29 March 2018

REPORT

CONFIRMATION OF REMEDIATION

K19 Trutch Former Townsite, Alaska Highway, Northern BC Remedial Excavations 1B and 1C

Submitted to:
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Golder Associates

Executive Summary

Golder Associates Ltd. (Golder) was retained by Public Services and Procurement Canada (PSPC) to monitor and document the remediation of two Areas of Environmental Concern (AEC 1B and AEC 1C) at the Former Trutch Townsite (referred to as K-19 or the Site). The Site is located at KM 320 (Franz 2010a) of the old alignment of the Alaska Highway at latitude 57º43.908 north and longitude 122º56.564 west. The Site is located approximately 247 kilometres (km) north of Fort St. John. (Figures 1 and 2). Remediation work at the Site was undertaken by Tervita Corporation Ltd. (Tervita), based in Victoria, BC, who were contracted by PSPC.

This report was prepared for Canada in accordance with terms and conditions of the Public Works Government Services Canada (PWGSC) Remediation Consulting task authorization contract (reference EZ897-160027/002/PWY) dated 31 July 2015; the scope of work outlined in Golder's document titled "*Implementation Work Plan and Cost Estimate: Tasks in Support of Remediation Implementation of Remediation Plan and Contractor Monitoring, at Site K-19, Alaska Highway, Northern BC*", dated 29 June 2017; and the Remedial Action Plan and Risk Management Plan outlined in Golder's document titled "*2016 Revised Remedial Action Plan / Risk Management Plan, K-19 Trutch Former Townsite, Alaska Highway, Northern BC*" dated 14 October 2016. Approval for the scope of work was provided TA 700386476, dated 10 July 2017.

The Site is located within the former Townsite of Trutch, BC, which historically consisted of a highway construction and maintenance camp, refuelling area, dumpsite and residential area.

Since 2009, a number of environmental investigations have been completed at the Site prior to the remediation work reported herein. The most recent investigation was conducted by Golder in July 2017. The results of the investigation work carried out identified several areas of potential environmental concern (APECs) and areas of environmental concern (AECs), and associated potential contaminants of concern (PCOCs) or contaminants of concern (COCs). AECs were retained based on the results of intrusive investigation work (i.e., soil and groundwater sampling), while APECs were retained based on a review of historical information as well as observations made during the June 2016 site walkover (Figure 2). Additional APECs were identified from a 1951 Site plan provided to Golder by Ron Sedor on 16 September 2016 and summarized in the document entitled "*Updated Sampling and Analysis Plan for K-19 Trutch, Former Alaska Highway Alignment, BC*", dated 22 December 2016. Following the 27 July 2017 investigation program, an updated list of the APECs/AECs at the Site was developed as shown in Table 1, below and on Figure 2. Based on the results of site investigation works conducted to July 2017, nine areas were identified to have petroleum hydrocarbon related contamination in soils and were carried forward for remedial excavation work.

The primary activities conducted at the Site as part of the remediation program included:

- Excavation and off-site disposal of contaminated soil from AEC 1B and AEC 1C at the Site (a summary of the soil volumes removed from each AEC is shown on the table below).
- Decommissioning of 13 of monitoring wells that were located within or in the immediate vicinity of the excavation areas.
- Backfilling of EX17-01 within AEC 1B.
- Partial backfilling of EX17-02 within AEC 1C.
- Site restoration activities.

Summary of Excavated Soil Volumes

AEC	Approximate Volume of Contaminated Material Removed (m^3)	Disposal Location	Residual Soil Contaminants of Concern (in situ)	Status
AEC 1B	16,316	Northern Rockies Landfill (37,290 tonnes)	Benzene, toluene, xylene, naphthalene, LEPH, HEPH, VPH	Further remedial excavation work required to address residual soil contamination in excavation sidewalls
AEC 1C	5,549	Northern Rockies Landfill (5,793 tonnes) Temporary On-Site Stockpile (6,889 tonnes)	Benzene, toluene, xylene, LEPH	Further remedial excavation work required to address residual soil contamination in excavation sidewalls Backfilling of excavation to pre-existing Site grade.

Approximately 16,100 m^3 of backfill materials (ex situ volume), was imported to the Site from the Adsette pit, near Prophet River. Sampling data provided prior to mobilization by Tervita indicated that concentrations of contaminants of concern were below the CSR WL_R standards at the time the results were reviewed. Additional quality assurance sampling and chemical analysis carried out on the backfill material imported to Site by Golder and analysed for metals indicated that concentrations of arsenic in selected backfill samples were above applicable standards. The arsenic exceedances are considered to be related to background soil quality and are the result of regulatory changes that were introduced following the completion of backfilling work at the Site. EX17-01 (AEC 1B) was backfilled, compacted and restored to conditions similar to pre-existing site grades, while the excavated area at EX 17-02 (AEC 1C) was partially backfilled to a depth of approximately 2.0 m bgs.

The overall objective of the remediation activities at the Site was to reduce PSPC's liability associated with contaminated soil and groundwater at the Site. In general, remediation objectives were met, as the majority of the confirmatory soil samples collected from the walls and bases of both excavations meet the applicable CSR WL_R/IL standards. However, a number of confirmatory samples collected in both excavations exceeded these applicable standards, as described in Section 6.0, above. In addition, changes to the CSR Protocol 4 relating to background arsenic concentrations that came to force on 1 November 2017 resulted in slight exceedances in a number of the backfill material which had at the time of sampling and analysis and importation/placement had met the background concentrations.

Based on the scope of the 2017 remediation work that was conducted, residual hydrocarbon contaminated material remains in situ in localized areas within both AEC 1B and AEC 1C. It is anticipated that additional delineation and remediation work will be conducted at AEC 1B in the future, in order to remove the residual contaminated material that underlies the former Alaska Highway alignment as well as along a portion of the eastern wall of the EX 17-01 at AEC 1B. Similarly, for EX 17-02 at AEC 1C, it is anticipated that the residual contaminated material remaining along localized sections of the excavation walls will be delineated laterally and remediated as part of the future remediation program at the Site. Further remediation work at AEC 1C will also include disposal of the existing stockpile of contaminated soils that were excavated as part of the 2017 remediation program.

The following recommendations for AEC 1B and AEC 1C are based on the scope of remediation work conducted at the Site up to November 2017 while considering the overall remediation/risk management strategy for the Site:

- Develop and undertake a post-remediation monitoring program to assess groundwater and soil vapour quality in AEC 1B and AEC 1C. Given that backfilling of EX17-02 at AEC 1C has not yet been completed, this would initially be targeted to the residual contamination within the excavated portion of AEC 1B. The post-remediation monitoring program would entail establishing an appropriate number of nested groundwater monitoring wells and soil vapour probes which would subsequently undergo seasonal annual monitoring (2 events per year). The nested groundwater monitoring wells (screened within the shallow soils and within bedrock) will allow post-remediation groundwater concentrations to be monitored relative to former groundwater monitoring wells that exhibited groundwater contamination within these AECs. The soil vapour probes will allow for assessment of post remediation vapour concentrations associated with residual contamination remaining at depth.
- Undertake an investigation to laterally delineate the remaining residual contamination within AEC 1B at the limits of the Excavation 17-01 to the northwest (beneath the former Alaska Highway alignment) and to the northeast as well as within AEC 1C, along sections of the north, east and south walls on the eastern portion of excavation EX17-02 (wall samples W18, W14, and W13); and,
- At AEC 1C, backfilling and compaction of the remaining areas of excavation EX17-02 will be required as well as removal and off-site disposal of the stockpiled soils that were generated. This would be followed by implementation of post-remediation groundwater and soil vapour monitoring as noted above for AEC 1B.
- Collection of additional soil samples of the imported backfill material to further assess concentrations of arsenic as part of a risk management approach for the Site.

Implementation of the above-mentioned investigation and post-remediation monitoring activities will further support ongoing remediation and risk management at the Site.

Notice to Readers

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The inferences concerning Site conditions contained in this report are based on information obtained during the assessment conducted by Golder personnel, and are based solely on the condition of the properties at the time of the Site reconnaissance, supplemented by historical and interview information obtained by Golder, as described in this report.

This report was prepared, based in part, on information obtained from historic information sources. In evaluating the subject Site, Golder has relied in good faith on information provided. We accept no responsibility for any deficiency or inaccuracy contained in this report as a result of our reliance on the aforementioned information.

The findings and conclusions documented in this report have been prepared for the specific application to this project, and have been developed in a manner consistent with that level of care normally exercised by environmental professionals currently practicing under similar conditions in the jurisdiction.

With respect to regulatory compliance issues, regulatory statutes are subject to change and interpretation. These statutes and interpretations may change over time, and should be reviewed.

If new information is discovered during future work, the conclusions of this report should be re-evaluated and the report amended, as required, prior to any reliance upon the information presented herein.

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1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Public Services and Procurement Canada (PSPC) to monitor and document the remediation of two Areas of Environmental Concern (AEC 1B and AEC 1C) at the Former Trutch Townsite (referred to as K-19 or the Site). The Site is located at KM 320 (Franz 2010a) of the old alignment of the Alaska Highway at latitude 57º43.908 north and longitude 122º56.564 west. The Site is located approximately 247 kilometres (km) north of Fort St. John. (Figures 1 and 2). Remediation work at the Site was undertaken by Tervita Corporation Ltd. (Tervita), based in Victoria, BC, who were contracted by PSPC.

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The tasks undertaken as part of the remediation program comprised monitoring and documentation of two excavations, segregation, off-site disposal of soil, and restoration of the Site, and were conducted between September and November 2017.

1.1 Site Description and Background

The Site is located within the former Townsite of Trutch, BC, which historically consisted of a highway construction and maintenance camp, refuelling area, dumpsite and residential area.

Since 2009, a number of environmental investigations have been completed at the Site prior to the remediation work reported herein. The most recent investigation was conducted by Golder in July 2017. The results of the investigation work carried out identified several areas of potential environmental concern (APECs) and areas of environmental concern (AECs), and associated potential contaminants of concern (PCOCs) or contaminants of concern (COCs). AECs were retained based on the results of intrusive investigation work (i.e., soil and groundwater sampling), while APECs were retained based on a review of historical information as well as observations made during the June 2016 site walkover (Figure 2). Additional APECs were identified from a 1951 Site plan provided to Golder by Ron Sedor on 16 September 2016 and summarized in the document entitled "*Updated Sampling and Analysis Plan for K-19 Trutch, Former Alaska Highway Alignment, BC*", dated 22 December 2016. Following the 27 July 2017 investigation program, an updated list of the APECs/AECs at the Site was developed as shown in Table 1, below and on Figure 2. Based on the results of site investigation works conducted to July 2017, nine areas were identified to have petroleum hydrocarbon related contamination in soils and were carried forward for remedial excavation work.

Table 1: Investigated APEC and AEC Summary Table for K-19

APEC / AEC	Description	Contamination Identified to date[1]	Status
AEC 1 a (3)	Suspected Maintenance Garage	**Soil:** salt related parameters (i.e., sodium and chloride) and petroleum hydrocarbon related parameters **Groundwater:** metals, salt related parameters	Carried forward for remediation of hydrocarbon contamination and risk assessment for salt related contamination (AEC 29). Area for hydrocarbon remediation is delineated.
AEC 1b	Suspected Maintenance Garage	**Soil:** metals (arsenic, barium, zinc), petroleum hydrocarbon related parameters, VOCs **Groundwater:** metals, salt related parameters, petroleum hydrocarbon related parameters (2)	Carried forward for remediation and risk assessment. Area for hydrocarbon remediation is partially delineated. Hydrocarbon contamination in soil and groundwater extends to the former alignment. Off-site delineation has not been completed.
AEC 1c	Suspected Maintenance Garage	**Soil:** metals (arsenic, barium, nickel, selenium) petroleum hydrocarbon related parameters **Groundwater:** metals, petroleum hydrocarbon related parameters	Carried forward for remediation and risk assessment. Area for hydrocarbon remediation is delineated.
AEC/ APEC 1d	Berm of debris (100 m long) near Suspected Maintenance Garage	**Soil:** metals (arsenic, barium and iron) **Groundwater:** metals (lithium[4])	Carried forward as AEC 1d. Metals to be addressed through site wide risk-based evaluation (further detailed below).
AEC 1e	Shallow hydrocarbon contamination on the eastern side of the access road	**Soil:** Metals (arsenic, barium, cadmium), petroleum hydrocarbon related parameters	Carried forward for remediation and risk assessment
AEC 2a	Suspected Maintenance Garage	**Soil:** metals (arsenic, barium, beryllium), petroleum hydrocarbon related parameters **Groundwater:** metals (barium), salt related parameters (2)	Carried forward for remediation and risk assessment. Area for hydrocarbon remediation is delineated.
AEC 2b	Suspected Maintenance Garage	**Soil:** metals (barium), petroleum hydrocarbon related parameters **Groundwater:** metals (barium, cobalt), salt related parameters	Carried forward for remediation and risk assessment. Area for hydrocarbon remediation is delineated.
AEC/ APEC 3a (3)	Former residential area with ASTs, minor surface debris	**Groundwater:** metals (cobalt)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).

APEC / AEC	Description	Contamination Identified to date[1]	Status
AEC/ APEC 3b [(3)]	Former residential area with ASTs, minor surface debris	**Groundwater:** metals (cobalt)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 4	Former residential area with USTs, and minor surface debris	**Soil:** metals (arsenic, barium) **Groundwater:** metals (lithium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 5	Potentially Buried Debris	**Soil:** metals (arsenic, cadmium, and zinc) **Groundwater:** metals (lithium)	Carried forward as AEC 24. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 6	Surface Area Debris	**Soil:** metals (arsenic, zinc) **Groundwater:** metals (lithium)	Area combined with AEC 5 and carried forward as AEC 24. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 7a	Potentially Buried Debris (including Car Parts)	Area addressed with AEC 23a	Area addressed with AEC 23a
APEC 7b	Surface Area Debris	**Groundwater:** Metals (barium and cobalt)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 8	Potentially Buried Debris	None	Retired as an APEC. APEC not retained for further investigation
APEC 9	Surface Area Debris including 200-L Drum	None	Retired as an APEC. APEC not retained for further investigation
APEC 10a	Rebar and 200-L Drum	**Soil:** Metals (barium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 10b	Partially Exposed Metal Pipe	**Soil:** Metals (barium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC/AEC 11	Surface Area Debris including AST, Abandoned Fuel Pumps, and 200-L Drums	**Soil:** metals (arsenic, barium, manganese, zinc) **Groundwater:** metals (lithium)	Carried forward as AEC 11 for metals in soil (manganese and zinc), carried forward as AEC 28 for groundwater. Both to be addressed through site wide risk-based evaluation (further detailed below).
APEC/AEC 12	Surface Area Debris including 200-L Drums, Abandoned Residential Structure, and vehicle parts	**Soil:** metals (barium) **Groundwater:** metals (lithium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).

APEC / AEC	Description	Contamination Identified to date[1]	Status
APEC/AEC 13	Inferred non-industrial buildings on 1951 Gator map (i.e., small buildings without vehicle access)	**Soil:** metals (barium) **Groundwater:** metals (barium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 14	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Soil:** metals (arsenic) **Groundwater:** metals (cobalt)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 15	Inferred industrial building on 1951 Gator map (i.e., large buildings with vehicle access)	**Soil:** metals (arsenic, barium) **Groundwater:** metals (lithium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 16	Inferred non-industrial buildings on 1951 Gator map (i.e., small buildings without vehicle access)	**Soil:** metals (arsenic, barium) **Groundwater:** metals (lithium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 17	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Soil:** metals (arsenic) **Groundwater:** metals (barium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 18	Inferred non-industrial buildings on 1951 Gator map (i.e., small buildings without vehicle access)	**Soil:** metals (arsenic) **Groundwater:** metals (barium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC/AEC 19	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Soil:** metals (arsenic, barium, cobalt) and petroleum hydrocarbon contamination **Groundwater:** metals (cobalt)	Carried forward as AEC 19a and 19b and is carried forward for remediation and risk assessment. Area for hydrocarbon remediation at AEC 19b is not delineated.
APEC 20	Inferred non-industrial buildings on 1951 Gator map (i.e., small buildings without vehicle access)	**Soil:** metals (arsenic) **Groundwater:** metals (lithium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 21	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Groundwater:** metals (lithium)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
AEC 23a	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Soil:** metals (arsenic), petroleum hydrocarbon related parameters **Groundwater:** metals (barium, cobalt), salt related parameters	Carried forward for remediation and risk assessment. Area for hydrocarbon remediation is generally delineated.
AEC 23b	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Soil:** petroleum hydrocarbon related parameters	Carried forward for remediation (surficial contamination). Step out sampling required to confirm lateral extent fully.

APEC / AEC	Description	Contamination Identified to date[1]	Status
APEC/ AEC 24	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Soil:** metals (arsenic, cadmium and zinc), **Groundwater:** metals (cobalt)	Carried forward as AEC 24 for metals in soil (cadmium and zinc), carried forward as AEC 28 for groundwater and arsenic in soil. To be addressed through site wide risk-based evaluation (further detailed below).
APEC 25	Inferred non-industrial buildings on 1951 Gator map (i.e., small buildings without vehicle access)	**Soil:** metals (arsenic, zinc) **Groundwater:** metals (zinc)	Carried forward as AEC 25 for zinc in soil. Carried forward as AEC 28 for groundwater. Metals will be addressed through site wide risk-based evaluation (further detailed below).
APEC 26	Inferred industrial buildings on 1951 Gator map (i.e., large buildings with vehicle access)	**Groundwater:** metals (barium, cobalt)	Carried forward as AEC 28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
APEC 27	Inferred non-industrial buildings on 1951 Gator map (i.e., small buildings without vehicle access)	**Groundwater:** metals (lithium)	Carried forward as AEC28. Metals to be addressed through site wide risk-based evaluation (further detailed below).
AEC 28	Site-wide Metals	**Soil:** metals **Groundwater:** metals	Carried forward for risk-assessment. Related to widespread exceedances of arsenic and barium in soil and dissolved barium, cobalt and lithium exceedances across the Site. Further interpretation and investigation may be required to determine which metals are associated with background concentrations and which are anthropogenic in nature.
AEC 29 a, b and c	Site-Wide Storage and Handling of Salt	**Soil:** sodium and chloride ions **Groundwater:** salt related parameters	Carried forward for risk-assessment. Generally delineated. Further localized refinement of extent of contamination may be required.

Notes:

1) For a more detailed discussion on Site contaminant of concern and potential contaminants of concern, please refer to the SAP (Golder 2017a) and RAP documents (Golder 2016d) and/or the sections below.

2) AEC was defined by Franz / Arcadis under the federal Regulatory Regime. Based on existing data these areas are considered APECs rather than AECs.

3) Note that PAHs were also detected in the historical drinking water well located in this area. Given the condition of the historical well (i.e., no cover, large diameter) samples from this well are not considered representative of groundwater conditions in this APEC. Further investigation of groundwater in this area was completed and exceedances to hydrocarbon related parameters were not observed.

4) Dissolved lithium exceeds at all APECs/ AECs that were tested for groundwater and it is listed only at APECs/ AECs in which lithium is the sole groundwater parameter that exceeds the applicable standards.

The present report summarizes the results of the remedial excavations within AECs 1B and 1C, carried out from 26 September to 17 November 2017. Table 2 below, provides a summary of the aerial extent, approximate depth, and approximate volume of petroleum hydrocarbon contamination in AECs 1B (base work) and 1C (optional work) that were targeted for remedial excavation as described in this report.

Table 2: Summary of AECs Retained for Remedial Excavation during September-November 2017

APEC / AEC	Description	Estimated Aerial Extent (m^2)	Approximate Depth Range of Contamination (m bgs)	Approximate Volume proposed for Remedial Excavation (m^3)[1]	Status
AEC 1B	*Suspected Maintenance Garage*	*4,200*	*0 – 6.0*	*17,792*	With the exception of the north-west portion of the AEC (where contamination extends beyond the Site boundary), and three wall sample locations along the north-east wall of the excavation, the area for remediation is delineated. Petroleum hydrocarbon contamination in soil and groundwater extends beneath the former alignment. Off-site delineation has not been completed. Remediation of on-site soil contamination was implemented during September/October 2017
AEC 1C	*Suspected Maintenance Garage*	*1,900*	*0 – 4.0*	*7,648*	Area for remediation is broadly delineated. Remediation excavation was implemented in October and November 2017.
Total Approximate Volume for Remedial Excavation in confirmed AECs				**21,800**	Preliminary estimated volumes based on the level of delineation up to July 2017.

Notes:

1) Volume estimate for AEC 1B assumes a maximum excavation depth of 6 m bgs in the area northeast of the former alignment. Volume for remedial excavation assumes that low level exceedances at depth greater than 6 m bgs can be addressed through risk assessment and post remediation monitoring. Volume estimate is based on conceptual understanding of Site conditions at the end of July 2017 and prior to implementation of remediation work implemented in September through November 2017.

1.2 Remediation Strategy

In discussions with PSPC, the overall remediation strategy for the Site is to remove hydrocarbon and VOC contaminated soil from the Site through excavation and off-site disposal. Due to the relatively shallow nature of the petroleum hydrocarbon and solvent contamination present at the Site in most locations (i.e., 5 m to 6 m below ground surface [bgs]), excavation of the majority of the petroleum hydrocarbon and solvent contamination in accessible areas of the Site is considered to have a high likelihood of success, and provides a high degree of certainty that soil would be sufficiently remediated (by removal of the main contaminant source areas) to meet the project objectives. In addition, while excavating to remove petroleum hydrocarbon and solvent contaminated soils, some areas of metals- contaminated soils could also be removed. Post-remediation monitoring of groundwater and soil vapour will be required in order to confirm that the remediation objectives have been met.

Residual groundwater contamination or inaccessible soil contamination remaining following the remediation will be addressed through risk assessment / risk management. Once remediation has been confirmed, the Site will be evaluated through the Federal Contaminated Sites Action Plan (FCSAP) Site Closure Tool.

2.0 OBJECTIVES AND SCOPE OF WORK

2.1 Objectives

Overall, the objective of the remediation activities at the Site was to reduce PSPC's liability associated with contaminated soil and groundwater at the Site. The remediation was conducted in accordance with the Work Plan prepared by Golder *"*1657709-037-L-Rev0-6000 - *Implementation Work Plan and Cost Estimate: Tasks in Support of Remediation Implementation of Remediation Plan and Contractor Monitoring at Site K-19, Alaska Highway, Northern BC",* dated 29 June 2017, and the Remedial Action Plan and Risk Management Plan outlined in Golder's document titled "1657709-008-R-Rev1-2000 - *2016 Revised Remedial Action Plan / Risk Management Plan, K-19 Trutch Former Townsite, Alaska Highway, Northern BC*", dated 14 October 2016.

2.2 Scope of Work

The scope of work for this project included the following main tasks:

- Task 1: Assistance with Review of Contractor Submittals
- Task 2: Preparation for Site remediation activities
- Task 3: Monitoring and documenting the Contractor's activities during remediation
- Task 4: Closure Reporting and associated tasks
- Task 5: Project Management and coordination

These tasks are described in further detail in the sections below.

2.2.1 Assistance with Review of Contractor Submittals

Golder assisted PSPC in reviewing the submittals specified in the tender package, including the following:

- Environmental Protection Plan
- Quality Assurance and Quality Control Plan
- Contractor Emergency Response Plan
- Excavation, Shoring, Sloping and Backfilling Plan
- Project Schedule and Updates

After the review of the submittals, Golder provided the results of the review to PSPC in the Technical Review template, including a general comment on thoroughness/completeness relative to the requirements of the Specifications and the additional information that was still pending and/or required within the submittal(s). In addition, prior to the Contractor mobilization to Site, Golder assisted PSPC with review of the proposed backfill quality to be used during the remedial excavation program.

2.2.2 Preparation for Site Remediation Activities and Project Planning

This task was associated with project planning and preparatory activities, including development of a Site-specific health and safety plan, coordination of resources and equipment and coordination with the laboratory required during the course of the remediation activities.

Tervita was assigned the role of prime Contractor and was responsible for overall health and safety at the Site. Golder revised and updated the Site-specific health and safety, environment plan (HaSEP) and Emergency Response Plan (ERP) developed during previous phases of work at the Site. The HaSEP was updated to address and provide controls for the potential hazards associated with the remediation work; identify the personal safety equipment and the project personnel responsibilities; and provide the decontamination procedures.

This task included an internal project kick-off prior to mobilization to the Site, as well as the following field coordination and planning activities:

- Coordination with contractors and subcontractors to confirm scope of work, scheduling, and develop work orders.
- Reserve and ship field equipment and supplies.
- Booking flights, rental vehicles and accommodations.

2.2.3 Monitoring and Documenting the Contractor's Activities During Remediation

This task included Golder's monitoring of the remediation activities undertaken by Tervita to excavate accessible contaminated soils, as outlined in the Specifications. Specifically, the scope for this task included:

- Full time monitoring and documenting the excavation of contaminated soils at the Site and providing daily reports to PSPC Departmental Representative (DR).
- Assisting the Contractor (Tervita) with segregating excavated soils and identifying the excavation limits.
- Collection of confirmatory soil samples from the walls and, where applicable, base of the excavation areas in general accordance with British Columbia MoE Technical Guidance #1 (TG #1) – Site Characterization and Confirmation Testing.
- Submission of soil samples to the analytical laboratory AGAT Laboratories (AGAT)
- Regular tabulation of Chain of Custody submissions, laboratory Certificate of Analysis, analytical data (including confirmation samples), Site photographs and certificates of disposal.

- Screening tabulated analytical data against applicable standards.
- Providing summaries of the confirmatory sampling results relative to applicable standards, and indicating if excavations could be backfilled, or if additional excavation were recommended to achieve remediation objectives.
- Coordinating progress surveys of excavation areas upon reaching the limits of the excavation and to document volumes of soil that were excavated.
- Coordinating post-excavation surveys of excavation areas to assess if areas have been reinstated to pre-excavation conditions.
- Attending Progress Meetings scheduled and led by Tervita on a weekly basis throughout the duration of the Work.
- Attending daily Tailgate Meetings scheduled and led by Tervita throughout the duration of field activities.
- Reviewing progress claims, change orders and breakdown of lump sum prices provided by Tervita.
- Reviewing the testing results for backfill provided by Tervita for use at the Site, indicating the acceptability of the material to Tervita for its intended use.

2.2.4 Closure Reporting and Associated Tasks

This task includes the preparation of a Confirmation of Remediation Report (this report). The confirmation of remediation report describes the field methods, observations and results of the remediation program, including:

- An overview of schedule and summary of activities undertaken by the Contractor and Golder.
- For each excavation area, a discussion of field observations, extents of contamination, volumes of soil removed, and a discussion concerning the manner in which the excavation areas were reinstated to original condition.
- Results of confirmatory sample analyses, including a discussion on the quality of soil left in place, figures showing confirmatory sample locations, updated analytical soil figures with excavation limits and coloured halos and chemistry call outs for confirmation samples.
- Updated screened analytical soil data.
- Brief discussion on soil contamination left in place (i.e., in areas where soils could not be removed due to proximity to roadways, etc.) and the extent of the contamination.
- Overall conclusions of the remediation activities, and recommendations for further investigation/delineation (if warranted) as part of the next phase of remediation at the Site.

2.2.5 Project Management and Coordination

The activities related to the management and coordination effort included setting up the appropriate work breakdown structure, identifying risk and its monitoring/mitigation, internal and external communications, respective task budgets/tracking and appropriate invoicing protocols, together with day to day coordination of the activities carried out during the remedial activities.

As part of project initiation, an internal kick-off meeting was conducted with the Golder's project team to confirm the project expectations, responsibilities, lines of communication and key deliverable schedules.

In addition, daily field summaries were provided for the duration of the field activities undertaken by Golder during the remediation activities at the Site.

2.3 Revisions to the Original Scope of Work

The original scope of work as outlined in the Technical Specifications and the RAP/RMP, was generally followed during the implementation of the remediation program. However, the following revision to the original scope of work was made during the course of the remedial excavation program:

- The soil disposal volumes were revised due to the variations between the assumed bulk density adopted during tender and the actual value provided by Tervita following comparison of weights through weigh scales at the time of disposal. This resulted in a tonnage factor of 2.28 kg/m^3 being adopted instead of approximately 1.80 kg/m^3, as estimated during the tendering process. The higher density factor resulted in a higher rate of disposal of contaminated and resulted in the overall construction budget being consumed faster than anticipated. As such, PSPC opted to stockpile a portion of the excavated soils from AEC 1C that was exceeded the tonnages assumed in the unit price table of the tender document. Therefore, approximately 54% of the soil from this remedial excavation was stockpiled and temporarily placed on-site for disposal as part of future remediation phases of the project. The initial scope of work assumed that 100% of soils that were excavated from both remedial excavations (AEC 1B and 1C) would be disposed at the Northern Rockies Landfill, located in Fort Nelson, BC.

3.0 APPLICABLE REGULATORY CRITERIA

Golder understands that the Site is owned by the province of British Columbia and leased from the Province by PSPC. The former Site use was industrial but also included accommodation as part of the maintenance camp. Currently there are no buildings on-site. Based on this ownership structure, and taking into consideration the objectives of the remediation works, and considering that Provincial regulations are to be applied in the event that the Site is transferred back to the Province, only the Provincial environmental legislation was applied to the Site to assess soil quality during the remedial activities at the Site.

Generally, provincial and municipal laws, regulations and requirements do not apply on federal lands, activities or undertakings. Soil and other materials that are removed from federal lands may become subject to provincial or municipal laws and regulations. Provincial or municipal standards may be used in relation to federal lands only as guidelines for the purpose of establishing remediation goals and objectives. The term "standards" is used in this part in order to maintain consistency in terminology throughout this document, and does not imply that standards contained in provincial or municipal laws and regulations apply on federal lands, activities or undertakings.

In British Columbia, environmental matters pertaining to contaminated sites generally fall under the jurisdiction of the Ministry of Environment and Climate Change Strategy, pursuant to the Environmental Management Act (EMA, SBC 2003, Chapter 53 assented to 23 October 2003, updated to 30 October 2017). The key regulation under the EMA that relates to the assessment and remediation of contaminated sites is the Contaminated Sites Regulation (CSR; BC Reg. 375/96, O.C. 1480/96 and M271/2004, as updated [includes amendments up to BC Reg. 253/2016 and BC Reg. 196/2017, updated to 1 November 2017]). BC Reg. 253/2016 is also known as the Stage 10 or Omnibus amendment; BC Reg. 196/2017 is also known as the Stage 11 or Housekeeping amendment. These two amendments, effective as of 1 November 2017, include significant changes to the text and numerical standards of the CSR, and are accompanied by new technical guidance documents and administrative procedures.

A related regulation under the EMA is the Hazardous Waste Regulation (HWR; BC Reg. 63/88, O.C. 268/88, as updated [includes amendments up to BC Reg. 243/2016, updated to 1 November 2017]). Previous amendments to the CSR and the HWR (in effect 19 July 2016) decoupled the CSR and HWR for the management of contaminated sites, such that the role of the HWR in contaminated sites is limited to cases of off-site transport and disposal of material meeting the criteria of hazardous waste, and cases involving materials that do not meet the definition of on-site media (e.g., drums of hazardous waste, dumped hazardous waste, mine tailings and waste rock).

A third regulation in effect in BC that applies to environmental investigations is the BC Ground Water Protection Regulation (GPWR; BC Reg 39/2016, O.C. 113/2016, including amendments up to BC Reg 152/2016, 10 June 2016). This regulation establishes standards to protect groundwater supplies by requiring wells in BC, including environmental boreholes, test pits and monitoring wells, to be properly constructed, maintained, and, at the end of their service and properly deactivated.

3.1 Provincial CSR Soil Standards

The CSR identifies soil standards based on six land use categories and two sub-categories: Agricultural (AL); Urban Park (PL); Wildlands (WL) (subdivided into natural and reverted); Residential (RL) (subdivided into low density and high density); Commercial (CL); and Industrial (IL). The CSR also includes standards for the protection of human health (including intake of contaminated soil) and environmental protection in consideration of environmental receptors. The standards are further divided into site-specific standards, based on the nature of the land and groundwater use at or in the area of a subject site, including standards for groundwater used for drinking water (DW), groundwater flow to aquatic life in surface water (AW), groundwater used for livestock watering (LW), and groundwater used for irrigation (IW). The CSR also includes provision for the development of site-specific risk-based standards.

Current and future land use of the Site is considered to be Wildlands Reverted (WL_R). For the purposes of remediation, WL_R soil standards were considered applicable for the top three metres of soil, while CSR IL soil standards were considered applicable for soil samples collected deeper than 3 metres below ground surface (m bgs).

The following CSR matrix and generic numerical soil standards (Schedule 3.1, Parts 1 and 2) were considered applicable to the Site:

- Human health protection—intake of contaminated soil
- Human health protection—protection of groundwater used as drinking water
- Environmental protection—toxicity to soil invertebrates and plants
- Environmental protection—groundwater flow to freshwater used by aquatic life

3.2 BC Hazardous Waste Leachable Quality Standards

Toxicity characteristic leaching procedure (TCLP) results were compared to BC Hazardous Waste Leachable Quality Standards (Schedule 4 in HWR).

3.3 Remediation Objectives for Contaminated Soil

Although the Site was historically managed by the federal government, it is currently owned or permitted to the Peace River District (PRD), therefore provincial soil standards were used as remediation objectives. Similarly, as soil removed from the Site was disposed of at an off-site, provincially-permitted facility, soil for disposal was compared to the CSR and HWR standards. In addition, as noted in the RAP/RMP, PSPCs preferred remediation approach is to adopt the Provincial CSR document and associated guidance as the primary regulatory document for the development of the remedial objectives for the Site while the applicable Federal guidelines were considered as part of site characterization works

4.0 REMEDIATION METHODS AND PLANNING

4.1 Roles and Responsibilities

The following designations are used in this document to refer to the key personnel responsible for executing various work functions and making decisions during the remediation process.

The general responsibilities of these personnel are outlined below.

Federal Custodian / Departmental Representative: Public Services Procurement Canada was the federal custodian and DR for the Site. PSPC funded and was ultimately responsible for the remediation project outlined in the Contract Documents and this document. For the purposes of this project PSPC was considered as the Site owner.

PSPC's On-Site Representative: Golder acted as PSPC's on-site Representative during the Site work, and had responsibility for field administration as it relates to soil management. During this time, Golder liaised directly with PSPC DR. Golder's specific duties included:

- Monitoring the excavation (including monitoring well decommissioning), identification and transportation of suspect or potentially-contaminated soil.
- Surveying progress of excavations on a daily basis, in order to calculate excavated soil volumes from within the remedial excavations.
- Providing technical input to the PSPC DR and, if approved by the PSPC DR, to the Contractor on matters related to soil contamination.
- Developing and monitoring the adequacy of the sampling and analysis plans.
- Collecting confirmatory soil samples from the walls and base of the remedial excavations for chemical testing.
- Interpreting analytical results.
- Making recommendations regarding the disposal of contaminated soil, based on the analytical results.
- Monitoring and documenting the Contractor's compliance with procedures designed to protect aquatic and terrestrial habitat.

Contractor: Tervita was the designated Contractor, or Prime Contractor, for this specific project. The Contractor's scope of work was outlined in the Contract Document and included preparing the Site, excavating, transporting and disposing the soil, and managing the overall health and safety at the Site. The Contractor's full responsibilities were outlined in the Contract Document.

The Contractor was also responsible for the installation and maintenance of protective equipment and structures intended to prevent detrimental impacts to habitat, including fencing and adequate excavation sloping.

4.2 Health and Safety

As the prime contractor, Tervita was responsible for implementing the overall Site health and safety plan and was ultimately responsible for the health and safety of the Federal Custodian, PSPC Representative and contractor workers during the remediation. As part of Tervita's health and safety program, workers were required to undergo a Site-specific health and safety (H&S) orientation prior to working on-site. A designated first aid attendant was present on-site for the duration of the Site activities. Tervita chaired weekly progress meetings, during which health and safety issues were discussed.

Prior to undertaking the field program, Golder developed a Site-specific Health, Safety and Environment Plan (HaSEP) for Golder employees and Golder subcontractors working at the Site. The HaSEP was intended to provide a guide to Golder personnel to safely and effectively undertake their scope of work and identify, address and mitigate potential hazards at the Site. Golder completed an internal health and safety tailgate meeting daily prior to the Site health and safety meeting conducted by Tervita. The HaSEP included details for the mitigation and control measures to the identified Site-specific hazards. Safety meetings and work-task risk assessments were conducted prior to, and during the work.

4.3 Project Schedule

Table 3 below, outlines the schedule of on-site activities and tasks completed by Tervita and Golder and their subcontractors during the remedial program.

Table 3: Timeline of Work Completed

Date	General Site Activities and Tasks Completed
25 September 2017	Mobilization
26 September 2017	Site Preparation
27 September 2017	Health and Safety Orientation[1] Contractor Surveying the proposed limits of remedial excavation EX17-01 (AEC 1B) EX17-01 initiated
27 September 2017 to 5 October 2017	Remedial excavation work within AEC 1B: ▪ Confirmatory Sampling ▪ Soil disposal ▪ Backfilling of excavations
2 October 2017	Monitoring wells decommissioned within the limits of excavation EX17-01 (AEC 1B)
3 October 2017	Monitoring wells decommissioned within the limits of excavation EX17-02 (AEC 1C)
6 to 10 October 2017	Thanksgiving Holiday Break
11 October to 12 November 2017	Continuation of remedial excavation work within AEC 1B: ▪ Confirmatory Sampling ▪ Soil disposal ▪ Backfilling of excavation
30 October 2017	Remedial excavation EX17-02 (AEC 1C) initiated
30 October to 15 November 2017	Remedial excavation work within AEC 1C:

Date	General Site Activities and Tasks Completed
	▪ Confirmatory Sampling ▪ Soil disposal ▪ Backfilling of excavation
9 to 15 November 2017	Stockpiling on-site contaminated material from EX17-02 (AEC 1C) for future disposal
12 November 2017	Backfilling of excavation EX17-01 (AEC 1B) completed
15 November 2017	Partial backfilling of excavation EX17-02 (AEC 1C) completed Finished berm and fencing around EX17-02 (AEC 1C) Placed poly on the two on-site stockpiles Final survey of the extension of both remedial excavations
17 November 2017	Golder Demobilized; Tervita commences staged demobilization of equipment
28 November 2017	Contractor on-site for collecting and removing oversize waste debris
30 November 2017	Golder on-site confirming oversize waste was removed from the Site
13 December 2017	Tervita final demobilization from Site
15 December 2017	Golder personnel on-site for final inspection

Notes:

1. Health and safety orientations were provided for new workers to the Site on an on-going basis. Daily health and safety meetings, administered by Tervita, were held for Site workers.

4.4 Excavation Layouts

For description purposes as part of this report, and to clarify the geographical orientation of the remedial excavations, four (4) walls were defined for each excavation, as shown on Figure 3, and outlined below:

- AEC 1B (remedial excavation EX17-01):
  - Northwest Wall: includes confirmatory soil sampling locations located along the former Alaska Highway Alignment: W4, W5, W6, W7, W8, W28, W27, W26, W22, W21, W19, W20, W13, W12, and W11.
  - Northeast Wall: includes confirmatory soil sampling locations W14, W15, W36, W38, W39, W16, and W17.
  - Southwest Wall: includes confirmatory soil sampling locations W3, W2, W1, W9, W31, W32, W33, W34, W30, and W29.
  - Southeast Wall: includes confirmatory soil sampling locations W35, W37, W24, W23, and W18.
- AEC 1C (remedial excavation EX17-02):
  - North Wall: includes confirmatory soil sampling locations W11, W12, W18, and W17.
  - East Wall: includes confirmatory soil sampling locations W15, W14, and W16.
  - South Wall: includes confirmatory soil sampling locations W2, W3, W4, W5, W6, W8, W10, and W13.
  - West Wall: includes confirmatory soil sampling locations W1, W7, and W9.

4.5 Soil Classification

The term “soil” is used to describe material including fill and native soils that were present within the remediation areas. These materials have been classified as follows for the purposes of this report:

- “Overburden” refers to the surficial soil located within the remedial excavation areas. Overburden soil at the Site was previously characterized and in places met the applicable CSR soil standards.
- “Contaminated” refers to characterized soils where contaminant concentrations exceeded the CSR WLR and/or IL standards, and may have contained indicators of potential contamination (odours, staining, discolouration and debris). Contaminated soils were divided into the following categories:
  - Waste Quality (WQ): Soils with contaminant concentrations that exceeded the applicable CSR WLR and IL standards.
  - Hazardous Waste (HWQ): Soils with contaminant concentrations that exceeded the British Columbia Environmental Management Act, Hazardous Waste Regulation standards.
- “Residual Bedrock” generally consisted of weathered siltstone and was excavated as part of the remediation program.
- “Competent Bedrock” refers to native, intact, bedrock material. Competent bedrock was not excavated as part of the remediation program. Competent bedrock was considered the depth of refusal for excavation planning purposes.
- “Backfill” soil refers to assessed soils hauled on-site for backfilling purposes from approved locations. Analysed contaminant concentrations in backfill material were less than the CSR WLR/IL standards and did not contain indicators of potential contamination.

Soils were generally managed as outlined in Table 4.

Table 4: Summary of Soil Management

Soil Classification	Soil Management
Clean overburden	Temporarily stockpiled on-site for re-use as backfill material
Waste Quality	Direct Off-site Disposal under manifest
Hazardous Waste Quality	Direct Off-site Disposal under manifest
Backfill	Hauled on-site for backfilling purposes

4.6 Soil Disposal

Tervita utilized one disposal facility for soil generated at the Site that required off-site disposal:

- **Northern Rockies Landfill**—permitted to accept Waste and Hazardous Waste Quality soils.

The Northern Rockies Landfill is an engineering landfill facility that is permitted to accept hazardous waste under PR16078.

Non-contaminated overburden soils were temporarily stockpiled on-site, generally adjacent the excavation area, and reused for backfilling the remedial excavations once they were completed.

4.7 Remedial Excavation

Tervita and their subcontractors conducted the remedial excavation of the two AECs between 26 September 2017 and 17 November 2017. Subcontractors retained by Tervita during the course of the remediation are shown in Table 5.

Table 5: Subcontractors Retained by Tervita

Subcontractor	Role
Tangle Ridge Custom Crushing Ltd.	Provision and operation of equipment, trucking
Can-Am Geomatics Ltd.	Surveyors
HMR Engineering Inc.	Geotechnical engineers
Cira Medical Services Ltd.	First Aid on-site

Golder retained Vector Geomatics Land Surveying Inc. (Vector) from Fort Saint John, BC, for surveying, on an as-needed basis. Golder field staff conducted daily surveys to estimate the volumes of excavated soil and to record the locations of confirmatory soil samples. Vector were mobilized to Site at the request of Golder to provide further QA verification of Golder survey methods and measurements. Further detail regarding Vector's QA methods are described in Section 4.12.4.

The general limits of the excavations at the two AECs were laid out by Can-Am Geomatics prior to commencing with the excavation and were reviewed and agreed upon by Golder. One front end loader (John Deere 744K) and two John Deere excavators (350G LC and 470G LC models) were used for the excavation, loading trucks, stockpile construction and backfilling. Tangle Ridge sub-contracted several trucking companies to transport excavated soil from the excavations to the stockpile area or to the appropriate disposal facility, and transport imported fill materials for backfill.

Upon reaching inferred remedial excavation limits, soil samples were recovered from the walls and base of the excavations and analyzed as outlined in Section 4.7.3, below. The remedial excavation limits are shown on Figure 3. The locations from which the confirmatory soil samples were collected are shown on Figures 6A, 6B, and 7. Select Site photographs are provided in Appendix A.

No utilities were encountered during the remedial works of AECs 1B and 1C.

4.7.1 Soil Segregation

The excavation activities were conducted in general accordance with the specifications provided in Tervita's Environmental Protection Plan and Excavation Plan. Golder staff were on-site to monitor the excavation and provide information to Tervita for the segregation of soils according to characterized contamination levels.

The clean overburden material was temporarily stockpiled adjacent to the limits of the remedial excavations, in order to excavate contaminated soils.

As indicated in Table 4 above, contaminated soils were in general "hot loaded" for direct disposal (i.e., excavated and disposed off-site without further characterization). The limits of the excavation were determined by results of previous investigations and information regarding historical land uses at the Site, visual observations (e.g., black staining or visual presence of hydrocarbons, metal debris, demolition debris, or wood waste material) made in the field, and field screening of organic vapour with a calibrated organic vapour monitor (headspace measurements).

Field screening of soil samples was undertaken with the dry headspace method, whereby a small volume of soil was placed in a sealed plastic bag, shaken, and left to stand for several minutes. The headspace over the soil was then monitored for the presence of organic vapours using a photoionization detector (PID) equipped with a 10.6 electron volt (eV) ultraviolet lamp calibrated to 100 parts per million (ppm) isobutylene.

4.7.2 Soil Stockpiling

Soil excavated from both remedial excavations was generally removed directly from Site for disposal, as the material was classified for disposal based on sample results obtained during previous investigations at the Site.

However, a portion of the excavated soil from remedial excavation of AEC 1C was temporarily stockpiled on-site, due to budget constraints related to the excavated soil disposal. The stockpile was lined with polyethylene sheeting, and will be removed from the Site during future remediation phases.

4.7.3 Soil Sample Collection

Confirmatory soil samples were collected in pre-cleaned 125 mL glass soil sample jars and 40 mL glass vials preserved with methanol. Sample containers were supplied by the laboratory. Samples were thumb-packed in the jars to minimize release of volatiles from the soil. In general, two jars and two vials were filled for samples to account for breakage and allow for re-analysis at the laboratory. Each sample jar was labelled, registered on a chain-of-custody (CoC) form, packed in cardboard boxes and placed in a cooler with ice for transport to the laboratory. Appropriate preservatives, prepared by the laboratory, were used to preserve samples where appropriate.

Soil samples were submitted to the laboratory for analysis of contaminants of concern including benzene, toluene, ethylbenzene, xylenes (BTEX), volatile petroleum hydrocarbons (VPH), polycyclic aromatic hydrocarbons (PAHs), and light and heavy extractable petroleum hydrocarbons ($LEPH_s$/$HEPH_s$).

4.7.3.1 Confirmatory Soil Samples

Confirmatory soil samples were recovered from the limits of excavations to assess and document soil quality at these limits and to confirm that the soil remaining on the Site after completion of the remediation work met the CSR WL_R/IL use standards. The collection of confirmatory samples was consistent with BC MoE's *Technical Guidance #1 on Contaminated Sites, Site Characterization and Confirmation Testing* (2009). In general, one discrete sample was collected from the base of the excavation for each 10 m by 10 m area (one sample per approximately 100 m^2). In areas were suspected hazardous waste was expected, base soil samples were collected for each 5 m by 5 m area (one sample per approximately 25 m^2). A discrete soil sample was also recovered from the excavation sidewalls every 5 to 10 m and from multiple depths to assess the quality of differing soil strata, as applicable. Samples were generally collected within the first metre and every subsequent metre thereafter. In general, the walls along the excavations were sloped during the remedial activities, in order to avoid potential geotechnical stability issues. As the result, wall samples were usually collected at different depths along the slope of the excavation walls, as shown on Figures 6A, 6B, and 7.

Additional samples were collected where warranted based on field observations including visual and olfactory evidence of contamination and headspace measurements.

If contaminated soil (i.e., soil exceeding the CSR WL_R/IL guidelines) was identified through the confirmatory sampling program, information on the soil quality was provided to the PSPC DR and the Contractor. If needed, and agreed to by the PSPC DR, the Contractor, and Golder, additional excavation was conducted to remove contaminated material associated with the laboratory results or the high PID readings. In such instances, the area of the exceedance of the CSR WL_R/IL standards was excavated with a minimum of 10 m^3 of additional soil removed for disposal in accordance with BC MoE Technical Guidance #1 or based on field observations that utilized the data from previous investigations as well as PID and/or laboratory data during the remedial excavations. The area was then subjected to further confirmatory sampling. The remedial excavation was considered complete once the analytical results from confirmatory soil samples representing soil remaining at the limits of the excavation met the WL_R and/or IL soil quality standards, or when practical limits of excavation were reached (e.g., competent bedrock or former highway alignment).

In both remedial excavations, some soils exceeding the applicable guidelines were left in place due the proximity of existing roadways (along the northern wall of AEC 1B), or when the bedrock was reached (base of both excavations). In addition, residual contamination along portions of the walls on the northeast, east and southeast of excavation 1C was identified but not removed due to project budget constraints. It is anticipated that the removal of residual contamination along the walls of AEC 1B and AEC 1C will be undertaken as part of future remediation at the Site.

