24 hours (200%)**
☐ **24 to 48 hours (100 %)**
☐ **48 to 72 hours (50%)**

DATE REQUIRED:
PLEASE CONTACT LABORATORY TO NOTIFY

LABORATORY USE ONLY
Date and Time: SEP 27 AM 10:29
Arrival temperature: 5°C
AGAT Job Number: 13V764328

Report To:
Company: SNC-Lavalin Inc.
Contact: Dave Bridger
Address: 8648-commerce court
Burnaby BC Postal Code: V5A 4N6
Phone: 604-515-5151 Fax: 604-515-5150
LSD:
Client Project #: 131416

Report Information - reports to be sent to:
1. Name: Dave Bridger
Email: dave.bridger@snclavalin.com
2. Name: Mia Sakelariou
Email: mia.sakelariou@snclavalin.com

Report Format
☐ Single Sample per page
☒ Multiple Samples per page
☒ Excel Format Included

Bill Invoice To: SAME ([✓ Y] / N) - circle
Company:
Contact:
Address:
Postal Code:
Phone: Fax:
PO/AFE#:

Regulatory requirements (Check One):

☒ **CCME**
- ☐ Agricultural
- ☐ Residential/Park
- ☐ Commercial
- ☐ Industrial
- ☐ Drinking Water
- ☐ FWAL

☐ **AB Tier 1**
- ☐ Natural Area
- ☐ Agricultural
- ☐ Residential/Park
- ☐ Commercial
- ☐ Industrial

☐ **Other**
- ☐ BC CSR
- ☐ D50 (Drilling)
- ☐ SPIGEC

Laboratory Use (Lab ID #)	Sample Identification	Sample Matrix	Date/Time Sampled	Comments- Site/ Sample Info. Sample Containment	# OF CONTAINERS	Detailed Soil Salinity (Sat. Paste)	CCME BTEX/F1-F4	Metals (Check Guideline)	Routine Water Potability	AB Class 2 Landfill	BC Landfill (Specify:)	D50 Detailed Soil Salinity (As received)	Microtox	Dioxins + Furans	phenoxy acid herbicides				HOLD FOR 1 YEAR	CONTAMINATED/HAZARDOUS (Y/N)
4788075	SS13-1-130925	SOIL	13-09-25		2									X	X					
↓ 077	SS13-2-130925	SOIL	↓		2									X	X					
↓ 078	SS13-3-130925	SOIL	↓		2									X	X					

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
Tim Drozda	Sept. 25/13 16:50	Lindsay Meikle	Sept. 25, 2013 16:45
		S. Naper	

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

PAGE 1 of 1

NO: 0091929

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY
Work Order # 13V764328

RECEIVING BASICS:
***Complete CoC as well where required**
Date and Time: 27-SEP-13@10:29
Courier: Novex
Received by: S.Napier
Relinquished by: Novex
Branch Received From: Whitehorse
Company: SNCLavalin
Consultant: ______
Client left without count verified: N/A

COC INFORMATION:
Received [✓ Yes] No-Emailed to PM
Completed in full: [✓ Yes] No If NO, why: ______
TURNAROUND TIME: Reg
COC Numbers: 009929

SAMPLE QUANTITIES:
Coolers: 1 Bottles/Jars: 6 Bags: ______

TIME SENSITIVE ISSUES:
Earliest Date Sampled: ______
Microbiology Test: ______
Hydrocarbons Test: ______
ALREADY EXCEEDED? Yes No
Expiry: ______
Expiry: ______
Samples are received >5 days after sampling: Yes No
Time Sensitive Test (circle): BOD, Chlorine, Colour, Dissolved Oxygen, Ortho-Phosphate, Nitrate/Nitrite, pH, Turbidity

SPECIALTY ISSUES:
Legal Samples: Yes No N/A
International Samples: Yes No
**Proper tape/labels applied: Yes No

Hazardous Samples:
Why hazardous: ______

Precaution taken: ______

SAMPLE REQUIREMENTS:
*Complete while logging in by login staff.

Correct bottles used for testing: [✓ Yes] No
If No, explain: ______

Correct amount of sample for analysis: [✓ Yes] No
If No, explain: ______

Are all samples labeled correctly: [✓ Yes] No
If No, explain: ______

NON-CONFORMANCES:
3 temperatures of samples* and average of each cooler: (record differing temperatures on the CoC next to sample ID's) ***use jars when available**
(1) 5+6+5=5 °C (2) __+__+__=__°C (3) __+__+__=__°C (4) __+__+__=__°C

Was ice or ice pack present: [✓ Yes] No

Additional integrity issues:
1) ______
2) ______
3) ______

Account Project Manager: ______ Have they been notified of the above issues: Yes No
Whom spoken to: Date and Time:

ADDITIONAL NOTES:

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM – Branch: Whitehorse Received by: Lindsay

RECEIVING BASICS

Date & Time: Sept. 25, 2013 445 am / [✓ pm] Relinquished by: Tim Drozda Company/Consultant: SNC-Lavalin Inc.

Client left without count verified: Yes / No Custody Seal Intact: Yes / No / NA

COC INFORMATION

COC received: [✓ Yes] / No Emailed to CPM TAT: 24hr 24-48hr 48-72hr [✓ Reg] Other______

COC Complete? [✓ Yes] / No *If NO why: ____________

COC Numbers: ____________

TIME SENSITIVE ISSUES

Earliest Date Sampled: ____________ ALREADY EXCEEDED? Yes No

Microbiology/Time Sensitive Test*: ____________ Expiry: ____________

Hydrocarbon Test: ____________ Expiry: ____________

Are samples received more than **5 days** after sampling: Yes No

**Residual Chlorine, Dissolved Oxygen, Turbidity, BOD, Nitrate/Nitrite, Microtox*

SAMPLE INTEGRITY

Hazardous Samples

Why hazardous: ____________ Precaution taken: ____________

Damaged: Yes / No If YES why? No Bubble Wrap Frozen Courier Other: ____________

Temperature *(to be recorded from bottles/jars only)* N/A – Only Soil Bags received

(1) (Bottle/Jar) 12.2+11.9+12.4=12.2°C **(2)** (Bottle/Jar) ___+___+___=___°C **(3)** (Bottle/Jar) ___+___+___=___°C

(4) (Bottle/Jar) ___+___+___=___°C **(5)** (Bottle/Jar) ___+___+___=___°C **(6)** (Bottle/Jar) ___+___+___=___°C

(If more than 6 coolers are received use another sheet of paper and attach)

Coolant used: Icepack ([✓ Top] / Bottom / Side) Bagged Ice (Top / [✓ Bottom] / Side) Free Ice None

Coolant added by Branch? [✓ Yes] / No **Samples repacked by Branch**? Yes / [✓ No]

Additional integrity issues (Indicate issues below and on the CoC next to the sample ID):

Account Project Manager: ____________ have they been notified of the above issues: Yes No

Whom spoken to: ____________ Date and Time: ____________ CPM Initial: ______