4.7.3.1.1 Confirmatory Sample Naming Convention

Confirmatory samples were collected from sidewall and base locations at one or more depths, in general accordance with BC MoE Technical Guidance #1. During the remediation program, wall samples collected from remedial Excavation at AEC 1B were coded as EX17-01, while samples collected from remedial Excavation AEC 1C were coded as EX17-02.

Wall sample names shown in Tables 17 and 19 (at the end of this report) include the excavation location (e.g., EX17-01), the wall sample location (e.g., W13), and letters to denote the sample depth (A, B, C, etc.); whereas the base samples include the excavation location (e.g., EX17-01), and the base sample location (e.g., B2). In order to simplify the sampling naming notation on the Figures of this report, wall and base samples locations for both remedial excavation have not included the "EX17-01 and EX17-02" prefixes (e.g., EX17-01-W9A, has been simplified to W9A).

When a confirmatory sample contained concentrations of a contaminant of concern (CoC) exceeding the applicable standards, and where practical, the sample was considered "interim" and additional soil was excavated. An additional confirmatory sample would then be collected from the equivalent location on the new sidewall or base, and the new sample would be named using the next available and not previously used number, following the same naming methods described above.

4.7.3.2 Contaminants of Concern

Based on the results of previous investigations, CoCs included LEPH/HEPH, naphthalene, 2-methylnapthalene, BTEX and VPH. In addition, where hazardous waste soil quality was identified in remedial excavations AEC 1B and 1C, confirmatory soil samples were also analyzed for dichloromethane. Selection of confirmatory samples for analysis along the walls of the remedial excavations was based on visual and PID observations as well as to allow reasonable characterization of the vertical contamination profile; whereas all the confirmatory samples collected from the base of the excavations, were scheduled for analysis.

Other analyses necessary for assessing the contaminated soils in regard to landfill acceptance requirements included additional toxicity characteristic leaching procedure (TCLP) BTEX, as well as leachable anions and nutrients including fluoride, nitrate, nitrite, and cyanide. The results of these analyses were presented in Golder's report entitled "*Supplementary Report on Environmental Investigation – K19 Trutch Former Townsite, Alaska Highway, Northern BC*" (DRAFT, dated 15 December 2017).

The turnaround time (TAT) for the samples collected was generally 4 days from receipt by the laboratory; however, in cases where the data was critical to the completion of the ongoing work, a rush of 24h to 48h TAT was requested.

4.8 Monitoring Well Decommissioning

Monitoring wells present within the excavation footprints were decommissioned by Tervita prior to proceeding with the remedial activities. Methods for decommissioning the monitoring wells were generally consistent with the BC Ground Water Protection Regulation (BC Reg 299/2004), and involved filling the polyvinyl chloride (PVC) monitoring well with coated bentonite pellets, and hydrating the bentonite to create a low-permeability seal. Later during excavation, these monitoring wells were exposed and cut off at the base of the excavation, or removed completely.

Monitoring wells that were decommissioned or removed are shown in Table 6, below.

Table 6: Monitoring Wells Decommissioned during Remediation

Monitoring Well	Depth Monitoring Well (m bgs)	Excavation Location	Decommissioning Date
K19A-09MW-01	10.5	AEC 1B	2 October 2017
K19A-10MW-02	7.3		
K19-MW16-02	4.2		
K19-MW16-14	7.9		
K19-MW17-01S	4.8		
K19-MW17-01D	8.8		
K19-MW17-02	8.3		
K19A-10MW-10	9.1	AEC 1C	3 October 2017
K19A-10MW-26	4.6		
K19A-10MW-28	8.8		
K19A-10MW-29	3.1		
K19-MW16-04	5.0		
K19-MW16-06	11.3		

In addition to the monitoring wells decommissioned within the limits of the remedial excavations, three (3) monitoring wells were accidentally destroyed during the remediation works, and are no longer available for monitoring purposes: K19-MW16-03S, K-19-MW16-03D, and K19A-10MW04. The three monitoring wells were located around AEC 1B.

4.9 Water Management

No groundwater was encountered during the remedial excavation work of AECs 1B and 1C. Furthermore, no discharge permits and/or a water treatment system was needed during the remedial activities.

4.10 Laboratory Analysis

AGAT Laboratories (AGAT) was retained by PSPC to perform the chemical analyses for the soil samples collected by Golder during the remediation. Samples were stored and transported by air and/or ground transportation to the laboratory in chilled coolers with chain-of-custody forms. Sample analytical results are provided in Tables 17 through 22 (at the end of this report). AGAT was contracted by PSPC to analyse the confirmatory soil samples collected as part of the investigation. AGAT is certified by the Canadian Association for Laboratory Accreditation (CALA) for the analyses undertaken.

Copies of the analytical reports and the corresponding chain-of-custody forms are provided in Appendix D.

4.11 Backfilling and Restoration

Backfilling and compaction at the Site was undertaken concurrent with the excavation, in accordance with the Excavation Plan prepared by Tervita, and Tervita's geotechnical engineer (HMR Engineering). Backfill soils were sourced as shown in Table 7, below.

Table 7: Details for Backfill Soils

Backfill Soil Sample	Sample Collection Date	Source of Backfill Material	Fill Type
COMPA	3 October 2017	Adsette Pit, near Prophet River	Clayey till with trace of sand and gravel
COMPB	3 October 2017		
COMPC	3 October 2017		
BACKFILL1	19 October 2017		Sand and gravel with cobbles
BACKFILL2	26 October 2017		
BACKFILL3	1 November 2017		
BACKFILL4 (FDA)	8 November 2017		
BACKFILL4 (FD)	8 November 2017		
BACKFILL5	13 November 2017		

During the course of the remedial excavations, nine backfill soil samples, including one (1) field duplicate were collected by Golder and analyzed by the laboratory, to assess the environmental quality of the imported soils. COMPA, B, and C consisted of composite soil samples that were collected directly at the source (Adsette Pit), while BACKFILL1 to 5 were discrete soil samples collected on-site, for soil quality verification, during the remedial activities. Backfill samples were analyzed for metals, chloride, sodium, LEPH/HEPH/PAHs, and BTEX/VOCs. Backfill materials imported into the Site were visually assessed for evidence of potential hydrocarbon contamination prior to placement in the excavations.

4.12 Quality Assurance and Quality Control Methods

4.12.1 Field Procedures

To assess and document that the sampling and analytical data are interpretable, meaningful, and reproducible, conformance to a Golder quality assurance/quality control (QA/QC) program was followed. Standard industry field procedures were used throughout the field investigation to ensure that reproducibility would be achieved. This involved using QA/QC measures in both the collection (field program) and analysis (laboratory) of samples. A detailed description of the QA/QC procedures and a discussion of the results of the QA/QC program are presented in Appendix E.

4.12.2 Data Transfer

Standard Golder data quality checks were completed to verify that electronic and manual data transfers (e.g., compilation of data into tables) were complete and that potential for errors was minimized.

4.12.3 Laboratory QA/QC

The quality of the generated laboratory data was assessed using the appropriate laboratory quality control samples and laboratory quality replicate samples. Quality control samples consisted of analytical method blanks, analysis of reference material, laboratory replicate samples and laboratory spikes.

4.12.4 Survey Validation

During the remediation program, Golder was responsible for surveying the progress of the extent of excavations on a daily basis, for the purposes of calculating excavated soil volumes. However, on 5 October 2017, Vector Geomatics was on-site to survey the extent of remedial excavation AEC 1B up to that point of the remediation program. The purpose of Vector's survey was to cross-check the excavation volume that was calculated by Golder staff up to 5 October 2017. As of 5 October, Golder estimated an excavated soil volume of 5,707 m^3, while Vector Geomatics estimated a volume of 5,737 m^3. Given that Vector's volume calculations were similar in magnitude to those calculated by Golder, Golder's surveying methods were considered valid for volume calculation purposes for the remainder of the excavation program.

5.0 RESULTS OF REMEDIATION IMPLEMENTATION

Golder field personnel were present at the Site full time during the remedial program to observe the excavation, collect samples for confirmation of remediation, provide information to the contractor on behalf of the PSPC DR, monitor segregation of characterized soils, conduct progress surveys and to document the scope of work completed by the Contractor during the remediation.

5.1 Mobilization to Site

On 25 September 2017, Golder and Tervita mobilized to Site. On 26 September 2017, an on-site kick-off meeting occurred with Tervita, Golder and Tangle Ridge. The PSPC DR was not present for the kick-off meeting. Topics discussed included health and safety orientation, project timeline, scope of remediation work, and constraints.

5.2 Health, Safety and Environment

Tervita was prime contractor in regard to Site health and safety. Near misses and environmental incidents occurred during the course of work at the Site. Near misses and incidents were notified to the PSPC DR and discussed at daily tailgate meetings and controls were implemented to mitigate the hazards identified. Near misses and environmental incidents are summarized in Table 8, below.

Table 8: Summary of Near Misses, Incidents, and Environmental Incidents

Date	Class	Description
24 October 2017	Health and Safety	Ambient air in vicinity of hazardous waste cell above 5 ppm limit. Excavator operator wore respirator, with appropriate cartridges, while working within that area.
27 October 2017	Health and Safety	Golder employee reported two small cuts and minor swelling on their fingers. On site first aid attendant treated the injury, and the employee returned to work. Employee unaware when injury occurred or whether injury occurred on-site or not.
27 October 2017	Environmental	Leak of hydraulic fluid from haul truck trailer. Approximately 1L reached the ground surface. An estimated 0.2L of hydraulic oil was also released to ground surface during the repair of the haul truck. Impacted soil was collected for disposal to an off-site treatment facility.
30 October 2017	Environmental	Haul truck spilled engine coolant over an approximate area of 200 m^2. Approximately 5 L was released. Impacted material was excavated and disposed off-site on 10 November 2017.
5 November 2017	Environmental	350G LC excavator leaked hydraulic fluid from excavator arm. Fluid was observed over the excavator arm and operator cabin but no fluid reached the ground surface. 744K front end loader was found to be leaking a small amount of hydraulic fluid from a fitting. The leak was contained within the machine and no fluid reached the ground surface.
6 November 2017	Environmental	470G LC excavator found to be leaking hydraulic oil. The machine was sitting on an impacted material stockpile when leak occurred. Approximately 10 L of hydraulic fluid reached the surface of the impacted material stockpile while another, estimated, 30 L of fluid was absorbed by spill pads.
9 November 2017	Environmental	350G LC excavator found to be leaking hydraulic oil. The machine was sitting on an impacted material stockpile when leak occurred. Approximately 30L of hydraulic fluid was released. 0.3 L of hydraulic fluid reached the surface of the impacted material stockpile while the remaining amount was captured by spill pads.

5.3 Site Preparation

At the initiation of remedial activities, the areas to be remediated included mainly open grassy areas and no clearing of the area was needed. The main Site preparation activities undertaken by Tervita included:

- Mobilization of equipment and Site office trailer and facilities.
- Construction of haul road at the north end of AEC 1B, and at the south end of AEC 1B following excavation of contaminated material in this area.
- Surveying and marking the extension of both remedial excavations.
- Creation and delineation of the areas for temporary stockpiling of excavated soils.

Site preparation activities conducted by Tervita were generally completed in accordance with Tervita's Environmental Protection Plan.

5.4 Soil Excavation

Excavation of contaminated soil was initiated on 27 September 2017 and concluded on 16 November 2017. During the remedial excavation, one front end loader and two excavators were used to excavate and load trucks for transport and direct disposal, as well as moving around the imported backfill materials. Approximately 23,641 m^3 of soil was excavated from the Site as part of the remediation program. A breakdown of excavation volumes and tonnages by excavation area and soil quality is presented in Table 9 (Section 5.5). The extents of the remedial excavations are shown in Figure 3. Results of confirmatory sampling are discussed in Section 5.7 and shown on Figures 10A, 10B and 11. Final survey of the extension of both remedial excavations was carried out by Golder on 15 November 2017.

5.4.1 AEC 1B

Excavation of AEC 1B (denoted as EX17-01 on the figures and below) was conducted between 27 September 2017 and 12 November 2017.

Affected soils were excavated and removed until competent bedrock was reached, with depths ranging from depths of 4.0 to 6.0 metres below ground surface (m bgs). The excavation walls were in general sloped for avoiding geotechnical issues, with slope angles generally managed at 1H:1V, with the exception of the northwest wall, which was excavated at a slope of approximately 1H:2V, due to the presence of the former alignment of the Alaska Highway. The excavation was extended laterally from the original inferred limits due to the presence of affected soils, along the northeast and southeast walls. Backfilling and compaction was conducted concurrently with the excavation to minimize the accumulation of precipitation and the area of the excavation was backfilled to surface. The overall grade within certain areas of AEC 1B was slightly higher (< 0.3 m) following backfilling than at the beginning of the excavation program.

Although no underground utilities were identified during the remedial activities, an abandoned piece of concrete slab (oversize waste debris) was found and removed on the south-eastern corner of the excavation. The concrete slab was removed and stockpiled adjacent to the excavation for future disposal. On 28 November 2017, Tervita used a breaker hammer to break up the concrete into pieces manageable for transport and disposal. The concrete debris was disposed at Northern Rockies Landfill on the same day.

Approximately 16,316 m^3 of contaminated soil were excavated from EX17-01, including approximately 1,485 m^3 of HWQ soils. During the course of the excavation, 97 confirmatory sidewall samples and 48 confirmatory base samples were collected and analysed. PID measurements for these confirmatory samples (i.e., those representing the final limits achieved) ranged from below the instrument detection limit (IDL) of 0.1 ppm to 977.5 ppm. The highest PID readings were observed at confirmatory sample location EX17-01-20B, located at the north-west wall of the excavation. As anticipated from the previous site characterization data, the highest exceedances corresponded with portions of the north-west wall, along the former Alaska Highway alignment, as well as several hot spots located along the north-eastern wall of the excavation. The PID readings for each confirmatory soil sample are shown on Tables 17 to 20, at the end of this this report.

Approximately 33,897 tonnes of Waste Quality (WQ) material and 3,393 tonnes of HWQ material were disposed at the Northern Rockies Landfill as part remedial excavation work conducted at AEC 1B. The HWQ soils were disposed of under HW manifests and Transportation of Dangerous Goods (TDG) protocols.

5.4.2 AEC 1C

Excavation of AEC 1C (denoted as EX17-02 on the figures and below) began on 30 October 2017 and was completed on 15 November 2017.

Affected soils were excavated and removed until competent bedrock was reached, with depths ranging from depths of 2.5 to 4.0 metres below ground surface (m bgs). No underground utilities were identified during the remedial activities. In general, the walls of this remedial excavation were excavated almost vertically, with minimal sloping. The eastern portion of this excavation was excavated shallower than originally anticipated, due to the shallower presence of bedrock in this area.

Backfilling and compaction was conducted following removal of contaminated material from AEC 1C. However, backfilling of AEC 1C to the pre-existing grade was not completed due to PSPC's budgetary constraints related to the overall budget originally assigned for the disposal of the affected soils for both excavations. Approximately 1 m of backfill material was placed and compacted within the excavation limits. Further details regarding backfill results are provided in Section 5.8.

Approximately 5,549 m^3 of soil were excavated from AEC 1C, including approximately 128 m^3 of HWQ. Approximately 5,500 tonnes of WQ soil and 293 tonnes of HWQ soil were disposed off-site at the Northern Rockies Landfill. The HWQ soils were disposed of under HW manifests and TDG protocols. Due to project budgetary constraints, approximately 6,889 tonnes of WQ soil was stockpiled on-site instead of off site disposal. It is anticipated that this soil will be removed from Site as part of a future remediation program.

During the course of the excavation, 36 confirmatory sidewall samples and 27 confirmatory base samples were collected and analysed. PID measurements for these confirmatory samples (i.e, those representing the final limits achieved) ranged from below the instrument detection limit (IDL) of 0.1 ppm to 196.2 ppm, on location EX1702-W14C, located at the east wall of the excavation.

5.5 Summary of Excavated Soil

A summary of excavated volume and tonnage totals by excavation area is presented in Table 9, below. Copies of Tervita's Soil Disposal Manifests are included as Appendix C.

Table 9: Summary of Approximate Excavation Volumes by Area

Excavation Area	Waste Quality		Hazardous Waste Quality	
	Approximate Volume[1]	Approximate Tonnage[2]	Approximate Volume[1]	Approximate Tonnage[2]
EX17-01 (AEC 1B)	16,316	37,200	1,485	3,393
EX17-02 (AEC 1C)[3]	5,549	5,793 (disposed off-site)	128	293
		6,889 (stockpiled on-site)		
Total	**21,865**	**49,882**	**1,613**	**3,686**

Notes: (1) Approximate volumes in m^3 provided by Tervita at the end of the field program; (2) Estimated tonnage calculated using a soil density of 2.2855 kg per cubic metre, obtained by dividing total tonnage by volume. (3) Approximately 5,549 m^3 of soil was excavated from AEC 1C, representing an overall tonnage of 12,682 tonnes. 5,793 tonnes was disposed off-site, while 6,889 tonnes of soil is currently stockpiled on-site.

5.6 Soil Stockpiling

During the remedial activities, imported backfill soils were temporarily stockpiled in the area located directly east of the remedial excavation at AEC 1B. The total amount of the imported backfill materials were used during the restoration backfill of both remedial excavations; therefore, no imported backfill materials are currently present on-site.

Overburden soils excavated from both remedial excavations were temporarily stockpiled on-site in the area located directly southwest of excavation AEC 1B. Approximately 650 m^3 of overburden material was stockpiled on-site for future backfill completion of excavation AEC 1C. The material was stockpiled in order to be used as surface grading material as part of future Site restoration.

Soil excavated from both remedial excavations were transported and disposed to the approved disposal facility at the Northern Rockies Landfill. Soil excavated from the remedial excavation at AEC 1B was directly hauled and disposed off-site during the course of the excavations. However, approximately 3,014 m^3 of soil excavated from remedial excavation at AEC 1C was stockpiled adjacent to the east of the excavation limits at this location for future off-site disposal. The soils were placed on a polyethylene liner, and the stockpile was covered with a polyethylene tarp when the remedial activities at AEC 1C where completed. The tarps were secured using small amounts of overburden material along the top and around the tarp perimeter, at the ground level.

Locations of current stockpiles on-site, as well as other Site restoration items, are shown on Figure 14.

5.7 Confirmatory Sampling Results

Confirmatory soil samples were collected from sidewalls and bases of the excavations to assess and document soil quality at the excavation limits and to confirm that soil remaining on the Site after completion of the remediation work met the applicable CSR WL_R and IL standards. The limits of the excavations were defined by the historical assessment results, in addition to visual, olfactory evidence and field measurements collected during remedial works.

As discussed previously in Section 4.5 above, CSR WL_R soil standards are considered applicable for samples collected between depths of 0 and 3 m bgs, while CSR IL soil standards are considered applicable for samples collected at depths greater than 3 m bgs.

Two-hundred and eight (208) confirmatory soil samples were collected from both remedial excavations, and analysed as follows:

- 208 samples analysed for PAHs, LEPH/HEPH, BTEX, and VPHs
- 21 samples analysed for dichloromethane

A summary of confirmatory results by excavation area is presented in Table 10 and the sections below. Laboratory Analytical Certificates are included as Appendix D. Results of confirmatory sampling are included as Tables 17 to 20, at the end of this report.

Table 10: Summary of Confirmatory Samples

Excavation Area	Number of Sidewall Samples	Number of Base Samples	Number of Interim Confirmatory Samples
EX17-01 (AEC 1B)	97	48	2
EX17-02 (AEC 1C)	36	27	-
Total	**133**	**75**	**2**

5.7.1 AEC 1B

Approximately 16,316 m^3 (37,290 tonnes) of contaminated soil was removed from AEC 1B. Upon completion, the excavation area was approximately 4,548 m^2 and the depth ranged from 4.0 m bgs at the eastern end, to 6.0 m bgs in the central area. Photographs of the pre-remedial and post-remedial excavation are provided in Appendix A, while a visual summary of excavation progress is shown in Figure 4.

One hundred and forty-five (145) confirmatory samples, including 19 field duplicates, were collected from the sidewalls and base of the excavation. The confirmatory samples were submitted for PAHs, LEPH/HEPH, BTEX, and VPHs. In addition, confirmatory base samples from the central area of the excavation (where hazardous waste soils were removed) were analyzed for dichloromethane.

Table 11 below, summarizes the soil samples collected from each wall of the excavation:

Table 11: Soil Sampling Locations – AEC 1B

Excavation Wall	Soil Sampling Locations
Northwest Wall	W4, W5, W6, W7, W8, W28, W27, W26, W22, W21, W19, W20, W13, W12, and W11
Northeast Wall	W14, W15, W36, W38, W39, W16, and W17
Southeast Wall	W35, W37, W24, W23, and W18
Southwest Wall	W3, W2, W1, W9, W31, W32, W33, W34, W30, and W29

As shown on cross sections A-A' and B-B' (Figures 8 and 9, respectively) and on Figures 12A and 12B, several confirmatory soil samples collected from the base and the walls of the excavation contained concentrations above the applicable CSR standards for one or more of the following parameters: naphthalene, LEPH/HEPHs, VPHs, benzene, toluene, and xylene. The wall exceedances were mainly present along the former Alaska Highway alignment (northwest wall of the excavation), over a lateral distance of approximately 70 m, with depths ranging from 0.5 to 5.5 m bgs (locations W7, W8, W28, W27, W26, W22, W21, W19, and W20). Three hot spots along the northeast wall of the excavation (locations W17, W36 and W39) also exceeded applicable CSR standards at depths of approximately 1.5 m bgs. A polyethylene (poly) liner was placed along the areas of the walls where those samples were collected, for being used as a marker for future remediation programs. Specific locations where the poly marker was placed are shown on Figure 14.

In the case of the base samples, collected when the competent bedrock was reached at the bottom of the excavation, the exceedances were mainly located in the central area of the excavation where the hazardous waste soils were excavated (B3, B4, B6, B40, B33, B39, B38, B41), as well as in location B44, in the northeast portion of the excavation. The depths of base confirmatory sample exceedances ranged from 5 to 6 m bgs, at the competent bedrock interface.

A summary of exceedances in confirmatory soil samples collected from AEC 1B is shown on Table 12, below.

Table 12: Summary of Petroleum Hydrocarbon Compounds in Confirmatory Samples – AEC 1B

Parameter	Benzene	Toluene	Xylene	Naphthalene	LEPH	HEPH	VPH
CSR WL_R Standard (mg/kg)	0.035	0.5	6.5	0.6	1,000	1,000	200
CSR IL Standard (mg/kg)	0.035	0.5	6.5	20	2,000	5,000	200
Number of soil samples exceeding the CSR WL_R/IL standards	18	6	3	3	6	1	6
Maximum concentration (mg/kg)	44.1	5.36	11.4	6.50	5,930	2,340	1,790

Detailed analytical results for AEC 1B confirmatory samples are presented in Tables 17 and 18, at the end of this report.

5.7.2 AEC 1C

Approximately 5,549 m^3 (12,682 tonnes) of soil were removed from AEC 1C. Upon completion, the excavation area was approximately 1,957 m^2 and the depth ranged from 2.5 m bgs in the eastern end, to 4.0 m bgs at the western end. The variation in the final excavation depth from east to west is related to presence of competent bedrock topography. Photographs of the pre-remedial and post-remedial excavation are provided in Appendix A, while the staged excavation progress is shown in Figure 5.

Sixty-three (63) confirmatory samples, including four (4) field duplicates were collected from the sidewalls and base of the excavation. The confirmatory samples were submitted for PAHs, LEPH/HEPH, BTEX, and VPHs. In addition, confirmatory base samples were analyzed for dichloromethane in the area where hazardous waste soils were removed.

Table 13 below, summarizes the soil samples collected from each wall of the excavation.

Table 13: Soil Sampling Locations – Excavation AEC 1C

Excavation Wall	Soil Sampling Locations
North Wall	W11, W12, W18, and W17
East Wall	W15, W14, and W16
South Wall	W2, W3, W4, W5, W6, W8, W10, and W13
West Wall	W1, W7, and W9

As shown on cross sections C-C' and D-D' (Figures 10 and 11, respectively) and on Figure 13, several confirmatory soil samples collected from the base and the walls of the excavation contained concentrations above the applicable CSR standards for at least one or more of the following parameters: LEPH, benzene, toluene, and xylene.

The wall exceedances were mainly located along the north (W18), east (W14), and south (W13) walls of the excavation, with depths ranging from 0.5 to 2.5 m bgs. Exceedances of base samples were observed at sample locations B2, B3, and B4, in the area where the hazardous waste soils were excavated at depths of 3.75 m bgs, and in locations B18, B20, and B23, at depths ranging from 2.5 to 3.5 m bgs. Base confirmatory samples were collected when competent bedrock was encountered at the bottom of the excavation.

A polyethylene liner was placed along the segments of those walls where confirmatory soil samples showed exceedances (hot spots along the north, east, and south walls), before the backfilling of the excavation started. The poly liner will be used as a marker for future remediation programs. Specific locations where the poly marker was placed are shown on Figure 14.

A summary of exceedances in confirmatory soil samples collected from AEC 1C is shown on Table 14, below.

Table 14: Summary of Petroleum Hydrocarbon Compounds in Confirmatory Samples – AEC 1C

Parameter	Benzene	Toluene	Xylene	LEPH
CSR WL_R Standard (mg/kg)	0.035	0.5	6.5	1,000
CSR IL Standard (mg/kg)	0.035	0.5	6.5	2,000
Number of soil samples exceeding the CSR WL_R/IL standards	8	3	2	1
Maximum concentration (mg/kg)	1.57	2.76	7.5	2,790

Detailed analytical results for AEC 1C confirmatory samples are presented in Tables 19 and 20, at the end of this report.

5.7.3 Interim Confirmatory Soil Sample Results

During the excavation activities, two interim confirmatory soil samples (collected from the limits of the excavation in AEC 1B) were found to contain concentrations of petroleum hydrocarbon-based compounds exceeding the CSR WL_R/IL standards. In those cases, a minimum of an additional 10 cubic metres of soil were removed, in accordance with the CSR *Technical Guidance #1: Site Characterization and Confirmatory Testing* (January 2009) or based on field observations that utilized the data from previous investigations as well as PID and/or laboratory data during the remedial excavation monitoring. The additional volume of material that was removed from such areas was centred on the initial soil sampling location, and following the removal, a subsequent confirmatory sample was collected in the soil horizon that previously exceeded the standard. Interim confirmatory samples are shown in Tables 17 to 20, at the end of this report, and are shaded grey indicating they have been removed.

5.8 Results of QA/QC Analysis

The methods and detailed results of QA/QC analyses are included in Appendix E. QA/QC analyses included a review of field duplicate results and a review of laboratory QA/QC tests from the most recent investigation. The key findings of the QA/QC review are summarized below.

5.8.1 Duplicate Frequency

The target duplicate frequency is 10% or greater, and Golder met this target overall and for individual analytes during the present field program, as shown below:

- LEPH/ HEPH/PAH—11.06%
- BTEX/ VPH—11.54%
- Dichloromethane—14.23%

5.8.2 Relative Percent Difference and Difference Factor

The target Relative percent difference (RPD) and difference factor (DF) are as follows:

- For parameters in soil except PAHs, a RPD of less than 35%.
- For PAH parameters in soil, a RPD of less than 50%.
- For parameters with concentrations less than five times the MRL, the difference factor should be less than two (2).

RPD and DF values for selected parameters exceeded Golder's internal objectives of RPDs of 50% for PAHs, HEPH, VH and VPH; and 35% for other parameters and/or DFs of 2 in soil. The elevated RPDs and/or DFs are considered to be a result of sample heterogeneity. Furthermore, the majority of the duplicate pairs where an elevated RPD and/or DF value was observed, the results of both the original and duplicate samples were both either above or below the applicable CSR soil standards. Therefore, the QA/QC results are not considered to affect the interpretation of soil quality at the Site.

5.8.3 Laboratory QC

No exceedances of laboratory QC tests were identified.

5.9 Site Restoration

5.9.1 Backfilling

Excavations were backfilled with appropriate and approved material for the restoration of the Site to existing grade. Backfilling at the Site was undertaken concurrently with the excavation. Previously stockpiled overburden materials as well as approved imported fill were used for backfilling the remedial excavations. EX17-01 (AEC 1B) was backfilled, compacted and restored to conditions similar to pre-existing site grades; while the excavated area at EX 17-02 (AEC 1C) was partially backfilled to a depth of approximately 2.0 m bgs, as shown on Figure 5.

Imported backfill materials from the Adsette Pit, located near Prophet River, were transported to Site on the return trip from the Northern Rockies Landfill to the Site. As outlined in Section 6.2 of Tervita's Environmental Protection Plan, trucks leaving the landfill were inspected, prior to departure from the landfill and before being loaded with backfill material, to confirm that truck boxes were fully emptied of contaminated soil and that tailgates were clean.

The backfill materials mainly consisted of a gravelly sand with cobbles. Golder personnel visually inspected the imported soils before they were placed into the remedial excavations in addition to undertaking additional samples for chemical analysis at rate of approximately 1 sample per 2700 m^3 of imported soils.

A summary of backfill quantities is presented in Table 15, below.

Table 15: Summary of Placed Backfill Quantities

Backfill Material	AEC 1B (m^3)	AEC 1C (m^3)
Imported Backfill	17,756	1,430
Overburden Backfill	1,064	-

5.9.1.1 Backfill Analytical Results

Analytical results for backfill soils are presented as Table 21, at the end of this report. In general, backfill samples were found to be below the applicable CSR standards, with the following exceptions:

- COMPA, COMPB, COMPC, and BACKFILL4 and BACKFILL5 samples were found to the be slightly above the applicable CSR WL_R and IL standards for arsenic.

The arsenic exceedances are considered to be related to regional background soil quality and are the result of regulatory changes that took effect on 1 November 2017. The implications of these changes are further discussed in Section 6.3. Although selected arsenic exceedances were observed, the material was considered to meet overall remediation and risk management objectives for the Site (e.g. risk-management of metals exceedances), because the magnitude of the exceedances was similar to metals concentrations that were previously identified at the Site.

5.9.1.2 Backfill Compaction

Compaction of backfill soils was undertaken by Tervita, in accordance with the Specifications provided by HMR Engineering in the document titled “Sloping and Shoring Excavation Plan, and Backfilling Recommendations. Trutch Remediation Project, Trutch, British Columbia”, dated 6 October 2017, and included in Appendix F, at the end of this report.

As specified in the Specifications, backfilling at the Site was undertaken concurrently with the excavation. Backfill was placed in nominal lifts not exceeding 300 mm in thickness and was compacted using a combination of excavator tracks and bucket, as well as the bucket of the front end loader. The backfill material did not contain materials such as ice, snow, and/or debris prior to placement.

5.9.2 Site Restoration

Site restoration activities were initiated shortly after completion of excavation and backfilling. Site restoration activities included:

- Removing the temporarily signs and installations installed by the Contractor.
- Removal of the heavy machinery used during the remedial excavations.
- Removal of temporary fencing along the former Alaska Highway alignment (within AEC 1B).
- Fencing the perimeter of the partially backfilled excavation at AEC 1C.

On 30 November 2017, Golder personnel visited the Site to confirm that the restoration activities were completed by the Contractor. With the exception of the perimeter fencing of remedial excavation at AEC 1C, and the removal of the heavy machinery used by the Contractor, Site restoration works were complete. During a final Site walkover carried out by Golder personnel on 15 December 2017, outstanding Site restoration activities were complete. An outline of the restored Site is shown on Figure 14.

5.10 Demobilization from Site

Golder demobilized from Site on 17 November 2017 and Tervita demobilized Site equipment and facilities between 17 November and 15 December 2017.

6.0 SUMMARY OF EXCAVATION WORK AND RESIDUAL SOIL CONTAMINATION

The RAP/RMP for the Site anticipated that, in localized areas, contamination may have extended into the bedrock and recommended a remedial strategy based on a combination of source removal through excavation of soils and risk management of residual contamination that exceed applicable CSR IL standards.

Residual contamination with petroleum hydrocarbon compounds including BTEX compounds, VPH/VH, and PAH compounds, exceeding the applicable CSR WLR/IL was identified at competent bedrock surfaces in localized areas within AEC 1B and AEC 1C as well as within some sections of some of the excavation walls. The presence of petroleum hydrocarbon above the applicable CSR WLR/IL along some sections of the walls requires further excavation work.

A summary of residual soil contamination within AEC 1B and AEC 1C is provided in the following sections.

6.1 AEC 1B

The confirmatory samples within AEC 1B that exceeded applicable CSR standards were mainly found along the northwest wall (samples W7, W8, W17, W19, W20, W21, W22, W26, W27 and W28) and northeast wall (samples W17, W36 and W39) as well as the base areas from where the HWQ soils were excavated (B3, B6, B4, B33, B38, B39, B40, B41, and B44), as shown on Figures 8, 9, 12A and 12B.

Residual contaminated soils were not excavated at these sampling locations due to:

- Geotechnical set-backs and sloping established by HMR Engineering (Tervita's geotechnical engineer) along the northwest wall of the excavation, close to the former Alaska Highway alignment.
- The proximity to the temporary access road with the walls alongside the northeastern limits of the excavation.
- Competent bedrock underlying the affected soils at the base of the excavation.

Based on the results of the remediation work conducted in AEC 1B in 2017, further excavation work is considered warranted in AEC 1B to address residual petroleum hydrocarbon contamination identified in confirmatory wall sample locations. The residual contamination remaining along the northwest wall of AEC 1B (i.e., along the former Alaska Highway alignment) has been laterally delineated parallel to the alignment and is generally confined between 2 m bgs and at least 6 m bgs (into the competent bedrock) along an approximately 30 m length of the wall. Beyond this length, residual contamination continues for another 35 m but tends to be confined generally between 2.5 m bgs and 5.5 m bgs and does not extend into the competent bedrock. Lateral delineation off-site to the northwest of the former alignment has not been achieved. The available data indicates residual soil contamination contains concentrations of LEPH/HEPHs, VPHs, benzene, toluene, xylene, and naphthalene above applicable CSR standards.

The residual contamination identified along the northeast wall with LEPH/HEPH and naphthalene has been vertically delineated to be confined to depths of 1.5 m bgs and extends along approximately three 10 m long segments along length of the excavation wall. Lateral delineation to the east of the wall has not been achieved.

Further excavation work is not considered necessary at base confirmatory sample locations due to the presence of competent bedrock, where excavation is not considered technically feasible. It is anticipated that residual soil contamination at the base of AEC 1B will be addressed as part of the risk management strategy for the Site, including a combination of post remediation soil vapour and groundwater monitoring and risk assessment.

6.2 AEC 1C

In remedial excavation EX17-02 (AEC 1C), three wall samples (W13, W14 and W18) and five base samples (B2, B3, B4, B20 and B23) were found to exceed the applicable CSR standards, as shown on Figures 10, 11, and 13.

Residual soil contamination at these sampling locations was not excavated due to:

- Project budgetary constraints not allowing additional excavations to be carried out along the north, east, and south walls.
- Competent bedrock underlying the affected soils at the base of the excavation.

In addition to residual contamination that was identified along the walls and base of EX17-02, a portion of the excavated contaminated soil was not disposed off-site and was stockpiled adjacent to the excavation area. The contaminated soil was not disposed off-site due to project budgetary constraints. Approximately 3014 m^3 (6889 tonnes) of contaminated soil is currently stockpiled on-site and will require off-site disposal as part of a future remediation program.

Further excavation work is considered warranted in AEC 1C, in order to address soil contamination observed at wall sample locations W13, W14, and 18. The available data indicates contamination with benzene at location W13 to be confined at approximately 0.5 m bgs, and lateral delineation to the south-east has not been achieved. In the case of wall sample W14, the available data indicates that contamination with LEPH/HEPHs and benzene is confined at approximately 0.5 m bgs, and lateral delineation to the northeast has not been achieved. At wall location W18, data indicates contamination with toluene to be confined at a depth of approximately 2.5 m bgs, and lateral delineation to the north has not been achieved. Where sidewall sample exceedances were observed, a black polyethylene liner (“marker”) was placed along the excavation wall in order to provide a visual indicator for future remedial phases (Figure 14). In these areas, it is anticipated that additional delineation of the lateral extent of the residual contamination will be carried out at a later date, followed by localized remediation.

Further excavation work is not considered necessary at base confirmatory sample locations due to the presence of competent bedrock, where excavation is not considered technically feasible. It is anticipated that residual soil contamination at the base of AEC 1C will be addressed as part of the risk management strategy for the Site, including a combination of post remediation soil vapour and groundwater monitoring and risk assessment.

6.3 Imported Backfill Material

As described in Section 5.9.1, slight exceedances of arsenic (i.e., within 10 to 15% of the applicable soil standard of 10 mg/kg) were observed in backfill material that was imported to the Site as part of the remediation program. The observed concentrations are considered to be related to regional background soil quality, as material was sourced from a gravel quarry with no historical sources of potential soil contamination.

The exceedances were noted due to changes to BC MoE Protocol 4 – Determining Background Soil Quality, that were released on 17 November 2017. The specific change to Protocol 4 that is relevant to the imported backfill at the Site is a reduction of the regional (Region 7 – Omineca/Peace) background concentration of arsenic in soil from 15 mg/kg to 10 mg/kg.

The majority of backfill material was imported to the Site and placed within the remedial excavations prior to 1 November 2017, and backfilling work was completed prior to 17 November 2017. Because changes to Protocol 4 were not released until 17 November, screening of backfill analytical chemistry results, at the time the samples were collected, did not identify exceedances (as a background concentration of 15 mg/kg was considered applicable). A draft version of Protocol 4 was released for comment in the months preceding the regulatory changes that came into effect on 1 November 2017, however the adoption of a reduced regional background concentration of 10 mg/kg for arsenic was not certain until after backfilling work at the Site was completed. The previous approved background concentration of 15 mg/kg was therefore used for screening backfill results.

Although arsenic exceedances are present in backfill material, based on the updated Protocol 4 document, the backfill material is considered to meet overall remediation and risk management objectives for the Site (e.g., risk-management of metals exceedances), because the magnitude of the exceedances is similar to metals concentrations that were previously identified at the Site. It is anticipated that the quality of the backfill material can be addressed through risk-assessment, or by using a statistical approach to evaluate the quality of material. Further soil sampling would be required to use a statistical approach to evaluate the quality of backfill material.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Golder was retained by PSPC to monitor and document the remediation of AEC 1B and AEC 1C at the Former Trutch Townsite. The remedial excavation work was undertaken between 27 September and 15 November 2017. The primary activities conducted at the Site as part of the remediation program included:

- Excavation and off-site disposal of contaminated soil from AEC 1B and AEC 1C at the Site (a summary of the soil volumes removed from each AEC is shown on Table 16, below).
- Decommissioning of 13 of monitoring wells that were located within or in the immediate vicinity of the excavation areas.
- Backfilling of EX17-01 within AEC 1B.
- Partial backfilling of EX17-02 within AEC 1C.
- Site restoration activities.

Table 16: Summary of Excavated Soil Volumes

AEC	Approximate Volume of Contaminated Material Removed (m^3)	Disposal Location	Residual Soil Contaminants of Concern (in situ)	Status
AEC 1B	16,316	Northern Rockies Landfill (37,290 tonnes)	Benzene, toluene, xylene, naphthalene, LEPH, HEPH, VPH	Further remedial excavation work required to address residual soil contamination in excavation sidewalls
AEC 1C	5,549	Northern Rockies Landfill (5,793 tonnes) Temporary On-Site Stockpile (6,889 tonnes)	Benzene, toluene, xylene, LEPH	Further remedial excavation work required to address residual soil contamination in excavation sidewalls Backfilling of excavation to pre-existing Site grade.

Approximately 16,100 m^3 of backfill materials (ex situ volume), was imported to the Site from the Adsette pit, near Prophet River. Sampling data provided prior to mobilization by Tervita indicated that concentrations of contaminants of concern were below the CSR WL_R standards at the time the results were reviewed. Additional quality assurance sampling and chemical analysis carried out on the backfill material imported to Site by Golder and analysed for metals indicated that concentrations of arsenic in selected backfill samples were above applicable standards. The arsenic exceedances are considered to be related to background soil quality and are the result of regulatory changes that were introduced following the completion of backfilling work at the Site. EX17-01 (AEC 1B) was backfilled, compacted and restored to conditions similar to pre-existing site grades, while the excavated area at EX 17-02 (AEC 1C) was partially backfilled to a depth of approximately 2.0 m bgs.

The overall objective of the remediation activities at the Site was to reduce PSPC's liability associated with contaminated soil and groundwater at the Site. In general, remediation objectives were met, as the majority of the confirmatory soil samples collected from the walls and bases of both excavations meet the applicable CSR WL_R/IL standards. However, a number of confirmatory samples collected in both excavations exceeded these applicable

standards, as described in Section 6.0, above. In addition, changes to the CSR Protocol 4 relating to background arsenic concentrations that came to force on 1 November 2017 resulted in slight exceedances in a number of the backfill material which had at the time of sampling and analysis and importation/placement had met the background concentrations.

Based on the scope of the 2017 remediation work that was conducted, residual hydrocarbon contaminated material remains in situ in localized areas within both AEC 1B and AEC 1C. It is anticipated that additional delineation and remediation work will be conducted at AEC 1B in the future, in order to remove the residual contaminated material that underlies the former Alaska Highway alignment as well as along a portion of the eastern wall of the EX 17-01 at AEC 1B. Similarly, for EX 17-02 at AEC 1C, it is anticipated that the residual contaminated material remaining along localized sections of the excavation walls will be delineated laterally and remediated as part of the future remediation program at the Site. Further remediation work at AEC 1C will also include disposal of the existing stockpile of contaminated soils that were excavated as part of the 2017 remediation program.

7.1 RECOMMENDATIONS

The following recommendations for AEC 1B and AEC 1C are based on the scope of remediation work conducted at the Site up to November 2017 while considering the overall remediation/risk management strategy for the Site:

- Develop and undertake a post-remediation monitoring program to assess groundwater and soil vapour quality in AEC 1B and AEC 1C. Given that backfilling of EX17-02 at AEC 1C has not yet been completed, this would initially be targeted to the residual contamination within the excavated portion of AEC 1B. The post-remediation monitoring program would entail establishing an appropriate number of nested groundwater monitoring wells and soil vapour probes which would subsequently undergo seasonal annual monitoring (two events per year). The nested groundwater monitoring wells (screened within the shallow soils and within bedrock) will allow post-remediation groundwater concentrations to be monitored relative to former groundwater monitoring wells that exhibited groundwater contamination within these AECs. The soil vapour probes will allow for assessment of post remediation vapour concentrations associated with residual contamination remaining at depth.
- Undertake an investigation to laterally delineate the remaining residual contamination within AEC 1B at the limits of the Excavation 17-01 to the northwest (beneath the former Alaska Highway alignment) and to the northeast as well as within AEC 1C, along sections of the north, east and south walls on the eastern portion of excavation EX17-02 (wall samples W18, W14, and W13); and,
- At AEC 1C, backfilling and compaction of the remaining areas of excavation EX17-02 will be required as well as removal and off-site disposal of the stockpiled soils that were generated. This would be followed by implementation of post-remediation groundwater and soil vapour monitoring as noted above for AEC 1B.
- Collection of additional soil samples of the imported backfill material to further assess concentrations of arsenic as part of a risk management approach for the Site.

Implementation of the above-mentioned investigation and post-remediation monitoring activities will further support ongoing remediation and risk management at the Site.

8.0 CLOSURE

We trust that this report meets your current needs. Should you have any questions or require further information, please do not hesitate to contact the undersigned 604-296-4200.

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Table 17
Results of Confirmatory Soil Analyses - Walls AEC 1B
K19 - Trutch Former Townsite
Alaska Highway, BC

Location	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-01-W1B	EX17-01-W1C	EX17-01-W2A	EX17-01-W2C	EX17-01-W3A	EX17-01-W3B	EX17-01-W4B	EX17-01-W4C	EX17-01-W5A	EX17-01-W5B	EX17-01-W6B	EX17-01-W6B	EX17-01-W6C	EX17-01-W7C	EX17-01-W7D
Sample Control Number					04256-02	04257-02	04256-03	04257-03	04256-05	04256-06	04256-08	04257-05	04256-09	04256-10	04256-12	04257-01	04257-07	04258-03	04258-04
Sample Date					9/30/2017	10/1/2017	9/30/2017	10/1/2017	9/30/2017	9/30/2017	9/30/2017	10/1/2017	9/30/2017	9/30/2017	9/30/2017	9/30/2017	10/1/2017	10/4/2017	10/4/2017
Depth of Sample (m bgs)					3.5-3.5 m	4.5-4.5 m	2.5-2.5 m	4.5-4.5 m	2.5-2.5 m	3.5-3.5 m	3.5-3.5 m	4.5-4.5 m	2.5-2.5 m	3.5-3.5 m	3.5-3.5 m	3.5-3.5 m	4.5-4.5 m	2.5-2.5 m	3.5-3.5 m
Laboratory Report					17V268098	17V268098	17V268098	17V268098	17V268098	17V268098	17V268098	17V268098	17V268098	17V268098	17V268098	17V268098	17V268098	17F269272	17F269272
Sample Type					Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory FDA	Confirmatory FD	Confirmatory	Confirmatory	Confirmatory
QA/QC																			
Field Parameters																			
PID (ppm)					1.4	2.1	1.7	1	1.4	1.9	2.3	0.3	1.8	1.9	1.8	1.8	0.9	0	171.0
Physical Tests																			
Moisture (%)					6.04	6.27	8.03	7.27	8.23	6.06	6.21	6.44	8.16	8.48	11.5	12.5	11.9	6	7
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Acenaphthylene					< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	0.12	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	**I**	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene					0.07	0.11	< 0.05	0.06	< 0.05	0.05	< 0.05	0.06	0.05	0.05	< 0.05	0.05	0.05	< 0.05	0.05
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	0.07	0.11	< 0.05	0.06	< 0.05	0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	0.06	0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	0.01	0.02	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	**1000**	HH	9500	HH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.06
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					0.6	0.9	< 0.6	0.6	< 0.6	0.6	< 0.6	0.6	< 0.6	< 0.6	< 0.6	0.6	0.6	< 0.6	< 0.6
Naphthalene	**0.6**	T	20	T	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	0.94
Phenanthrene	**5**	EH	50	EH	0.05	0.11	0.04	0.10	0.04	0.04	0.03	0.05	0.03	0.04	0.03	0.05	0.05	0.03	< 0.2
Pyrene	**10**	EH	100	EH	0.02	0.05	0.01	0.03	< 0.01	0.02	0.01	0.03	0.01	0.01	0.01	0.02	0.02	< 0.01	0.01
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	< 0.005	< 0.005	0.010	< 0.005	0.011	0.014	0.008	< 0.005	0.008	0.009	0.009	0.010	0.011	0.015	2.22
2-Methylnaphthalene	**100**	HH	950	HH	< 0.005	< 0.005	0.006	0.014	0.008	0.008	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	0.018	4.14
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	91	157	39	95	29	56	43	87	37	38	46	52	72	34	356
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	162	206	74	108	48	107	83	130	70	73	71	77	104	77	90
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VH(C6-C10)	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	38	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	40
VPH	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	38	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	40
BTEX																			
Benzene	**0.035**	DW	0.035	DW	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.488
Toluene	**0.5**	AW	0.5	AW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.13
Ethylbenzene	**15**	DW	15	DW	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.28
Total Xylenes	**6.5**	DW	6.5	DW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.70
o-Xylene					< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	-	-
m,p-Xylenes					< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	-	-
Styrene	**5**	EH	50	EH	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	**5**	EH	50	EH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.01

Notes:
All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surface
BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).
Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.
Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).
QA/QC = Quality Assurance, Quality Control
FDA = Field Duplicate Available; FD = Field Duplicate.
Italics = indicates that the detection limit exceeds one or more criteria.
< = Less than the laboratory method detection limit; (-) = Parameter not analyzed
PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 17
Results of Confirmatory Soil Analyses - Walls AEC 1B
K19 - Trutch Former Townsite
Alaska Highway, BC

Location	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-01-W7E	EX17-01-W7F	EX17-01-W8A	EX17-01-W8C	EX17-01-W8D	EX17-01-W8F	EX17-01-W9B	EX17-01-W9F	EX17-01-W11A	EX17-01-W11B	EX17-01-W11D	EX17-01-W12A	EX17-01-W12A	EX17-01-W12B	EX17-01-W13B
Sample Control Number					04258-06	04258-07	04258-08	04258-10	04258-12	04259-02	04259-04	04259-08	04262-06	04262-07	04264-06	04262-03	04262-04	04262-05	04269-03
Sample Date					10/4/2017	10/4/2017	10/4/2017	10/4/2017	10/4/2017	10/4/2017	10/4/2017	10/4/2017	10/5/2017	10/5/2017	10/13/2017	10/5/2017	10/5/2017	10/5/2017	10/5/2017
Depth of Sample (m bgs)					4.5-4.5 m	5.5-5.5 m	0.5-0.5 m	2.5-2.5 m	3.5-3.5 m	5.5-5.5 m	1.5-1.5 m	5.5-5.5 m	2.5-2.5 m	3.5-3.5 m	5-5 m	2.5-2.5 m	2.5-2.5 m	3.5-3.5 m	3.5-3.5 m
Laboratory Report					17F269272	17F269272	17F269272	17F269272	17F269272	17F269272	17F269272	17F269272	17F269272	17F269272	17F272731	17F269272	17F269272	17F269272	17F269272
Sample Type					Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory FDA	Confirmatory FD	Confirmatory	Confirmatory
QA/QC																			
Field Parameters																			
PID (ppm)					143.1	57.5	1.3	170.1	455.2	31.2	17.0	17.1	2.6	2.0	1.1	70.4	70.4	8.2	149.3
Physical Tests																			
Moisture (%)					5	6	17	7	7	7	11	5	8	6	-	9	11	7	5
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	< 0.005	<0.005	< 0.05	< 0.05	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Acenaphthylene					< 0.005	< 0.005	< 0.005	<0.005	< 0.05	< 0.05	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	<0.004	< 0.04	< 0.04	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	< 0.03	< 0.03	<0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	< 0.03	< 0.03	<0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	< 0.05	< 0.05	<0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene					0.09	0.10	< 0.05	< 0.05	< 0.05	< 0.05	0.06	0.11	< 0.05	0.06	< 0.05	< 0.05	< 0.05	0.05	< 0.05
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	0.10	0.08	< 0.05	< 0.05	< 0.05	0.07	0.05	0.09	< 0.05	0.08	< 0.05	< 0.05	< 0.05	0.06	0.06
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	< 0.005	< 0.005	<0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	0.02	0.01	< 0.01	<0.01	< 0.01	< 0.01	0.01	0.02	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	**1000**	HH	9500	HH	< 0.02	< 0.02	< 0.02	0.61	0.07	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.07	0.03	0.03	< 0.02	0.04
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	<0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					0.6	0.6	< 0.6	<0.6	< 0.6	< 0.6	0.6	0.6	< 0.6	0.6	< 0.6	< 0.6	< 0.6	0.6	0.6
Naphthalene	**0.6**	T	20	T	0.104	< 0.005	< 0.005	0.53	0.727	0.041	0.005	0.066	0.014	0.012	0.121	0.024	0.042	0.009	0.056
Phenanthrene	**5**	EH	50	EH	0.13	0.08	< 0.02	0.55	0.14	0.07	0.06	0.15	0.08	0.12	0.22	0.11	0.12	0.09	0.13
Pyrene	**10**	EH	100	EH	0.05	0.03	< 0.01	<0.01	0.01	0.04	0.02	0.04	0.01	0.03	0.03	0.01	0.01	0.01	0.02
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	<0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	0.066	0.021	< 0.005	-	1.44	-	0.023	0.094	0.027	0.053	0.274	0.092	0.224	0.036	0.142
2-Methylnaphthalene	**100**	HH	950	HH	0.077	< 0.005	< 0.005	1.50	1.71	0.076	0.021	0.143	0.031	0.051	0.473	< 0.005	< 0.005	< 0.005	< 0.005
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	172	215	< 20	**1600**	420	182	21	194	41	57	50	348	264	93	183
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	-	-	< 20	**1600**	420	182	21	194	41	57	49	348	264	93	183
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	201	306	< 20	-	112	210	34	266	59	62	42	521	73	71	58
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	-	-	< 20	95	112	210	34	265	59	61	42	521	72	71	58
VH(C6-C10)	**200**	HH/EH	200	HH/EH	50	< 10	< 10	30	200	40	< 10	< 10	< 10	< 10	< 10	10	< 10	< 10	40
VPH	**200**	HH/EH	200	HH/EH	60	< 10	< 10	30	190	40	< 10	< 10	< 10	< 10	< 10	10	< 10	< 10	40
BTEX																			
Benzene	**0.035**	DW	0.035	DW	0.267	0.309	< 0.005	**0.362**	3.70	1.00	< 0.005	< 0.005	< 0.005	< 0.005	< 0.02	< 0.005	< 0.005	< 0.005	< 0.005
Toluene	**0.5**	AW	0.5	AW	0.32	0.15	< 0.05	< 0.05	0.31	0.96	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	**15**	DW	15	DW	0.97	0.05	< 0.01	0.34	0.83	0.14	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01
Total Xylenes	**6.5**	DW	6.5	DW	5.96	0.15	< 0.05	0.19	1.28	0.77	< 0.05	0.05	< 0.05	< 0.05	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05
o-Xylene					-	-	-	-	-	-	-	-	-	-	< 0.05	-	-	-	-
m,p-Xylenes					-	-	-	-	-	-	-	-	-	-	< 0.05	-	-	-	-
Styrene	**5**	EH	50	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	-	-	-	-	-	-	-	-	-	-	< 0.1	-	-	-	-
Dichloromethane	**5**	EH	50	EH	-	-	-	-	< 0.01	-	-	-	-	-	-	-	-	-	< 0.01

Notes:
All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surface
BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).
Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.
Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).
QA/QC = Quality Assurance, Quality Control
FDA = Field Duplicate Available; FD = Field Duplicate.
Italics = indicates that the detection limit exceeds one or more criteria.
< = Less than the laboratory method detection limit; (-) = Parameter not analyzed
PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 17
Results of Confirmatory Soil Analyses - Walls AEC 1B
K19 - Trutch Former Townsite
Alaska Highway, BC

Location Sample Control Number Sample Date Depth of Sample (m bgs) Laboratory Report Sample Type QA/QC	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-01-W13C 04264-01 10/13/2017 4.25-4.25 m 17F272731 Confirmatory	EX17-01-W14A 04262-08 10/5/2017 2.5-2.5 m 17F269272 Confirmatory	EX17-01-W14B 04262-09 10/5/2017 3.5-3.5 m 17F269272 Confirmatory	EX17-01-W14C 04264-07 10/13/2017 4.25-4.25 m 17F272731 Confirmatory	EX17-01-W15B 04262-11 10/5/2017 3.5-3.5 m 17F269272 Confirmatory FDA	EX17-01-W15B 04262-12 10/5/2017 3.5-3.5 m 17F269272 Confirmatory FD	EX17-01-W15D 04264-11 10/13/2017 5-5 m 17F272731 Confirmatory	EX17-01-W16B 04265-10 10/14/2017 1.5-1.5 m 17F272731 Confirmatory	EX17-01-W16F 04266-07 10/15/2017 4-4 m 17F272731 Confirmatory FDA	EX17-01-W16F 04266-08 10/15/2017 4-4 m 17F272731 Confirmatory FD	EX17-01-W17B 04267-05 10/16/2017 1.5-1.5 m 17N273185 Confirmatory	EX17-01-W17C 04267-11 10/16/2017 2.5-2.5 m 17N273185 Confirmatory	EX17-01-W17D 04267-12 10/16/2017 3.5-3.5 m 17N273185 Confirmatory	EX17-01-W18C 04267-08 10/16/2017 2.5-2.5 m 17N273185 Confirmatory
Field Parameters																		
PID (ppm)					1.1	1.9	2.9	0.5	39.3	39.3	0.9	0.3	0.2	0.2	1.0	0.1	0.0	0.1
Physical Tests																		
Moisture (%)					-	7	6	-	7	6	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.02	< 0.005	< 0.005	< 0.005
Acenaphthylene					< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.02	< 0.005	< 0.005	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.02	< 0.004	< 0.004	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.2	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.2	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	< 0.05	0.05	< 0.05	0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.2	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene					0.06	< 0.05	0.08	0.08	0.08	0.09	0.09	< 0.05	< 0.05	< 0.05	< 0.2	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.2	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	0.05	< 0.05	0.10	0.05	0.11	0.11	0.05	< 0.05	< 0.05	< 0.05	< 0.2	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.02	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	0.01	< 0.01	0.02	0.01	0.02	0.02	0.01	< 0.01	< 0.01	< 0.01	0.31	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.2	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.2	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	0.05	< 0.05	0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	**1000**	HH	9500	HH	< 0.02	< 0.02	< 0.02	0.04	0.02	0.04	0.08	< 0.02	< 0.02	< 0.02	< 0.1	< 0.02	< 0.02	< 0.02
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.1	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					0.6	< 0.6	0.7	0.6	0.7	0.7	0.6	< 0.6	< 0.6	< 0.6	< 3	< 0.6	< 0.6	< 0.6
Naphthalene	**0.6**	T	20	T	< 0.005	0.006	0.014	0.011	0.010	0.015	0.080	< 0.005	< 0.005	< 0.005	< 0.02	< 0.005	< 0.005	< 0.005
Phenanthrene	**5**	EH	50	EH	0.07	0.05	0.17	0.16	0.21	0.26	0.23	0.03	0.02	0.02	1.3	0.02	0.03	0.03
Pyrene	**10**	EH	100	EH	0.04	< 0.01	0.07	0.04	0.07	0.07	0.03	< 0.01	< 0.01	< 0.01	0.86	< 0.01	< 0.01	< 0.01
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.2	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	0.014	0.012	0.052	0.072	0.066	0.133	0.217	0.006	0.007	0.007	< 0.02	< 0.005	0.008	0.007
2-Methylnaphthalene	**100**	HH	950	HH	< 0.005	< 0.005	< 0.005	0.128	< 0.005	< 0.005	0.376	< 0.005	< 0.005	< 0.005	< 0.02	< 0.005	0.005	0.005
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	71	38	94	51	197	235	46	42	< 20	< 20	**2660**	< 20	23	< 20
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	-	38	93	-	197	235	-	-	-	-	**2660**	< 20	23	< 20
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	72	49	88	43	111	111	45	49	49	53	**2340**	28	41	35
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	-	49	88	-	111	111	-	-	-	-	**2340**	28	41	35
VH(C6-C10)	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	-	< 10	-	< 10
VPH	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	-	< 10	-	< 10
BTEX																		
Benzene	**0.035**	DW	0.035	DW	< 0.02	< 0.005	< 0.005	< 0.02	< 0.005	< 0.005	< 0.02	< 0.02	< 0.02	< 0.02	-	< 0.02	-	< 0.02
Toluene	**0.5**	AW	0.5	AW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05	-	< 0.05
Ethylbenzene	**15**	DW	15	DW	< 0.05	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05	-	< 0.05
Total Xylenes	**6.5**	DW	6.5	DW	< 0.1	< 0.05	< 0.05	< 0.1	< 0.05	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	-	< 0.1	-	< 0.1
o-Xylene					< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05	-	< 0.05
m,p-Xylenes					< 0.05	-	-	< 0.05	-	-	< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05	-	< 0.05
Styrene	**5**	EH	50	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05	-	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	< 0.1	-	-	< 0.1	-	-	< 0.1	< 0.1	< 0.1	< 0.1	-	< 0.1	-	< 0.1
Dichloromethane	**5**	EH	50	EH	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surface
BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).
Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.
Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).
QA/QC = Quality Assurance, Quality Control
FDA = Field Duplicate Available; FD = Field Duplicate.
Italics = indicates that the detection limit exceeds one or more criteria.
< = Less than the laboratory method detection limit; (-) = Parameter not analyzed
PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 17
Results of Confirmatory Soil Analyses - Walls AEC 1B
K19 - Trutch Former Townsite
Alaska Highway, BC

Location	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-01-W18E	EX17-01-W19A	EX17-01-W19C	EX17-01-W19D	EX17-01-W19F	EX17-01-W20B	EX17-01-W20B	EX17-01-W20D	EX17-01-W21A	EX17-01-W21D	EX17-01-W21D	EX17-01-W22C	EX17-01-W22E	EX17-01-W23A
Sample Control Number					04267-10	04269-01	04269-03	04273-02-2.5m	04276-04	04269-05	04269-06	04273-01	04269-09	04275-07	04275-08	04275-03-2.5m	04275-05	04270-06
Sample Date					10/16/2017	10/17/2017	10/17/2017	10/22/2017	10/28/2017	10/17/2017	10/17/2017	10/22/2017	10/18/2017	10/24/2017	10/24/2017	10/24/2017	10/24/2017	10/19/2017
Depth of Sample (m bgs)					4-4 m	0.5-0.5 m	2-2 m	2.5-2.5 m	4.5-4.5 m	3.5-3.5 m	3.5-3.5 m	5-5 m	0.5-0.5 m	3.5-3.5 m	3.5-3.5 m	2.5-2.5 m	4.5-4.5 m	0.5-0.5 m
Laboratory Report					17N273185	17N274395	17N274395	17N275674	17N278674	17N274395	17N274395	17N275674	17N274395	17N276808	17N276808	17N276808	17N276808	17Y274566
Sample Type					Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory FDA	Confirmatory FD	Confirmatory	Confirmatory	Confirmatory FDA	Confirmatory FD	Confirmatory	Confirmatory	Confirmatory
QA/QC																		
Field Parameters																		
PID (ppm)					0.4	5.9	174.4	380.4	20.7	977.5	977.5	0.9	17.3	750.8	750.8	383.5	398.8	10.1
Physical Tests																		
Moisture (%)					-	-	-		-	-	-	-	-	-	-		-	-
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	**2000**	HH	15000	HH	< 0.005	-	< 0.05	< 0.05	< 0.005	< 0.05	< 0.05	< 0.005	< 0.005	< 0.05	< 0.05	< 0.005	< 0.05	< 0.005
Acenaphthylene					< 0.005	-	< 0.05	< 0.05	< 0.005	< 0.05	< 0.05	< 0.005	< 0.005	< 0.05	< 0.05	< 0.005	< 0.05	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	-	< 0.04	< 0.04	< 0.004	< 0.04	< 0.04	< 0.004	< 0.004	< 0.04	< 0.04	< 0.004	< 0.04	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	-	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	-	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene					0.06	-	< 0.05	< 0.05	0.06	0.05	0.05	0.08	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	0.06	-	< 0.05	< 0.05	0.06	0.07	0.08	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	-	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	< 0.01	-	< 0.01	0.1	< 0.01	0.02	0.02	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene (TPE)					< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	**1000**	HH	9500	HH	< 0.02	-	< 0.2	1.1	< 0.02	< 0.2	0.3	0.08	< 0.02	< 0.2	< 0.2	< 0.02	< 0.2	< 0.02
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	-	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					0.6	-	< 0.6	< 0.6	0.6	0.6	0.6	0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Naphthalene	**0.6**	T	20	T	< 0.005	-	0.30	**5.92**	0.039	2.34	2.40	0.057	< 0.005	1.59	1.65	**0.93**	2.1	0.008
Phenanthrene	**5**	EH	50	EH	0.03	-	0.10	1.1	0.05	0.40	0.47	0.23	< 0.02	< 0.2	< 0.2	0.05	< 0.2	< 0.02
Pyrene	**10**	EH	100	EH	0.02	-	< 0.01	0.2	0.04	0.03	0.03	0.03	< 0.02	0.01	< 0.01	< 0.01	0.01	< 0.01
Quinoline	**4.5**	HH	10	HH	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	0.010	-	0.90	14.0	0.133	2.72	3.29	0.224	0.005	0.41	0.38	0.172	0.43	0.023
2-Methylnaphthalene	**100**	HH	950	HH	< 0.005	-	0.37	18.5	0.178	1.98	2.08	0.393	< 0.005	0.93	0.94	0.184	0.93	0.031
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	43	-	319	**5940**	89	1560	2030	50	44	370	384	130	313	22
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	43	-	319	**5930**	89	1550	2020	50	44	370	384	129	313	-
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	66	-	84	360	54	168	206	50	129	90	92	49	82	33
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	66	-	84	360	54	168	206	50	129	90	92	49	82	-
VH(C6-C10)	**200**	HH/EH	200	HH/EH	< 10	< 10	15	**217**	< 10	181	264	< 10	< 10	534	370	154	986	< 10
VPH	**200**	HH/EH	200	HH/EH	< 10	< 10	15	**215**	< 10	171	250	< 10	< 10	526	365	145	958	< 10
BTEX																		
Benzene	**0.035**	DW	0.035	DW	< 0.02	< 0.02	< 0.02	**0.06**	0.10	0.62	0.76	< 0.02	**0.21**	1.20	1.15	**2.59**	7.31	< 0.02
Toluene	**0.5**	AW	0.5	AW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.59	0.87	< 0.05	0.07	0.21	0.19	0.16	0.71	< 0.05
Ethylbenzene	**15**	DW	15	DW	< 0.05	< 0.05	< 0.05	0.67	< 0.05	3.64	5.76	< 0.05	< 0.05	2.51	1.84	4.02	9.22	< 0.05
Total Xylenes	**6.5**	DW	6.5	DW	< 0.1	< 0.1	< 0.1	0.4	< 0.1	4.6	6.7	< 0.1	< 0.1	3.8	2.1	1.8	11.4	0.3
o-Xylene					< 0.05	< 0.05	< 0.05	0.05	< 0.05	0.41	0.51	< 0.05	< 0.05	0.09	0.08	0.14	0.33	0.09
m,p-Xylenes					< 0.05	< 0.05	< 0.05	0.37	< 0.05	4.16	6.18	< 0.05	< 0.05	3.74	2.04	1.68	11.1	0.18
Styrene	**5**	EH	50	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichloromethane	**5**	EH	50	EH	-	-	< 0.05	-	-	< 0.05	< 0.05	-	-	< 0.05	< 0.05	-	< 0.05	-

Notes:
All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surface
BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).
Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.
Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).
QA/QC = Quality Assurance, Quality Control
FDA = Field Duplicate Available; FD = Field Duplicate.
Italics = indicates that the detection limit exceeds one or more criteria.
< = Less than the laboratory method detection limit; (-) = Parameter not analyzed
PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 17
Results of Confirmatory Soil Analyses - Walls AEC 1B
K19 - Trutch Former Townsite
Alaska Highway, BC

Location	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-01-W23D	EX17-01-W23D	EX17-01-W24B	EX17-01-W24E	EX17-01-W26E	EX17-01-W26E	EX17-01-W26G	EX17-01-W27D	EX17-01-W27F	EX17-01-W27G	EX17-01-W28C	EX17-01-W28C	EX17-01-W28G	EX17-01-W29B
Sample Control Number					04270-03	04270-08	04271-02	04270-11	04274-12	04275-02	04276-11	04274-08	04274-10	04276-02	04272-09	04272-10	04274-06	04278-03
Sample Date					10/19/2017	10/19/2017	10/19/2017	10/19/2017	10/24/2017	10/24/2017	10/28/2017	10/24/2017	10/24/2017	10/28/2017	10/21/2017	10/21/2017	10/23/2017	10/31/2017
Depth of Sample (m bgs)					3.5-3.5 m	3.5-3.5 m	1.5-1.5 m	4-4 m	3.5-3.5 m	3.5-3.5 m	5.5-5.5 m	2.5-2.5 m	4.5-4.5 m	5.5-5.5 m	2.0-2.0 m	2.0-2.0 m	5.5-5.5 m	1.5-1.5 m
Laboratory Report					17Y274566	17Y274566	17Y274566	17Y274566	17N276808	17N276808	17F278674	17N276808	17N276808	17F278674	17N275674	17N275674	17N276808	17N280287
Sample Type					Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory FDA	Confirmatory FD	Confirmatory	Confirmatory
QA/QC																		
Field Parameters																		
PID (ppm)					24.6	24.6	2.5	10.3	598.7	399.2	460.0	104.4	89.6	688.4	299.5	299.5	719.4	0.8
Physical Tests																		
Moisture (%)					-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	< 0.05	< 0.005	< 0.005	< 0.05	< 0.005	< 0.025	< 0.025	< 0.005	< 0.005
Acenaphthylene					< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	< 0.05	< 0.005	< 0.005	< 0.05	< 0.005	< 0.025	< 0.025	< 0.005	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	< 0.004	< 0.04	< 0.04	< 0.004	< 0.004	< 0.04	< 0.004	< 0.02	< 0.02	< 0.004	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	< 0.05
Benzo(g,h,i)perylene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	< 0.05	< 0.05	0.08	< 0.05	< 0.05	0.08	< 0.05
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	< 0.05	< 0.05	0.08	< 0.05	< 0.05	0.09	< 0.05
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	0.01	< 0.01
Benzo(a)pyrene (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	< 0.05
Fluorene	**1000**	HH	9500	HH	0.03	0.03	< 0.02	< 0.02	< 0.2	< 0.2	< 0.02	< 0.02	< 0.2	< 0.02	0.4	0.5	< 0.02	< 0.02
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	0.6	< 0.6	< 0.6	0.6	< 0.6	< 0.6	0.8	< 0.6
Naphthalene	**0.6**	T	20	T	0.090	0.193	< 0.005	0.037	1.39	1.56	0.014	0.005	5.14	0.539	0.077	< 0.05	0.281	< 0.005
Phenanthrene	**5**	EH	50	EH	0.07	0.06	< 0.02	0.03	< 0.2	< 0.2	0.06	0.03	< 0.2	0.06	0.33	0.42	0.11	0.02
Pyrene	**10**	EH	100	EH	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03	< 0.01	0.01	0.04	< 0.01	< 0.01	0.05	< 0.01
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	0.270	0.371	0.009	0.142	0.16	0.21	0.019	< 0.005	0.87	0.095	4.39	9.64	0.176	< 0.005
2-Methylnaphthalene	**100**	HH	950	HH	0.290	0.438	0.009	0.177	0.43	0.42	0.023	< 0.005	2.07	0.095	< 0.05	< 0.05	0.278	< 0.005
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	156	138	< 20	87	152	143	85	24	534	184	**1090**	**1280**	198	26
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	-	-	-	-	152	143	85	24	534	183	**1090**	**1280**	198	26
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	76	56	30	53	57	57	78	40	90	182	54	54	110	42
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	-	-	-	-	57	57	78	40	90	182	54	54	110	42
VH(C6-C10)	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	259	342	32	< 10	1790	183	37	36	146	< 10
VPH	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	245	325	21	< 10	1750	158	35	34	138	< 10
BTEX																		
Benzene	**0.035**	DW	0.035	DW	< 0.02	< 0.02	< 0.02	< 0.02	3.45	4.48	9.22	0.03	11.1	5.13	**0.68**	**0.68**	5.48	< 0.02
Toluene	**0.5**	AW	0.5	AW	< 0.05	< 0.05	< 0.05	< 0.05	0.20	0.37	0.80	< 0.05	2.28	5.36	< 0.05	< 0.05	0.28	< 0.05
Ethylbenzene	**15**	DW	15	DW	< 0.05	< 0.05	< 0.05	< 0.05	5.10	6.49	0.11	< 0.05	14.0	2.68	0.90	0.90	1.48	< 0.05
Total Xylenes	**6.5**	DW	6.5	DW	< 0.1	< 0.1	< 0.1	< 0.1	4.8	6.0	0.5	< 0.1	18.7	12.1	< 0.1	< 0.1	1.3	< 0.1
o-Xylene					< 0.05	< 0.05	< 0.05	< 0.05	0.08	0.17	0.09	< 0.05	1.57	2.50	< 0.05	< 0.05	< 0.05	< 0.05
m,p-Xylenes					< 0.05	< 0.05	< 0.05	< 0.05	4.69	5.82	0.41	< 0.05	17.1	9.61	< 0.05	< 0.05	1.29	< 0.05
Styrene	**5**	EH	50	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichloromethane	**5**	EH	50	EH	-	-	-	-	< 0.05	< 0.05	-	< 0.05	< 0.05	-	< 0.05	-	< 0.05	-

Notes:
All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surface
BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).
Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.
Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).
QA/QC = Quality Assurance, Quality Control
FDA = Field Duplicate Available; FD = Field Duplicate.
Italics = indicates that the detection limit exceeds one or more criteria.
< = Less than the laboratory method detection limit; (-) = Parameter not analyzed
PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 17
Results of Confirmatory Soil Analyses - Walls AEC 1B
K19 - Trutch Former Townsite
Alaska Highway, BC

Location	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-01-W29E	EX17-01-W29E	EX17-01-W30C	EX17-01-W30F	EX17-01-W31A	EX17-01-W31E	EX17-01-W32C	EX17-01-W32F	EX17-01-W32F	EX17-01-W33B	EX17-01-W33E	EX17-01-W34A	EX17-01-W34D	EX17-01-W35B
Sample Control Number					04277-11	04277-12	04278-08	04278-05	04285-11	04284-05	04285-06	04285-02	04285-03	04286-12	04286-07	04286-06	04286-03	04287-06
Sample Date					10/31/2017	10/31/2017	10/31/2017	10/31/2017	11/2/2017	11/1/2017	11/2/2017	11/2/2017	11/2/2017	11/2/2017	11/2/2017	11/2/2017	11/2/2017	11/2/2017
Depth of Sample (m bgs)					4.5-4.5 m	4.5-4.5 m	2.5-2.5 m	5.5-5.5 m	0.5-0.5 m	4.5-4.5 m	2.5-2.5 m	5.5-5.5 m	5.5-5.5 m	1.5-1.5 m	4.5-4.5 m	0.5-0.5 m	3.5-3.5 m	1.5-1.5 m
Laboratory Report					17N280287	17N280287	17N280287	17N280287	17N280522	17N280287	17N280522	17N280522	17N280522	17N280522	17N280522	17N280522	17N280522	17N280522
Sample Type					Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory
QA/QC					FDA	FD						FDA	FD					
Field Parameters																		
PID (ppm)					1.7	1.7	0.7	3.0	1.2	6.9	1.6	6.2	6.2	0.7	1.8	0.7	1.4	0.9
Physical Tests																		
Moisture (%)					-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	0.009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.008
Acenaphthylene					< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene					0.06	0.07	< 0.05	0.07	< 0.05	0.05	< 0.05	0.10	0.11	< 0.05	0.07	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	0.06	0.08	< 0.05	0.07	< 0.05	0.05	< 0.05	0.08	0.09	< 0.05	0.07	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	0.01	0.01	< 0.01	0.01	< 0.01	0.01	< 0.01	0.02	0.02	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	**1000**	HH	9500	HH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					0.6	0.6	< 0.6	0.6	< 0.6	0.6	< 0.6	0.6	0.6	< 0.6	0.6	< 0.6	< 0.6	< 0.6
Naphthalene	**0.6**	T	20	T	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.007	0.010	< 0.005	< 0.005	< 0.005	< 0.005	0.006
Phenanthrene	**5**	EH	50	EH	0.03	0.03	0.03	0.09	< 0.02	0.10	0.03	0.17	0.18	< 0.02	0.03	< 0.02	0.02	0.03
Pyrene	**10**	EH	100	EH	0.02	0.03	< 0.01	0.03	< 0.01	0.03	0.01	0.04	0.03	< 0.01	0.03	< 0.01	< 0.01	< 0.01
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.005	< 0.005	0.029	0.035	< 0.005	0.012	< 0.005	< 0.005	0.016
2-Methylnaphthalene	**100**	HH	950	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.047	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	134	163	31	234	< 20	158	77	253	286	< 20	126	< 20	45	32
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	134	163	31	234	< 20	158	77	253	286	< 20	126	< 20	45	32
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	201	235	64	384	72	210	160	385	435	150	154	29	82	42
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	201	235	64	384	72	210	160	385	435	150	154	29	82	42
VH(C6-C10)	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
VPH	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
BTEX																		
Benzene	**0.035**	DW	0.035	DW	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02	< 0.02	< 0.02
Toluene	**0.5**	AW	0.5	AW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	**15**	DW	15	DW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Xylenes	**6.5**	DW	6.5	DW	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
o-Xylene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
m,p-Xylenes					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Styrene	**5**	EH	50	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichloromethane	**5**	EH	50	EH	-	-	-	-		-	-	-	-	-	-	-	-	-

Notes:
All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surface
BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).
Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.
Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).
QA/QC = Quality Assurance, Quality Control
FDA = Field Duplicate Available; FD = Field Duplicate.
Italics = indicates that the detection limit exceeds one or more criteria.
< = Less than the laboratory method detection limit; (-) = Parameter not analyzed
PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 17
Results of Confirmatory Soil Analyses - Walls AEC 1B
K19 - Trutch Former Townsite
Alaska Highway, BC

Location	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-01-W35D	EX17-01-W36B	EX17-01-W36B	EX17-01-W36D	EX17-01-W37C	EX17-01-W37E	EX17-01-W38A	EX17-01-W38C	EX17-01-W39B	EX17-01-W39B	EX17-01-W39D
Sample Control Number					04287-04	04287-11	04287-12	04287-09	04288-04	04288-02	04289-04	04289-02	04289-07	04289-08	04289-05
Sample Date					11/2/2017	11/2/2017	11/2/2017	11/2/2017	11/2/2017	11/2/2017	11/3/2017	11/3/2017	11/3/2017	11/3/2017	11/3/2017
Depth of Sample (m bgs)					3.5-3.5 m	1.5-1.5 m	1.5-1.5 m	3.5-3.5 m	2.5-2.5 m	4.5-4.5 m	0.5-0.5 m	2.5-2.5 m	1.5-1.5 m	1.5-1.5 m	3.5-3.5 m
Laboratory Report					17N280522	17N280522	17N280522	17N280522	17N280522	17N280522	17N281394	17N281394	17N281394	17N281394	17N281394
Sample Type					Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory
QA/QC						FDA	FD						FDA	FD	
Field Parameters															
PID (ppm)					1.0	40.6	40.6	2.8	2.5	1.3	45.4	0.5	103.3	103.3	1.8
Physical Tests															
Moisture (%)					-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	< 0.05	< 0.005
Acenaphthylene					< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	< 0.05	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.04	< 0.04	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene					< 0.05	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	< 0.05	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.1	< 0.01
Benzo(a)pyrene (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	**1000**	HH	9500	HH	< 0.02	0.14	0.13	< 0.02	< 0.02	< 0.02	0.09	< 0.02	1.3	1.3	< 0.02
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					< 0.6	< 0.6	< 0.6	0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Naphthalene	**0.6**	T	20	T	< 0.005	0.229	0.238	< 0.005	< 0.005	< 0.005	0.062	0.006	**6.50**	**4.24**	0.014
Phenanthrene	**5**	EH	50	EH	0.03	0.16	0.14	0.06	0.03	0.03	0.18	0.04	2.4	2.2	0.05
Pyrene	**10**	EH	100	EH	< 0.01	< 0.01	< 0.01	0.03	< 0.01	< 0.01	0.07	0.01	0.09	0.2	0.01
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	0.005	1.55	1.59	0.008	0.006	0.009	0.322	0.019	12.1	10.0	0.048
2-Methylnaphthalene	**100**	HH	950	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.021	11.7	6.20	0.053
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	40	**1150**	**1140**	66	55	42	999	71	**3810**	**3980**	157
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	40	**1150**	**1140**	65	55	41	998	71	**3800**	**3980**	157
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	52	44	43	65	42	54	294	96	617	666	148
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	52	44	43	65	42	54	294	96	617	666	148
VH(C6-C10)	**200**	HH/EH	200	HH/EH	< 10	19	28	< 10	< 10	< 10	< 10	< 10	130	56	< 10
VPH	**200**	HH/EH	200	HH/EH	< 10	19	28	< 10	< 10	< 10	< 10	< 10	128	54	< 10
BTEX															
Benzene	**0.035**	DW	0.035	DW	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.03	0.03	< 0.02
Toluene	**0.5**	AW	0.5	AW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	**15**	DW	15	DW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.06	0.93	< 0.05
Total Xylenes	**6.5**	DW	6.5	DW	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.4	0.3	< 0.1
o-Xylene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
m,p-Xylenes					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.38	0.29	< 0.05
Styrene	**5**	EH	50	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichloromethane	**5**	EH	50	EH	-	-	-	-	-	-	-	-	-	-	-

Notes:
All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surface
BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).
Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.
Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).
QA/QC = Quality Assurance, Quality Control
FDA = Field Duplicate Available; FD = Field Duplicate.
Italics = indicates that the detection limit exceeds one or more criteria.
< = Less than the laboratory method detection limit; (-) = Parameter not analyzed
PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 18
Results of Confirmatory Soil Analyses - Base AEC 1B
K19 - Trutch Former Townsite
Alaska Highway, BC

Location	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-01-B1	EX17-01-B2	EX17-01-B3	EX17-01-B3	EX17-01-B4	EX17-01-B5	EX17-01-B6	EX17-01-B7	EX17-01-B8	EX17-01-B9	EX17-01-B9	EX17-01-B10	EX17-01-B11	EX17-01-B11	EX17-01-B12	EX17-01-B13	EX17-01 B14
Sample Control Number					04257-08	04257-09	04259-10	04259-11	04259-12	04260-01	04260-02	04265-01	04265-02	04265-03	04265-04	04265-05	04265-06	04265-07	04265-08	04266-01	04266-02
Sample Date					10/1/2017	10/1/2017	10/4/2017	10/4/2017	10/4/2017	10/4/2017	10/4/2017	10/13/2017	10/13/2017	10/13/2017	10/13/2017	10/13/2017	10/13/2017	10/13/2017	10/13/2017	10/15/2017	10/15/2017
Depth of Sample (m bgs)					5-5 m	5-5 m	5.5-5.5 m	5.5-5.5 m	5.5-5.5 m	6-6 m	5.5-5.5 m	5-5 m	5-5 m	5-5 m	5-5 m	5-5 m	5-5 m	5-5 m	5-5 m	4-4 m	4-4 m
Laboratory Report					17V268098	17V268098	17F269272	17F269272	17F269272	17F269272	17F269272	17F272731	17F272731	17F272731	17F272731	17F272731	17F272731	17F272731	17F272731	17F272731	17F272731
Sample Type					Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory
QA / QC							FDA	FD						FDA	FD		FDA	FD			
Field Parameters																					
PID (ppm)					2.5	3.7	48.0	48.0	49.7	7.3	25.3	2.3	1.2	36.0	36.0	1.7	26.1	26.1	6.5	2.1	5.0
Physical Tests																					
Moisture (%)					4.99	5.56	5	5	4	5	4	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (PAHs)																					
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	< 0.005	< 0.005	< 0.005
Acenaphthylene					< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	< 0.005	< 0.005	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.04	< 0.004	< 0.004	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene					0.10	0.09	0.12	0.14	0.12	0.11	0.10	0.10	0.08	0.07	0.06	0.09	0.08	0.08	0.08	0.06	0.09
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	0.10	0.09	0.11	0.14	0.10	0.11	0.10	0.05	0.05	< 0.05	< 0.05	0.05	0.05	0.05	0.05	0.07	0.07
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	0.01	0.02	0.03	0.03	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Benzo(a)pyrene (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	**1000**	HH	9500	HH	< 0.02	< 0.02	< 0.02	< 0.02	0.02	0.02	< 0.02	0.09	0.10	0.09	0.06	0.09	0.11	< 0.2	0.10	< 0.02	< 0.02
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					0.6	0.6	0.6	0.8	0.6	0.6	0.6	0.6	0.6	< 0.6	< 0.6	0.6	0.6	0.6	0.6	0.6	0.6
Naphthalene	**0.6**	T	20	T	< 0.005	< 0.005	< 0.005	< 0.005	0.033	0.011	0.011	0.132	0.232	0.074	0.048	0.077	0.201	0.320	0.086	< 0.005	< 0.005
Phenanthrene	**5**	EH	50	EH	0.15	0.17	0.19	0.22	0.14	0.19	0.11	0.27	0.27	0.22	0.20	0.26	0.28	0.29	0.26	0.05	0.05
Pyrene	**10**	EH	100	EH	0.04	0.04	0.06	0.08	0.05	0.05	0.05	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.02	0.03
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	< 0.005	0.023	0.044	0.049	0.090	0.033	0.035	0.318	0.494	0.279	0.172	0.290	0.514	0.62	0.272	0.014	0.023
2-Methylnaphthalene	**100**	HH	950	HH	< 0.005	< 0.005	< 0.005	< 0.005	0.108	< 0.005	< 0.005	0.536	0.792	0.370	0.294	0.460	0.675	1.05	0.478	< 0.005	< 0.005
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	164	152	370	410	318	333	464	49	52	101	92	47	100	111	74	152	172
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	-	-	369	410	317	332	464	-	-	-	-	-	-	-	-	-	-
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	228	201	466	540	478	499	207	55	54	48	40	48	54	61	51	227	265
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	-	-	466	540	478	499	206	-	-	-	-	-	-	-	-	-	-
VH(C6-C10)	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	10	10	< 10	10	12	< 10	< 10	10	< 10	< 10	< 10	< 10	< 10
VPH	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	10	10	< 10	10	12	< 10	< 10	10	< 10	< 10	< 10	< 10	< 10
BTEX																					
Benzene	**0.035**	DW	0.035	DW	< 0.005	< 0.005	< 0.005	0.036	0.360	< 0.005	1.14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Toluene	**0.5**	AW	0.5	AW	< 0.05	< 0.05	< 0.05	< 0.05	0.05	< 0.05	0.21	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	**15**	DW	15	DW	< 0.01	< 0.01	< 0.01	< 0.01	0.03	< 0.01	0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Xylenes	**6.5**	DW	6.5	DW	< 0.05	< 0.05	< 0.05	< 0.05	0.09	< 0.05	0.15	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
o-Xylene					< 0.02	< 0.02	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
m,p-Xylenes					< 0.02	< 0.02	-	-	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Styrene	**5**	EH	50	EH	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	-	-	-	-	-	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichloromethane	**5**	EH	50	EH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surface
BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).
Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.
Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).
QA/QC = Quality Assurance, Quality Control
FDA = Field Duplicate Available; FD = Field Duplicate.
Italics = indicates that the detection limit exceeds one or more criteria.
< = Less than the laboratory method detection limit; (-) = Parameter not analyzed
PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 18
Results of Confirmatory Soil Analyses - Base AEC 1B
K19 - Trutch Former Townsite
Alaska Highway, BC

Location	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-01-B15	EX17-01-B16	EX17-01-B17	EX17-01-B18	EX17-01-B19	EX17-01-B20	EX17-01-B21	EX17-01-B22	EX17-01-B22	EX17-01-B23	EX17-01-B24	EX17-01-B25	EX17-01-B25	EX17-01-B26	EX17-01-B27	EX17-01-B28	EX17-01-B29
Sample Control Number					04266-03	04266-04	04266-09	04267-01	04267-02	04267-03	04268-02	04268-03	04268-04	04272-12	04270-07	04270-09	04270-10	04272-02	04272-01	04272-11	04274-01
Sample Date					10/15/2017	10/15/2017	10/15/2017	10/16/2017	10/16/2017	10/16/2017	10/16/2017	10/16/2017	10/16/2017	10/22/2017	10/19/2017	10/19/2017	10/19/2017	10/20/2017	10/20/2017	10/22/2017	10/23/2017
Depth of Sample (m bgs)					4-4 m	4-4 m	4-4 m	5-5 m	5-5 m	5-5 m	4-4 m	4-4 m	4-4 m	5-5 m	4-4 m	4-4 m	4-4 m	4-4 m	4-4 m	5-5 m	6-6 m
Laboratory Report					17F272731	17F272731	17F272731	17N273185	17N273185	17N273185	17N273185	17N273185	17N273185	17N275674	17Y274566	17Y274566	17Y274566	17N275674	17N275674	17N275674	17N276808
Sample Type					Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Interim
QA/QC												FDA	FD			FDA	FD				
Field Parameters																					
PID (ppm)					5.3	2.4	4.6	13.7	0.6	16.9	0.2	1.4	1.4	2.4	1.0	3.9	3.9	5.8	5.1	0.6	128.7
Physical Tests																					
Moisture (%)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (PAHs)																					
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Acenaphthylene					< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Benzo(g,h,i)perylene					0.07	0.06	0.06	0.05	0.06	0.07	0.06	0.07	0.07	0.09	0.07	0.09	0.08	0.09	0.05	0.07	< 0.05
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	0.08	0.06	0.07	< 0.05	< 0.05	0.06	0.05	0.08	0.07	0.07	0.06	0.08	0.08	0.08	< 0.05	0.05	0.13
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	0.01	< 0.01	0.01	0.01	0.01	0.01	< 0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	< 0.01	0.01	0.03
Benzo(a)pyrene (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05
Fluorene	**1000**	HH	9500	HH	< 0.02	< 0.02	< 0.02	0.05	0.07	0.10	< 0.02	< 0.02	< 0.02	0.07	< 0.02	< 0.02	< 0.02	0.03	< 0.02	0.05	< 0.02
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					0.6	0.6	0.6	< 0.6	< 0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	< 0.6	0.6	0.7
Naphthalene	**0.6**	T	20	T	< 0.005	< 0.005	< 0.005	0.015	0.026	0.096	< 0.005	< 0.005	< 0.005	0.058	< 0.005	< 0.005	< 0.005	0.013	< 0.005	0.006	0.023
Phenanthrene	**5**	EH	50	EH	0.03	0.03	0.04	0.14	0.18	0.24	0.02	0.02	0.03	0.23	0.02	0.04	0.03	0.12	0.03	0.17	0.13
Pyrene	**10**	EH	100	EH	0.02	0.02	0.03	0.02	0.03	0.04	0.02	0.03	0.03	0.04	0.04	0.06	0.05	0.04	0.02	0.03	0.07
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	0.024	0.025	0.022	0.106	0.128	0.265	0.005	0.016	0.019	0.211	< 0.005	0.019	< 0.005	0.056	0.013	0.059	< 0.005
2-Methylnaphthalene	**100**	HH	950	HH	< 0.005	< 0.005	< 0.005	0.189	0.220	0.445	< 0.005	0.015	0.031	0.341	< 0.005	0.013	< 0.005	0.075	0.014	0.095	0.027
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	140	172	174	37	38	50	66	96	96	79	110	92	86	89	110	40	263
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	-	-	-	36	38	49	66	96	96	79	-	-	-	89	110	40	263
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	196	315	268	36	41	47	91	165	152	59	127	80	78	73	142	39	292
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	-	-	-	36	41	47	91	165	152	59	-	-	-	73	142	39	292
VH(C6-C10)	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	13	< 10	< 10	< 10	< 10	< 10	< 10	66
VPH	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	13	< 10	< 10	< 10	< 10	< 10	< 10	58
BTEX																					
Benzene	**0.035**	DW	0.035	DW	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	3.53
Toluene	**0.5**	AW	0.5	AW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	2.36
Ethylbenzene	**15**	DW	15	DW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.25
Total Xylenes	**6.5**	DW	6.5	DW	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1.3
o-Xylene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.27
m,p-Xylenes					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.03
Styrene	**5**	EH	50	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichloromethane	**5**	EH	50	EH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surfa
BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).
Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.
Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).
QA/QC = Quality Assurance, Quality Control
FDA = Field Duplicate Available; FD = Field Duplicate.
Italics = indicates that the detection limit exceeds one or more criteria.
< = Less than the laboratory method detection limit; (-) = Parameter not analyzed
PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 18
Results of Confirmatory Soil Analyses - Base AEC 1B
K19 - Trutch Former Townsite
Alaska Highway, BC

Location	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-01-B30	EX17-01-B31	EX17-01-B32	EX17-01-B32	EX17-01-B33	EX17-01-B34	EX17-01-B35	EX17-01-B36	EX17-01-B37	EX17-01-B38	EX17-01-B39	EX17-01-B40	EX17-01-B41	EX17-01-B42	EX17-01-B43	EX17-01-B44
Sample Control Number					04274-02	04276-06	04276-07	04276-08	04276-12	04277-01	04277-02	04277-03	04277-04-	04277-05	04277-06	04277-09	04284-02	04284-03	04285-01	04287-02
Sample Date					10/23/2017	10/28/2017	10/28/2017	10/28/2017	10/28/2017	10/31/2017	10/31/2017	10/31/2017	10/31/2017	10/31/2017	10/31/2017	10/31/2017	11/1/2017	11/1/2017	11/2/2017	11/2/2017
Depth of Sample (m bgs)					6-6 m	6-6 m	6-6 m	6-6 m	6-6 m	6-6 m	6-6 m	6-6 m	6-6 m	6-6 m	6-6 m	6-6 m	6-6 m	6-6 m	5.5-5.5 m	5-5 m
Laboratory Report					17N276808	17F278674	17F278674	17F278674	17F278674	17N280287	17N280287	17N280287	17N280287	17N280287	17N280287	17N280287	17N280287	17N280287	17N280522	17N280522
Sample Type					Interim	Confirmatory	Confirmatory FDA	Confirmatory FD	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory
QA/QC																				
Field Parameters																				
PID (ppm)					138.6	1.0	4.8	4.8	53.5	0.2	1.2	1.0	1.1	10.0	29.9	7.1	5.5	326.2	14.0	1.4
Physical Tests																				
Moisture (%)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (PAHs)																				
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Acenaphthylene					< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene					0.12	0.05	0.06	0.06	0.06	0.06	0.07	0.05	0.05	0.06	0.06	< 0.05	0.07	0.07	0.08	0.05
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	0.14	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	0.07	< 0.05	0.07	0.08	0.07	0.05
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	0.02	0.01	0.01	0.01	0.01	0.01	0.01	< 0.01	0.01	0.01	0.02	0.01	0.02	0.01	0.01	0.01
Benzo(a)pyrene (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	**1000**	HH	9500	HH	< 0.02	0.05	0.06	0.07	0.07	0.03	0.07	0.03	0.06	0.04	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					0.8	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	0.6	0.6	< 0.6	0.6	0.6	0.6	0.6
Naphthalene	**0.6**	T	20	T	0.027	0.031	0.035	0.036	0.070	< 0.005	0.115	0.005	0.016	0.012	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005
Phenanthrene	**5**	EH	50	EH	0.13	0.13	0.16	0.18	0.16	0.11	0.20	0.10	0.18	0.18	0.06	0.06	0.10	0.10	0.10	0.05
Pyrene	**10**	EH	100	EH	0.08	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.04	0.02	0.03	0.03	0.03	0.03
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	0.065	0.087	0.126	0.144	0.150	0.012	0.253	0.024	0.089	0.060	0.019	0.012	< 0.005	0.019	0.021	0.094
2-Methylnaphthalene	**100**	HH	950	HH	< 0.005	0.145	0.218	0.250	0.271	0.020	0.426	0.042	0.161	0.107	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.058
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	291	30	38	43	55	31	54	30	41	84	164	82	184	248	278	131
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	291	30	38	43	54	31	54	30	41	84	164	82	184	248	278	131
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	347	37	41	43	48	60	73	49	46	85	262	95	281	370	442	129
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	346	37	41	43	48	60	73	49	46	85	262	95	281	369	442	129
VH(C6-C10)	**200**	HH/EH	200	HH/EH	12	< 10	14	15	25	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
VPH	**200**	HH/EH	200	HH/EH	11	< 10	14	16	26	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
BTEX																				
Benzene	**0.035**	DW	0.035	DW	0.60	< 0.02	0.03	0.03	0.89	< 0.02	< 0.02	< 0.02	< 0.02	0.83	3.11	0.34	0.05	< 0.02	0.03	0.15
Toluene	**0.5**	AW	0.5	AW	0.15	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.11	0.09	0.89	0.09	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	**15**	DW	15	DW	< 0.05	< 0.05	< 0.05	< 0.05	0.08	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.11	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Xylenes	**6.5**	DW	6.5	DW	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
o-Xylene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
m,p-Xylenes					< 0.05	< 0.05	< 0.05	< 0.05	0.13	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.36	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Styrene	**5**	EH	50	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichloromethane	**5**	EH	50	EH	-	-	-	-	< 0.05	-	-	-	-	< 0.05	-	-	-	-	-	-

Notes:
All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surfa
BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).
Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.
Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).
QA/QC = Quality Assurance, Quality Control
FDA = Field Duplicate Available; FD = Field Duplicate.
Italics = indicates that the detection limit exceeds one or more criteria.
< = Less than the laboratory method detection limit; (-) = Parameter not analyzed
PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 19
Results of Confirmatory Soil Analyses - Walls AEC 1C
K19 - Trutch Former Townsite
Alaska Highway, BC

Location	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-02-W1A	EX17-02-W2A	EX17-02-W2A	EX17-02-W2B	EX17-02-W3B	EX17-02-W3C	EX17-02-W4A	EX17-02-W4D	EX17-02-W5B	EX17-02-W5C	EX17-02-W6B	EX17-02-W6D	EX17-02-W7A	EX17-02-W7B	EX17-02-W8A
Sample Control Number					04290-04	04290-08	04290-09	04290-07	04290-11	04290-10	04291-04	04291-01	04291-07	04291-06	04292-04-1.5m	04292-02-3.5m	04292-09-	04292-08-2.5m	04293-07-0.5m
Sample Date					11/4/2017	11/4/2017	11/4/2017	11/4/2017	11/4/2017	11/4/2017	11/4/2017	11/4/2017	11/4/2017	11/4/2017	11/5/2017	11/5/2017	11/7/2017	11/7/2017	11/9/2017
Depth of Sample (m bgs)					1.75-1.75 m	1.75-1.75 m	1.75-1.75 m	2.5-2.5 m	2.5-2.5 m	3.5-3.5 m	0.5-0.5 m	3.5-3.5 m	1.5-1.5 m	2.5-2.5 m	1.5-1.5 m	3.5-3.5 m	1.75-1.75 m	2.5-2.5 m	0.5-0.5 m
Laboratory Report					17N281394	17N281394	17N281394	17N281394	17N281394	17N281394	17N281394	17N281394	17N281394	17N281394	17N283221	17N283221	17N283221	17N283221	17N283221
Sample Type					Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory
QA/QC						FDA	FD												
Field Parameters																			
PID (ppm)					1.0	0.7	0.7	0.4	0.3	0.4	0.4	0.6	0.6	0.4	1.1	53.9	0.4	0.6	0.7
Physical Tests																			
Moisture (%)					-	-	-	-	-	-	-	-	-	-					
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Acenaphthylene					< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene					< 0.05	< 0.05	< 0.05	0.05	< 0.05	0.08	< 0.05	0.11	< 0.05	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	< 0.05	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	0.07	< 0.05	0.05	< 0.05	0.07	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	< 0.01	< 0.01	< 0.01	0.01	< 0.01	0.01	< 0.01	0.02	< 0.01	0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	**1000**	HH	9500	HH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.05	< 0.02	0.08	< 0.02	< 0.02	< 0.02	0.05	< 0.02	< 0.02	< 0.02
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					< 0.6	< 0.6	< 0.6	0.6	< 0.6	< 0.6	< 0.6	0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Naphthalene	**0.6**	T	20	T	< 0.005	< 0.005	< 0.005	0.007	< 0.005	0.013	< 0.005	0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Phenanthrene	**5**	EH	50	EH	< 0.02	0.04	0.02	0.13	0.03	0.15	< 0.02	0.24	< 0.02	0.05	< 0.02	0.12	< 0.02	0.02	< 0.02
Pyrene	**10**	EH	100	HH	< 0.01	< 0.01	< 0.01	0.02	< 0.01	0.03	< 0.01	0.04	< 0.01	0.02	< 0.01	0.05	< 0.01	< 0.01	< 0.01
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	0.008	0.009	0.008	0.025	0.008	0.057	< 0.005	0.169	< 0.005	0.012	< 0.005	0.057	< 0.005	0.012	< 0.005
2-Methylnaphthalene	**100**	HH	950	HH	0.011	0.011	0.012	0.027	0.010	0.099	< 0.005	0.283	< 0.005	0.009	< 0.005	< 0.005	< 0.005	0.019	< 0.005
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	21	< 20	< 20	34	36	44	< 20	70	< 20	26	< 20	598	< 20	< 20	< 20
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	21	< 20	< 20	34	35	44	< 20	70	< 20	26	< 20	598	< 20	< 20	< 20
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	46	28	42	41	34	40	32	68	25	32	24	70	42	38	202
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	46	28	42	41	34	40	32	68	25	32	24	70	42	38	202
VH(C6-C10)	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	< 10	< 10	< 10	14	< 10	< 10	< 10	16	< 10	< 10	< 10
VPH	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	< 10	< 10	< 10	14	< 10	< 10	< 10	15	< 10	< 10	< 10
1-Methylnaphthalene	**500**	HH	1000	HH	0.008	0.009	0.008	0.025	0.008	0.057	< 0.005	0.169	< 0.005	0.012	< 0.005	0.057	< 0.005	0.012	< 0.005
BTEX																			
Benzene	**0.035**	DW	0.035	DW	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Toluene	**0.5**	AW	0.5	AW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	**15**	DW	15	DW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.10	< 0.05	< 0.05	< 0.05
Total Xylenes	**6.5**	DW	6.5	DW	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1	< 0.1	< 0.1
o-Xylene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
m,p-Xylenes					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.19	< 0.05	< 0.05	< 0.05
Styrene	**5**	EH	50	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichloromethane	**5**	EH	50	EH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surface
BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).
Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.
Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).
QA/QC = Quality Assurance, Quality Control
FDA = Field Duplicate Available; FD = Field Duplicate.
Italics = indicates that the detection limit exceeds one or more criteria.
< = Less than the laboratory method detection limit; (-) = Parameter not analyzed
PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 19
Results of Confirmatory Soil Analyses - Walls AEC 1C
K19 - Trutch Former Townsite
Alaska Highway, BC

Location Sample Control Number Sample Date Depth of Sample (m bgs) Laboratory Report Sample Type QA/QC	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-02-W8C 04293-05-2.5m 11/9/2017 2.5-2.5 m 17N283221 Confirmatory	EX17-02-W9C 04294-01-2.5m 11/9/2017 2.5-2.5 m 17N283221 Confirmatory	EX17-02-W9D 04293-12-3.5m 11/9/2017 3.5-3.5 m 17N283221 Confirmatory	EX17-02-W10B 04294-06-1.5m 11/9/2017 1.5-1.5 m 17N283221 Confirmatory	EX17-02-W10D 04294-04-3.5m 11/9/2017 3.5-3.5 m 17N283221 Confirmatory	EX17-02-W11A 04295-07-0.5m 11/10/2017 0.5-0.5 m 17V284467 Confirmatory	EX17-02-W11B 04295-06-1.5m 11/10/2017 1.5-1.5 m 17V284467 Confirmatory	EX17-02-W12B 04295-09-1.5m 11/10/2017 1.5-1.5 m 17V284467 Confirmatory	EX17-02-W12C 04295-08-2.5m 11/10/2017 2.5-2.5 m 17V284467 Confirmatory	EX17-02-W13A 04296-03-0.5m 11/10/2017 0.5-0.5 m 17V284467 Confirmatory	EX17-02-W13C 04296-01-2.5m 11/10/2017 2.5-2.5 m 17V284467 Confirmatory	EX17-02-W14A 04296-08-0.5m 11/11/2017 0.5-0.5 m 17V284467 Confirmatory	EX17-02-W14C 04296-06-2.5m 11/11/2017 2.5-2.5 m 17V284467 Confirmatory	EX17-02-W15A 04297-02-0.5m 11/11/2017 0.5-0.5 m 17V284467 Confirmatory
Field Parameters																	
PID (ppm)					0.3	0.4	0.4	0.4	0.6	0.6	1.5	0.4	0.2	8.8	1.0	59.4	196.2	9.4
Physical Tests																		
Moisture (%)																		
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Acenaphthylene					< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene					< 0.05	0.07	0.12	< 0.05	0.08	< 0.05	< 0.05	< 0.05	0.09	< 0.05	< 0.05	< 0.05	0.09	< 0.05
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	0.05	0.06	0.09	< 0.05	0.08	< 0.05	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	`	< 0.05
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	0.01	0.01	0.02	< 0.01	0.02	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Benzo(a)pyrene (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	**1000**	HH	9500	HH	< 0.02	< 0.02	< 0.02	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.10	0.05	< 0.02	< 0.02	0.19	< 0.02
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	0.6	< 0.6	< 0.6	< 0.6	0.6	< 0.6
Naphthalene	**0.6**	T	20	T	< 0.005	0.005	< 0.005	< 0.005	0.035	< 0.005	< 0.005	< 0.005	0.005	0.431	< 0.005	< 0.005	0.493	< 0.005
Phenanthrene	**5**	EH	50	EH	0.03	0.06	0.07	< 0.02	0.15	< 0.02	< 0.02	< 0.02	0.28	0.10	< 0.02	< 0.02	0.31	< 0.02
Pyrene	**10**	EH	100	HH	0.03	0.03	0.07	< 0.01	0.06	< 0.01	< 0.01	< 0.01	0.04	0.03	< 0.01	< 0.01	0.08	< 0.01
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	0.005	0.022	0.014	0.005	0.084	< 0.005	< 0.005	< 0.005	0.028	0.560	< 0.005	< 0.005	2.65	< 0.005
2-Methylnaphthalene	**100**	HH	950	HH	< 0.005	0.022	< 0.005	0.005	0.133	< 0.005	< 0.005	< 0.005	0.041	0.150	< 0.005	< 0.005	0.641	< 0.005
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	20	37	64	< 20	58	< 20	< 20	< 20	60	316	< 20	30	**2790**	< 20
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	20	37	64	< 20	58	< 20	< 20	< 20	60	316	< 20	30	**2790**	< 20
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	40	68	75	26	55	28	25	21	59	69	30	35	137	32
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	40	68	75	26	55	28	25	21	59	69	29	34	137	32
VH(C6-C10)	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	19	< 10	40	112	< 10
VPH	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	17	< 10	40	112	< 10
1-Methylnaphthalene	**500**	HH	1000	HH	0.005	0.022	0.014	0.005	0.084	< 0.005	< 0.005	< 0.005	0.028	0.560	< 0.005	< 0.005	2.65	< 0.005
BTEX																		
Benzene	**0.035**	DW	0.035	DW	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	**0.04**	< 0.02	< 0.02	**0.06**	< 0.02
Toluene	**0.5**	AW	0.5	AW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	**15**	DW	15	DW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.27	< 0.05	< 0.05	0.21	< 0.05
Total Xylenes	**6.5**	DW	6.5	DW	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.8	< 0.1	< 0.1	0.2	< 0.1
o-Xylene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
m,p-Xylenes					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.80	< 0.05	< 0.05	0.22	< 0.05
Styrene	**5**	EH	50	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichloromethane	**5**	EH	50	EH	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surface
BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).
Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.
Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).
QA/QC = Quality Assurance, Quality Control
FDA = Field Duplicate Available; FD = Field Duplicate.
Italics = indicates that the detection limit exceeds one or more criteria.
< = Less than the laboratory method detection limit; (-) = Parameter not analyzed
PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 19
Results of Confirmatory Soil Analyses - Walls AEC 1C
K19 - Trutch Former Townsite
Alaska Highway, BC

Location Sample Control Number Sample Date Depth of Sample (m bgs) Laboratory Report Sample Type QA/QC	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-02-W15B 04297-01-1.5m 11/11/2017 1.5-1.5 m 17V284467 Confirmatory	EX17-02-W16B 04297-05-1.5m 11/12/2017 1.5-1.5 m 17V284467 Confirmatory	EX17-02-W16C 04297-04-2.5m 11/12/2017 2.5-2.5 m 17V284467 Confirmatory	EX17-02-W17B 04297-08-1.5m 11/12/2017 1.5-1.5 m 17V284467 Confirmatory	EX17-02-W17C 04297-07-2.5m 11/12/2017 2.5-2.5 m 17V284467 Confirmatory	EX17-02-W18A 04297-11-0.5m 11/12/2017 0.5-0.5 m 17V284467 Confirmatory	EX17-02-W18C 04297-10-2.5m 11/12/2017 2.5-2.5 m 17V284467 Confirmatory
Field Parameters											
PID (ppm)					2.2	10.4	62.1	11.1	134.4	1.5	187.7
Physical Tests											
Moisture (%)											
Polycyclic Aromatic Hydrocarbons (PAHs)											
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Acenaphthylene					< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.07
Benzo(g,h,i)perylene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.22
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.16
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	0.007	< 0.005	< 0.005	0.006	< 0.005	0.011
Fluoranthene	**50**	T	200	T	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.04
Benzo(a)pyrene (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.07
Fluorene	**1000**	HH	9500	HH	< 0.02	< 0.02	< 0.02	< 0.02	0.03	< 0.02	0.03
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					< 0.6	0.6	< 0.6	< 0.6	0.6	< 0.6	1.0
Naphthalene	**0.6**	T	20	T	< 0.005	0.009	< 0.005	0.018	< 0.005	0.007	0.293
Phenanthrene	**5**	EH	50	EH	< 0.02	< 0.02	< 0.02	0.02	0.07	< 0.02	0.41
Pyrene	**10**	EH	100	HH	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.09
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	< 0.005	0.013	0.007	0.018	0.189	0.008	0.563
2-Methylnaphthalene	**100**	HH	950	HH	< 0.005	0.013	< 0.005	0.024	< 0.005	0.013	0.91
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	< 20	< 20	< 20	174	457	54	232
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	< 20	< 20	< 20	174	457	54	231
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	38	40	49	36	49	38	76
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	38	40	49	36	49	38	76
VH(C6-C10)	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	22	< 10	108
VPH	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	22	< 10	97
1-Methylnaphthalene	**500**	HH	1000	HH	< 0.005	0.013	0.007	0.018	0.189	0.008	0.563
BTEX											
Benzene	**0.035**	DW	0.035	DW	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.66
Toluene	**0.5**	AW	0.5	AW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	**2.76**
Ethylbenzene	**15**	DW	15	DW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.91
Total Xylenes	**6.5**	DW	6.5	DW	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	5.9
o-Xylene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	1.60
m,p-Xylenes					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	4.34
Styrene	**5**	EH	50	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichloromethane	**5**	EH	50	EH	-	-	-	-	-	-	-

Notes:
All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surface
BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).
Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.
Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).
QA/QC = Quality Assurance, Quality Control
FDA = Field Duplicate Available; FD = Field Duplicate.
Italics = indicates that the detection limit exceeds one or more criteria.
< = Less than the laboratory method detection limit; (-) = Parameter not analyzed
PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 20
Results of Confirmatory Soil Analyses - Base AEC 1C
K19 - Trutch Former Townsite
Alaska Highway, BC

Location	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-02-B01	EX17-02-B02	EX17-02-B03	EX17-02-B04	EX17-02-B05	EX17-02-B06	EX17-02-B07	EX17-02-B08	EX17-02-B08	EX17-02-B09	EX17-02-B10	EX17-02-B11	EX17-02-B12	EX17-02-B13	EX17-02-B14	EX17-02-B15
Sample Control Number					04289-10	04289-11	04289-12	04290-01	04290-05	04291-09	04291-10	04291-11	04291-12	04292-01-	04292-10-	04292-11-	04292-12-	04293-01-	04293-08-	04293-09-
Sample Date					11/3/2017	11/3/2017	11/3/2017	11/3/2017	11/4/2017	11/5/2017	11/5/2017	11/5/2017	11/5/2017	11/5/2017	11/7/2017	11/7/2017	11/7/2017	11/7/2017	11/9/2017	11/9/2017
Depth of Sample (m bgs)					3.75-3.75 m	3.75-3.75 m	3.75-3.75 m	3.75-3.75 m	4-4 m	4-4 m	4-4 m	4-4 m	4-4 m	4-4 m	3.5-3.5 m	3.5-3.5 m	4-4 m	4-4 m	4-4 m	4-4 m
Laboratory Report					17N281394	17N281394	17N281394	17N281394	17N281394	17N281394	17N281394	17N281394	17N281394	17N283221	17N283221	17N283221	17N283221	17N283221	17N283221	17N283221
Sample Type					Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory
QA/QC												FDA	FD							
Field Parameters																				
PID (ppm)					4.6	55.0	99.5	80.4	3.4	1.9	1.7	1.4	1.4	1.1	1.9	21.6	0.7	1.2	5.5	3.8
Physical Tests																				
Moisture (%)					-	-	-	-	-	-	-	-	-							
Polycyclic Aromatic Hydrocarbons (PAHs)																				
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Acenaphthylene					< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene					0.06	0.08	0.09	0.09	0.10	0.07	0.08	0.08	0.10	0.07	0.08	0.08	0.11	0.08	0.09	0.09
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	< 0.05	< 0.05	0.05	0.06	0.05	< 0.05	0.05	0.05	0.06	0.06	0.07	0.05	0.09	0.07	0.07	0.07
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.01
Benzo(a)pyrene (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	**1000**	HH	9500	HH	0.07	0.09	0.07	0.08	0.10	0.05	0.06	< 0.02	< 0.02	0.03	0.08	0.10	0.04	0.06	0.09	0.04
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					< 0.6	< 0.6	0.6	0.6	0.6	< 0.6	0.6	0.6	0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Naphthalene	**0.6**	T	20	T	0.053	0.322	0.477	0.85	0.103	0.042	0.015	< 0.005	< 0.005	0.008	0.035	0.123	0.005	0.057	0.086	0.013
Phenanthrene	**5**	EH	50	EH	0.21	0.23	0.21	0.22	0.28	0.15	0.18	0.06	0.07	0.15	0.26	0.27	0.18	0.21	0.28	0.16
Pyrene	**10**	EH	100	HH	0.02	0.02	0.03	0.03	0.03	0.02	0.03	0.03	0.04	0.03	0.04	0.03	0.06	0.04	0.04	0.04
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	0.173	0.49	0.582	1.13	0.322	0.132	0.069	< 0.005	< 0.005	0.038	0.143	0.329	0.028	0.116	0.284	0.039
2-Methylnaphthalene	**100**	HH	950	HH	0.296	0.71	1.07	1.87	0.534	0.211	0.119	< 0.005	< 0.005	0.050	0.248	0.604	0.042	0.141	0.464	0.066
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	90	144	353	364	80	60	67	73	86	88	91	85	87	77	112	90
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	90	144	352	363	80	60	67	73	86	88	90	85	87	77	111	90
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	54	54	87	76	61	42	55	62	71	68	68	50	80	63	85	68
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	54	54	87	75	61	41	55	62	71	68	68	50	80	63	85	68
VH(C6-C10)	**200**	HH/EH	200	HH/EH	17	26	28	67	11	< 10	< 10	< 10	< 10	< 10	< 10	22	< 10	< 10	< 10	< 10
VPH	**200**	HH/EH	200	HH/EH	17	28	30	78	11	< 10	< 10	< 10	< 10	< 10	< 10	21	< 10	< 10	< 10	< 10
BTEX																				
Benzene	**0.035**	DW	0.035	DW	< 0.02	0.09	0.14	0.65	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Toluene	**0.5**	AW	0.5	AW	< 0.05	0.23	0.27	2.25	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	**15**	DW	15	DW	< 0.05	0.26	0.48	1.39	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.09	< 0.05	< 0.05	< 0.05	< 0.05
Total Xylenes	**6.5**	DW	6.5	DW	0.2	1.3	1.9	6.9	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.5	< 0.1	< 0.1	< 0.1	< 0.1
o-Xylene					< 0.05	0.24	0.37	1.90	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.11	< 0.05	< 0.05	< 0.05	< 0.05
m,p-Xylenes					0.15	1.10	1.55	4.97	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.05	0.37	< 0.05	< 0.05	0.05	0.07
Styrene	**5**	EH	50	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichloromethane	**5**	EH	50	EH	< 0.05	< 0.05	< 0.05	< 0.05	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surface

BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).

Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.

Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).

QA/QC = Quality Assurance, Quality Control

FDA = Field Duplicate Available; FD = Field Duplicate.

Italics = indicates that the detection limit exceeds one or more criteria.

< = Less than the laboratory method detection limit; (-) = Parameter not analyzed

PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 20
Results of Confirmatory Soil Analyses - Base AEC 1C
K19 - Trutch Former Townsite
Alaska Highway, BC

Location	BC CSR Standards for WL_R (< 3m)	Notes	BC CSR Standards for IL (> 3m)	Notes	EX17-02-B16	EX17-02-B16	EX17-02-B17	EX17-02-B18	EX17-02-B19	EX17-02-B20	EX17-02-B21	EX17-02-B22	EX17-02-B23	EX17-02-B24	EX17-02-B25
Sample Control Number					04293-10-	04293-11-	04295-01-	04295-02-	04295-03-	04295-04-	04296-04-	04296-05-	04296-09-	04296-10-	04297-03-
Sample Date					11/9/2017	11/9/2017	11/10/2017	11/10/2017	11/10/2017	11/10/2017	11/11/2017	11/11/2017	11/11/2017	11/11/2017	11/11/2017
Depth of Sample (m bgs)					4-4 m	4-4 m	3.5-3.5 m	3-3 m	2.7-2.7 m	3.5-3.5 m	2.5-2.5 m	2.5-2.5 m	2.5-2.5 m	2.5-2.5 m	2.5-2.5 m
Laboratory Report					17N283221	17N283221	17V284467	17V284467	17V284467	17V284467	17V284467	17V284467	17V284467	17V284467	17V284467
Sample Type					Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory	Confirmatory
QA/QC					FDA	FD									
Field Parameters															
PID (ppm)					18.9	18.9	12.3	95.4	2.6	29.9	29.4	29.5	142.8	7.9	13.7
Physical Tests															
Moisture (%)															
Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Acenaphthylene					< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene					0.09	0.09	0.07	0.09	0.08	0.07	0.06	0.09	0.07	0.07	0.07
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	0.07	0.07	0.05	0.07	0.05	0.05	0.05	0.07	0.05	0.06	0.05
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Benzo(a)pyrene (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b,j)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	**1000**	HH	9500	HH	0.09	0.07	0.07	0.13	0.10	0.08	0.02	0.09	0.15	0.10	0.10
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					< 0.6	< 0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Naphthalene	**0.6**	T	20	T	0.077	0.084	0.098	0.430	0.094	0.236	0.090	0.034	1.64	0.024	0.062
Phenanthrene	**5**	EH	50	EH	0.28	0.25	0.22	0.35	0.23	0.25	0.10	0.27	0.32	0.25	0.25
Pyrene	**10**	EH	100	HH	0.04	0.04	0.03	0.04	0.03	0.03	0.03	0.04	0.03	0.03	0.03
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	0.184	0.177	0.252	1.16	0.193	0.455	0.158	0.179	2.00	0.134	0.272
2-Methylnaphthalene	**100**	HH	950	HH	0.327	0.316	0.399	2.34	0.305	0.56	0.212	0.301	3.32	0.224	0.432
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	131	148	101	353	91	278	202	127	657	78	86
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	130	147	100	352	91	277	202	127	655	78	86
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	70	80	66	85	58	64	162	66	70	62	60
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	70	80	66	85	57	64	162	66	70	62	60
VH(C6-C10)	**200**	HH/EH	200	HH/EH	< 10	17	< 10	49	< 10	13	< 10	< 10	47	< 10	12
VPH	**200**	HH/EH	200	HH/EH	< 10	16	< 10	45	< 10	12	< 10	< 10	36	< 10	12
BTEX															
Benzene	**0.035**	DW	0.035	DW	< 0.02	0.02	< 0.02	**0.07**	< 0.02	0.26	< 0.02	< 0.02	**1.57**	< 0.02	< 0.02
Toluene	**0.5**	AW	0.5	AW	< 0.05	< 0.05	< 0.05	**0.58**	< 0.05	< 0.05	< 0.05	< 0.05	1.65	< 0.05	< 0.05
Ethylbenzene	**15**	DW	15	DW	0.05	0.11	< 0.05	0.34	< 0.05	0.09	< 0.05	< 0.05	1.06	< 0.05	< 0.05
Total Xylenes	**6.5**	DW	6.5	DW	0.2	0.3	< 0.1	2.3	< 0.1	0.5	0.1	< 0.1	**7.5**	< 0.1	< 0.1
o-Xylene					< 0.05	0.05	< 0.05	0.72	< 0.05	0.06	< 0.05	< 0.05	0.84	< 0.05	< 0.05
m,p-Xylenes					0.18	0.29	0.06	1.58	< 0.05	0.46	0.10	< 0.05	6.65	< 0.05	< 0.05
Styrene	**5**	EH	50	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichloromethane	**5**	EH	50	EH	-	-	-	-	-	-	-	-	-	-	-

Notes:
All parameter units in milligrams per kilogram (ug/g), unless otherwise noted; m bgs= metres below ground surface
BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).
Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.
Most conservative CSR standard applied of intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).
QA/QC = Quality Assurance, Quality Control
FDA = Field Duplicate Available; FD = Field Duplicate.
Italics = indicates that the detection limit exceeds one or more criteria.
< = Less than the laboratory method detection limit; (-) = Parameter not analyzed
PID = Photoionization Detector used for organic vapour readings; model MiniRae 3000 calibrated with 100 ppm isobutylene.

Table 21
Results of Soil Analyses - Imported Backfill
K19 - Trutch Former Townsite
Alaska Highway, BC

Location	BC CSR Standards for WL_R (< 3m) Stage 10_3	Notes	BC CSR Standards for IL (> 3m) Stage 10_3	Notes	COMPA	COMPB	COMPC	BACKFILL1	BACKFILL2	BACKFILL3	BACKFILL4	BACKFILL4	BACKFILL5
Sample Control Number					04336-01	04336-02	04336-03	04270-01	04276-01	04284-01	04293-02	04293-03	04335-01
Sample Date					10/03/2017	10/03/2017	10/03/2017	10/19/2017	10/26/2017	11/1/2017	11/8/2017	08/11/17	13/11/17
Laboratory Report					17F268944	17F268944	17F268944	17Y274566	17F278674	17N280287	17N283221	17N283221	17V284467
Sample Type					Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite
QA/QC											FDA	FD	
Physical Tests													
pH					7.09	7.12	7.25	8.32	8.51	8.44	8.52	8.49	8.58
Moisture (%)					21.8	21.9	20.8	-	-	-	-	-	-
PID (ppm)					-	-	-	0.0	-	0.8	-	-	0.0
Metals													
Aluminum	**40,000**	HH	250,000	HH	12900	12800	14000	6010	4870	6020	6870	6680	5060
Antimony	**20**	EH	40	EH	0.6	0.6	0.6	0.5	0.4	0.4	0.4	0.5	0.6
Arsenic	**10**	P4	10	P4	**12.2**	**11.3**	**10.6**	6.7	7.3	6.5	6.5	**11.7**	**10.1**
Barium	**500**	P4	500	P4	388	470	391	146	151	191	208	232	159
Beryllium	**1-150**	AW/T/PH	1-350	AW/T/PH	0.7	0.7	0.8	0.5	0.3	0.3	0.4	0.5	0.3
Bismuth					< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Cadmium	**1 - 30**	AW/T/PH	1 - 50	AW/PH	0.69	0.79	0.73	0.61	0.52	0.35	0.34	0.36	0.47
Calcium					21800	22400	26300	78200	98300	67700	72300	72300	65200
Chromium (total)	**50**	P4	50	P4	21	22	24	14	10	14	13	14	11
Cobalt	**25**	P4	25	P4	11.3	10.6	12.1	6.9	6.5	6.1	5.7	6.1	6.4
Copper	**75 - 150**	AW/T/pH/P4	75 - 300	AW/T/pH/P4	30.1	29.7	32.1	18.8	13.1	12.6	13.5	14.0	12.8
Iron	**40,000**	P4	150,000	HH	26800	25800	27100	24200	20000	25700	21900	25300	20400
Lead	**120**	I	120 - 1000	DW/T/PH	14.9	15.0	14.6	6.7	6.3	5.8	6.2	7.6	6.1
Lithium	**65**	HH	450	HH	17.2	17.4	18.5	8.4	8.4	9.5	11.5	11.8	8.6
Magnesium					9110	8500	8740	12700	12400	13000	11900	14300	10700
Manganese	**2000**	DW/T	2,000	DW/T	308	322	325	368	358	481	447	573	336
Mercury	**25**	I	75	T	0.06	0.07	0.07	0.04	0.04	0.04	0.03	0.03	0.04
Molybdenum	**15**	DW	15	DW	2.8	2.4	2.3	2.7	1.9	1.8	1.9	2.4	2.8
Nickel	**70 - 150**	DW/T/PH	70 - 250	DW/T/PH	33.6	32.9	36.5	19.2	18.2	17.4	17.0	18.3	18.3
Phosphorous					732	751	710	494	492	485	402	480	407
Potassium					2390	2400	2610	1100	979	1280	1540	1630	961
Selenium	**4**	P4	4	P4	1.3	1.2	1.3	0.6	0.9	0.4	0.5	0.9	0.5
Silver	**20**	EH	40	EH	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Sodium					126	110	159	102	102	227	205	108	78
Strontium	**20,000**	HH	150,000	HH	67	70	73	60	77	70	68	94	65
Thallium	**2**	DW/AW/I	2	DW/AW/I	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Tin	**50**	EH	300	EH	0.6	0.6	0.7	0.3	0.3	0.3	0.3	0.4	0.3
Titanium					93	96	100	169	153	187	268	231	135
Uranium	**30**	DW	30	DW	2.1	2.0	2.0	1.1	1.1	1.4	1.3	1.2	1.2
Vanadium	**100**	DW	100	DW	42	43	45	29	20	24	28	24	18
Zinc	**150 - 450**	AW/T/pH	150 - 450	AW/T/pH	120	122	123	80	64	61	53	63	75
Zirconium					6.2	6.0	6.7	3.3	3.0	3.3	3.6	4.3	2.9
Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene	**2000**	HH	15000	HH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Acenaphthylene					< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Anthracene	**2.5**	T	30	T	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Benz(a)anthrancene	**1**	EH	10	EH	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	**10**	I	50	I	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(g,h,i)perylene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	**400**	HH	4500	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	**1**	EH	10	EH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Fluoranthene	**50**	T	200	T	0.01	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene Total Potency Equivalence (TPE)					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[j]fluoranthene					< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b+j)fluoranthene	**1**	EH	10	EH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	**1000**	HH	9500	HH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Indeno(1,2,3-c,d)pyrene	**1**	EH	10	EH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Index of Additive Cancer Risk (IACR)					< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Naphthalene	**0.6**	T	20	T	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Phenanthrene	**5**	EH	50	EH	0.03	0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pyrene	**10**	EH	100	HH	0.02	0.02	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Quinoline	**4.5**	HH	10	HH	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
1-Methylnaphthalene	**500**	HH	1000	HH	0.018	0.014	0.016	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
2-Methylnaphthalene	**100**	HH	950	HH	0.018	0.011	0.015	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
$EPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	41	56	99	< 20	< 20	< 20	< 20	< 20	< 20
$EPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	64	63	64	< 20	< 20	< 20	< 20	< 20	< 20
$HEPH_{(C19-C32)}$	**1000**	HH/EH	5000	HH/EH	64	63	64	< 20	< 20	< 20	< 20	< 20	< 20
$LEPH_{(C10-C19)}$	**1000**	HH/EH	2000	HH/EH	41	56	99	< 20	< 20	< 20	< 20	< 20	< 20
VH	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
VPH	**200**	HH/EH	200	HH/EH	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
BTEX/VOCs													
Benzene	**0.035**	DW	0.035	DW	< 0.005	< 0.005	< 0.005	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Toluene	**0.5**	AW	0.5	AW	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene	**15**	DW	15	DW	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Xylenes	**6.5**	DW	6.5	DW	< 0.05	< 0.05	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
o-Xylene					< 0.02	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Styrene	**5**	EH	50	EH	-	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methyl tert-Butyl Ether (MTBE)	**8000**	HH	20000	HH	-	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylene					< 0.02	< 0.02	< 0.02	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Notes:

All parameter units in milligrams per kilogram (mg/kg), unless otherwise noted; m bgs= metres below ground surface

BC Contaminated Sites Regulation standards shown are from the 01 November 2017 (BC Reg 253/2016 and BC Reg 196/2017).

Current Site Land Use is Wildlands (WL); under the CSR Wildlands (reverted) Land Use (WLR) standards are applied soil above 3 m, and Industrial Land Use (IL) standards are applied to soil below 3 m.

Most conservative CSR standard applied of generic (G), intake of contaminated soil (I), toxicity to soil invertebrates and plants (T), freshwater aquatic life (AW), drinking water (DW), protection of human health (HH) and protection of ecological health (EH).

pH = Standard is pH dependant

P4 = BC MoE Protocol 4 For Contaminated Sites

QA/QC = Quality Assurance, Quality Control

FDA = Field Duplicate Available; FD = Field Duplicate.

Italics = indicates that the detection limit exceeds one or more criteria.

< = Less than the laboratory method detection limit; (-) = Parameter not analyzed

Table 22
Results of Soil Analyses - Leachate Analysis
K19 - Trutch Former Townsite
Alaska Highway, BC

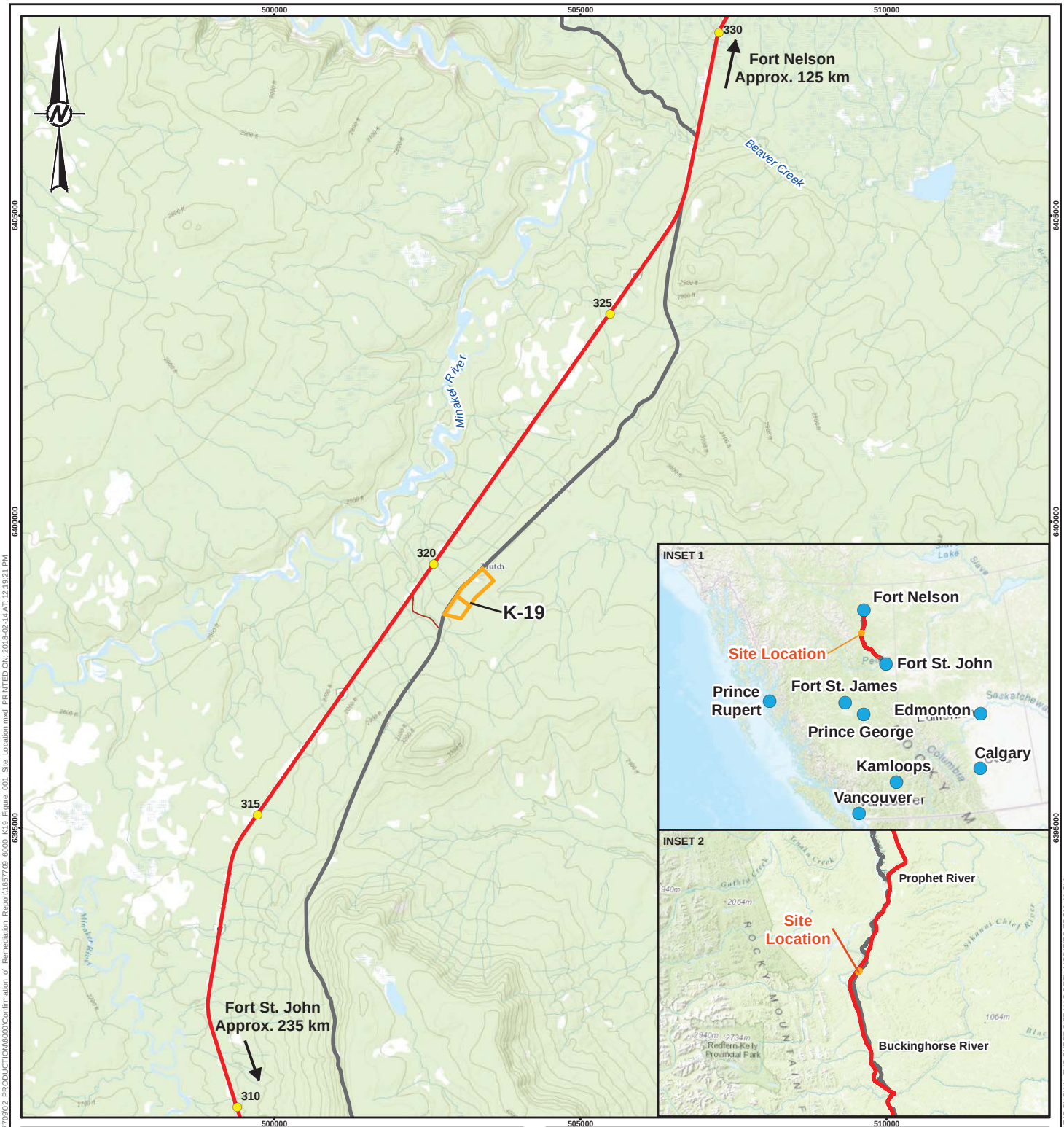
Location	**BC CSR HWR Leachate Quality Standards**	EX17-01-W20B	EX17-01-W27F
Sample Control Number		04269-06	04274-10
Sample Date		10/17/2017	10/24/2017
Depth of Sample (m bgs)		3.5-3.5 m	4.5-4.5 m
Laboratory Report		17N274395	17N276808
Sample Type		Confirmatory	Confirmatory
QA/QC			
Leachable Non-Halogenated Volatiles			
Leachate Benzene	**0.5**	0.006	0.015
Leachate Toluene	**2.4**	0.007	0.011
Leachate Ethylbenzene	**0.24**	0.036	0.116
Leachate Total Xylenes	**30**	0.051	0.168

Notes:

All parameter units in milligrams per liter (mg/L), unless otherwise noted; m = metres; bgs = below ground surface

Standards shown are from the Contaminated Sites Regulation (CSR) BC Reg. 63/88, Schedule 1 Hazardous Waste Regulation (HWR), including amendments up to BC Reg 179/20176, 19 July 2016.

< = Less than the laboratory method detection limit



LEGEND

- COMMUNITY / TOWN / CITY
- KILOMETRE POST
- ALASKA HIGHWAY 2007 SURVEYED ALIGNMENT
- ALASKA HIGHWAY FORMER ALIGNMENT
- SECONDARY ROAD
- SITE LOCATION

0 1.5 3

1:90,000 KILOMETRES

NOTE

KILOMETRE POSTS ARE COUNTED FROM KILOMETRE 0 OF THE ALASKA HIGHWAY IN DAWSON CREEK, BC, APPROXIMATELY 75 KILOMETRES SOUTH OF FORT ST. JOHN.

REFERENCE(S)

1. TOPO MAP OBTAINED FROM ESRI, HERE, DELORME, INTERMAP, GEBCO, USGS, FAO, NPS, NRCAN AND THE GIS USER COMMUNITY.
2. COMMUNITY, TOWN AND CITY LOCATIONS AND NAMES OBTAINED FROM CANVEC AND GEOGRATIS © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
3. KILOMETRE POSTS AND ALASKA HIGHWAY ALIGNMENTS OBTAINED FROM ARCADIS.
4. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

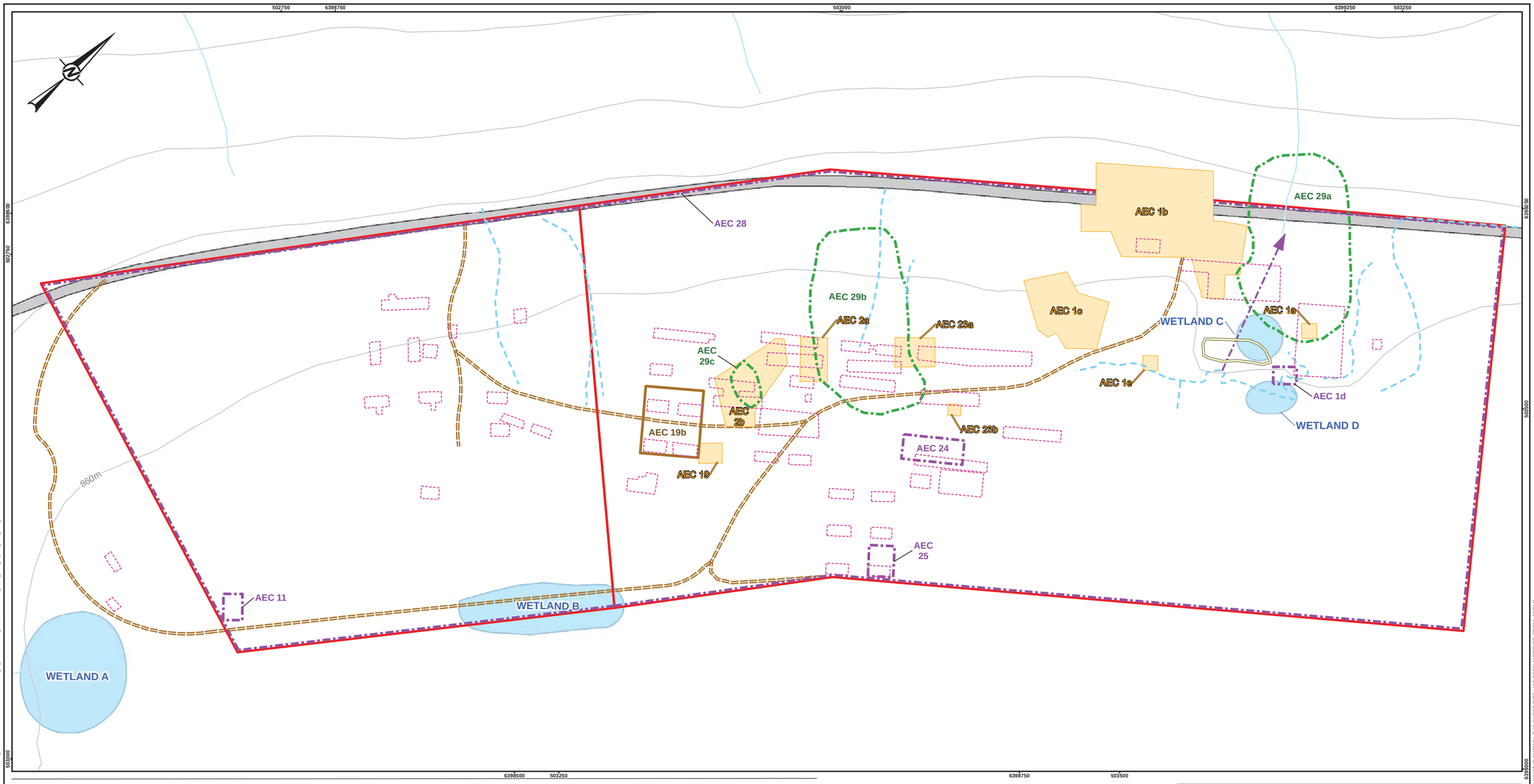
PROJECT
K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE
SITE LOCATION

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	1



LEGEND

- CONTOUR (10m)
- SECONDARY ROAD
- INFERRED UNDERGROUND WATERCOURSE
- APPROXIMATE SEASONAL SWALE / DRAINAGE DITCH
- WATERCOURSE
- APPROXIMATE WETLAND
- ALASKA HIGHWAY FORMER ALIGNMENT
- APPROXIMATE LOCATION OF HISTORICAL BUILDINGS
- SITE LOCATION
- AEC BOUNDARY BASED ON METALS CONTAMINATION
- AEC BOUNDARY BASED ON SODIUM AND/OR CHLORIDE CONTAMINATION
- PRELIMINARY AEC BOUNDARY BASED ON ESTIMATED PETROLEUM HYDROCARBON CONTAMINATION (DELINEATION REQUIRED)
- AEC BOUNDARY BASED ON ESTIMATED EXTENT OF PETROLEUM HYDROCARBON CONTAMINATION
- WOOD DEBRIS PILE

0 50 100

1:2,500 METRES

REFERENCE(S)

1. CONTOURS OBTAINED FROM ARCADIS.
2. APPROXIMATE WETLAND AND APPROXIMATE SWALE/DRAINAGE DITCH OBTAINED FROM GOLDER ASSOCIATES LTD..
3. ALASKA HIGHWAY FORMER ALIGNMENT AND SECONDARY ROADS OBTAINED BY ARCADIS, PORTIONS DERIVED BY VECTOR GEOMATICS, FEBRUARY 7TH AND 8TH, 2017.
4. WATERCOURSES OBTAINED BY B.C. MINISTRY OF FORESTS, LAND AND NATURAL RESOURCE OPERATIONS.
5. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT
PUBLIC SERVICES AND PROCUREMENT CANADA

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-03-26
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

PROJECT
K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE
SITE PLAN

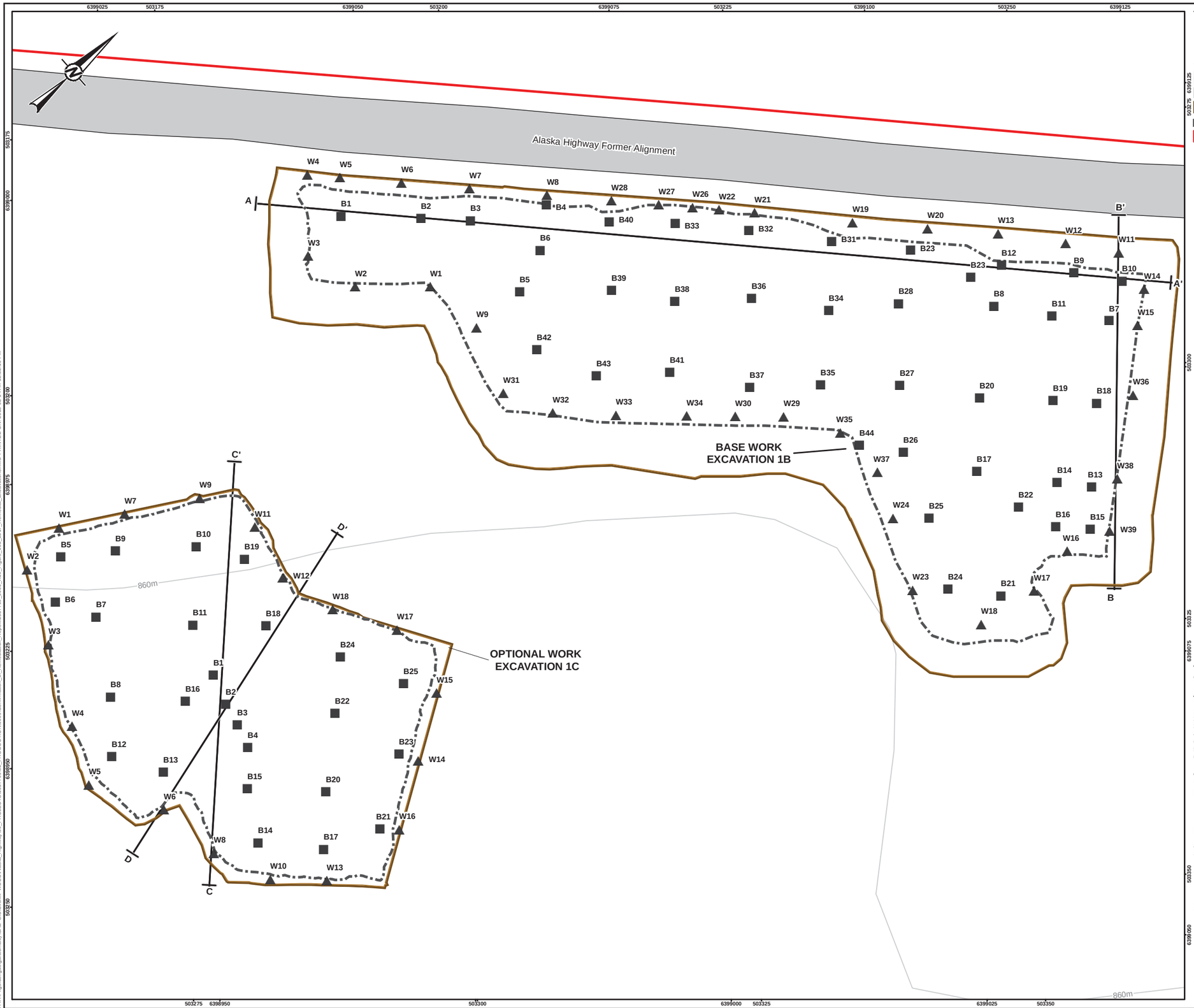
PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

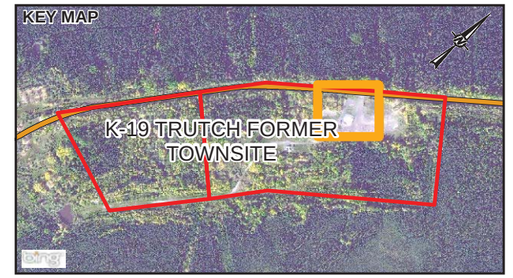
0

PATH: \\golder.gds\gal\burnaby\CAD-GIS\Client\PWGSC\Alaska_Highway\09_PROJECTS\1657709\02_PRODUCTION\6000\Confirmation_of_Remediation_Report\1657709_6000_K19_Figure_002_Site_Plan.mxd PRINTED ON: 2018-03-26 AT: 10:40:45 AM



LEGEND

- BASE SAMPLE
- WALL SAMPLE
- CONTOUR (10M)
- CROSS SECTIONS LOCATION
- ALASKA HIGHWAY FORMER ALIGNMENT
- TOP OF EXCAVATION
- BOTTOM OF EXCAVATION
- SITE LOCATION



0 10 20

1:500 METRES

NOTES

WALL SAMPLE LOCATIONS ARE SHOWED IN PLAIN VIEW AND ARE APPROXIMATE. REFER TO FIGURES 12A, 12B, AND 13.

REFERENCES

1. CONTOURS OBTAINED FROM ARCADIS.
2. BASE SAMPLES AND WALL SAMPLES OBTAINED FROM GOLDER ASSOCIATES LTD.
3. CULVERT, APPROXIMATE WETLAND AND APPROXIMATE SWALE/DRAINAGE DITCH OBTAINED FROM GOLDER ASSOCIATES LTD.
4. ALASKA HIGHWAY FORMER ALIGNMENT AND SECONDARY ROADS OBTAINED BY ARCADIS, PORTIONS DERIVED BY VECTOR GEOMATICS, FEBRUARY 7TH AND 8TH, 2017.
5. WATERCOURSES OBTAINED BY B.C. MINISTRY OF FORESTS, LAND AND NATURAL RESOURCE OPERATIONS.
6. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT

PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT

K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE

2017 REMEDIAL EXCAVATIONS OF AECS 1B AND 1C

CONSULTANT

Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	3

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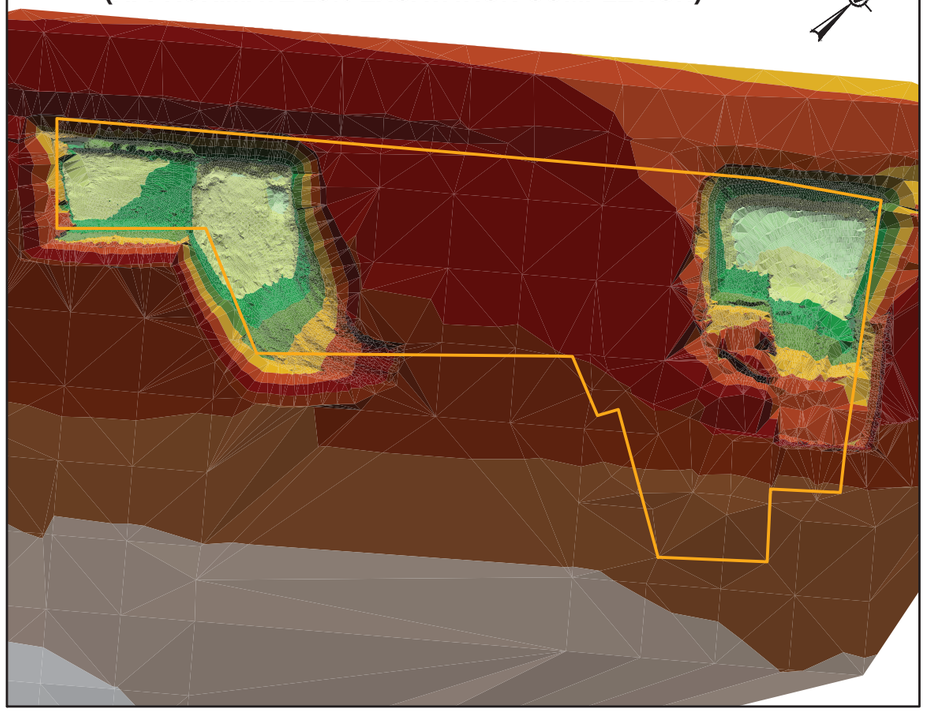
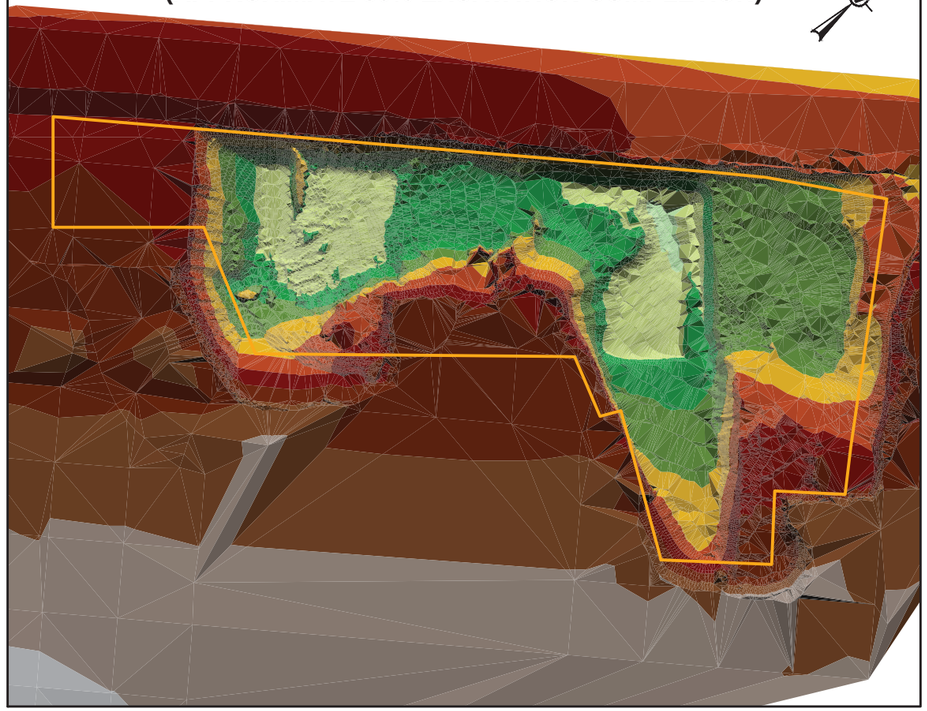
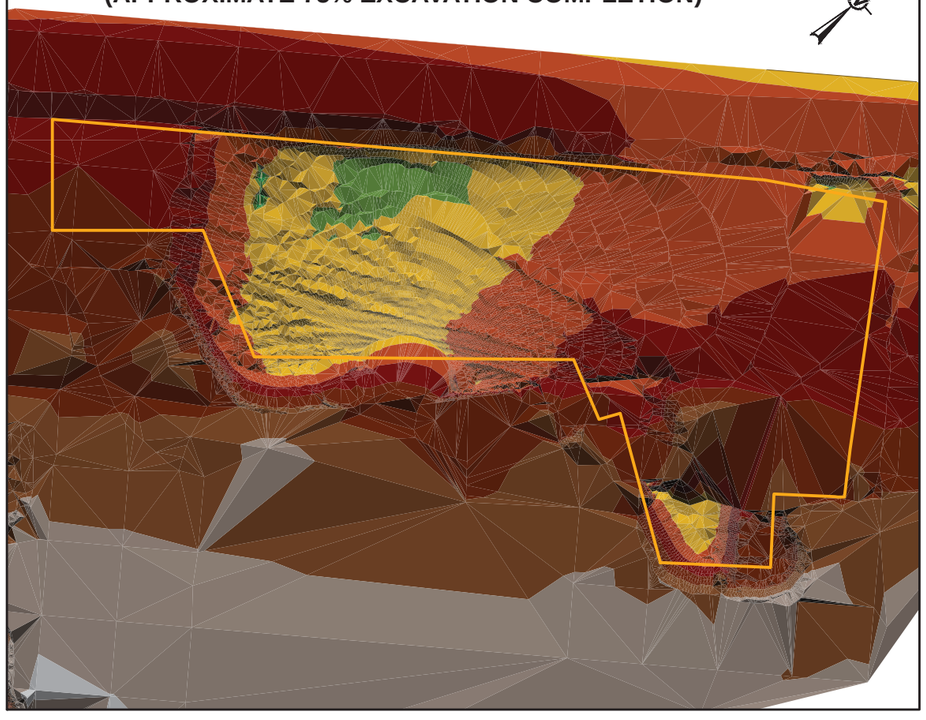
OCTOBER 13th, 2017
(APPROXIMATE 25% EXCAVATION COMPLETION)



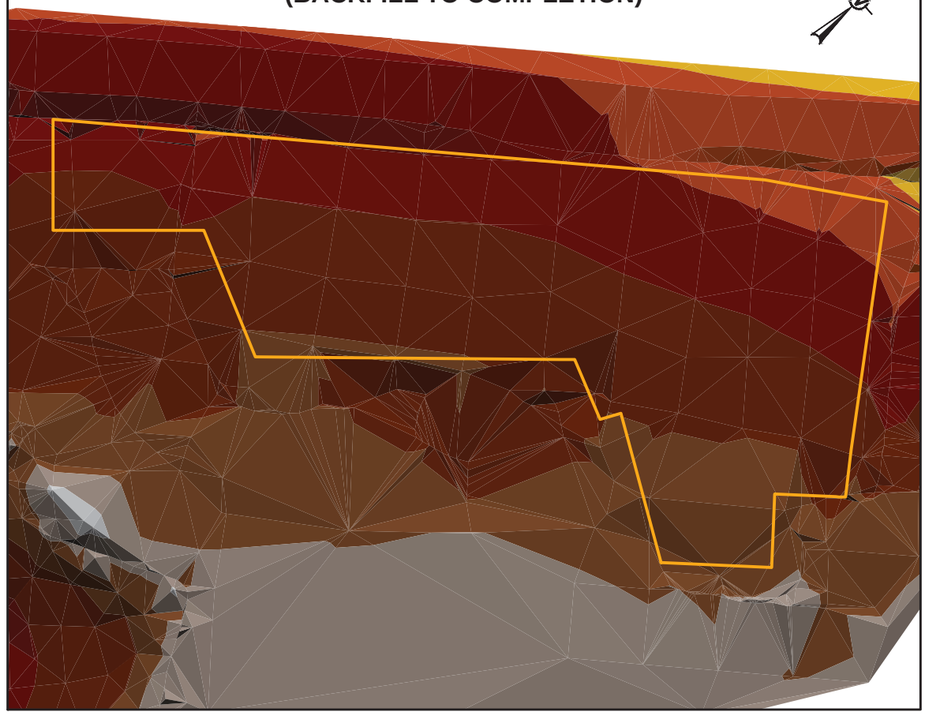
OCTOBER 26th, 2017
(APPROXIMATE 50% EXCAVATION COMPLETION)



NOVEMBER 6th, 2017
(APPROXIMATE 75% EXCAVATION COMPLETION)



NOVEMBER 16th, 2017
(BACKFILL TO COMPLETION)



LEGEND

- BASE WORK REMEDIATION AREA

ELEVATION (masl)

- 859 - 860
- 858 - 859
- 857 - 858
- 856 - 857
- 855 - 856
- 854 - 855
- 853 - 854
- 852 - 853
- 851 - 852
- 850 - 851
- 849 - 850
- 848.26 - 849
- 848.26

0 10 20

1:791 METRES

NOTES

MASL: METRES ABOVE SEA LEVEL.

REFERENCES

1. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT

PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT

K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE

EXCAVATION 1B PROGRESS

CONSULTANT

Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25mm 1

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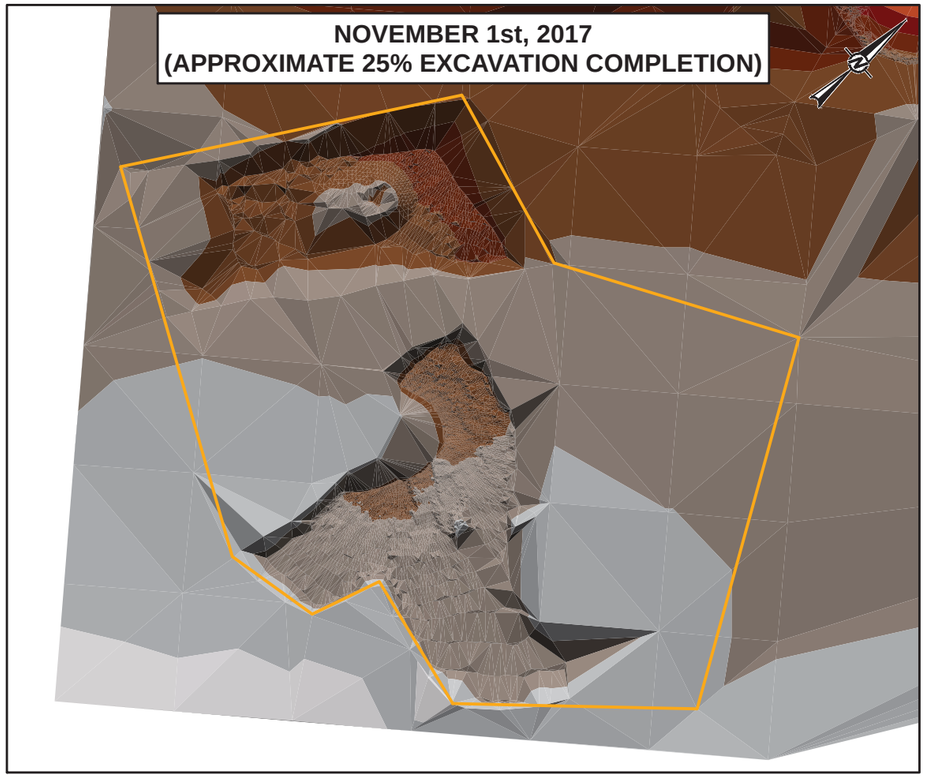

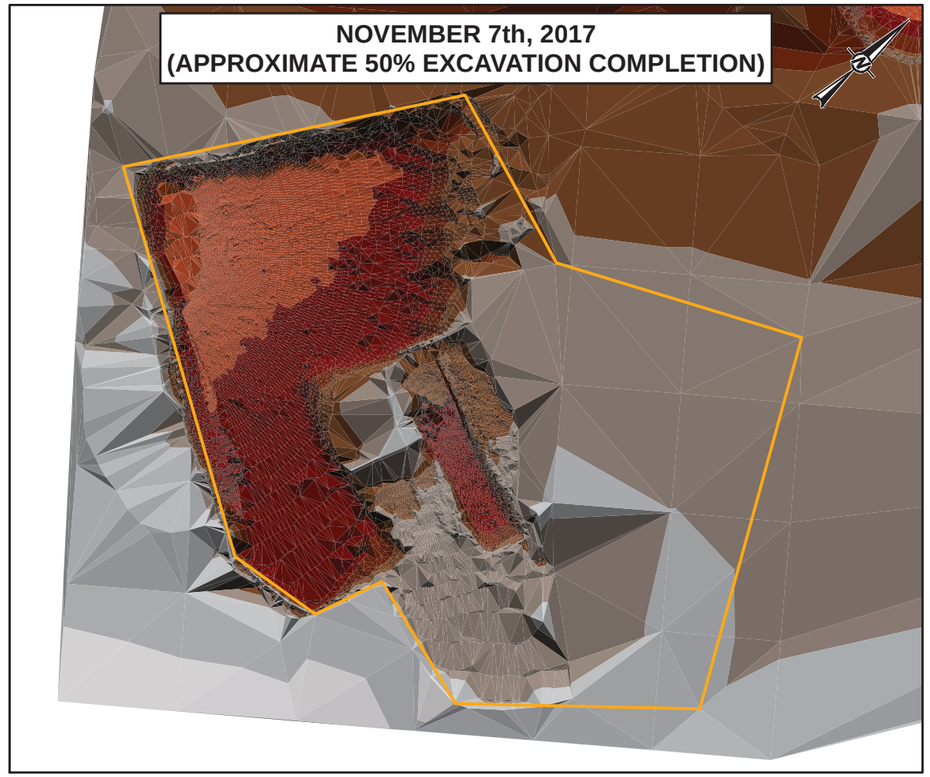

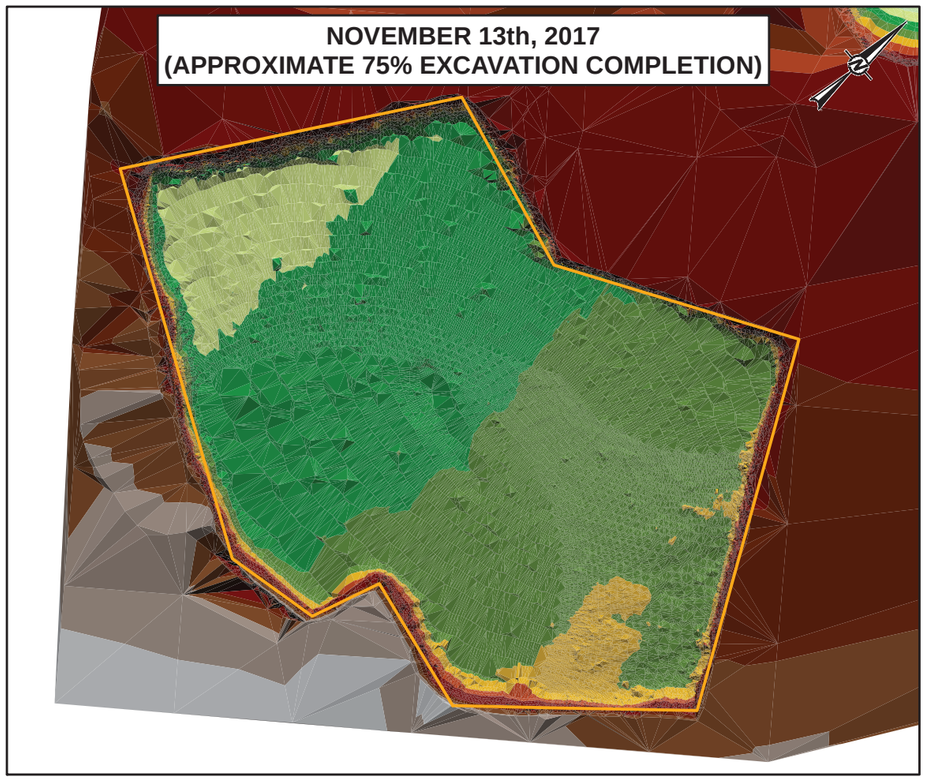

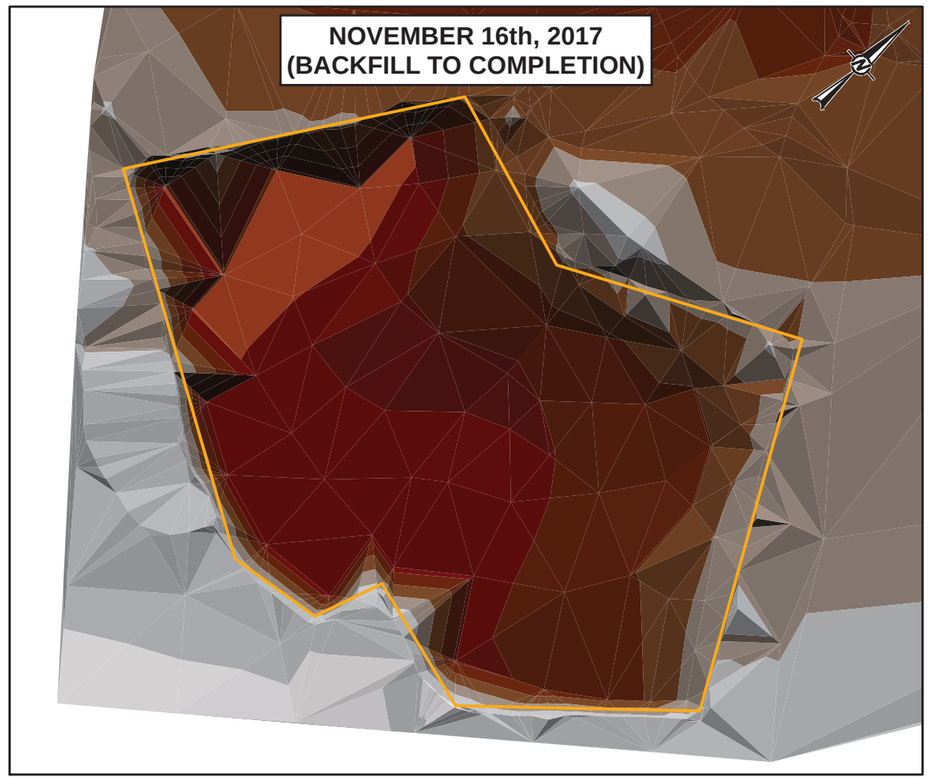

LEGEND

- OPTIONAL WORK REMEDIATION

ELEVATION (masl)

- 859.5 - 860
- 859 - 859.5
- 858.5 - 859
- 858 - 858.5
- 857.5 - 858
- 856 - 857.5
- 855.5 - 856
- 855 - 855.5
- 854.5 - 855
- 854 - 854.5
- 853.5 - 854
- 853 - 853.5
- 848.26 - 853

0 10 20

1:500 METRES

NOTES

MASL: METRES ABOVE SEA LEVEL.

REFERENCES

1. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT

PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT

K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE

EXCAVATION 1C PROGRESS

CONSULTANT

Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	5

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0 25mm

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Alaska Highway Former Alignment

W4 W5 W6 W7 W8 W28 W27 W26 W22 W21

B1 B2 B3 B4 B40 B33 B32 B31

W3 B6

W2 W1 B5 B39 B38 B36 B34

W9 B42

B43 B41 B37 B35

W31 W32 W33 W34 W30 W29 W35

W12

860m

Excavation Continues on Figure 6B

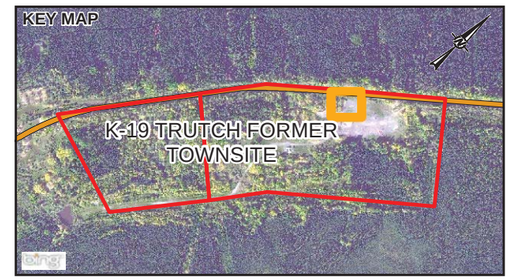
503200 503210 6399060 503220 6399070 503230 6399080 503240 6399090

6399030 503200 6399020 503210 6399010 503220 6399000 503230 6398990 503240 6398980 503250 6398970 503260 6398960 503270 6398950 503280 6398940 503290

LEGEND

- BASE SAMPLE
- WALL SAMPLE
- CONTOUR (10M)
- ALASKA HIGHWAY FORMER ALIGNMENT
- TOP OF EXCAVATION
- BOTTOM OF EXCAVATION
- SITE LOCATION

KEY MAP



0 5 10

1:250 METRES

NOTES

REFERENCES

1. CONTOURS OBTAINED FROM ARCADIS.
2. BASE SAMPLES AND WALL SAMPLES OBTAINED FROM GOLDER ASSOCIATES LTD.
3. ALASKA HIGHWAY FORMER ALIGNMENT AND SECONDARY ROADS OBTAINED BY ARCADIS, PORTIONS DERIVED BY VECTOR GEOMATICS, FEBRUARY 7TH AND 8TH, 2017.
4. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT
PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT
K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE
CONFIRMATORY SAMPLING LOCATIONS
EXCAVATION 1B WEST

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	6A

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25mm

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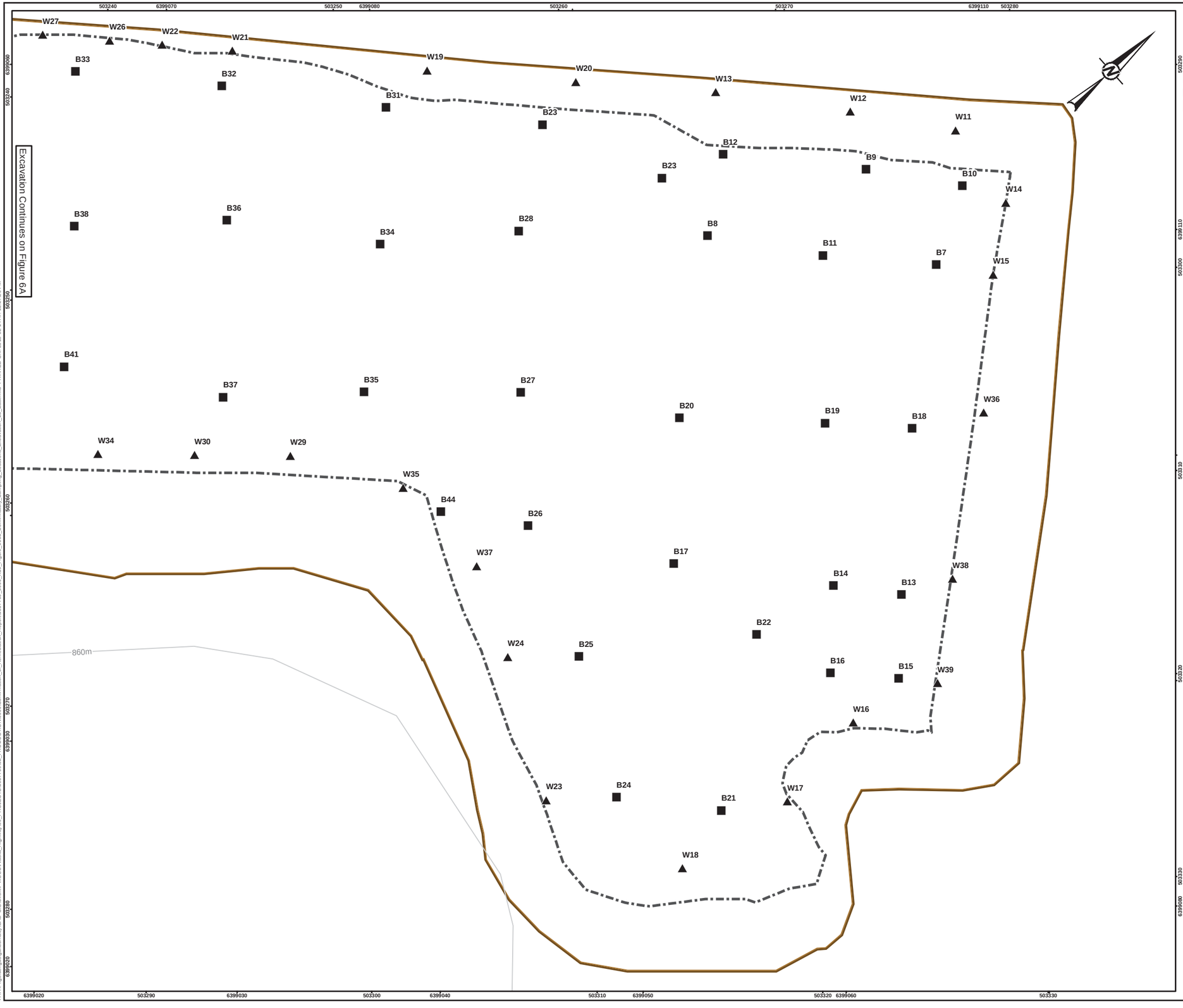
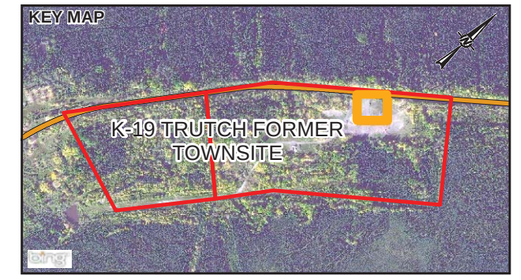


LEGEND

- BASE SAMPLE
- WALL SAMPLE
- CONTOUR (10M)
- TOP OF EXCAVATION
- BOTTOM OF EXCAVATION
- SITE LOCATION



0 5 10

1:250 METRES

NOTES

MBGS: METRES BELOW GROUND SURFACE.
SAMPLE LOCATION LABELS
W20B: SOIL SAMPLE MEETING APPLICABLE WL_B/IL STANDARDS.
W20C : SOIL SAMPLE EXCEEDING APPLICABLE WL_B/IL STANDARDS.

REFERENCES

1. CONTOURS OBTAINED FROM ARCADIS.
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4. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT
PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT
K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE
CONFIRMATORY SAMPLING LOCATIONS
EXCAVATION 1B EAST

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	6B

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25mm

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LEGEND

- BASE SAMPLE
- WALL SAMPLE
- CONTOUR (10M)
- TOP OF EXCAVATION
- BOTTOM OF EXCAVATION
- SITE LOCATION

0 5 10

1:215 METRES

NOTES

MBGS: METRES BELOW GROUND SURFACE.

SAMPLE LOCATION LABELS

W20B: SOIL SAMPLE MEETING APPLICABLE WL_d/IL STANDARDS.

W20C : SOIL SAMPLE EXCEEDING APPLICABLE WL_d/IL STANDARDS.

REFERENCES

1. CONTOURS OBTAINED FROM ARCADIS.
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4. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT

PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT

K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE

CONFIRMATORY SAMPLING LOCATIONS EXCAVATION 1C

CONSULTANT

Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

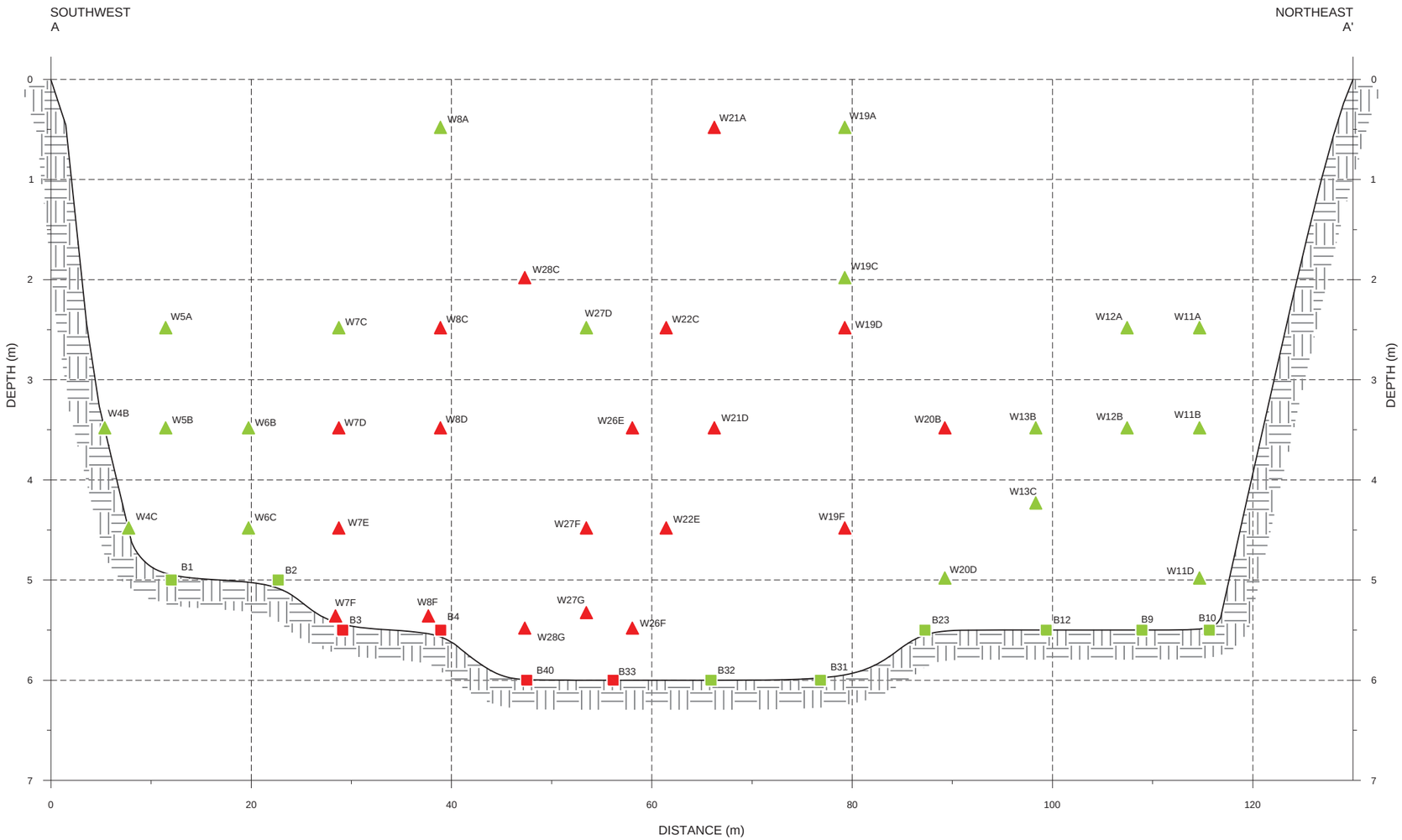
PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

0

PATH: \\golder.gds\gal\burnaby\CAD-GIS\Client\PWGSC\Alaska_Highway\99_PROJECTS\1657709\02_PRODUCTION\6000\Confirmation_of_Remediation_Report\1657709_6000_K19_Figure_007_Confirmatory_Sampling_Locations_Excavation_1c.mxd PRINTED ON: 2018-02-14 AT: 12:40:03 PM



A 3 CROSS SECTION A-A'

LEGEND

- BASE SAMPLE LOCATION WHICH MEETS APPLICABLE STANDARDS
- BASE SAMPLE WHICH EXCEEDS APPLICABLE STANDARDS
- WALL SAMPLE LOCATION WHICH MEETS APPLICABLE STANDARDS
- WALL SAMPLE WHICH EXCEEDS APPLICABLE STANDARDS

0 1 2
1:50 VERTICAL METRES

0 10 20
1:500 HORIZONTAL METRES

CLIENT
PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT
K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE
AEC 1B EXCAVATION: CROSS SECTION A-A'

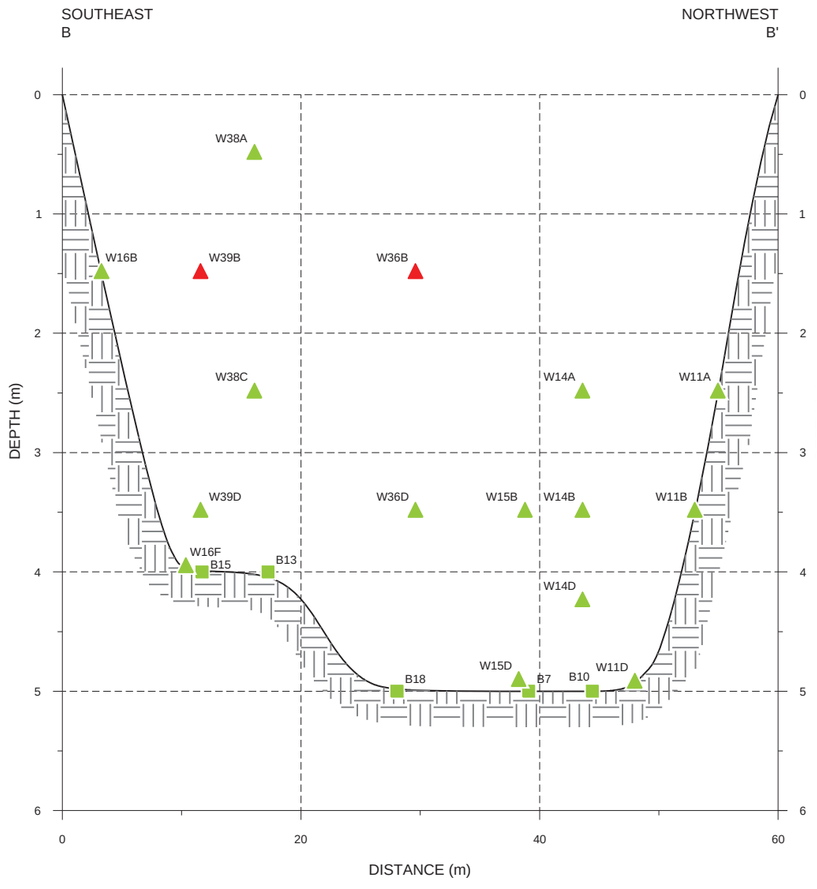
CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RTJ
REVIEWED	AB
APPROVED	AM

PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	8

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm



B 3 CROSS SECTION B-B'

LEGEND

- BASE SAMPLE LOCATION WHICH MEETS APPLICABLE STANDARDS
- BASE SAMPLE WHICH EXCEEDS APPLICABLE STANDARDS
- WALL SAMPLE LOCATION WHICH MEETS APPLICABLE STANDARDS
- WALL SAMPLE WHICH EXCEEDS APPLICABLE STANDARDS

0 1 2
1:50 VERTICAL METRES

0 10 20
1:500 HORIZONTAL METRES

CLIENT
PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT
K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

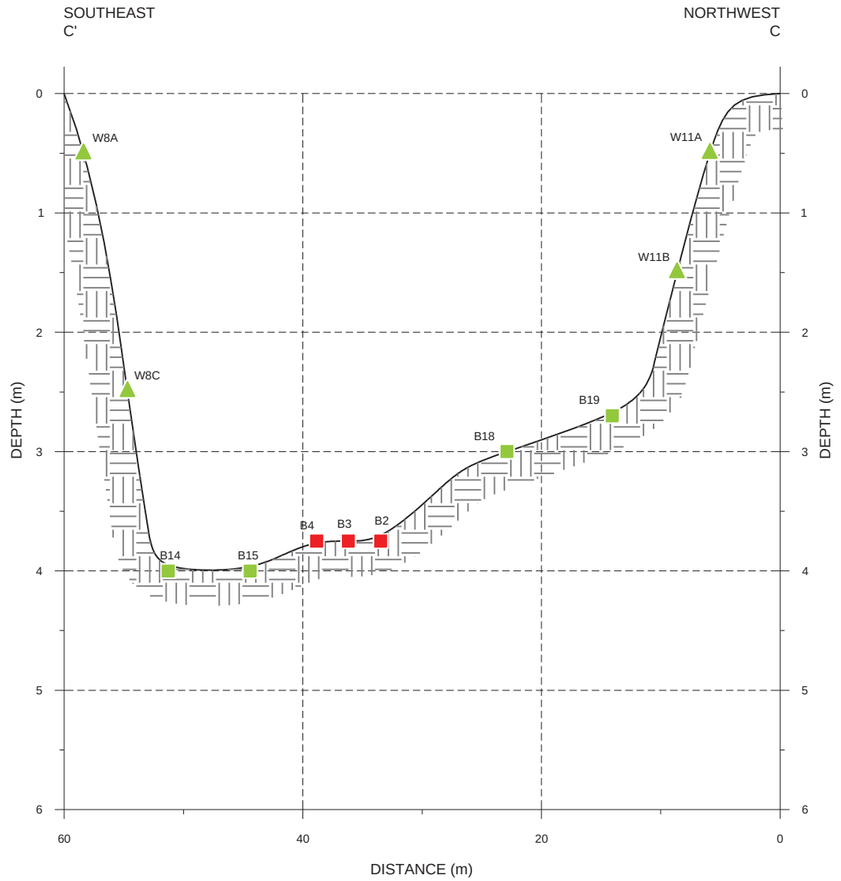
TITLE
AEC 1B EXCAVATION: CROSS SECTION B-B'

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RTJ
REVIEWED	AB
APPROVED	AM

PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	9

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25 mm
0



C/3 CROSS SECTION C-C'

LEGEND

- BASE SAMPLE LOCATION WHICH MEETS APPLICABLE STANDARDS
- BASE SAMPLE WHICH EXCEEDS APPLICABLE STANDARDS
- WALL SAMPLE LOCATION WHICH MEETS APPLICABLE STANDARDS
- WALL SAMPLE WHICH EXCEEDS APPLICABLE STANDARDS

0 1 2
1:50 VERTICAL METRES

0 10 20
1:500 HORIZONTAL METRES

CLIENT
PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT
K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE
AEC 1C EXCAVATION: CROSS SECTION C-C'

CONSULTANT
Golder Associates

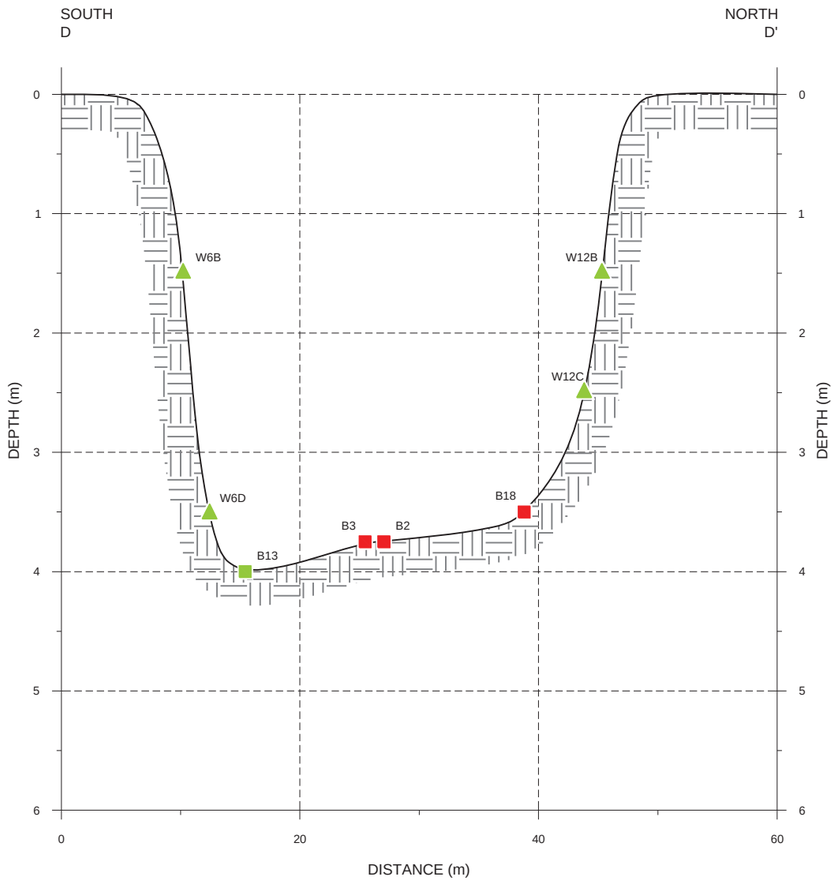
YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RTJ
REVIEWED	AB
APPROVED	AM

PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	10

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

0



D/3 CROSS SECTION D-D'

LEGEND

- BASE SAMPLE LOCATION WHICH MEETS APPLICABLE STANDARDS
- BASE SAMPLE WHICH EXCEEDS APPLICABLE STANDARDS
- WALL SAMPLE LOCATION WHICH MEETS APPLICABLE STANDARDS
- WALL SAMPLE WHICH EXCEEDS APPLICABLE STANDARDS

0 1 2
1:50 VERTICAL METRES

0 10 20
1:500 HORIZONTAL METRES

CLIENT
PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT
K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE
AEC 1C EXCAVATION: CROSS SECTION C-C'

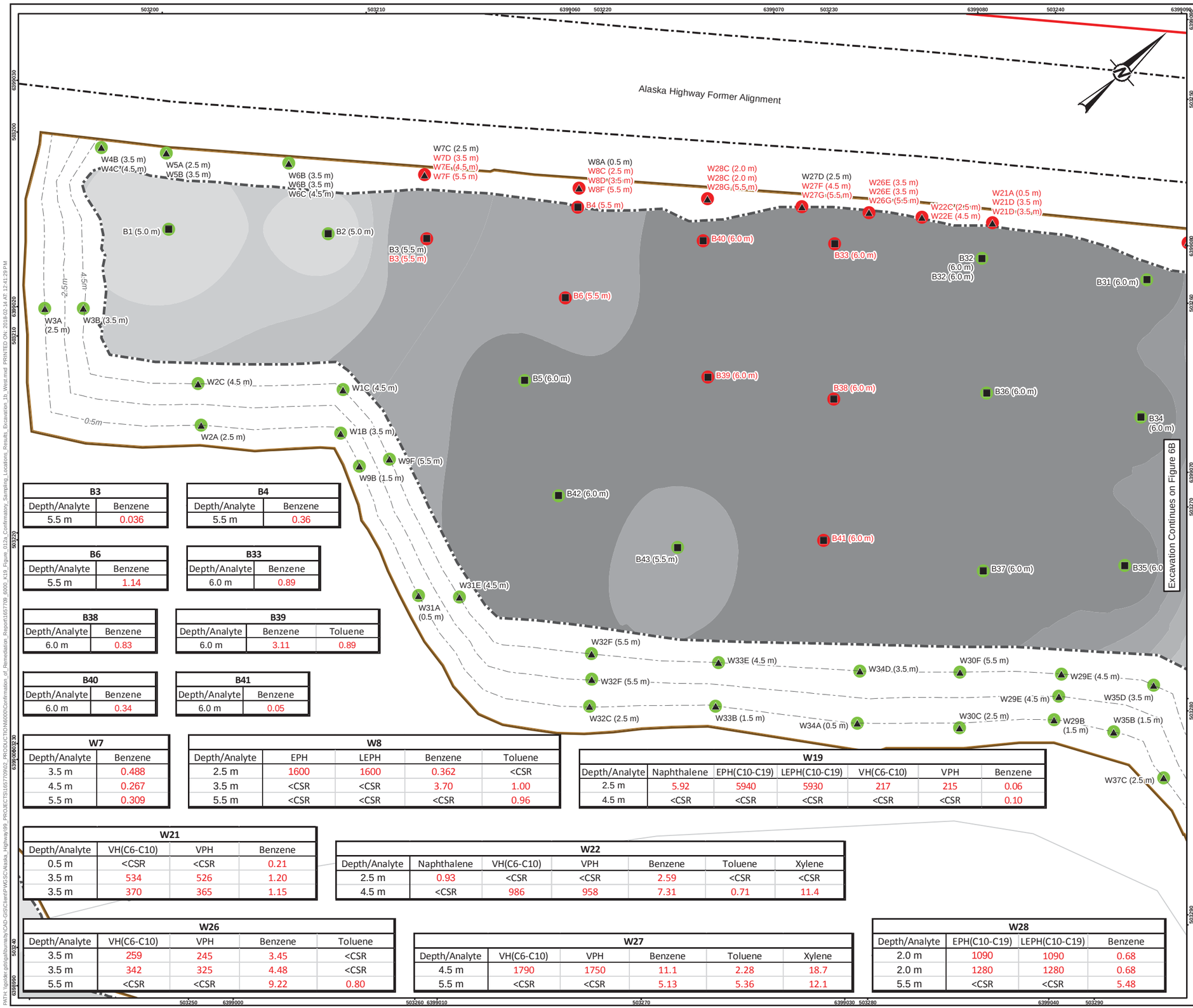
CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RTJ
REVIEWED	AB
APPROVED	AM

PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	11

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm



B3	
Depth/Analyte	Benzene
5.5 m	0.036

B4	
Depth/Analyte	Benzene
5.5 m	0.36

B6	
Depth/Analyte	Benzene
5.5 m	1.14

B33	
Depth/Analyte	Benzene
6.0 m	0.89

B38	
Depth/Analyte	Benzene
6.0 m	0.83

B39		
Depth/Analyte	Benzene	Toluene
6.0 m	3.11	0.89

B40	
Depth/Analyte	Benzene
6.0 m	0.34

B41	
Depth/Analyte	Benzene
6.0 m	0.05

W7	
Depth/Analyte	Benzene
3.5 m	0.488
4.5 m	0.267
5.5 m	0.309

W8				
Depth/Analyte	EPH	LEPH	Benzene	Toluene
2.5 m	1600	1600	0.362	<CSR
3.5 m	<CSR	<CSR	3.70	1.00
5.5 m	<CSR	<CSR	<CSR	0.96

W19						
Depth/Analyte	Naphthalene	EPH(C10-C19)	LEPH(C10-C19)	VH(C6-C10)	VPH	Benzene
2.5 m	5.92	5940	5930	217	215	0.06
4.5 m	<CSR	<CSR	<CSR	<CSR	<CSR	0.10

W21			
Depth/Analyte	VH(C6-C10)	VPH	Benzene
0.5 m	<CSR	<CSR	0.21
3.5 m	534	526	1.20
3.5 m	370	365	1.15

W22						
Depth/Analyte	Naphthalene	VH(C6-C10)	VPH	Benzene	Toluene	Xylene
2.5 m	0.93	<CSR	<CSR	2.59	<CSR	<CSR
4.5 m	<CSR	986	958	7.31	0.71	11.4

W26				
Depth/Analyte	VH(C6-C10)	VPH	Benzene	Toluene
3.5 m	259	245	3.45	<CSR
3.5 m	342	325	4.48	<CSR
5.5 m	<CSR	<CSR	9.22	0.80

W27					
Depth/Analyte	VH(C6-C10)	VPH	Benzene	Toluene	Xylene
4.5 m	1790	1750	11.1	2.28	18.7
5.5 m	<CSR	<CSR	5.13	5.36	12.1

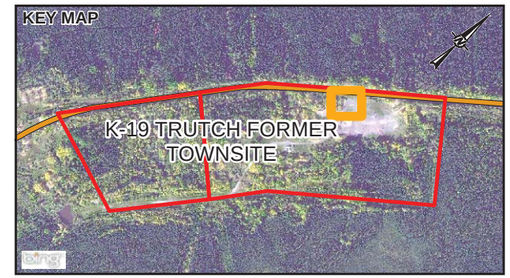
W28			
Depth/Analyte	EPH(C10-C19)	LEPH(C10-C19)	Benzene
2.0 m	1090	1090	0.68
2.0 m	1280	1280	0.68
5.5 m	<CSR	<CSR	5.48

LEGEND

- BASE SAMPLE
- WALL SAMPLE
- ONE OR MORE SAMPLES IN THIS WALL OR BASE LOCATION CONTAIN CONCENTRATIONS OF PETROLEUM HYDROCARBONS EXCEEDING THE CSR RL STANDARDS
- SAMPLES WITH HYDROCARBONS AND BTEX LESS THAT RL(DW) CSR STANDARDS
- DEPTH CONTOUR
- CONTOUR (10M)
- ALASKA HIGHWAY FORMER ALIGNMENT
- TOP OF EXCAVATION
- BOTTOM OF EXCAVATION
- SITE LOCATION

EXCAVATION DEPTH (mbgs)

- 2.75
- 3
- 4.5
- 4.75
- 5
- 5.25
- 5.5
- 5.75
- 6



0 5 10
1:250 METRES

NOTES
MBGS: METRES BELOW GROUND SURFACE.
SAMPLE LOCATION LABELS
W20B: SOIL SAMPLE MEETING APPLICABLE WL_B/IL STANDARDS.
W20C : SOIL SAMPLE EXCEEDING APPLICABLE WL_B/IL STANDARDS.

REFERENCES
1. CONTOURS OBTAINED FROM ARCADIS.
2. BASE SAMPLES AND WALL SAMPLES OBTAINED FROM GOLDER ASSOCIATES LTD.
3. ALASKA HIGHWAY FORMER ALIGNMENT AND SECONDARY ROADS OBTAINED BY ARCADIS, PORTIONS DERIVED BY VECTOR GEOMATICS, FEBRUARY 7TH AND 8TH, 2017.
4. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT
PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT
K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE
CONFIRMATORY SAMPLING LOCATIONS RESULTS EXCAVATION 1B WEST

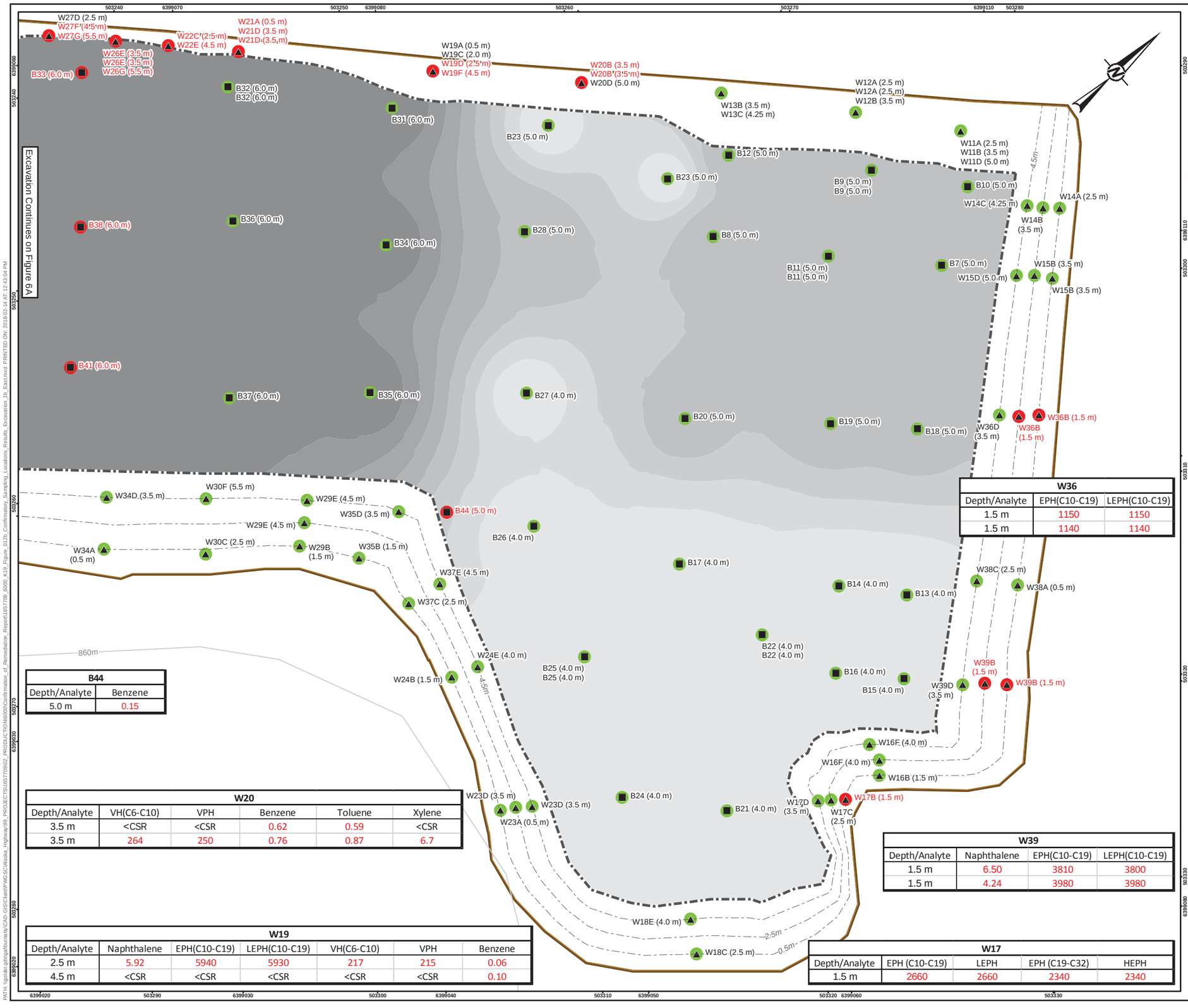
CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	12A

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25mm
0

PATH: \\golder.gds\gal\burnaby\CAD-GIS\Client\PWGSC\Alaska_Highway\99_PROJECTS\1657709\2_PRODUCTION\6000\Confirmation_of_Remediation_Report\1657709_6000_K19_Figure_012a_Confirmatory_Sampling_Locations_Results_Excavation_1b_West.mxd PRINTED ON: 2018-02-14 AT 12:41:29 PM



B44	
Depth/Analyte	Benzene
5.0 m	0.15

W20					
Depth/Analyte	VH(C6-C10)	VPH	Benzene	Toluene	Xylene
3.5 m	<CSR	<CSR	0.62	0.59	<CSR
3.5 m	264	250	0.76	0.87	6.7

W19						
Depth/Analyte	Naphthalene	EPH(C10-C19)	LEPH(C10-C19)	VH(C6-C10)	VPH	Benzene
2.5 m	5.92	5940	5930	217	215	0.06
4.5 m	<CSR	<CSR	<CSR	<CSR	<CSR	0.10

W36		
Depth/Analyte	EPH(C10-C19)	LEPH(C10-C19)
1.5 m	1150	1150
1.5 m	1140	1140

W39			
Depth/Analyte	Naphthalene	EPH(C10-C19)	LEPH(C10-C19)
1.5 m	6.50	3810	3800
1.5 m	4.24	3980	3980

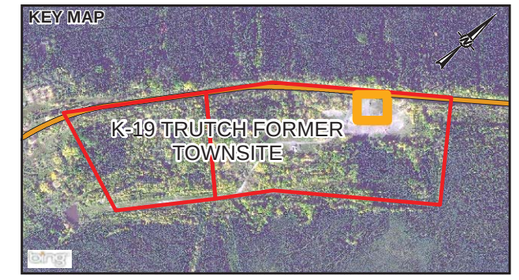
W17				
Depth/Analyte	EPH (C10-C19)	LEPH	EPH (C19-C32)	HEPH
1.5 m	2660	2660	2340	2340

LEGEND

- BASE SAMPLE
- WALL SAMPLE
- ONE OR MORE SAMPLES IN THIS WALL OR BASE LOCATION CONTAIN CONCENTRATIONS OF PETROLEUM HYDROCARBONS EXCEEDING THE CSR WL_R/IL STANDARDS
- SAMPLES WITH HYDROCARBONS AND BTEX LESS THAN WL_R/IL CSR STANDARDS
- DEPTH CONTOUR
- CONTOUR (10M)
- TOP OF EXCAVATION
- BOTTOM OF EXCAVATION
- SITE LOCATION

EXCAVATION DEPTH (mbgs)

- 4
- 4.5
- 4.75
- 5
- 5.25
- 5.5
- 5.75
- 6



0 5 10

1:250 METRES

NOTES

MBGS: METRES BELOW GROUND SURFACE.
SAMPLE LOCATION LABELS
W20B: SOIL SAMPLE MEETING APPLICABLE WL_R/IL STANDARDS.
W20C : SOIL SAMPLE EXCEEDING APPLICABLE WL_R/IL STANDARDS.

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4. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT
PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT
K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE
CONFIRMATORY SAMPLING LOCATIONS RESULTS EXCAVATION 1B EAST

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	12B

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

B18		
Depth/Analyte	Benzene	Toluene
3.0 m	0.07	0.58

W18	
Depth/Analyte	Toluene
2.5 m	2.76

B2	
Depth/Analyte	Benzene
3.75 m	0.09

B3	
Depth/Analyte	Benzene
3.75 m	0.14

B4			
Depth/Analyte	Benzene	Toluene	Xylene
3.75 m	0.65	2.25	6.9

B23		
Depth/Analyte	Benzene	Xylene
2.5 m	1.57	7.5

W14			
Depth/Analyte	EPH	LEPH	Benzene
0.5 m	2790	2790	0.06

B20	
Depth/Analyte	Benzene
3.5 m	0.26

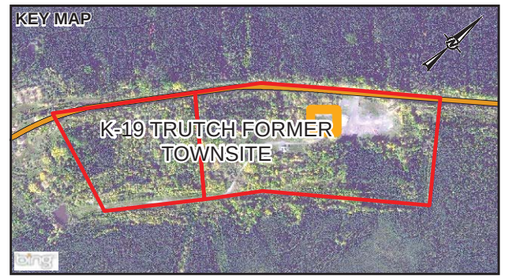
W13	
Depth/Analyte	Benzene
0.5 m	0.04

LEGEND

- BASE SAMPLE
- WALL SAMPLE
- ONE OR MORE SAMPLES IN THIS WALL OR BASE LOCATION CONTAIN CONCENTRATIONS OF PETROLEUM HYDROCARBONS EXCEEDING THE CSR RL STANDARDS
- SAMPLES WITH HYDROCARBONS AND BTEX LESS THAT RL(DW) CSR STANDARDS
- CONTOUR (10M)
- TOP OF EXCAVATION
- BOTTOM OF EXCAVATION
- SITE LOCATION

EXCAVATION DEPTH (mbgs)

- 2.5
- 2.75
- 3
- 3.5
- 3.75
- 4



0 5 10

1:215 METRES

NOTES

MBGS: METRES BELOW GROUND SURFACE.

SAMPLE LOCATION LABELS

W20B: SOIL SAMPLE MEETING APPLICABLE WL_d/IL STANDARDS.

W20C : SOIL SAMPLE EXCEEDING APPLICABLE WL_d/IL STANDARDS.

REFERENCES

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2. BASE SAMPLES AND WALL SAMPLES OBTAINED FROM GOLDER ASSOCIATES LTD.
3. ALASKA HIGHWAY FORMER ALIGNMENT AND SECONDARY ROADS OBTAINED BY ARCADIS, PORTIONS DERIVED BY VECTOR GEOMATICS, FEBRUARY 7TH AND 8TH, 2017.
4. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT

PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT

K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE

CONFIRMATORY SAMPLING LOCATIONS RESULTS EXCAVATION 1C

CONSULTANT

Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	13

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

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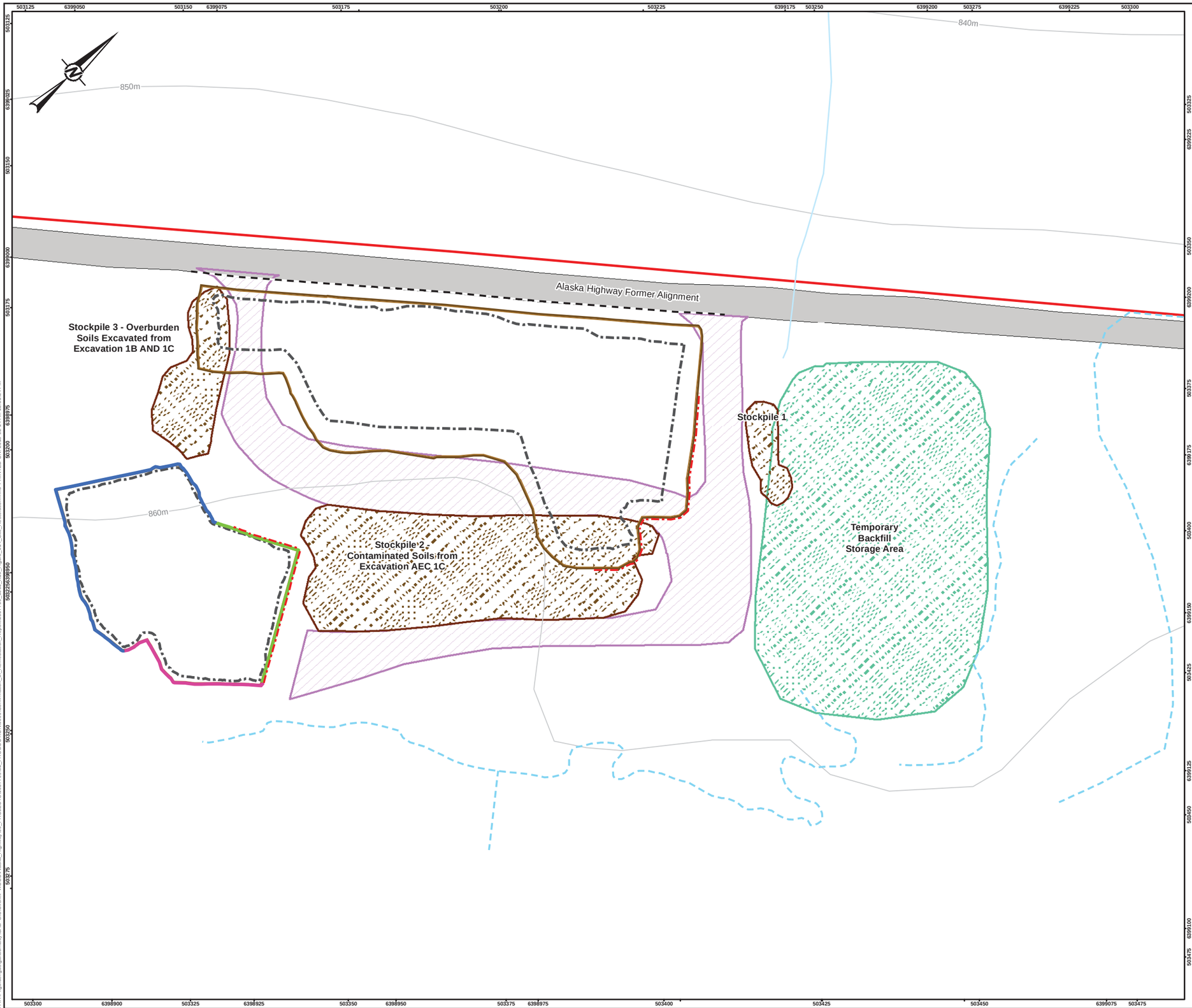

LEGEND

- CONTOUR (10M)
- APPROXIMATE SEASONAL SWALE / DRAINAGE DITCH
- WATERCOURSE
- ALASKA HIGHWAY FORMER ALIGNMENT
- TOP OF EXCAVATION
- BOTTOM OF EXCAVATION
- SITE LOCATION
- BERMED AND SNOW FENCE
- METAL RENTAL FENCE
- METAL RENTAL FENCE AND SNOW FENCE
- VERTICAL CUT - UNFENCED
- POLYETHYLENE LINER
- STOCKPILE
- TEMPORARY BACKFILL STORAGE AREA
- HAUL ROAD

0 10 20

1:900 METRES

NOTES

REFERENCES

1. CONTOURS OBTAINED FROM ARCADIS.
2. BASE SAMPLES AND WALL SAMPLES OBTAINED FROM GOLDER ASSOCIATES LTD.
3. CULVERT, APPROXIMATE WETLAND AND APPROXIMATE SWALE/DRAINAGE DITCH OBTAINED FROM GOLDER ASSOCIATES LTD.
4. ALASKA HIGHWAY FORMER ALIGNMENT AND SECONDARY ROADS OBTAINED BY ARCADIS, PORTIONS DERIVED BY VECTOR GEOMATICS, FEBRUARY 7TH AND 8TH, 2017.
5. WATERCOURSES OBTAINED BY B.C. MINISTRY OF FORESTS, LAND AND NATURAL RESOURCE OPERATIONS.
6. PROJECTION: UTM ZONE 10N DATUM: WGS84

CLIENT
PUBLIC SERVICES AND PROCUREMENT CANADA

PROJECT
K-19 TRUTCH FORMER TOWNSITE
ALASKA HIGHWAY, B.C.

TITLE
SITE RESTORATION

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-14
DESIGNED	AGH
PREPARED	RC
REVIEWED	AB
APPROVED	AM

PROJECT NO.	PHASE	REV.	FIGURE
1657709	6000	0	14

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APPENDIX A

Site Remediation Photos

27-SEP-17

Photo 1: Preliminary excavation of surface material (mulched wood, shrubs, grasses) in AEC 1B looking west towards the former Alaska Highway alignment.

28-Sep-17

Photo 2: Excavation of overburden in northern section of AEC 1B looking north-east.

29-SEP-17

Photo 3: Excavation of inferred impacted material in western portion of AEC 1B looking north-west towards old Alaska Highway alignment.

30-SEP-17

Photo 4: Excavation to 4 metres below ground surface (m bgs) of inferred impacted material from southwestern corner of AEC 1B looking towards the north-east.

01-OCT-17

Photo 5: Excavation to 5 m bgs of inferred impacted material from southwestern corner of AEC 1B looking towards the north-east.

02-OCT-17

Photo 6: Continued excavation of inferred impacted material from southwestern portion of AEC 1B looking towards the north-east

03-OCT-17

Photo 7: Excavation to 6 m bgs of inferred impacted material from central portion of AEC 1B looking towards the north-east.

04-OCT-17

Photo 8: Continued excavation to 6 m bgs of inferred impacted material from central portion of AEC 1B looking towards the west.

05-OCT-17

Photo 9: Southern and central portion of AEC 1B looking towards the west.

11-OCT-17

Photo 10: Backfilling southern portion of AEC 1B looking towards the north-west.

12-OCT-17

Photo 11: Continued backfilling of southern portion of AEC 1b looking towards the south.

13-OCT-17

Photo 12: Excavation of inferred impacted material to depth of 5 m bgs in northern portion of AEC 1B looking towards the south-east.

14-OCT-17

Photo 13: Continued excavation of inferred impacted material in eastern portion of AEC 1B looking towards the east.

15-OCT-17

Photo 14: Continued excavation of inferred impacted material from eastern portion of AEC 1B looking towards the east.

16-OCT-17

Photo 15: Completed haul road across excavation 1B looking towards the south-west.

17-OCT-17

Photo 16: Excavation of inferred impacted material from western edge of AEC 1B looking towards the south-west.

18-OCT-17

Photo 17: Continued excavation of inferred impacted material from eastern portion of AEC 1B looking towards the south-east.

19-OCT-17

Photo 18: Continued excavation of inferred impacted material from eastern portion of AEC 1B looking towards the south-east.

20-OCT-17

Photo 19: Continued excavation of inferred impacted material from eastern portion of AEC 1B looking towards the west.

21-OCT-17

Photo 20: Backfilling north-west corner of AEC 1B looking towards the north-west.

22-OCT-17

Photo 21: Continued backfilling of north-east of AEC 1B looking towards the north-west.

23-OCT-17

Photo 22: Continued backfilling of north-east of AEC 1B looking towards the north-west.

24-OCT-17

Photo 23: Backfilling north-east portion of AEC 1B looking towards the north-east.

25-OCT-17

Photo 24: Continued backfilling of northern portion of AEC 1B looking towards the north-east.

26-OCT-17

Photo 25: Concrete removed near the western edge of AEC 1B looking towards the south-east.

27-OCT-17

Photo 26: Continued backfilling of northern portion of AEC 1B looking towards the north-west.

28-OCT-17

Photo 27: Continued backfilling of northern portion of AEC 1B looking towards the north.

29-OCT-17

Photo 28: Continued excavation of central portion of AEC 1B looking towards the east.

30-OCT-17

Photo 29: Continued excavation of central portion of AEC 1B looking towards the north-east.

31-OCT-17

Photo 30: Continued excavation of central portion of AEC 1B looking towards the north-east.

01-NOV-17

Photo 31: Excavation of inferred impacted material from the southern portion of AEC 1C looking towards the north-east.

02-NOV-17

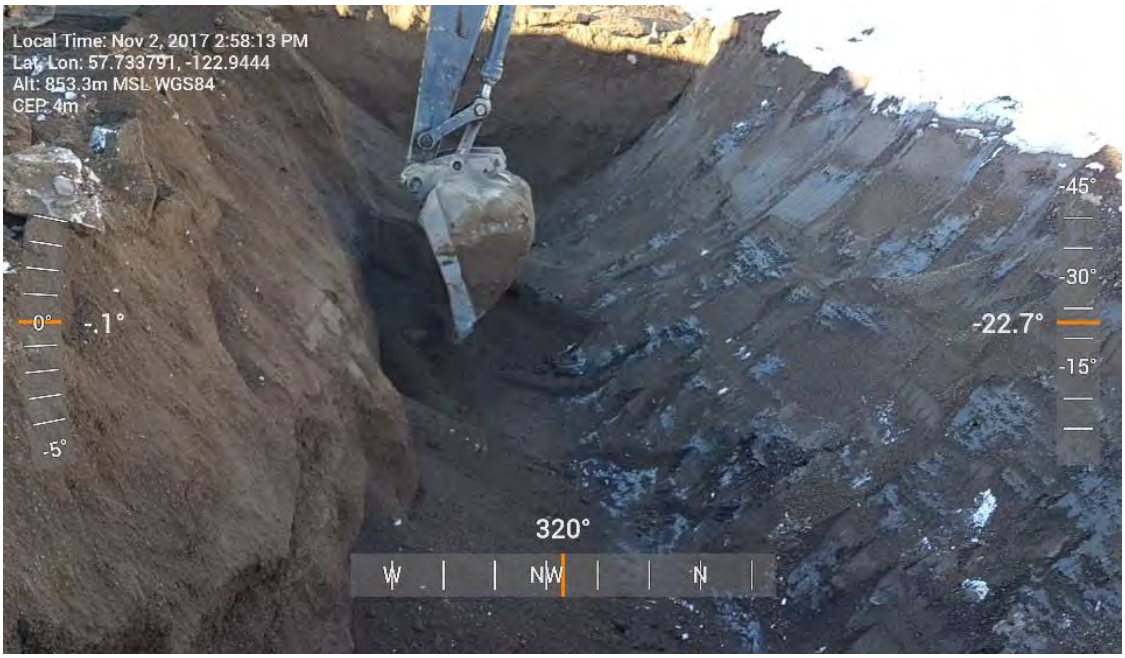


Photo 32: Exposing backfilled northern wall of AEC 1B in preparation of installation of poly liner looking towards the north-west.

03-NOV-17

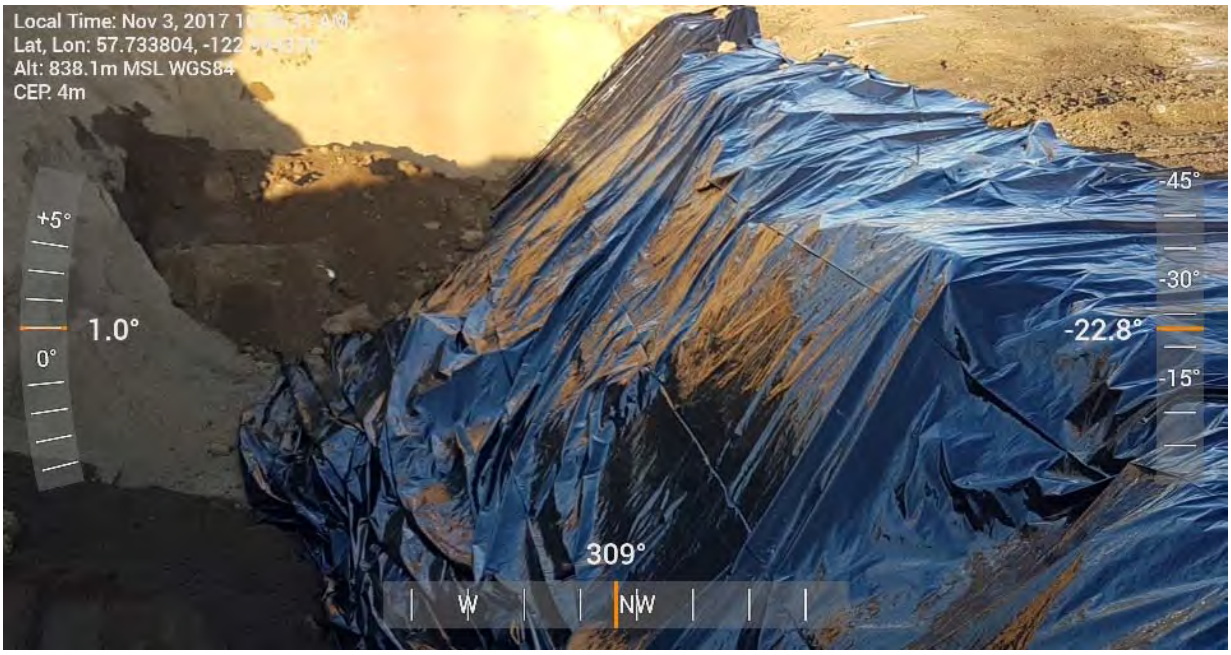


Photo 33: Installation of poly liner along northern wall of AEC 1B looking towards the north-west.

04-NOV-17

Photo 34: Excavation of inferred impacted material along the southern edge of AEC 1C looking towards the west.

05-NOV-17

Photo 35: Continued excavation of inferred impacted material along western edge of AEC 1C looking towards the north.

06-NOV-17

Photo 36: Continued backfilling of AEC 1B looking towards the north-east.

07-NOV-17

Photo 37: Continued excavation of central portion of AEC 1C looking towards the north-west.

08-NOV-17

Photo 38: Continued excavation of central portion of AEC 1C looking towards the east.

09-NOV-17

Photo 39: Continued backfilling of AEC 1B looking towards the north-east.

10-NOV-17

Photo 40: Excavation of inferred impacted material from eastern edge of AEC 1C looking towards the north-east.

11-NOV-17

Photo 41: Excavation of inferred impacted material from eastern portion of AEC 1C looking towards the west.

12-NOV-17

Photo 42: Spreading of overburden over backfilled AEC 1B looking towards the south.

13-NOV-17

Photo 43: AEC 1C inferred impacted material windrowing.

14-NOV-17

Photo 44: Backfilling of AEC 1C looking towards the west.

15-NOV-17

Photo 45: Installation of poly liner along north-east edge of AEC 1C looking towards the west.

16-NOV-17

Photo 46: AEC 1C inferred impacted material stockpile covered with poly liner.

APPENDIX B

Daily Reports

Daily Site Report: 27 SEP 17
K-19 Former Trutch Townsite Remedation

Personnel on-Site
Tervita (and affiliated subcontractors): Greg Miller - Site Supervisor; Curtis (Tangle Ridge - excavator operator); Can/Am Surveying (two-person crew) Golder: Andrew Bruemmer, Konane Dion-Belair Vector Surveying: Richard Gook Medic: 1 person Various subcontractors delivering equipment to the Site
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. (Vector signed off on Golder H&S). No incidents or injuries to report.
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
- Stakeout of excavation limits and top of slope off-sets completed by Can/Am Surveying - Clearing and grubbing completed by Tervita in clean overburden areas within AEC 1B - Site facilities/equipment delivered: office trailer, light tower, excavator, front end loader, portable washrooms
4) Weather
Partly cloudy in the morning. Sunny afternoon. High of approximately 18 degrees celsius
5) Excavation Monitoring
- Preliminary excavation of surface material in southern portion of AEC 1B (material consisted mainly of mulched wood, shrubs, and grasses)

Personnel on-Site
Tervita (and affiliated subcontractors): Greg Miller - Site Supervisor; Curtis (Tangle Ridge - excavator operator); Tangle Ridge Operator (front end loader operator) Golder: Andrew Bruemmer, Konane Dion-Belair Medic: 1 person Subcontractors delivering fencing
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report.
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Site fencing has been set up between the former alignment and excavation 1b culvert outlet. -Excavation of overburden in the northern corner of excavation 1b was completed by Tervita
4) Weather
Partly cloudy. High of approximately 21 degrees Celsius
5) Excavation Monitoring
- Excavation of overburden material in northern portion of AEC 1b. -Petroleum hydrocarbon-like odours were noted at the southeastern wall of the overburden excavation, near K19-TP16-15
Survey of ground surface following the stripping of surface material completed by Golder in the southern portion of AEC 1b

6) Site Photographs

Excavated overburden in northern section of AEC 1b

Surface material removed in the southwest corner of AEC 1b

Personnel on-Site
Tervita (and affiliated subcontractors): Greg Miller - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Sean Williams (front end loader operator) Golder: Andrew Bruemmer, Konane Dion-Belair First Aid Attendant: Matt Kovacs
Operating Equipment
John Deere 744K front end loader John Deere 250G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Andrew: 09:00-17:00; Konane: 07:00-16:30; Tervita 07:00-17:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of overburden (0 to 2 m bgs) completed in the southwestern corner of AEC 1b including cells E2, E3, F2, F3, G2, G3. Hydrocarbon-like odours were not observed in the overburden material -Excavation of inferred impacted material commenced in cells E2 and F2 -No truck movements or off-Site soil disposal - Stockpiling of overburden material and construction of site access/egress.
4) Weather
Mostly cloudy in the morning. Sunny Afternoon. High of approximately 19 degrees Celsius
5) Excavation Monitoring
- Excavation of overburden material in the western corner of AEC 1b including cells E2, E3, F2, F3, G2,
-Petroleum hydrocarbon-like odours were noted at the interface of overburden and inferred impacted material at a depth of 2 m bgs near cells F3 and G3 -Survey of overburden excavation in eastern portion of AEC 1b including cells N2, N3, O2, O3, O4, P2, P3, P4. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team. (Preliminary estimates expected on 2 October 2017)
- Difficult excavation conditions encountered at approximately 4 m bgs in cell F2
-Evidence of a historical trench (see photo 2, below) was observed at a depth of 2 m bgs, in cells E3 and F3. It is expected that the majority of the material within the trench will be excavated as part of remediation works. However, the southern extremity of the trench was not confirmed due to the current extent of the excavation limits.

6) Site Photographs

Stockpiles generated from overburden removed from cells E2, E3, F2, F3, G2, G3

Potential trench identified during the excavation of overburden in cells E3 and F3

Excavation of impacted material between 2 and 3 m bgs in cell F2

Personnel on-Site
Tervita (and affiliated subcontractors): Greg Miller - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Sean Williams (front end loader operator) Golder: Andrew Bruemmer, Konane Dion-Belair First Aid Attendant: Matt Kovacs
Operating Equipment
John Deere 744K front end loader John Deere 250G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Andrew: 07:00-15:30; Konane: 08:45-17:00; Tervita 07:00-17:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 2 to 4 mbgs) completed in the southwestern corner of AEC 1b including cells E2, E3, F2, F3, G2, G3. Slight hydrocarbon-like odours were observed. -Excavation of inferred impacted material commenced in cells G2, G3, H2 and H3 from approximately 0 to 3 mbgs. Strong hydrocarbon-like odours were observed. -No truck movements or off-Site soil disposal - Stockpiling of inferred impacted material
4) Weather
Mostly Cloudy with light showers. High of approximately 11 degrees Celsius
5) Excavation Monitoring
-Excavation of inferred impacted material (approximately 2 to 4 mbgs) in the southwestern corner of AEC 1b including cells E2, E3, F2, F3, G2, G3. -Slight hydrocarbon-like odours were noted from material removed from approximately 2 mbgs to 4mbgs in cells E2, E3, F2, F3, G2, G3. -Strong hydrocarbon odours noted from material removed from approximately 0 to 3 mbgs from cells G2, G3, H2 and H3. -Survey of excavation in southwestern portion of AEC 1b including cells E2, E3, F2, F3, G2, G3. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team. (Preliminary estimates expected on 2 October 2017)
-Confirmatory sampling started along the walls in the southwestern corner of AEC 1b in cells E2, E3, F2, F3, G2 and G3.

6) Site Photographs

Photograph 1: Stockpiles generated from material removed from cells E2, E3, F2, F3, G2, G3, looking south.

Photograph 2: Excavation in AEC 1b to approximately 4 mbgs in cells E2, E3, F2, F3, G2, G3, looking east.

Personnel on-Site
Tervita (and affiliated subcontractors): Greg Miller - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); Brandon Anderson (labourer); DJ Nugent (Tangle Ridge - excavator operator) Golder: Andrew Bruemmer, Konane Dion-Belair; Sean Sutherland First Aid Attendant: Matt Kovacs
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Andrew: 07:00-17:00 Konane: 07:00-17:00; Sean: 16:00-17:00 Tervita 07:00-17:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 4 to 5 mbgs) in AEC 1b including cells E2, E3, F2, F3, G2, G3. -Excavation of inferred impacted material (approximately 0 to 3 mbgs) in AEC 1b including cells G3, H3, H4 and I4. -Excavation of inferred impacted material (approximately 0 to 2 mbgs) in AEC 1b including cells N3, N4 and O4. -Eleven haul trucks stockpiling imported backfill on-Site and hauling impacted soil for off-Site disposal. -Approximately 451 m³ (900 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - Stockpiling of inferred impacted material.
4) Weather
Partly cloudy, periods of snow. High of approximately 5 degrees Celsius
5) Excavation Monitoring
Slight hydrocarbon-like odours were observed from material removed from approximately 4 to 5 mbgs in cells E2, E3, F2, F3, G2, G3. -Strong hydrocarbon-like odours were observed from material removed from approximately 0 to 3mbgs in cells G3, H3, H4, I4 and from approximately 0 to 2 mbgs in cells N3, N4 and O4. -Survey of excavation in AEC 1b including cells E2, E3, F2, F3, G2, G3 and N2, N3, N4, I2, O3, O4, P2, P3, P4. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team. (Preliminary estimates expected on 2 October 2017)
-Confirmatory sampling completed in the base and along the walls in AEC 1b including cells E2, E3, F2 and F3.

6) Site Photographs

Photograph 1: Excavation in AEC 1b to approximately 5mbgs in cells E2, E3, F2, F3, G2, G3, looking east.

Photograph 2: Haul truck being loaded with material for off-Site disposal.

Personnel on-Site
Tervita (and affiliated subcontractors): Greg Miller - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); Brandon Anderson (excavator operator) Golder (and affiliated subcontractors): Andrew Bruemmer, Konane Dion-Belair; Sean Sutherland; Vector Land Surveying (2 man crew) First Aid Attendant: Darren Sutton
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Andrew: 07:00-12:30 Konane: 07:00-17:00; Sean: 07:00-17:00; Tervita 07:00-17:00; Vector 14:30 - 16:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 2 to 3 mbgs) in AEC 1b including cells N2, N3, O2, O3, P2 and P3. -Excavation of inferred impacted material (approximately 3 to 5 mbgs) in AEC 1b including cells G2, G3, H2, H3, H4 and I4. -Approximately 557 m³ (1100 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - Stockpiling of inferred impacted material.
4) Weather
Partly cloudy. High of approximately 11 degrees Celsius
5) Excavation Monitoring
-Strong hydrocarbon-like odours were observed from material removed from approximately 2 to 3 mbgs in cells N2, N3, O2, O3 P2, P3 and from approximately 3 to 5 mbgs in cells G2, G3, H2, H3, H4 I4. -Survey of excavation in AEC 1b including cells N2, N3, O2, O3 P2, P3 and G2, G3, H2, H3, H4 and I4. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.
-Water seepage in the excavation was observed in cells G2 and H2 from an approximate depth of 5 mbgs.

6) Site Photographs

Photograph 1: Excavation in AEC 1b in cells E2, E3, F2, F3, G2, G3, H2, H3, H4 and I4 looking east.

Photograph 2: Haul truck being loaded with material for off-Site disposal, looking east .

Photograph 3: Excavation in AEC 1b to approximately 3 mbgsin cells N2, O2 and P2, looking east.

Photograph 4: Excavator stockpiling material in AEC 1b, looking northwest.

Personnel on-Site
Tervita (and affiliated subcontractors): Greg Miller - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); Brandon Anderson (excavator operator) Golder (and affiliated subcontractors): Konane Dion-Belair; Sean Sutherland; Bing Miao First Aid Attendant: One Staff
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Konane: 07:00-17:00; Sean: 07:00-15:00; Bing: 12:30-17:00; Tervita 07:00-17:00;
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 2 to 4 mbgs) in AEC 1b including cells N2, N3,O2, O3, P2, P3. -Excavation of inferred impacted material (approximately 0 to 6 mbgs) in AEC 1b including cells H2, H3, H4, I2, I3, I4. -Approximately 590 m^3 (1180 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. -Up to nine haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 25 trucks loads of backfill was brought to site and 25 loads of inferred impacted material was hauled off-Site. -Approximately one hour was spent removing oversize material from AEC 1b. - Stockpiling of inferred impacted material.
4) Weather
Partly cloudy. High of approximately 17 degrees Celsius.
5) Excavation Monitoring
-Strong hydrocarbon-like odours were observed from material removed from approximately 2 to 4 mbgs in cells N2, N3, N4,O2, O3, O4, P2, P3, P4 and from approximately 0 to 6 mbgs in cells H2, H3, H4, I2, -Survey of excavation in AEC 1b including cells N2, N3, N4,O2, O3, O4, P2, P3 and H2, H3, I2, I3. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.
-Water seepage in the excavation was observed in cells G2 and H2 from an approximate depth of 5 to 6 mbgs.

6) Site Photographs

Photograph 1: Excavation in AEC 1b in cells H2, H3, H4, I2, I3, I4 looking east.

Photograph 2: Test pit in cell H2 to determine feasibilty of excavating to approximately 6 mbgs.

Photograph 3: Excavation in AEC 1b to approximately 4 mbgs in cells N2, N3, O2, O3, P2, P3, looking east.

Photograph 4: Water seepage in AEC 1b in cells G2, H2, I2.

Personnel on-Site
Tervita (and affiliated subcontractors): Greg Miller - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); Brandon Anderson (excavator operator) Golder (and affiliated subcontractors): Konane Dion-Belair; Sean Sutherland; Bing Miao First Aid Attendant: One Staff
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Konane: 07:00-17:00; Sean: 07:00-17:00; Bing: 07:00-17:00; Tervita 07:00-17:30;
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of overbuden in AEC 1b in cells N2, O2, P2. -Excavation of inferred impacted material (approximately 0 to 6 mbgs) in AEC 1b including cells I2, I3, I4, H4. -Approximately 469 m³ (940 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. -Up to ten haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 28 truck loads of backfill was brought to site and 27 loads of inferred impacted material was hauled off-Site. One haul truck was loaded with oversized concrete debris for off-Site disposal. -Approximately one hour was spent loading stockpile oversized concrete material into a haul truck. -Shipping container and water treatment system delivered to Site. - Stockpiling of inferred impacted material and overburden
4) Weather
Clear skies. High of approximately 22 degrees Celsius.
5) Excavation Monitoring
-Strong hydrocarbon-like odours were observed from material removed from approximately 0 to 6 mbgs in cells I2, I3,I4. -Survey of excavation in AEC 1b including cells G2, G3, G4, H2, H3, H4. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.
-Collection of confirmatory wall and base samples in cells G2, G3, G4, H2, H3, H4.

6) Site Photographs

Photograph 1: Loading of oversize concrete material for off-Site disposal.

Photograph 2: Excavation in AEC 1b in cells H2 and H3, looking east.

Photograph 3: Excavation of overburden in cells N2, O2 and P2, looking northeast.

Photograph 4: Completion of ramp into cells G2 and H2, looking east.

Personnel on-Site
Tervita (and affiliated subcontractors): Greg Miller - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); Brandon Anderson (excavator operator) Golder (and affiliated subcontractors): Konane Dion-Belair; Sean Sutherland; Bing Miao First Aid Attendant: Dan Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Konane: 07:00-16:15; Sean: 07:00-16:00; Bing: 07:00-16:15; Tervita 07:00-16:15;
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material from approximately 3 to 4 mbgs in cells N2, N3, O2, O3, P2, P3. Elevated PID readings were identified from samples collected on the base of cells O3 and P3 at 4 approximately mbgs and ranged from approximately 190 to 290 ppm. Cells O3 and P3 were excavated to approximately 4.5 mbgs. -Approximately 514 m³ (1,030 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. -Ten haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 30 truck loads of backfill was brought to site and 30 loads of inferred impacted material was hauled off-Site. - Stockpiling of inferred impacted material and overburden
4) Weather
Clear skies. High of approximately 17 degrees Celsius.
5) Excavation Monitoring
-Hydrocarbon-like odours were observed from material removed from approximately 3 to 4 mbgs in N3, O3, P3. -Survey of excavation in AEC 1b including cells N2, N3, O2, O3, P2, P3. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.
-Collection of confirmatory wall samples in cells N2, O2, P2, P3.

6) Site Photographs

Photograph 1: AEC 1b including the excavation in cells F2, F3, G2, G3, H2, H3, H4, I2, I3, I4, looking west.

Photograph 2: Excavation in AEC 1b in cells O3 and P3 to 4 mbgs, looking west.

Photograph 3: Excavation in AEC 1b including cells N2, N3, O2, O3, P2, P3, looking east.

Photograph 4: On-Site stockpiled material, looking north.

Personnel on-Site
Tervita (and affiliated subcontractors): Tangle Ridge Mechanic Golder (and affiliated subcontractors): Konane Dion-Belair; Vector Geomatics (Braden)
Operating Equipment
No operating equipment
1) Health and Safety
Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Konane: 10:30-12:30; Vector: 10:30 - 14:30: Tangle Ridge: Unknown - 11:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Tangle Ridge mechanic was on-Site installing a new radio in the front-end loader
4) Weather
Clear skies. High of approximately 13 degrees Celsius.
5) Excavation Monitoring
-Survey by Golder of the excavation in AEC 1b including cells I2, I3, I4. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.
-Survey by Vector of the excavation in AEC 1b including cells E2, E3, F2, F3, G2, G3, H2, H3, H4, I2, I3, I4 and N2, N3, O2, O3, P2, P3.

6) Site Photographs

Photograph 1: AEC 1b including the excavation in cells N2, N3, O2, O3, P2, P3, looking west.

Personnel on-Site
Tervita (and affiliated subcontractors): Rrhodri Kheogh - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); Brandon Anderson (excavator operator) PWGSC: Dave Osguthorpe, Scott Tomlinson Golder (and affiliated subcontractors): Reagan MacKenzie; Bing Miao; Kesley Tanaka First Aid Attendant: Dan Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Reagan: 07:00-15:45; Kelsey: 07:00-17:00; Bing: 07:00-16:30 Tervita 07:00-16:30;
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Approximately 372 m^3 (834 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. -7 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 22 truck loads of backfill was brought to site and 22 loads of inferred impacted material was hauled off-Site.
4) Weather
Clear skies. High of approximately 6 degrees Celsius.
5) Excavation Monitoring
-No excavation onsite today. Tervita backfilling with stockpiled import material

6) Site Photographs

Photograph 1: AEC 1b including the backfilling of cells F2, F3, G2, G3, H2, H3, H4, I2, I3, I4, looking southwest.

Photograph 2: Backfill stockpiled onsite looking South from Hazardous Waste Cell.

Personnel on-Site
Tervita (and affiliated subcontractors): Rrhodri Kheogh - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); Brandon Anderson (excavator operator) PWGSC: Dave Osguthorpe, Scott Tomlinson Golder (and affiliated subcontractors): Reagan MacKenzie; Bing Miao; Kesley Tanaka First Aid Attendant: Dan Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator(not used) John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Reagan: 09:00-16:45; Kelsey: 07:00-15:30; Bing: 07:00-15:30 Tervita 07:00-16:45
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Approximately 667 m^3 (1,526 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. -41 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 41 truck loads of backfill was brought to site and 41 loads of inferred impacted material was hauled off-Site.
4) Weather
Clear skies. High of approximately 0 degrees Celsius.
5) Excavation Monitoring
-No excavation onsite today. Tervita backfilling with stockpiled import material

6) Site Photographs

Photograph 1: AEC 1b including the backfilling of cells F2, F3, G2, G3, H2, H3, H4, I2, I3, I4, looking southwest.

Photograph 2: Remaining stockpiled CL+ soil looking Northeast from Hazardous Waste Cell.

Personnel on-Site
Tervita (and affiliated subcontractors): Rrhodri Kheogh - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); Brandon Anderson (excavator operator) PWGSC - Golder (and affiliated subcontractors): Reagan MacKenzie; Bing Miao; Kesley Tanaka First Aid Attendant: Dan Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Reagan: 07:00-16:45; Kelsey: 07:00-16:45; Bing: 07:00-16:45 Tervita 07:00-1700;
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 0 to 2 mbgs) in AEC 1b including cells P4, P5, N4, N5, O4 and O5. As well as excavation of inferred impacted material (approximately 4 to 5 mbgs) in AEC 1b including cells N2, N3 ,N4, O2, O3, P2, P3 -Approximately 337m³ (778 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - 21 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 21 truck loads of backfill was brought to site and 20 loads of inferred impacted material was hauled off-Site.
4) Weather
Clear skies. High of approximately 2 degrees Celsius.
5) Excavation Monitoring
-Strong hydrocarbon-like odours were observed from material removed from approximately 0 to 2 mbgs in cells P4, P5, O5. -Survey of excavation in AEC 1b including cells N2, N3, N4, N5, O2, O3, O4, O5, P2, P3, P4, P5 Survey information will be used to estimate the volume of excavated soil volume. The volumes will be

6) Site Photographs

Photograph 1: AEC 1b including cells N2 to N5, O2 to O5 and P2 to P5 looking south

Photograph 2: AEC 1b including cells being backfilled E2, E3. F2, F3, G2, G3, H2, H3, H4, I2, I3 and I4 looking sou

Personnel on-Site

Tervita (and affiliated subcontractors): Rrhodri Kheogh - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); Brandon Anderson (excavator operator); Wallace Colp (excavator operator)
PWGSC -
Golder (and affiliated subcontractors): Reagan MacKenzie; Bing Miao; Kelsey Tanaka
First Aid Attendant: Dan Smith

Operating Equipment

John Deere 744K front end loader
John Deere 350G LC Excavator
John Deere 470G LC Excavator

1) Health and Safety

Safety Tailgate Meeting conducted by Tervita
Daily job assessment completed by Golder staff.
No incidents or injuries to report.
Site Hours: Reagan: 07:00-16:45; Kelsey: 07:00-16:45; Bing: 07:00-16:45 Tervita 07:00-1700;

2) Environmental Protection

Daily job assessment completed
No environmental incidents or near misses.

3) Work Completed

-Excavation of inferred impacted material (approximately 0 to 2 mbgs) in AEC 1b including cells P6 and O6 step out. As well as excavation of inferred impacted material (approximately 2 to 4 mbgs) in AEC 1b including cells P4, P5, N4, N5, O4 and O5.
-Approximately 741m^3 (1606 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill.
- 15 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 44 truck loads of backfill was brought to site and 45 loads of inferred impacted material was hauled off-Site.

4) Weather

Clear skies. High of approximately 5 degrees Celsius.

5) Excavation Monitoring

-Strong hydrocarbon-like odours were observed from material removed from approximately 0 to 2 mbgs in cells P6 and O6 step out.
-Survey of excavation in AEC 1b including cells N2, N3, N4, N5, O2, O3, O4, O5, O6, P2, P3, P4, P5, P6 Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: AEC 1b including cells N2 to N5, O2 to O6 and P2 to P6 looking southeast

Photograph 2: new haul road in AEC 1b, cells being backfilled E2, E3, F2, F3, G2, G3, H2, H3, H4, I2, I3 and I4 looking southwest

Personnel on-Site
Tervita (and affiliated subcontractors): Rrhodri Kheogh, Brandon Anderson (excavator operator) - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); Wallace Colp (excavator operator) PWGSC - Golder (and affiliated subcontractors): Reagan MacKenzie; Bing Miao; Kelsey Tanaka First Aid Attendant: Dan Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator - Down from ~10:20am to end of Daily, Mechanic showed up end of day, machine is operational for tomorrow.
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Reagan: 07:00-15:00; Kelsey: 07:00-16:30; Bing: 07:00-16:30 Tervita 07:00-1700;
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 2 to 4 mbgs) in AEC 1b including cells P6 and O6 step out. As well as continuing to excavate inferred impacted material (approximately 2 to 4 mbgs) in AEC 1b including cells N4 to N5, P4 to P5 and O4 and O5 -Approximately 733m³ (1678 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - 15 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 45 truck loads of backfill was brought to site and 45 loads of inferred impacted material was hauled off-Site.
4) Weather
Clear skies. High of approximately 5 degrees Celsius.
5) Excavation Monitoring
-Strong hydrocarbon-like odours were observed from material removed from approximately 4 mbgs in cells N4, P4 and O4 -Survey of excavation in AEC 1b including cells N2, N3, N4, N5, O2, O3, O4, O5, O6, P2, P3, P4, P5, P6 Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: AEC 1b including cells N2 to N5, O2 to O6 and P2 to P6 looking southeast

Photograph 2: new haul road in AEC 1b, cells being backfilled E2, E3, F2, F3, G2, G3, H2, H3, H4, I2, I3 and I4 looking southeast

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh, Brandon Anderson (excavator operator) - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator) PWGSC - Bill Woodworth Golder (and affiliated subcontractors): Reagan MacKenzie; Bing Miao; Kelsey Tanaka First Aid Attendant: Dan Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Kelsey: 07:00-16:30; Bing: 07:00-16:30; Sharon Busby: 12:00-16:30; Tervita 07:00-16:45
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 4 to 5 mbgs) in AEC 1b including cells N4, O4 and P4. Excavation of inferred impacted material (approximately 0 to 4 mbgs) in AEC 1b including cells N6 to N7, O6 and O7. -Approximately 685m³ (1,588 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - 15 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 44 truck loads of backfill was brought to site and 44 loads of inferred impacted material was hauled off-Site. - Tervita has completed moving the site haul road and it is fully operational. This road will expedite truck movement on and off site.
4) Weather
Clear skies. High of approximately 5 degrees Celsius.
5) Excavation Monitoring
-Hydrocarbon-like odours and black staining seam was observed from material removed from W16 approximately 1.5 mbgs. -Survey of excavation in AEC 1b including cells N2, N3, N4, N5, O2, O3, O4, O5, O6,O7, P2, P3, P4, P5, P6, P7 Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: AEC 1b including cells N2 to N6, O2 to O7 and P2 to P7 looking northeas

Photograph 2: completed haul road in AEC 1b, cells being backfilled E2, E3, F2, F3, G2, G3, H2, H3, H4, I2, I3 and I4 looking southwest

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh, Brandon Anderson (excavator operator) - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); Wallace Colp (Tangle Ridge - excavator operator) PWGSC - Golder (and affiliated subcontractors): Kelsey Tanaka; Bing Miao; Sharon Busby. First Aid Attendant: Dan Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Kelsey: 07:00-16:30; Bing: 07:00-16:30; Sharon Busby: 07:00-16:30; Tervita 06:15-16:45
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 0 to 4 mbgs) in AEC 1b including cells N2, M2, M3 and L2 -Approximately 753m³ (1,740 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - 16 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 47 truck loads of backfill was brought to site and 47 loads of inferred impacted material was hauled off-Site.
4) Weather
Mixture of overcast skies with late afternoon hail. High of approximately 5 degrees Celsius.
5) Excavation Monitoring
-Strong hydrocarbon-like odours were observed from material removed from approximately 2.0 mbgs in cells L2. Strong hydrocarbon-like odours were observed from material removed from approximately 3.5 to 4.0 mbgs in cell M2. -Survey of excavation in AEC 1b including cells K2, L2, M2, M3, N2, N3, N4, N5, O2, O3, O4, O5, O6, O7, P2, P3, P4, P5, P6, P7 Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: AEC 1b including cells N2 to N6, O2 to O7 and P2 to P7 looking northeas

Photograph 2: EC 1b including cells N2, M2, M3 and L2 looking southeas

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh, Brandon Anderson (excavator operator) - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); Justin Taylor (Tangle Ridge - Mechanic) PWGSC - Golder (and affiliated subcontractors): Kelsey Tanaka; Bing Miao; Sharon Busby. First Aid Attendant: Dan Smith
Operating Equipment
John Deere 744K front end loader (mechanical breakdown from 10:00 to 14:20) John Deere 350G LC Excavator John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Kelsey: 07:00-16:30; Bing: 07:00-16:30; Sharon Busby: 07:00-16:15; Tervita 06:15-16:45
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
- Golder staked out grid for Excavation 1C. -Excavation of inferred impacted material (approximately 0 to 2 mbgs) in AEC 1b including cells K2, L3, M3, M4 and M5. -Approximately 682m³ (1,564 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - 16 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 42 truck loads of backfill was brought to site and 42 loads of inferred impacted material was hauled off-Site.
4) Weather
Overcast skies . High of approximately 0 degrees Celsius.
5) Excavation Monitoring
-Survey of excavation in AEC 1b including cells K2, L2, M2, M3, M4,M5, N2, N3, N4, N5, O2, O3, O4, O5, O6, O7, P2, P3, P4, P5, P6, P7 Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: AEC 1b including cells M3 to M5, N2 to N6, O2 to O7 and P2 to P7 looking southeas

Photograph 2: AEC 1b including cells M2, M3, L2, L3 and K2 looking southeas

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh, Brandon Anderson (excavator operator) - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); PWGSC - Golder (and affiliated subcontractors): Kelsey Tanaka; Bing Miao; Sharon Busby. First Aid Attendant: Dan Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Kelsey: 07:00-16:15; Bing: 07:00-16:15; Sharon Busby: 07:00-16:00; Tervita 06:15-17:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 0 to 4 mbgs) in AEC 1b including cells N7, M7, N6, M6 and M5 -Approximately 574m³ (1,288 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - 12 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 34 truck loads of backfill was brought to site and 34 loads of inferred impacted material was hauled off-Site.
4) Weather
Overcast skies . High of approximately 6 degrees Celsius.
5) Excavation Monitoring
-Survey of excavation in AEC 1b including cells K2, L2, M2, M3, M4,M5, N2, N3, N4, N5, O4, O5, O6, O7, P4, P5, P6, P7 Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: AEC 1b including cells M6, N7, M7, M6, M5 looking northeas

Photograph 2: AEC 1b looking southwest

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor, Brandon Anderson (excavator operator); Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); Wallace Colp (Tangle Ridge - excavator operator) PWGSC - Golder (and affiliated subcontractors): Kelsey Tanaka; Bing Miao; Sharon Busby. First Aid Attendant: Dan Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Kelsey: 07:00-16:30; Bing: 07:00-16:30; Sharon Busby: 07:00-16:00; Tervita 06:15-17:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 0 to 4 mbgs) in AEC 1b including cells M4 and M5. Excavation of inferred impacted material (approximately 0 to 2 mbgs) in AEC 1b including cells I2 and J2. A Base sample was collected from M3 from a testpit to 4.0 mbgs. -Approximately 629m³ (1,448 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - 16 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 39 truck loads of backfill was brought to site and 39 loads of inferred impacted material was hauled off-Site.
4) Weather
Overcast skies and snow . High of approximately 2 degrees Celsius.
5) Excavation Monitoring
-Strong hydrocarbon-like odours were observed from material removed from approximately 3.5 mbgs in cells M5. Strong hydrocarbon-like odours were observed from material removed from approximately 4.0 mbgs in cell M3. -Survey of excavation in AEC 1b including cells K2, L2, M2, M3, M4,M5, N2, N3, N4, N5, O4, O5, O6, O7, P4, P5, P6, P7 Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: AEC 1b including cells M2 to M7, N2 to N7, O2 to O7, P2 to P7, L2, L3 and K2 looking south

Photograph 2: The northeast stockpile.

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh, Brandon Anderson (excavator operator/ labourer) - Site Supervisor; Curtis Witowski (Tangle Ridge - excavator operator); Austin Martyn (Tangle Ridge - front end loader operator); Wallace Colp (Tangle Ridge - excavator operator) PWGSC - Golder (and affiliated subcontractors): Kelsey Tanaka; Bing Miao; Sharon Busby. First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Kelsey: 07:00-16:30; Bing: 07:00-15:45; Sharon Busby: 07:00-16:30; Tervita 06:15-17:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 2 to 4 mbgs) in AEC 1b including cells M2, M3, M4 and L2. Excavation of inferred impacted material (approximately 0 to 2 mbgs) in AEC 1b including cells I2, J2, J3 and K2 - Started backfilling N2, O2, P2, N2, O3 and P3. -Approximately 593m³ (1,370 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - 13 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 37 truck loads of backfill was brought to site and 37 loads of inferred impacted material was hauled off-Site.
4) Weather
Sunny with clouds . High of approximately 2 degrees Celsius.
5) Excavation Monitoring
-Strong hydrocarbon-like odours were observed from material removed from approximately 2.0 mbgs in cells L2. -Survey of excavation in AEC 1b including cells E2, E3, G2, G3, H2 and H3 Survey information will be used to estimate the volume of backfilled soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD -Survey of excavation in AEC 1b including cells K2, L2, M2, M3, M4,M5, N2, N3, N4, N5, O4, O5, O6, O7, P4, P5, P6, P7 Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: AEC 1B including cells M2 to M7, N2 to N4, O2 to O4, P2 to P4, looking southwest

Photograph 2: Backfilling AEC 1B cell P2

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh, Brandon Anderson (excavator operator/ labourer) - Site Supervisor; Wallace Colp (Tangle Ridge - excavator operator); DJ Nugent (Tangle Ridge - excavator operator); Dave Jackson (Tangle Ridge - Mechanic/ Loader operator) PWGSC - Golder (and affiliated subcontractors): Kelsey Tanaka; Bing Miao; Sharon Busby. First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader (broken 7:00 to 8:00 am) John Deere 350G LC Excavator John Deere 470G LC Excavator
John Deere 744K front end loader - arrived mid-day, not in use
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Kelsey: 07:00-17:00; Bing: 07:00-17:00; Sharon Busby: 07:00-16:30; Tervita 06:15-17:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 4 to 5 mbgs) in AEC 1b including cells M2, M3, N2 and N3. - Backfilling N2, O2, P2, N2, O3 and P3. -Approximately 626m³ (1,742 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - 17 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 40 truck loads of backfill was brought to site and 40 loads of inferred impacted material was hauled off-Site.
4) Weather
Sunny with clouds . High of approximately 2 degrees Celsius.
5) Excavation Monitoring
-Strong hydrocarbon-like odours were observed from material removed from approximately 2.5 to 4.0 mbgs in cells L2. -Survey of excavation in AEC 1b including cells I2, I3, J2, J3, K2, L2, M2, M3, M4, N2, N3, N4, Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: AEC 1b including cells J2, K2, K3, L2 and L3 looking southeast

Photograph 2: Backfilling AEC 1b cell P2, P3, O2 and O3.

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh- Site Supervisor, Brandon Anderson (excavator operator/ labourer) ; Wallace Colp (Tangle Ridge - excavator operator); DJ Nugent (Tangle Ridge - excavator operator); Dave Jackson (Tangle Ridge - Mechanic/ Loader operator) PWGSC - Golder (and affiliated subcontractors): Kelsey Tanaka; Bing Miao; Sharon Busby. First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
John Deere 744K front end loader (not in use)
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Kelsey: 07:00-16:45; Bing: 07:00-16:45; Sharon Busby: 07:00-16:30; Tervita 06:15-17:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 0 to 2 mbgs) in AEC 1b including cells J3, J4, K3 and K4. Excavation of inferred impacted material (approximately 2 to 6 mbgs) in AEC 1b including cells I2, and I3. - Backfilling N2, O2, P2, N2, O3 and P3. -Approximately 717m³ (1,704 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - 16 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 47 truck loads of backfill was brought to site and 47 loads of inferred impacted material was hauled off-Site.
4) Weather
Overcast skies . High of approximately 2 degrees Celsius.
5) Excavation Monitoring
-Strong hydrocarbon-like odours were observed from material removed from approximately 2.5 to 6.0 mbgs in cells I2. Strong hydrocarbon-like odours were observed from material removed from approximately 6.0 mbgs in cells I2 and I3. -Survey of excavation in AEC 1b including cells I2, I3, I4, J2, J3, J4, K2, K3, K4 and K5 Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: AEC 1b including cells I2, I3, I4, J2, J3, J4 K2, K2 and K3 looking northeast

Photograph 2: Backfilling AEC 1b cell P2, P3 P4, O2, O3, O4, N2, N3 and N4 looking northeast

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh- Site Supervisor, Brandon Anderson (excavator operator/ labourer) ; Wallace Colp (Tangle Ridge - excavator operator); DJ Nugent (Tangle Ridge - excavator operator); Dave Jackson (Tangle Ridge - Mechanic/ Loader operator); Cameron Saunders (Tangle Ridge - Loader operator) PWGSC - Golder (and affiliated subcontractors): Kelsey Tanaka; Bing Miao; Sharon Busby. First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
John Deere 744K front end loader
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Kelsey: 07:00-16:15; Bing: 07:00-14:30; Sharon Busby: 07:00-16:15; Tervita 06:15-16:30
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses. Ambient air around the Haz-waste cell above 5 ppm - excavator operator wore respirator while digging
3) Work Completed
-Excavation of inferred impacted material (approximately 0 to 1.5 mbgs) in AEC 1b including cells J2, J3, K2 and K3. Excavation of inferred impacted material (approximately 2 to 4.5 mbgs) in AEC 1b including cells I2, J2, K2, L2. - Backfilling N2 to N7, O2 to O7 and P2 to P7. -Approximately 228m³ (522 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - 6 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 14 truck loads of backfill was brought to site and 14 loads of inferred impacted material was hauled off-Site.
4) Weather
Overcast skies . High of approximately 1 degrees Celsius. Snow fall warning 15 cm overnight
5) Excavation Monitoring
-Strong hydrocarbon-like odours were observed from material removed from approximately K2, K3, J2, J3, I2 and I3. -Survey of excavation in AEC 1b including cells I2, I3, I4, J2, J3, J4, K2, K3 and K4 Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: AEC 1b including cells H2, H3, I2, I3, I4, J2, J3, J4 K2, K2 and K3 looking northeast

Photograph 2: Backfilling AEC 1b cell N2 to N5, O2 to O7 and P2 to P6 looking northwest

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Wallace Colp (Tangle Ridge - excavator operator); DJ Nugent (Tangle Ridge - excavator operator); Dave Jackson (Tangle Ridge - Mechanic/ Loader operator); Cameron Saunders (Tangle Ridge - Loader operator) PWGSC - Golder (and affiliated subcontractors): Kelsey Tanaka; Sharon Busby. First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator
John Deere 744K front end loader
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Kelsey: 09:30-16:30; Sharon Busby: 09:30-16:30; Tervita 06:15-16:45
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
- No digging was completed in excavation AEC 1b. - Backfilling N2 to N7, O2 to O7 and P2 to P7. - No trucks were hauling due to the weather - Stockpile management
4) Weather
Mixture of overcast and sunny skies . High of approximately 1 degrees Celsius.
5) Excavation Monitoring
-Survey of excavation in AEC 1b including cells N2 to N7, O2 to O7 and P2 to P7. Survey information will be used to estimate the volume of backfilled soil. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: stockpile management, moving the stockpiles in preparation to start AEC 1C

Photograph 2: Backfilling AEC 1b cell N2 to N5, O2 to O7 and P2 to P6 looking northwest

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Wallace Colp (Tangle Ridge - excavator operator); DJ Nugent (Tangle Ridge - excavator operator);Wayne Munroe (Tangle Ridge - Loader operator); Cameron Saunders (Tangle Ridge - Loader operator) PWGSC - Golder (and affiliated subcontractors): Kelsey Tanaka; Sharon Busby; Konane Dion-Belair First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator John Deere 744K front end loader
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. No incidents or injuries to report. Site Hours: Kelsey Tanaka: 07:00-13:30; Sharon Busby: 07:00-16:30 ; Konane Dion-Belair: 07:00-16:30; Tervita 06:15-17:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 2 to 5 mbgs) in AEC 1b including cells J2, J3, J4, K2 and K3. - Backfilling N2 to N7, O2 to O7 and P2 to P7. -Approximately 674m³ (1556 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - Up to 19 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 42 truck loads of backfill was brought to site and 42 loads of inferred impacted material was hauled off-Site.
4) Weather
Mixture of overcast and sunny skies . High of approximately 2 degrees Celsius.
5) Excavation Monitoring
-Strong hydrocarbon-like odours were observed from material removed from approximately K2, K3, J2, and J3. Elevated PID readings of up to 120ppm were observed in ambient air in the immediate area. The excavator and Golder field staff wore respirators when working upwind was not possible. -Survey of excavation in AEC 1b including cells I2, I3, I4, J2, J3, J4, K2, K3 and K4 Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team. -Concrete removed near cells J2 and K2 (Photograph 2). -Collected composite sample from backfill material.

6) Site Photographs

Photograph 1: AEC 1b including cells I2, I3, I4, J2, J3, J4, K2, K3 and K4, looking north

Photograph 2: Concrete removed near cells J2 and K2, looking southeast

Personnel on-Site

Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Chris Hoover (bulldozer operator); Wallace Colp (Tangle Ridge - excavator operator); DJ Nugent (Tangle Ridge - excavator operator);Wayne Munroe (Tangle Ridge - Loader operator); Cameron Saunders (Tangle Ridge - Loader operator); Tangle Ridge Mechanic
PWGSC -
Golder (and affiliated subcontractors): Konane Dion-Belair; Sharon Busby
First Aid Attendant: Dave Smith

Operating Equipment

John Deere 744K front end loader
John Deere 350G LC Excavator
John Deere 470G LC Excavator
John Deere 744K front end loader
John Deere 850J bulldozer

1) Health and Safety

Safety Tailgate Meeting conducted by Tervita
Daily job assessment completed by Golder staff.
A Golder employee reported two small cuts and minor swelling on their fingers. The on-Site first aid attendant treated the injury. The Golder employee does not know when the injury occurred or if it occurred on-Site.
Site Hours: Konane Dion-Belair: 07:00-17:00; Sharon Busby: 07:00-16:30 ; Tervita 06:15-17:00

2) Environmental Protection

Daily job assessment completed
Two environmental incidents:

The trailer of a haul truck became stuck in the dumping position after unloading backfill on Site. The trailer bed was locked out using a front end loader prior to conducting repair works. The operator loosened the fitting of a hydraulic hose in an attempt to bleed any air that may be in the hydraulic system. This resulted in the release of hydraulic fluid. No secondary containment was set up prior to loosening the fitting. An estimated 1L of hydraulic oil was released to the ground surface. Tervita responded by deploying spill pads and collecting impacted soil. The spill pads and soil were placed in a drum inside the sea container. The material will be disposed of to an off-Site treatment facility. (Photograph 2)

A mechanic was mobilized to Site to fix the malfunctioning haul truck trailer. The mechanic was in the process of draining hydraulic oil into 20L buckets. Secondary containment was not in place and hydraulic oil was observed to be leaking onto the ground surface. An estimated 0.2L of hydraulic oil was released to the ground surface. Tervita responded by deploying spill pads and collecting impacted soil. The spill pads and soil were placed in a drum inside the sea container. The material will be disposed of to an off-Site treatment facility.

3) Work Completed

-Excavation of inferred impacted material (approximately 0 to 5.5 mbgs) in AEC 1b including cells J2, J3, J4, K2, K3 and K4.
- Backfilling N2 to N7, O2 to O7, P2 to P7 and M2 to M6.
-Approximately 784m³ (1792 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill.

- Up to 18 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 48 truck loads of backfill was brought to site and 48 loads of inferred impacted material was hauled off-Site.

4) Weather

Mixture of overcast and sunny skies . High of approximately 14 degrees Celsius.

5) Excavation Monitoring

Hydrocarbon-like odours were observed from material removed from approximately K2, K3, K4, J2, J3 and J4.
-Survey of excavation in AEC 1b including cells I2, I3, I4, J2, J3, J4, K2, K3 and K4 Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: Backfilling AEC 1b including cells O2 to O7 and P2 to P7, looking east.

Photograph 2: Spill response to hydraulic fluid leak.

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Chris Hoover (bulldozer operator); Wallace Colp (Tangle Ridge - loader operator); Willie Duchene (Tangle Ridge - excavator operator);Wayne Munroe (Tangle Ridge - loader operator); Cameron Saunders (Tangle Ridge - excavator operator); PWGSC - Golder: Konane Dion-Belair; Sharon Busby; Sean Sutherland First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator John Deere 744K front end loader John Deere 850J bulldozer
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Konane Dion-Belair: 07:00-16:45; Sharon Busby: 07:00-16:30 ; Sean Sutherland: 07:00-16:30; Tervita: 06:15-17:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 0 to 6 mbgs) in AEC 1b including cells L2, L3, J2, J3, J4, K2, K3 and K4. - Backfilling N2 to N7, O2 to O7, P2 to P7 and M2 to M6. -Approximately 712m³ (1636 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - Up to 16 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 44 truck loads of backfill was brought to site and 44 loads of inferred impacted material was hauled off-Site.
4) Weather
Mixture of overcast and sunny skies . High of approximately 11 degrees Celsius.
5) Excavation Monitoring
Hydrocarbon-like odours were observed from material removed from approximately L3, K3, K4, J3 and J4. -Survey of excavation in AEC 1b including cells L2 L3, I3, I4, J2, J3, J4, K2, K3 and K4 Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team. -Confirmatory samples including wall and base samples collected in cells L2, K2 and J2.

6) Site Photographs

Photograph 1: Excavation AEC 1b including cells H2 to H5, I2 to I5, J3 to J5 and K3 to K5, looking east.

Photograph 2: Backfilling AEC 1b including cells M2 to M6, N2 to N7, O2 to O7 and P2 to P6, looking east.

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Chris Hoover (bulldozer operator); Wallace Colp (Tangle Ridge - loader operator); Willie Duchene (Tangle Ridge - excavator operator);Wayne Munroe (Tangle Ridge - loader operator); Cameron Saunders (Tangle Ridge - excavator operator); PWGSC - Golder: Konane Dion-Belair; Sharon Busby; Sean Sutherland First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator John Deere 744K front end loader John Deere 850J bulldozer
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Konane Dion-Belair: 07:00-16:45; Sharon Busby: 07:00-12:30 ; Sean Sutherland: 07:00-16:45; Tervita: 06:15-16:45
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 0 to 6 mbgs) in AEC 1b including cells H4, I3, I4, J3, J4, K3, K4, L3, L4, M4. - Backfilling N2 to N7, O2 to O7, P2 to P7 and M2 to M6. -Approximately 831m³ (1902 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - Up to 18 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 51 truck loads of backfill was brought to site and 51 loads of inferred impacted material was hauled off-Site.
4) Weather
Mixture of overcast and sunny skies . High of approximately 6 degrees Celsius.
5) Excavation Monitoring
Hydrocarbon-like odours were observed from material removed from approximately I3, I4, J3, J4, K3, K4, L3, L4 and M4. -Survey of excavation in AEC 1b including cells I2, I3, I4, J2, J3, J4, K2, K3, K4, L2, L3, L4 and M4. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: Excavation AEC 1b including cells H2 to H5, I2 to I5, J2 to J5, K2 to K5 and L2 to L5, looking east.

Photograph 1: Excavation AEC 1b including cells L2 to L5, K2 to K5, J3 to J5 and I4 to I5, looking southeast.

Personnel on-Site
Tervita (and affiliated subcontractors): Kelly Valburg - Site Supervisor; Chris Hoover (bulldozer operator); Wallace Colp (Tangle Ridge - loader operator); Willie Duchene (Tangle Ridge - excavator operator); Wayne Munroe (Tangle Ridge - loader operator); Cameron Saunders (Tangle Ridge - excavator operator); PWGSC - Golder: Konane Dion-Belair; Sean Sutherland First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator John Deere 744K front end loader John Deere 850J bulldozer
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Konane Dion-Belair: 07:00-17:00; Sean Sutherland: 07:00-16:45; Tervita: 06:15-17:00
2) Environmental Protection
Daily job assessment completed A haul truck carrying backfill material spilled engine coolant along the former alignment over an approximate area of 200m. The truck parked approximately 50m north of the Site to assess the leak. The majority of the coolant was released over an area of approximately 50m, approximately 50m northeast of the Site. The leak was caused by a coolant hose that had become disconnected. The operator had to wait approximately 1 hour before repairing the leak to allow the system to cool. The operator topped up the coolant system and was able to drive off Site. Approximately 5L was released and the impacted material was not recovered due to frozen ground conditions. (Photograph 2)
3) Work Completed
-Excavation of inferred impacted material (approximately 0 to 6 mbgs) in AEC 1b including cells J3, J4, K3, K4, K5 L3, L4, L5 and M4. -Excavation of overburden material (approximately 0 to 1 mbgs) in AEC 1c including cells B7, B8, C7, C8, D6 to D8 and E6 to E8. -Excavation of inferred impacted material (approximately 0 to 0.5 mbgs) in AEC 1c including cells F8, F9 and G8 to G10 in order to build an access road for haul trucks for the excavation in AEC 1c. - Backfilling N2 to N7, O2 to O7, P2 to P7 and M2 to M6. -Approximately 708m³ (1590 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - Up to 16 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 42 truck loads of backfill was brought to site and 42 loads of inferred impacted material was hauled off-Site.
4) Weather
Mixture of overcast and sunny skies . High of approximately 7 degrees Celsius.
5) Excavation Monitoring
Hydrocarbon-like odours were observed from material removed from approximately J3, J4, K3, K4, L3, L4 and M4. -Survey of excavation in AEC 1b including cells I2, I3, I4, J2, J3, J4, K2, K3, K4, L2, L3, L4 and M4. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: Excavation in AEC 1c including cells F8, F9,G8, G9, G10 for the construction of a access road, looking north

Photograph 2: Spill of engine coolant along the haul road approximately 50m northeast of the Site, looking south

Personnel on-Site
Tervita (and affiliated subcontractors): Kelly Valburg - Site Supervisor; Chris Hoover (bulldozer operator); Wallace Colp (Tangle Ridge - loader operator); Curtis Watowski (Tangle Ridge - excavator operator); Wayne Munroe (Tangle Ridge - loader operator); Cameron Saunders (Tangle Ridge - excavator operator); PWGSC - Golder: Konane Dion-Belair; Sean Sutherland; Bing Miao First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator John Deere 744K front end loader John Deere 850J bulldozer
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Konane Dion-Belair: 07:00-17:15; Sean Sutherland: 06:45-16:45; Bing Miao 07:00-17:15; Tervita: 06:15-17:15
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 0 to 6 mbgs) in AEC 1b including cells H4, H5, I4, I5, J4, J5, K4, K5, L4, L5, M4 and M5. -Excavation of overburden material (approximately 0 to 1.5 mbgs) in AEC 1c including cells B7, B8, C7, C8, D6 to D8 and E6 to E8. -Excavation of inferred impacted material (approximately 0 to 1.5 mbgs) in AEC 1c including cells D8, D9, E9, E10. - Backfilling N2 to N7, O2 to O7, P2 to P7 and M2 to M6. -Approximately 837m³ (1950 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - Up to 19 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 53 truck loads of backfill was brought to site and 53 loads of inferred impacted material was hauled off-Site.
4) Weather
Mixture of overcast and sunny skies . High of approximately 3 degrees Celsius.
5) Excavation Monitoring
Hydrocarbon-like odours were observed from material removed from AEC 1b in cells M4, M5, L4 and L5. Hydrocarbon-like odours were observed from material removed from AEC 1c in cells D8, D9, E9, E10. -Collection of confirmatory samples including wall and base samples in AEC 1b including cells I2, I3, J3, K3, K4, K5, L3, L4, L5. -Survey of excavation in AEC 1b including cells I2, I3, I4, J2, J3, J4, K2, K3, K4, L2, L3, L4 and M4. Survey of excavation in AEC 1c including cells D8, D9, E9, E10. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: Excavation in AEC 1b including cells H3 to H5, I3 to I5, J3 to J5 and K3 to K5, looking south

Photograph 2: Excavation in AEC 1c including cells D8, D9, E8, E9, E10, looking southeast

Personnel on-Site
Tervita (and affiliated subcontractors): Kelly Valburg - Site Supervisor; Chris Hoover (bulldozer operator); Wallace Colp (Tangle Ridge - loader operator); Curtis Watowski (Tangle Ridge - excavator operator); Wayne Munroe (Tangle Ridge - loader operator); Cameron Saunders (Tangle Ridge - excavator operator); PWGSC - Golder: Konane Dion-Belair; Sean Sutherland; Bing Miao First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator John Deere 744K front end loader John Deere 850J bulldozer
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. A Site Visit was completed by one of Golder's Health, Safety, Security and Environment Advisors (Sheldon Price). Site Hours: Konane Dion-Belair: 07:15-17:30; Sean Sutherland: 07:15-17:30; Bing Miao 07:15-17:00; Sheldon Price (10:00-12:30) Tervita: 06:30-17:30
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Excavation of inferred impacted material (approximately 0 to 6 mbgs) in AEC 1b including cells H5, I5, J5. -Excavation of overburden material (approximately 1 to 1.5 mbgs) in AEC 1c including cells B7, B8, C7, C8, D6 to D8 and E6 to E8. -Excavation of inferred impacted material (approximately 0 to 1.5 mbgs) in AEC 1c including cells E10, E11, F10, F11, G10, G11, C9, C10, D9, D10. - Backfilling N2 to N7, O2 to O7, P2 to P7, M2 to M6, I2 to L2 and I3 to L3. -Approximately 485m³ (1136 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Approximately 75m³ (176 tonnes) was hauled off-Site from the excavation in AEC 1b and approximately 410 m³ (960 tonnes) from AEC 1c. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - Up to 18 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 31 truck loads of backfill was brought to site and 31 loads of inferred impacted material was hauled off-Site.
4) Weather
Snow . High of approximately -5 degrees Celsius.
5) Excavation Monitoring
-Hydrocarbon-like odours were observed from material removed from AEC 1c in cells E10, E11, F10, F11, G10, G11, C9, C10, D9, D10. -Collection of confirmatory samples including wall and base samples in AEC 1b including cells H4, H5 and J5. Confirmatory base samples collected in cells H4 and J4 were collected due to reaching target depth or competent bedrock. -Survey of excavation in AEC 1b including cells I2, I3, I4, J2, J3, J4, K2, K3, K4, L2, L3, L4 and M4. Survey of excavation in AEC 1c including cells D8, D9, E9, E10. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: Backfilling in AEC 1b including cells J2 to L2, looking north

Photograph 2: Excavation in AEC 1c including cells C9, C10, D9 and D10, looking northeast

Personnel on-Site
Tervita (and affiliated subcontractors): Kelly Valburg - Site Supervisor; Chris Hoover (bulldozer operator); Wallace Colp (Tangle Ridge - loader operator); Curtis Watowski (Tangle Ridge - excavator operator); Wayne Munroe (Tangle Ridge - loader operator); Cameron Saunders (Tangle Ridge - excavator operator); Tangle Ridge Mechanic PWGSC - Golder: Konane Dion-Belair; Sean Sutherland; Bing Miao First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator John Deere 744K front end loader John Deere 850J bulldozer
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Konane Dion-Belair: 07:00-17:15; Sean Sutherland: 07:00-17:00; Bing Miao 07:00-17:00; Tervita: 06:30-17:15
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
- Backfilling H2 to H5, I2 to I5, J2 to J5, K2 to K5 and L2 to L5. - No haul trucks were hauling material today.
4) Weather
Snow and clear skies. High of approximately -6 degrees Celsius.
5) Excavation Monitoring
-Collection of confirmatory wall and base samples in AEC 1b including cells I5, I4, J5, K5, L5, M5 and P4. Confirmatory base samples collected in cells I4 were collected due to reaching competent bedrock. -Survey of excavation backfill in AEC 1b including cells H2 to H5, I2 to I5, J2 to J5, K2 to K5, L2 to L5 and M2 and M5. Survey information will be used to estimate the volume of backfill. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

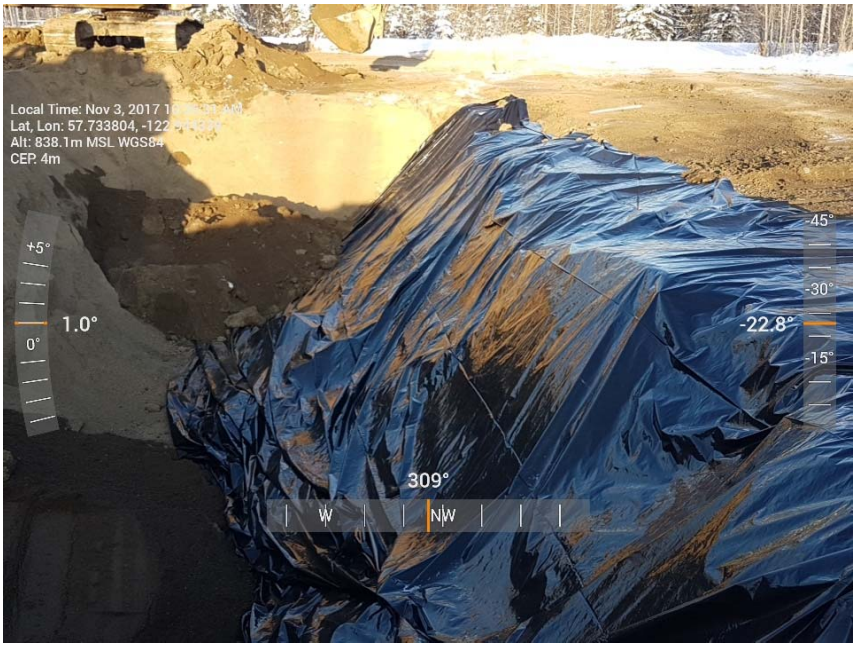
Photograph 1: Backfilling in AEC 1b including cells H2 To L2, H3 to L3, H4 to L4 and H5 to L5, looking east

Photograph 2: Exposing the backfilled wall in AEC 1b including cells P4 to P5, looking northwest

Personnel on-Site
Tervita (and affiliated subcontractors): Kelly Valburg - Site Supervisor; Chris Hoover (excavator operator); Wallace Colp (Tangle Ridge - loader operator); Willie Duchene (Tangle Ridge - excavator operator); Wayne Munroe (Tangle Ridge - loader operator); Cameron Saunders (Tangle Ridge - loader operator); PWGSC - Golder: Konane Dion-Belair; Sean Sutherland; Bing Miao First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator John Deere 744K front end loader
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Konane Dion-Belair: 08:00-17:15; Sean Sutherland: 08:00-16:45; Bing Miao 07:00-17:15; Tervita: 07:00-17:15
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
- Backfilling H2 to H5, I2 to I5, J2 to J5, K2 to K5 and L2 to L5. -Excavation of inferred hazard material (approximately 1.5 to 3.7 mbgs) in AEC 1c including cells D8, D9, E9 and E10. - No haul trucks were hauling material today. - John Deere 850J bulldozer was demobilized from Site for repairs.
4) Weather
Snow and clear skies. High of approximately -8 degrees Celsius.
5) Excavation Monitoring
-Collection of confirmatory wall samples in AEC 1b including cells P4, P5, P6. -Collection of confirmatory base samples in AEC 1c including cells D8, D9, E9 and E10. Base samples were collected due to hitting refusal at approximately 3.7 mbgs. -Strong hydrocarbon-like odours were observed from material removed from cells D8, D9, E9 and E10. -Survey of excavation in AEC 1c including cells D8, D9, E9 and E10. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by -Survey of excavation backfill in AEC 1b including cells H2 to H5, I2 to I5, J2 to J5, K2 to K5, L2 to L5 and M2 and M5. Survey information will be used to estimate the volume of backfill. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: Backfilling in AEC 1b including cells H2 To L2, H3 to L3, H4 to L4 and H5 to L5, looking north



Photograph 2: Liner placed in cells P4 to P6 in AEC 1b, looking northwest

Personnel on-Site
Tervita (and affiliated subcontractors): Chris Hoover - Site Supervisor; Wallace Colp (Tangle Ridge - loader operator); Willie Duchene (Tangle Ridge - excavator operator); Cameron Saunders (Tangle Ridge - excavator operator) PWGSC - Golder: Konane Dion-Belair; Sean Sutherland; Bing Miao First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator John Deere 744K front end loader
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Konane Dion-Belair: 07:00-17:00; Sean Sutherland: 07:00-16:15; Bing Miao 07:00-17:00; Tervita: 06:30-17:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
- Backfilling H2 to H5, I2 to I5, J2 to J5, K2 to K5 and L2 to L5. -Excavation of inferred impacted material (approximately 0 to 4.0 mbgs) in AEC 1c including cells B7, B8, B9, C7, C8, C9, C10 and C11. -All of the remaining stockpiled material from AEC 1b has been hauled off-Site for disposal. -A total of approximately 445m³ (1012 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Approximately 160m³ (370 tonnes) in inferred impacted material was hauled off-Site from the excavation in AEC 1b and approximately 123 m³ (270 tonnes) from AEC 1c. Approximately 162 m³ (372 tonnes) of inferred hazardous waste material was hauled off-Site from the excavation in AEC 1c. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - Up to 14 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 27 truck loads of backfill was brought to site and 27 loads of inferred impacted material was hauled off-Site.
4) Weather
Snow. High of approximately -5 degrees Celsius.
5) Excavation Monitoring
-Collection of confirmatory wall and base samples in AEC 1c including cells B7, B8, B9, C9, C10 and C11. Base samples were collected due to hitting target depth at approximately 4 mbgs. -Survey of excavation in AEC 1c including cells B7, B8, C7, C8, D6, D7, D8, E6, E7 and E8. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: Excavation AEC 1c including cells B7 to B9, C7 to C10 and D7 to D10, looking southeast.

Photograph 2: Excavation AEC 1c including cells B7, B8, B9, C9 and C10, looking west

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Chris Hoover (excavator operator); Wallace Colp (Tangle Ridge - loader operator); Willie Duchene (Tangle Ridge - excavator operator); Cameron Saunders (Tangle Ridge - loader operator) PWGSC - Golder: Konane Dion-Belair; Sean Sutherland; Bing Miao First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 350G LC Excavator John Deere 470G LC Excavator John Deere 744K front end loader
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Konane Dion-Belair: 07:00-16:45; Sean Sutherland: 07:00-16:45; Bing Miao 07:00-16:15; Tervita: 06:30-17:00
2) Environmental Protection
Daily job assessment completed The John Deere 350G LC excavator leaked hydraulic fluid from the hydraulic line that runs the hydraulic ram for the excavator bucket. Work was stopped to assess the leak and it was determined that a new hydraulic line is required. Tervita reported no hydraulic fluid hit the ground and the hydraulic line will be replaced tomorrow. (Photograph 2) A John Deere 744K front end loader was found to be leaking a small amount of hydraulic fluid from a fitting. The leak was contained within the machine and no fluid hit the ground. The fitting was tightened and wrapped with a spill pad and monitored throughout the day. The fitting will be tightened again tomorrow with the appropriate tool.
3) Work Completed
- Backfilling H2 to H5, I2 to I5, J2 to J5, K2 to K5 and L2 to L5. -Excavation of inferred impacted material (approximately 0 to 4.0 mbgs) in AEC 1c including cells B9, C7, C8, C9, D6, D7 and D8. -A total of approximately 536m³ (1250 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill from the excavation in AEC 1c. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - Up to 18 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 32 truck loads of backfill was brought to site and 30 loads of inferred impacted material was hauled off-Site.
4) Weather
Snow and clear skies. High of approximately -5 degrees Celsius.
5) Excavation Monitoring
-Collection of confirmatory wall and base samples in AEC 1c including cells B8, C7, C8, C9 and D10. Base samples were collected due to hitting target depth at approximately 4 mbgs. -Survey of excavation in AEC 1c including cells B7, B8, C7, C8, D6, D7, D8, E6, E7 and E8. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: Excavation AEC 1c including cells B7 to B9, C7 to C10 and D7 to D10, looking northeast.

Photograph 2: Hydraulic line leak on John Deere 350G LC excavator, looking northwest

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Chris Hoover (excavator operator); Wallace Colp (Tangle Ridge - loader operator); Willie Duchene (Tangle Ridge - excavator operator); Cameron Saunders (Tangle Ridge - loader operator); Tangle Ridge Mechanic PWGSC - Golder: Konane Dion-Belair; Sean Sutherland; Bing Miao First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 470G LC Excavator
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Konane Dion-Belair: 07:00-16:00; Sean Sutherland: 07:00-14:00; Bing Miao 07:00-14:00; Tervita: 06:30-17:00
2) Environmental Protection
Daily job assessment completed At approximately 11:50 today, the on-Site 470G LC excavator was found to be leaking hydraulic oil. The machine was sitting on inferred impacted material loading haul trucks. The operator indicated that he received a warning light on his dash and stopped the machine. He found the excavator to be leaking hydraulic oil from the belly of the machine. Tervita responded by deploying spill pads and the leak stopped at approximately 13:00. An estimated 10L of hydraulic fluid hit the ground and an additional 30L has been absorbed by spill pads. A more accurate estimate of the amount spilled will be provided after the repair is made to the machine and it is re-filled with hydraulic oil. (Photograph 1)
3) Work Completed
- Backfilling H2 to H5, I2 to I5, J2 to J5, K2 to K5 and L2 to L5. -Excavation of inferred impacted material (approximately 1.5 to 4.0 mbgs) in AEC 1c including cells D6 to D7. -A total of approximately 352m³ (814 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill from the excavation in AEC 1c. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - Up to 16 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 27 truck loads of backfill was brought to site and 22 loads of inferred impacted material was hauled off-Site.
4) Weather
Snow and clear skies. High of approximately -6 degrees Celsius.
5) Excavation Monitoring
-Survey of excavation in AEC 1c including cells C7, C8, D6, D7, D8, E6 and E7. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team. -Survey of backfill progress in AEC 1b including cells H2 to H5, I2 to I5, J2 to J5, K2 to K5 and L2 to L5. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team. Monitoring well K19-MW16-03S has been destroyed by front end loader & haul truck traffic.

6) Site Photographs

Photograph 1: Spill pads deployed to capture hydraulic fluid leaking from John Deere 470G LC excavator, looking northwest.

Photograph 2: Backfill of AEC 1b including cells H2 to P2, H3 to P3 and H4 to P4

Personnel on-Site

Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Joey (loader operator); Curtis Watowski (Tangle Ridge - excavator operator); Willie Duchene (Tangle Ridge - excavator operator); Cameron Saunders (Tangle Ridge - loader operator);
PWGSC -
Golder: Konane Dion-Belair; Sean Sutherland; Bing Miao
First Aid Attendant: Dave Smith

Operating Equipment

John Deere 744K front end loader
John Deere 470G LC Excavator
John Deere 350G LC Excavator
John Deere 744K front end loader

1) Health and Safety

Safety Tailgate Meeting conducted by Tervita

Daily job assessment completed by Golder staff.
Site Hours: Konane Dion-Belair: 07:00-16:45; Sean Sutherland: 07:00-15:45; Bing Miao 07:00-16:45; Tervita: 06:30-16:45

2) Environmental Protection

Daily job assessment completed
No environmental incidents or near misses.

Both the John Deere 350G LC and the 470G LC excavators were repaired overnight. Approximately 40L of hydraulic fluid was added to the 470G LC excavator after completing the repair. This amount agrees with the initial estimate of approximately 10L of hydraulic fluid leaking onto the inferred impacted material with an additional 30L captured by spill pads.

3) Work Completed

- Backfilling H2 to H5, I2 to I5, J2 to J5, K2 to K5 and L2 to L5.
-Excavation of inferred impacted material (approximately 0 to 4.0 mbgs) in AEC 1c including cells C6, D6, D7, D8, D9 and D10
-A total of approximately 477m³ (1086 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill from the excavation in AEC 1c. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill.

- Up to 13 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 29 truck loads of backfill was brought to site and 29 loads of inferred impacted material was hauled off-Site.

4) Weather

Snow and clear skies. High of approximately -11 degrees Celsius.

5) Excavation Monitoring

-Survey of excavation in AEC 1c including cells C6, D6, D7, D8 and D10. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

-Hydrocarbon-like odours were observed from material removed from AEC 1c in cells D8 and D10.
-Collection of confirmatory samples including wall and base samples in AEC 1c including cells C7, C10, D7, D8, D10.

-The material that was impacted from the hydraulic leak from the 470G LC excavator was stockpiled and hauled off-Site for disposal. The volume of the material was estimated to be approximately 1.5 m³ (Photograph 1).

-On October 31, 2017, inferred clean material was excavated from the excavation within AEC 1b. The clean material was inadvertently mixed in with WL+ material. The Golder Site Supervisor and the Tervita Site supervisor agreed that approximately 200 tonnes of inferred clean material was mixed with WL+ material and this weight will be added to the total allowable weight for disposal this year.

6) Site Photographs

Photograph 1: Stockpiled material that was impacted from the hydraulic leak from the 470G LC excavator, looking north.

Photograph 2: Excavation in AEC 1c including cells, B7 to B8, C7 to C10 and D7 to D10, looking northeast

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Joey McGill (loader operator); Curtis Watowski (Tangle Ridge - excavator operator); Willie Duchene (Tangle Ridge - excavator operator); Cameron Saunders (Tangle Ridge - loader operator); PWGSC - Golder: Konane Dion-Belair; Sean Sutherland; Bing Miao First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 470G LC Excavator John Deere 350G LC Excavator John Deere 744K front end loader John Deere 850J bulldozer
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Konane Dion-Belair: 07:00-16:45; Sean Sutherland: 07:00-16:45; Bing Miao 07:00-16:15; Tervita: 06:30-17:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
- Backfilling H2 to H5, I2 to I5, J2 to J5, K2 to K5 and L2 to L5. -Excavation of inferred impacted material (approximately 0 to 4.0 mbgs) in AEC 1c including cells D6 to D10, E6 and D7. -A total of approximately 541m³ (1234 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill from the excavation in AEC 1c. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - Up to 15 haul trucks hauling backfill material onto site and loaded with inferred impacted material. A total of 33 truck loads of backfill was brought to site and 33 loads of inferred impacted material was hauled off-Site. -The John Deere 850J bulldozer was down for repairs from approximately 07:00 to 13:00. The John Deere 470G LC excavator was down for repairs from approximately 12:00 to 15:30.
4) Weather
Snow and clear skies. High of approximately -11 degrees Celsius.
5) Excavation Monitoring
-Hydrocarbon-like odours were observed from material removed from AEC 1c in cells D8 to D10. -Survey of excavation in AEC 1c including cells B7 to B9, C7 to C10, D6 to D10, E6 and E7. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: Excavation in AEC 1c including cells, B7 to B8, C7 to C10 and D7 to D10, looking east.

Photograph 2: Backfill progress of the excavation in AEC 1b, looking east.

Personnel on-Site

Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Joey McGill (bulldozer operator operator); Curtis Watowski (Tangle Ridge - excavator operator); Willie Duchene (Tangle Ridge - excavator operator); Cameron Saunders (Tangle Ridge - loader operator); Wallace Colp (Tangle Ridge - loader operator); Tangle Ridge Mechanic
PWGSC -
Golder: Konane Dion-Belair; Sean Sutherland; Bing Miao
First Aid Attendant: Dave Smith

Operating Equipment

John Deere 744K front end loader
John Deere 470G LC Excavator
John Deere 350G LC Excavator
John Deere 744K front end loader
John Deere 850J bulldozer

1) Health and Safety

Safety Tailgate Meeting conducted by Tervita

Daily job assessment completed by Golder staff.
Site Hours: Konane Dion-Belair: 07:00-17:15; Sean Sutherland: 08:00-17:15; Bing Miao 07:00-17:15; Tervita: 07:00-17:15

2) Environmental Protection

Daily job assessment completed

At approximately 16:20 today, the on-Site 350G LC excavator was found to be leaking hydraulic oil. The machine was sitting on stockpiled inferred impacted material. The operator indicated that he observed hydraulic oil dripping onto his windshield and stopped the machine. He found the excavator to be leaking hydraulic oil from the boom of the machine. Tervita and Tangle Ridge responded by deploying spill pads and the majority of the leak was contained to the surface of the machine. An estimated 0.3L of hydraulic fluid hit the ground and an unknown amount was collected with spill pads by wiping down the excavator. A more accurate estimate of the amount leaked will be provided after the repair is made to the machine and it is re-filled with hydraulic oil. (Photograph 2)

3) Work Completed

- Backfilling H2 to H5, I2 to I5, J2 to J5, K2 to K5 and L2 to L5.
-Excavation of inferred impacted material (approximately 0 to 4.0 mbgs) in AEC 1c including cells D9, E8, E9, E10, E11 and F11.
-No haul truck activity or hauling of material off-Site.
- Stockpiling of inferred impacted material from the excavation in AEC 1c.
-Maintenance of the front end loader bucket was completed on both 744K front end loaders.

4) Weather

Snow and clear skies. High of approximately -9 degrees Celsius.

5) Excavation Monitoring

-Collection of confirmatory samples including wall and base samples in AEC 1c including cells D6, D9, E10 and E11. Confirmatory base samples collected in cells D9, E10 and E11 were collected due to reaching target depth or competent bedrock.
-Hydrocarbon-like odours were observed from material removed from AEC 1c in cells D9 and E8 to E11.
-Survey of excavation in AEC 1c including cells B7 to B9, C7 to C10, D6 to D10, E6 and E7. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: Excavation in AEC 1c including cells C8 to C10, D7 to D10, E9 to E11 and F9 to F11, looking northeast.

Photograph 2: Spill pads deployed to collect leaking hydraulic oil from the 350G LC excavator, looking south

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Joey McGill (bulldozer operator operator); Curtis Watowski (Tangle Ridge - excavator operator); Willie Duchene (Tangle Ridge - excavator operator); Cameron Saunders (Tangle Ridge - loader operator); Sean Williams (Tangle Ridge - loader operator); Tangle Ridge Mechanic PWGSC - Golder: Konane Dion-Belair; Sean Sutherland; Bing Miao First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 470G LC Excavator John Deere 350G LC Excavator John Deere 744K front end loader John Deere 850J bulldozer
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Konane Dion-Belair: 07:00-17:15; Sean Sutherland: 07:00-16:45; Bing Miao 08:00-17:15; Tervita: 07:00-17:15
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses. The hydraulic leak from the 350G excavator was repaired by 08:00. It was determined that approximately 30L was released but 0.3L hit the ground. The remainder of the hydraulic oil was captured by spill pads. The impacted soil was scraped up and disposed of in a drum. The material in the drum will be disposed of appropriately at the end of the project.
3) Work Completed
- Backfilling H2 to H5, I2 to I5, J2 to J5, K2 to K5 and L2 to L5. -Excavation of inferred impacted material (approximately 0 to 4.0 mbgs) in AEC 1c including cells D6, E6, E7, E8, E9, F9, F10, F11 and F12. -No haul truck activity or hauling of material off-Site. - Stockpiling of inferred impacted material from the excavation in AEC 1c.
4) Weather
Sunny. High of approximately -9 degrees Celsius.
5) Excavation Monitoring
-Collection of confirmatory samples including wall and base samples in AEC 1c including cells F11, F10, E8, E7. Confirmatory base samples collected in cells D9, E10 and E11 were collected due to reaching target depth or competent bedrock. -Survey of excavation in AEC 1c including cells D6 to D10, E6 to E11 and F8 to F11.. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: Excavation in AEC 1c including cells C8 to C10, D7 to D10, E9 to E11 and F8 to F11, looking northeast.

Photograph 2: Backfill progress in AEC 1b, looking southwest.

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Joey McGill (bulldozer operator operator); Curtis Watowski (Tangle Ridge - excavator operator); Willie Duchene (Tangle Ridge - excavator operator); Cameron Saunders (Tangle Ridge - loader operator); Sean Williams (Tangle Ridge - loader operator); Tangle Ridge Mechanic PWGSC - Golder: Konane Dion-Belair; Sean Sutherland; Bing Miao First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 470G LC Excavator John Deere 350G LC Excavator John Deere 744K front end loader John Deere 850J bulldozer
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Konane Dion-Belair: 09:00-12:00; Sean Sutherland: 07:00-17:00; Bing Miao 07:00-17:00; Tervita: 07:00-17:10
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
- Backfilling H2 to H5, I2 to I5, J2 to J5, K2 to K5 and L2 to L5. -Excavation of inferred impacted material (approximately 0 to 4.0 mbgs) in AEC 1c including cells F10, F9, F8, G8, G9, G10 and G11. -No haul truck activity or hauling of material off-Site. - Stockpiling of inferred impacted material from the excavation in AEC 1c.
4) Weather
Overcast. High of approximately -10 degrees Celsius.
5) Excavation Monitoring
-Collection of confirmatory samples including wall and base samples in AEC 1c including cells F8, F9, G8, G9, G10, and F11. Confirmatory base samples collected in cells F8, F9, G8, G9, G10 were collected due to reaching competent bedrock. -Survey of excavation in AEC 1c including cells G8 to G11 and F8 to F11. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: Excavation AEC 1c including cells E11 to E8, F11 to F8, and G11 to G8, looking west.

Photograph 2: Backfill progress in AEC 1b, looking west.

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Joey McGill (bulldozer operator); Curtis Watowski (Tangle Ridge - excavator operator); Willie Duchene (Tangle Ridge - excavator operator); Cameron Saunders (Tangle Ridge - loader operator); Sean Williams (Tangle Ridge - loader operator); Tangle Ridge Mechanic PWGSC - Golder: Sean Sutherland; Bing Miao First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 470G LC Excavator John Deere 350G LC Excavator John Deere 744K front end loader John Deere 850J bulldozer
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Sean Sutherland: 07:30-17:00; Bing Miao 07:30-17:00; Tervita: 07:15-17:15
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Backfilling of AEC 1B completed. Overburden orginially stripped from AEC 1B is now in the process of being re-distributed across the excavation. -AEC 1C stockpile of inferred impacted material was levelled out by excavators in preparation for sealing with poly. -No haul truck activity or hauling of material off-Site.
4) Weather
Light snow and overcast. High of approximately -12 degrees Celsius.
5) Excavation Monitoring
-Collection of wall confirmatory samples in AEC 1C including cells G11, F8, and G8. -Survey of wall sample points taken today from cells G11, F8, and G8 in AEC 1C.

6) Site Photographs

Photograph 1: View of stockpiled material from AEC 1C.

Photograph 2: View of AEC 1B area at the end of day.

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Joey McGill (bulldozer operator); Curtis Watowski (Tangle Ridge - excavator operator); Willie Duchene (Tangle Ridge - excavator operator); Cameron Saunders (Tangle Ridge - loader operator); Sean Williams (Tangle Ridge - loader operator); Tangle Ridge Mechanic; PWGSC - Golder: Sean Sutherland; Bing Miao. Subcontractors: Dave Clich (Vector); Haiden Page (Vector) First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 470G LC Excavator John Deere 350G LC Excavator John Deere 744K front end loader John Deere 850J bulldozer
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Sean Sutherland: 07:30-1:00; Bing Miao 07:30-17:00; Tervita: 07:00-17:00
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Spreading of overburden to bring AEC 1B back up to grade complete. -Continued shaping and re-arrangement of AEC 1C impacted material stockpile in preparation for installation of poly covers. -No haul truck activity or hauling of material off-Site. -Vector completed survey of AEC 1C excavation.
4) Weather
Light snow and overcast. High of approximately -12 degrees Celsius.
5) Excavation Monitoring
-Collection of additional wall confirmatory sample in AEC 1C, cell G9 at ~2.5 mbgs -Collection of PID screenings in AEC 1C cell G11 at ~2.5 mbgs -Survey of entire AEC 1C excavation. Survey information will be used to estimate the volume of excavated soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team.

6) Site Photographs

Photograph 1: View of stockpiled material from AEC 1C.

Photograph 2: View of AEC 1B area at the end of day.

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Joey McGill (bulldozer operator); Curtis Watowski (Tangle Ridge - excavator operator); Willie Duchene (Tangle Ridge - excavator operator); Cameron Saunders (Tangle Ridge - loader operator); Sean Williams (Tangle Ridge - loader operator); Tangle Ridge Mechanic; PWGSC - Golder: Sharon Busby; Bing Miao. First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 470G LC Excavator John Deere 350G LC Excavator John Deere 744K front end loader John Deere 850J bulldozer
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Sharon Busby: 08:00-16:15; Bing Miao 08:30-12:00; Tervita: 07:00-16:15
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
-Partial backfilling of AEC 1C grids E8,F8,G8-11 -Continued shaping and re-arrangement of AEC 1C impacted material stockpile in preparation for installation of poly covers. -No haul truck activity or hauling of material off-Site.
4) Weather
Light snow and overcast. High of approximately -10 degrees Celsius.
5) Excavation Monitoring
-Confirmatory base sample collected in AEC 1C grid E9

6) Site Photographs

Photograph 1: View of backfill progression in AEC 1C

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Joey McGill (bulldozer operator); Curtis Watowski (Tangle Ridge - excavator operator); Willie Duchene (Tangle Ridge - excavator operator); Cameron Saunders (Tangle Ridge - loader operator); Sean Williams (Tangle Ridge - loader operator); PWGSC - Golder: Sharon Busby; Kelsey Tanaka First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 470G LC Excavator John Deere 350G LC Excavator John Deere 744K front end loader John Deere 850J bulldozer - not in use
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Sharon Busby: 08:30-16:30; Kelsey Tanaka 08:30-16:30; Tervita: 07:00-16:45
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
- Placed poly along Cells F8, G8 to G11 in AEC 1C - Continued partial backfilling of Cells F8, G8 to G11 in AEC 1C. - Collected backfill sample - Approximately 51m³ (114 tonnes) was hauled off-Site and disposed of at Northern Rockies Landfill. Actual tonnage will be confirmed upon receipt of weight manifests from the landfill. - A total of 3 truck loads of inferred impacted material was hauled off-Site. - Scraped surface layer material, approximately 50 m North of the Site Entrance, at the spilled coolant location from October 30th.
4) Weather
Light snow and overcast. High of approximately -15 degrees Celsius.
5) Excavation Monitoring
-Survey of entire AEC 1B excavation. Survey information will be used to estimate the volume of backfilled soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team. - Surveyed the haul road to be used on updated Site Figure. - Surveyed stockpiles on Site to be used on updated Site Figure.

6) Site Photographs

Photograph 1: AEC 1C Cells F8, G8 to G11 polyed with sloped backfilled material looking northwest

Photograph 2: Removed material from coolant spill. Material was placed with stockpile to be hauled off-site.

Personnel on-Site
Tervita (and affiliated subcontractors): Rhodri Keogh - Site Supervisor; Joey McGill (bulldozer operator); Curtis Watowski (Tangle Ridge - excavator operator); Sean Williams (Tangle Ridge - loader operator); PWGSC - Golder: Sharon Busby; Kelsey Tanaka First Aid Attendant: Dave Smith
Operating Equipment
John Deere 744K front end loader John Deere 470G LC Excavator John Deere 350G LC Excavator - not in use John Deere 744K front end loader - not in use John Deere 850J bulldozer - not in use
1) Health and Safety
Safety Tailgate Meeting conducted by Tervita Daily job assessment completed by Golder staff. Site Hours: Sharon Busby: 08:15-15:30; Kelsey Tanaka 08:15-15:30; Tervita: 07:45-15:30
2) Environmental Protection
Daily job assessment completed No environmental incidents or near misses.
3) Work Completed
- Placed poly on the two wind rows staying on Site. - Finished the berm and fencing around AEC 1C. - GPS coordinates were obtained for Homestead 1.3 - All equipment and field gear was packed up and removed from Site. - Final Site inspection was completed. - GPS coordinates were collected downgradient from the former alignment for future monitoring wells - Approximately 5 m^3 of soil was removed north of the Site entrance and placed with the wind rows to be hauled off Site. (November 15, 2017)
4) Weather
Light snow and overcast. High of approximately -20 degrees Celsius.
5) Excavation Monitoring
-Survey of entire AEC 1C excavation. Survey information will be used to estimate the volume of backfilled soil volume. The volumes will be updated in a separate tracking sheet, following interpretation by Golder's CAD/GIS team. - Surveyed stockpiles on Site to be used on updated Site Figure.

6) Site Photographs

Photograph 1: AEC 1C Cells F8, G8 to G11 polyed with sloped backfilled material looking east

Photograph 2: Polyed wind rows looking south.

APPENDIX C

Soil Disposal Manifests

(Provided with Final version on CD-ROM)

APPENDIX D

Laboratory Analytical Results

AGAT Laboratories

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Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
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http://www.agatlabs.com

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709/6000

AGAT WORK ORDER: 17F268944

SOIL ANALYSIS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

TRACE ORGANICS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

DATE REPORTED: Oct 12, 2017

PAGES (INCLUDING COVER): 16

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 2: Sample receipt temperature 1°C.

Version 2 issued on October 12, 2017 is a complete report. Version 2 is an amendment to version 1.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17F268944

PROJECT: 1657709/6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works Metals in Soil

DATE RECEIVED: 2017-10-05

DATE REPORTED: 2017-10-10

		SAMPLE DESCRIPTION:		04336-01	04336-02	04336-03
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2017-10-03	2017-10-03	2017-10-03
Parameter	Unit	G / S	RDL	8793061	8793063	8793064
Aluminum	µg/g		10	12900	12800	14000
Antimony	µg/g		0.1	0.6	0.6	0.6
Arsenic	µg/g		0.1	12.2	11.3	10.6
Barium	µg/g		0.5	388	470	391
Beryllium	µg/g		0.1	0.7	0.7	0.8
Bismuth	µg/g		0.5	<0.5	<0.5	<0.5
Cadmium	µg/g		0.01	0.69	0.79	0.73
Calcium	µg/g		10	21800	22400	26300
Chromium	µg/g		1	21	22	24
Cobalt	µg/g		0.1	11.3	10.6	12.1
Copper	µg/g		0.2	30.1	29.7	32.1
Iron	µg/g		10	26800	25800	27100
Lead	µg/g		0.1	14.9	15.0	14.6
Lithium	µg/g		0.5	17.2	17.4	18.5
Magnesium	µg/g		10	9110	8500	8740
Manganese	µg/g		1	308	322	325
Mercury	µg/g		0.01	0.06	0.07	0.07
Molybdenum	µg/g		0.2	2.8	2.4	2.3
Nickel	µg/g		0.5	33.6	32.9	36.5
Phosphorus	µg/g		5	732	751	710
Potassium	µg/g		5	2390	2400	2610
Selenium	µg/g		0.1	1.3	1.2	1.3
Silver	µg/g		0.5	<0.5	<0.5	<0.5
Sodium	µg/g		5	126	110	159
Strontium	µg/g		1	67	70	73
Thallium	µg/g		0.1	0.3	0.3	0.3
Tin	µg/g		0.2	0.6	0.6	0.7
Titanium	µg/g		1	93	96	100
Uranium	µg/g		0.2	2.1	2.0	2.0
Vanadium	µg/g		1	42	43	45

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17F268944

PROJECT: 1657709/6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works Metals in Soil

DATE RECEIVED: 2017-10-05

DATE REPORTED: 2017-10-10

		SAMPLE DESCRIPTION:		04336-01	04336-02	04336-03
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2017-10-03	2017-10-03	2017-10-03
Parameter	Unit	G / S	RDL	8793061	8793063	8793064
Zinc	µg/g		1	120	122	123
Zirconium	µg/g		0.1	6.2	6.0	6.7
pH 1:2	pH units		0.05	7.09	7.12	7.25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8793061-8793064 Results are based on the dry weight of the sample

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17F268944

PROJECT: 1657709/6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH Silica Gell in Soil Low Level

DATE RECEIVED: 2017-10-05

DATE REPORTED: 2017-10-06

		SAMPLE DESCRIPTION:		04336-01	04336-02	04336-03
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2017-10-03	2017-10-03	2017-10-03
Parameter	Unit	G / S	RDL	8793061	8793063	8793064
Naphthalene	µg/g		0.005	<0.005	<0.005	<0.005
2-Methylnaphthalene	µg/g		0.005	0.018	0.011	0.015
1-Methylnaphthalene	µg/g		0.005	0.018	0.014	0.016
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02	<0.02
Phenanthrene	µg/g		0.02	0.03	0.02	0.02
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	0.01	0.01
Pyrene	µg/g		0.01	0.02	0.02	0.01
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	<0.05	<0.05
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05
EPH C10-C19sg	µg/g		20	41	56	99
EPH C19-C32sg	µg/g		20	64	63	64
LEPH C10-C19sg	µg/g			41	56	99
HEPH C19-C32sg	µg/g		20	64	63	64
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17F268944

PROJECT: 1657709/6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH Silica Gell in Soil Low Level

DATE RECEIVED: 2017-10-05

DATE REPORTED: 2017-10-06

		SAMPLE DESCRIPTION:	04336-01	04336-02	04336-03
		SAMPLE TYPE:	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-03	2017-10-03	2017-10-03
Surrogate	Unit	Acceptable Limits	8793061	8793063	8793064
Naphthalene - d8	%	50-130	74	72	72
2-Fluorobiphenyl	%	50-130	77	74	70
P-Terphenyl - d14	%	60-130	83	81	80

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8793061-8793064 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17F268944

PROJECT: 1657709/6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

CCME BTEX (Soil)

DATE RECEIVED: 2017-10-05

DATE REPORTED: 2017-10-11

		SAMPLE DESCRIPTION:		04336-01	04336-02	04336-03
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2017-10-03	2017-10-03	2017-10-03
Parameter	**Unit**	**G / S**	**RDL**	**8793061**	**8793063**	**8793064**
Benzene	µg/g		0.005	<0.005	<0.005	<0.005
Toluene	µg/g		0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.01	<0.01	<0.01	<0.01
m&p-Xylene	µg/g		0.02	<0.02	<0.02	<0.02
o-Xylene	µg/g		0.02	<0.02	<0.02	<0.02
VH	µg/g		10	<10	<10	<10
VPH	µg/g		10	<10	<10	<10
Moisture	%		0.5	21.8	21.9	20.8
Total Xylenes	µg/g		0.05	<0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**				
Bromofluorobenzene	%	60-140		113	103	110
Dibromofluoromethane	%	60-140		121	114	121
Toluene - d8	%	60-140		124	119	124

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8793061-8793064 Results are based on the dry weight of the sample.

Certified By:

AGAT Laboratories

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F268944

PROJECT: 1657709/6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date:			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
Public Works Metals in Soil															
Aluminum	8793064		14000	14000	0.2%	< 10	106%	70%	130%	100%	90%	110%			
Antimony	8796582		<0.1	<0.1	NA	< 0.1	91%	70%	130%	103%	90%	110%			
Arsenic	8796582		1.7	1.7	3.6%	< 0.1	116%	70%	130%	107%	90%	110%			
Barium	8796582		48.2	56.8	16.5%	< 0.5	103%	70%	130%	104%	90%	110%			
Beryllium	8796582		<0.1	0.1	NA	< 0.1	103%	70%	130%	100%	90%	110%			
Bismuth	8796582		<0.5	<0.5	NA	< 0.5				107%	85%	115%			
Cadmium	8796582		0.09	0.11	28.0%	< 0.01	103%	70%	130%	103%	90%	110%			
Calcium	8793064		26300	28000	6.2%	< 10	116%	70%	130%	100%	90%	110%			
Chromium	8796582		9	10	13.6%	< 1	112%	70%	130%	105%	90%	110%			
Cobalt	8796582		4.3	4.8	12.1%	< 0.1	113%	70%	130%	103%	90%	110%			
Copper	8796582		14.7	16.1	9.2%	< 0.2	114%	70%	130%	108%	90%	110%			
Iron	8793064		27100	27300	0.6%	< 10	105%	70%	130%	100%	90%	110%			
Lead	8796582		3.2	3.8	15.7%	< 0.1	112%	70%	130%	107%	90%	110%			
Lithium	8796582		3.6	3.9	8.3%	< 0.5				100%	85%	115%			
Magnesium	8793064		8740	9160	4.7%	< 10	115%	70%	130%	100%	90%	110%			
Manganese	8796582		280	315	11.8%	< 1	113%	70%	130%	103%	90%	110%			
Mercury	8796582		<0.01	<0.01	NA	< 0.01	106%	70%	130%	107%	90%	110%			
Molybdenum	8796582		<0.2	<0.2	NA	< 0.2	102%	70%	130%	102%	90%	110%			
Nickel	8796582		5.5	6.0	9.4%	< 0.5	119%	70%	130%	104%	90%	110%			
Phosphorus	8793064		710	793	11.1%	< 5	105%	70%	130%	92%	90%	110%			
Potassium	8793064		2610	2740	5.0%	< 5	111%	70%	130%	100%	90%	110%			
Selenium	8796582		<0.1	0.2	NA	< 0.1				103%	90%	110%			
Silver	8796582		<0.5	<0.5	NA	< 0.5	103%	70%	130%	98%	90%	110%			
Sodium	8793064		159	165	3.9%	< 5	113%	70%	130%	98%	90%	110%			
Strontium	8796582		36	41	12.0%	< 1	120%	70%	130%	103%	90%	110%			
Thallium	8796582		<0.1	<0.1	NA	< 0.1	121%	70%	130%	107%	90%	110%			
Tin	8796582		0.2	0.2	NA	< 0.2	98%	70%	130%	101%	90%	110%			
Titanium	8793064		100	105	4.4%	< 1				100%	90%	110%			
Uranium	8796582		0.5	0.5	NA	< 0.2	116%	70%	130%	108%	90%	110%			
Vanadium	8796582		45	52	13.8%	< 1	114%	70%	130%	105%	90%	110%			
Zinc	8796582		25	33	27.3%	< 1	118%	70%	130%	107%	90%	110%			
Zirconium	8796582		2.1	2.3	10.5%	< 0.1	105%	70%	130%	99%	90%	110%			
pH 1:2	8796582		7.65	7.65	0.0%		95%	90%	110%	100%	95%	105%			

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By:

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA | **AGAT WORK ORDER: 17F268944**

PROJECT: 1657709/6000 | **ATTENTION TO: Erin O'Brien**

SAMPLING SITE: | **SAMPLED BY:**

Trace Organics Analysis

RPT Date:			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
Public Works LEPH/HEPH Silica Gell in Soil Low Level															
Naphthalene	68005	8785407	<0.005	<0.005	NA	< 0.005	102%	80%	120%				91%	50%	130%
2-Methylnaphthalene	68005	8785407	<0.005	<0.005	NA	< 0.005	102%	80%	120%				85%	50%	130%
1-Methylnaphthalene	68005	8785407	<0.005	<0.005	NA	< 0.005	101%	80%	120%				89%	50%	130%
Acenaphthylene	68005	8785407	<0.005	<0.005	NA	< 0.005	101%	80%	120%				82%	50%	130%
Acenaphthene	68005	8785407	<0.005	<0.005	NA	< 0.005	101%	80%	120%				94%	50%	130%
Fluorene	68005	8785407	<0.02	<0.02	NA	< 0.02	101%	80%	120%				87%	50%	130%
Phenanthrene	68005	8785407	<0.02	<0.02	NA	< 0.02	103%	80%	120%				79%	60%	130%
Anthracene	68005	8785407	<0.004	<0.004	NA	< 0.004	98%	80%	120%				82%	60%	130%
Fluoranthene	68005	8785407	<0.01	<0.01	NA	< 0.01	101%	80%	120%				87%	60%	130%
Pyrene	68005	8785407	<0.01	<0.01	NA	< 0.01	100%	80%	120%				88%	60%	130%
Benzo(a)anthracene	68005	8785407	<0.03	<0.03	NA	< 0.03	101%	80%	120%				88%	60%	130%
Chrysene	68005	8785407	<0.05	<0.05	NA	< 0.05	101%	80%	120%				94%	60%	130%
Benzo(b)fluoranthene	68005	8785407	<0.05	<0.05	NA	< 0.05	97%	80%	120%				83%	60%	130%
Benzo(j)fluoranthene	68005	8785407	<0.05	<0.05	NA	< 0.05	99%	80%	120%				87%	60%	130%
Benzo(k)fluoranthene	68005	8785407	<0.05	<0.05	NA	< 0.05	103%	80%	120%				89%	60%	130%
Benzo(a)pyrene	68005	8785407	<0.03	<0.03	NA	< 0.03	101%	80%	120%				89%	60%	130%
Indeno(1,2,3-c,d)pyrene	68005	8785407	<0.02	<0.02	NA	< 0.02	100%	80%	120%				84%	60%	130%
Dibenzo(a,h)anthracene	68005	8785407	<0.005	<0.005	NA	< 0.005	101%	80%	120%				87%	60%	130%
Benzo(g,h,i)perylene	68005	8785407	<0.05	<0.05	NA	< 0.05	101%	80%	120%				93%	60%	130%
Quinoline	68005	8785407	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	50%	130%
Naphthalene - d8	68005	8785407	80	79	1.3%		102%	80%	120%				90%	50%	130%
2-Fluorobiphenyl	68005	8785407	81	79	2.5%		102%	80%	120%				91%	50%	130%
P-Terphenyl - d14	68005	8785407	79	78	1.3%		100%	80%	120%				92%	60%	130%
EPH C10-C19sg	68005	8785407	<20	30	NA	< 20	108%	70%	130%				80%	65%	120%
EPH C19-C32sg	68005	8785407	<20	<20	NA	< 20	102%	70%	130%				80%	80%	120%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

CCME BTEX (Soil)															
Benzene	68032	8793061	<0.005	<0.005	NA	< 0.005	102%	80%	120%				107%	60%	140%
Toluene	68032	8793061	<0.05	<0.05	NA	< 0.05	98%	80%	120%				111%	60%	140%
Ethylbenzene	68032	8793061	<0.01	<0.01	NA	< 0.01	99%	80%	120%				110%	60%	140%
m&p-Xylene	68032	8793061	<0.02	<0.02	NA	< 0.02	98%	80%	120%				111%	60%	140%
o-Xylene	68032	8793061	<0.02	<0.02	NA	< 0.02	99%	80%	120%				109%	60%	140%
Bromofluorobenzene	68032	8793061	113	110	2.7%		100%	60%	140%				93%	60%	140%
Dibromofluoromethane	68032	8793061	121	121	0.0%		100%	60%	140%				89%	60%	140%
Toluene - d8	68032	8793061	124	129	4.0%		99%	60%	140%				97%	60%	140%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

AGAT Laboratories

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F268944

PROJECT: 1657709/6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date:			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

Certified By:

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F268944

PROJECT: 1657709/6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Antimony	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Arsenic	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Barium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Beryllium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Bismuth	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cadmium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Calcium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Chromium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cobalt	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Copper	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Iron	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Lead	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Lithium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Magnesium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Manganese	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Mercury	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Molybdenum	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Nickel	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Phosphorus	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Potassium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Selenium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Silver	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Sodium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Strontium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Thallium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Tin	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F268944

PROJECT: 1657709/6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Titanium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Uranium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Vanadium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zinc	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zirconium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
pH 1:2	INOR-181-6031	BC MOE Lab Manual B (pH, Electrometric, Soil)	PH METER

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA **AGAT WORK ORDER: 17F268944**

PROJECT: 1657709/6000 **ATTENTION TO: Erin O'Brien**

SAMPLING SITE: **SAMPLED BY:**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19sg	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32sg	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F268944

PROJECT: 1657709/6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
LEPH C10-C19sg	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32sg	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Benzene	ORG-180-5100	EPA SW-846 8260-S	GC/MS/FID
Toluene	ORG-180-5100	EPA SW-846 8260-S	GC/MS/FID
Ethylbenzene	ORG-180-5100	EPA SW-846 8260-S	GC/MS/FID
m&p-Xylene	ORG-180-5100	EPA SW-846 8260-S	GC/MS/FID
o-Xylene	ORG-180-5100	EPA SW-846 8260-S	GC/MS/FID
VH	ORG-180-5103	Modified from BC MOE Lab Manual Sec D (VOC)	GC/MS/FID
VPH	ORG-180-5103	Modified from BC MOE Lab Manual Sec D (VOC)	GC/MS/FID
Moisture	INOR-181-6030	SSMA Chapter 70 (2nd Ed)	GRAVIMETRIC
Bromofluorobenzene			GC/MS
Dibromofluoromethane			GC/MS
Toluene - d8			GC/MS

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
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CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04336 page 1 of 1

17F268444

Project Number: 1657709 / 6000		Laboratory Name: AGAT	
Short Title: K19 Remediation	Golder Contact: Erin O'Brien	Address: 8600 Glenlyon Parkway, Burnaby, BC	
Golder E-mail Address 1: Erin_O'Brien @golder.com	Golder E-mail Address 2: [illegible] @golder.com	Telephone/Fax: 778-452-4009	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

OCT 5 AM 4:12

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	Metals	BTEX / VPH	LEPH/HEPH/PAH	Silica Gel Clean up						RUSH (Select TAT above)	Remarks (over) AGAT ID
04336-01	Comp A			So	03/10/17	18:00	Comp			4	X	X	X	X							8793061
-02	Comp B			↓	↓	18:10	↓			4	X	X	X	X							063
-03	Comp C			↓	↓	18:20	↓			4	X	X	X	X							064
-04																					
-05																					
-06																					
-07																					
-08																					
-09																					
-10																					
-11																					
-12																					

Sampler's Signature: [signature]	Relinquished by: Signature	Company	Date	Time	Received by: Signature [signature]	Company AGAT
Comments: ON ICE	Method of Shipment:	Waybill No.:	Received for Lab by: [signature]		Date: 04/10/17	Time: 1:40pm
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C) 1°C	Cooler opened by:	Date	

V112095

WHITE: Golder Copy YELLOW: Lab Copy

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17F268944

RECEIVING BASICS:

Received From: NOV ex Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 1 Containers: 6

TIME SENSITIVE ISSUES:

Earliest Date Sampled: Oct 03, 2017 ALREADY EXCEEDED? Yes (No)

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) 1 + 1 + 1 = 1 °C (2) ___ + ___ + ___ = ___ °C (3) ___ + ___ + ___ = ___ °C (4) ___ + ___ + ___ = ___ °C

Was ice or ice pack present: (Yes) No

Integrity Issues:

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 RECEIPT

Sending From Branch: EDM☐ GP☐ FN☐ FM☐ RD☐ VAN☐ LYD☐ FSJ☐ EST☑ Other:_____

Company/Consultant: Golder

TAT: <24hr ☐ 24-48hr ☐ 48-72hr ☐ Reg ☑ Other_____ Cooler Quantity: _____

TIME SENSITIVE ISSUES:

Earliest Date Sampled: Oct 2/17

Microbiology: Test: _____

Hydrocarbons: Test: _____

Are samples received >5 days after sampling: Yes☐ No☐

ALREADY EXCEEDED? Yes☐ No☑

Expiry: _____

Expiry: _____

(TEMPERATURE MUST BE MAINTAINED IF RECEIVED <10 DEGREES C)

3 temperatures of samples* and average of each cooler (taken on jars only): NA (only bags on coolers)

(1) 13+5+3=__°C (2) 2+2+0=__°C (3) 10+5+6=__°C (4) ___+___+___=___°C

Additional integrity issues (note here and on COC next to the sample ID):

_____

AGAT Laboratories

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CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709.6000

AGAT WORK ORDER: 17F269272

TRACE ORGANICS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

DATE REPORTED: Nov 10, 2017

PAGES (INCLUDING COVER): 24

VERSION*: 4

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 4: Sample receipt temperature 3°C.

Version 4 issued on November 10, 2017 to report the full LEPH/HEPH/PAH package as requested by Erin O'Brien Golder. Version 4 is an amendment to all previous versions.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Certificate of Analysis

AGAT WORK ORDER: 17F269272

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-07

DATE REPORTED: 2017-11-10

SAMPLE DESCRIPTION:				04258-03-2.5m	04258-04-3.5m	04258-06-4.5m	04258-07-5.5m	04258-08-0.5m	04258-10-2.5m	04258-12-3.5m	04259-02-5.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04
Parameter	Unit	G / S	RDL	8795647	8795648	8795650	8795651	8795652	8795654	8795656	8795658
Naphthalene	µg/g		0.005	0.006	0.941	0.104	<0.005	<0.005	0.530	0.727	0.041
2-Methylnaphthalene	µg/g		0.005	0.018	4.14	0.077	<0.005	<0.005	1.50	1.71	0.076
1-Methylnaphthalene	µg/g		0.005	0.015	2.22	0.066	0.021	<0.005	4.08	1.44	0.093
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	0.06	<0.02	<0.02	<0.02	0.61	0.07	0.02
Phenanthrene	µg/g		0.02	0.03	0.08	0.13	0.08	<0.02	0.55	0.14	0.07
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	<0.01	0.02	0.01	<0.01	<0.01	<0.01	0.01
Pyrene	µg/g		0.01	<0.01	0.01	0.05	0.03	<0.01	<0.01	0.01	0.04
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	<0.05	0.10	0.08	<0.05	<0.05	<0.05	0.07
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	0.05	0.09	0.10	<0.05	<0.05	<0.05	0.09
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	0.6	0.6	<0.6	<0.6	<0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	34	356	172	215	<20	1600	420	182
EPH C19-C32	µg/g		20	77	90	201	306	<20	95	112	210
LEPH C10-C19	µg/g		20	34	354	172	215	<20	1600	420	182
HEPH C19-C32	µg/g		20	77	90	201	306	<20	95	112	210
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17F269272

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-07

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:	04258-03-2.5m	04258-04-3.5m	04258-06-4.5m	04258-07-5.5m	04258-08-0.5m	04258-10-2.5m	04258-12-3.5m	04259-02-5.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04
Surrogate	Unit	Acceptable Limits	8795647	8795648	8795650	8795651	8795652	8795654	8795656	8795658
Naphthalene - d8	%	50-130	69	88	66	81	70	82	64	78
2-Fluorobiphenyl	%	50-130	68	94	66	82	69	89	67	81
P-Terphenyl - d14	%	60-130	77	99	87	86	77	93	78	88

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17F269272

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-07

DATE REPORTED: 2017-11-10

SAMPLE DESCRIPTION:				04259-04-1.5m	04259-08-5.5m	04259-10-5.5m	04259-11-5.5m	04259-12-5.5m	04260-01-5.5m	04260-02-5.5m	04262-02-3.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-05
Parameter	Unit	G / S	RDL	8795660	8795664	8795666	8795667	8795668	8795669	8795670	8795672
Naphthalene	µg/g		0.005	0.005	0.066	<0.005	<0.005	0.033	0.011	0.011	0.056
2-Methylnaphthalene	µg/g		0.005	0.021	0.143	<0.005	<0.005	0.108	<0.005	<0.005	<0.005
1-Methylnaphthalene	µg/g		0.005	0.023	0.094	0.044	0.049	0.090	0.033	0.035	0.142
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.02	<0.02	0.04
Phenanthrene	µg/g		0.02	0.06	0.15	0.19	0.22	0.14	0.19	0.11	0.13
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	0.02	0.03	0.03	0.02	0.01	0.02	<0.01
Pyrene	µg/g		0.01	0.02	0.04	0.06	0.08	0.05	0.05	0.05	0.02
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	0.05	0.09	0.11	0.14	0.10	0.11	0.10	0.06
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.06	0.11	0.12	0.14	0.12	0.11	0.10	<0.05
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	0.6	0.6	0.8	0.6	0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	21	194	370	410	318	333	464	183
EPH C19-C32	µg/g		20	34	266	466	540	479	499	207	58
LEPH C10-C19	µg/g		20	21	194	369	410	317	332	464	183
HEPH C19-C32	µg/g		20	34	265	466	540	478	499	206	58
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05

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Public Works LEPH/HEPH in Soil Low Level

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		SAMPLE DESCRIPTION:	04259-04-1.5m	04259-08-5.5m	04259-10-5.5m	04259-11-5.5m	04259-12-5.5m	04260-01-5.5m	04260-02-5.5m	04262-02-3.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-05
Surrogate	Unit	Acceptable Limits	8795660	8795664	8795666	8795667	8795668	8795669	8795670	8795672
Naphthalene - d8	%	50-130	69	72	89	94	77	90	81	61
2-Fluorobiphenyl	%	50-130	64	68	70	87	67	74	74	73
P-Terphenyl - d14	%	60-130	81	86	92	106	85	99	87	88

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Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-07

DATE REPORTED: 2017-11-10

SAMPLE DESCRIPTION:				04262-03-2.5m	04262-04-2.5m	04262-05-3.5m	04262-06-2.5m	04262-07-3.5m	04262-08-2.5m	04262-09-3.5m	04262-11-3.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-10-05	2017-10-05	2017-10-05	2017-10-05	2017-10-05	2017-10-05	2017-10-05	2017-10-05
Parameter	Unit	G / S	RDL	8795673	8795674	8795675	8795676	8795677	8795678	8795679	8795681
Naphthalene	µg/g		0.005	0.024	0.042	0.009	0.014	0.012	0.006	0.014	0.010
2-Methylnaphthalene	µg/g		0.005	<0.005	<0.005	<0.005	0.031	0.051	<0.005	<0.005	<0.005
1-Methylnaphthalene	µg/g		0.005	0.092	0.224	0.036	0.027	0.053	0.012	0.052	0.066
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	0.03	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	0.02
Phenanthrene	µg/g		0.02	0.11	0.12	0.09	0.08	0.12	0.05	0.17	0.21
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.02	0.02
Pyrene	µg/g		0.01	0.01	0.01	0.01	0.01	0.03	<0.01	0.07	0.07
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	<0.05	0.06	<0.05	0.08	<0.05	0.10	0.11
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	<0.05	0.05	<0.05	0.06	<0.05	0.08	0.08
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	0.6	<0.6	0.6	<0.6	0.7	0.7
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	348	264	93	41	57	38	94	197
EPH C19-C32	µg/g		20	521	73	71	59	62	49	88	111
LEPH C10-C19	µg/g		20	348	264	93	41	57	38	93	197
HEPH C19-C32	µg/g		20	521	72	71	59	61	49	88	111
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	0.05

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SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-07

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:	04262-03-2.5m	04262-04-2.5m	04262-05-3.5m	04262-06-2.5m	04262-07-3.5m	04262-08-2.5m	04262-09-3.5m	04262-11-3.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-05	2017-10-05	2017-10-05	2017-10-05	2017-10-05	2017-10-05	2017-10-05	2017-10-05
Surrogate	Unit	Acceptable Limits	8795673	8795674	8795675	8795676	8795677	8795678	8795679	8795681
Naphthalene - d8	%	50-130	83	69	73	113	73	53	79	72
2-Fluorobiphenyl	%	50-130	78	72	72	117	75	53	81	69
P-Terphenyl - d14	%	60-130	100	87	88	116	89	83	90	95

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		SAMPLE DESCRIPTION:		04262-12-3.5m
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-10-05
Parameter	Unit	G / S	RDL	8795682
Naphthalene	µg/g		0.005	0.015
2-Methylnaphthalene	µg/g		0.005	<0.005
1-Methylnaphthalene	µg/g		0.005	0.133
Acenaphthylene	µg/g		0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005
Fluorene	µg/g		0.02	0.04
Phenanthrene	µg/g		0.02	0.26
Anthracene	µg/g		0.004	<0.004
Fluoranthene	µg/g		0.01	0.02
Pyrene	µg/g		0.01	0.07
Benzo(a)anthracene	µg/g		0.03	<0.03
Chrysene	µg/g		0.05	0.11
Benzo(b)fluoranthene	µg/g		0.05	0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.09
Quinoline	µg/g		0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.7
B[a]P TPE (Soil)	µg/g		0.05	<0.05
EPH C10-C19	µg/g		20	235
EPH C19-C32	µg/g		20	111
LEPH C10-C19	µg/g		20	235
HEPH C19-C32	µg/g		20	111
Benzo(b+j)fluoranthene	µg/g		0.05	0.05

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		SAMPLE DESCRIPTION:	04262-12-3.5m
		SAMPLE TYPE:	Soil
		DATE SAMPLED:	2017-10-05
Surrogate	Unit	Acceptable Limits	8795682
Naphthalene - d8	%	50-130	85
2-Fluorobiphenyl	%	50-130	84
P-Terphenyl - d14	%	60-130	96

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8795647-8795682 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

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ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

British Columbia CSR - BTEXS/VPH Analysis - Soil

DATE RECEIVED: 2017-10-07

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:		04258-03-2.5m	04258-04-3.5m	04258-06-4.5m	04258-07-5.5m	04258-08-0.5m	04258-10-2.5m	04258-12-3.5m	04259-02-5.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04
Parameter	Unit	G / S	RDL	8795647	8795648	8795650	8795651	8795652	8795654	8795656	8795658
Benzene	µg/g		0.005	<0.005	0.488	0.267	0.309	<0.005	0.362	3.70	1.00
Toluene	µg/g		0.05	<0.05	0.13	0.32	0.15	<0.05	<0.05	0.31	0.96
Ethylbenzene	µg/g		0.01	<0.01	0.28	0.97	0.05	<0.01	0.34	0.83	0.14
Xylenes	µg/g		0.05	<0.05	0.70	5.96	0.15	<0.05	0.19	1.28	0.77
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VH (S C6-10)	µg/g		10	<10	40	60	<10	<10	30	200	40
VPH	µg/g		10	<10	40	50	<10	<10	30	190	40
Moisture Content	%		0.1	6	7	5	6	17	7	7	7
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		99	98	94	100	96	98	95	100

		SAMPLE DESCRIPTION:		04259-04-1.5m	04259-08-5.5m	04259-10-5.5m	04259-11-5.5m	04259-12-5.5m	04260-01-5.5m	04260-02-5.5m	04262-02-3.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-04	2017-10-05
Parameter	Unit	G / S	RDL	8795660	8795664	8795666	8795667	8795668	8795669	8795670	8795672
Benzene	µg/g		0.005	<0.005	<0.005	<0.005	0.036	0.360	<0.005	1.14	<0.005
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.21	<0.05
Ethylbenzene	µg/g		0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	0.02	<0.01
Xylenes	µg/g		0.05	<0.05	0.05	<0.05	<0.05	0.09	<0.05	0.15	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VH (S C6-10)	µg/g		10	<10	<10	<10	<10	10	10	<10	40
VPH	µg/g		10	<10	<10	<10	<10	10	10	<10	40
Moisture Content	%		0.1	11	5	5	5	4	5	4	5
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		98	96	93	101	98	99	97	98

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ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

British Columbia CSR - BTEXS/VPH Analysis - Soil

DATE RECEIVED: 2017-10-07

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:		04262-03-2.5m	04262-04-2.5m	04262-05-3.5m	04262-06-2.5m	04262-07-3.5m	04262-08-2.5m	04262-09-3.5m	04262-11-3.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-10-05	2017-10-05	2017-10-05	2017-10-05	2017-10-05	2017-10-05	2017-10-05	2017-10-05
Parameter	Unit	G / S	RDL	8795673	8795674	8795675	8795676	8795677	8795678	8795679	8795681
Benzene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VH (S C6-10)	µg/g		10	10	<10	<10	<10	<10	<10	<10	<10
VPH	µg/g		10	10	<10	<10	<10	<10	<10	<10	<10
Moisture Content	%		0.1	9	11	7	8	6	7	6	7
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		98	98	98	100	94	95	95	96

		SAMPLE DESCRIPTION:		04262-12-3.5m
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-10-05
Parameter	Unit	G / S	RDL	8795682
Benzene	µg/g		0.005	<0.005
Toluene	µg/g		0.05	<0.05
Ethylbenzene	µg/g		0.01	<0.01
Xylenes	µg/g		0.05	<0.05
Styrene	µg/g		0.05	<0.05
VH (S C6-10)	µg/g		10	<10
VPH	µg/g		10	<10
Moisture Content	%		0.1	6
Surrogate	Unit	Acceptable Limits		
Toluene-d8 (BTEX)	%	50-150		96

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17F269272

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

British Columbia CSR - BTEXS/VPH Analysis - Soil

DATE RECEIVED: 2017-10-07

DATE REPORTED: 2017-11-10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8795647-8795682 Results are based on dry weight of sample.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene.
VPH results have been corrected for BTEXS contributions.
VPH: Volatile Petroleum Hydrocarbons (n-C6 - n-C10); all volatile compounds in the n-C6 to n-C10 range quantified based on m-xylene and 1,2,4-trimethylbenzene response.
Analysis performed at AGAT Calgary.

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CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Soil - Dichloromethane

DATE RECEIVED: 2017-10-07

DATE REPORTED: 2017-11-10

SAMPLE DESCRIPTION:				04258-04-3.5m	04258-05-3.5m	04258-12-3.5m	04262-02-3.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-10-04	2017-10-04	2017-10-04	2017-10-05
Parameter	Unit	G / S	RDL	8795648	8795649	8795656	8795672
Methylene Chloride	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01
Surrogate	Unit	Acceptable Limits					
Toluene-d8	%	50-150		101	100	98	97

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8795648-8795672 Results were obtained based on the dry weight of the sample.
Xylenes is a calculated parameter. The calculated value is the sum of m&p-Xylenes + o-Xylene.
Analysis performed at AGAT Calgary.

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SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Nov 10, 2017

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
British Columbia CSR - BTEXS/VPH Analysis - Soil															
Benzene	4707	8795650	0.267	0.377	34.2%	< 0.005	109%	80%	120%	103%	80%	120%	119%	60%	140%
Toluene	4707	8795650	0.32	0.38	17.1%	< 0.05	111%	80%	120%	105%	80%	120%	116%	60%	140%
Ethylbenzene	4707	8795650	0.97	1.22	22.8%	< 0.01	112%	80%	120%	113%	80%	120%	127%	60%	140%
Xylenes	4707	8795650	5.96	7.47	22.5%	< 0.05	117%	80%	120%	108%	80%	120%	123%	60%	140%
Styrene	4707	8795650	<0.05	<0.05	NA	< 0.05	105%	80%	120%	110%	80%	120%	123%	60%	140%
VH (S C6-10)	4707	8795650	60	70	15.4%	< 10	105%	80%	120%	88%	80%	120%	101%	60%	140%
Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.															
British Columbia CSR - BTEXS/VPH Analysis - Soil															
Benzene	4706	8794528	<0.005	<0.005	NA	< 0.005	102%	80%	120%	107%	80%	120%	116%	60%	140%
Toluene	4706	8794528	<0.05	<0.05	NA	< 0.05	110%	80%	120%	99%	80%	120%	111%	60%	140%
Ethylbenzene	4706	8794528	<0.01	<0.01	NA	< 0.01	95%	80%	120%	110%	80%	120%	119%	60%	140%
Xylenes	4706	8794528	<0.05	<0.05	NA	< 0.05	105%	80%	120%	108%	80%	120%	115%	60%	140%
Styrene	4706	8794528	<0.05	<0.05	NA	< 0.05	107%	80%	120%	112%	80%	120%	118%	60%	140%
VH (S C6-10)	4706	8794528	<10	<10	NA	< 10	115%	80%	120%	94%	80%	120%	109%	60%	140%
Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.															
British Columbia CSR - BTEXS/VPH Analysis - Soil															
Benzene	2038	8795651	0.309	0.344	10.7%	< 0.005	99%	80%	120%	83%	80%	120%	98%	60%	140%
Toluene	2038	8795651	0.15	0.16	NA	< 0.05	101%	80%	120%	90%	80%	120%	98%	60%	140%
Ethylbenzene	2038	8795651	0.05	0.05	0.0%	< 0.01	104%	80%	120%	92%	80%	120%	95%	60%	140%
Xylenes	2038	8795651	0.15	0.14	NA	< 0.05	105%	80%	120%	92%	80%	120%	94%	60%	140%
Styrene	2038	8795651	<0.05	<0.05	NA	< 0.05	104%	80%	120%	86%	80%	120%	104%	60%	140%
VH (S C6-10)	2038	8795651	<10	<10	NA	< 10	100%	80%	120%	95%	80%	120%	103%	60%	140%
Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.															
Volatile Organic Compounds in Soil - Dichloromethane															
Methylene Chloride	2559	8844751	< 0.01	< 0.01	NA	< 0.01	114%	60%	140%	112%	60%	140%	110%	60%	140%
Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68011	8795647	0.006	0.008	NA	< 0.005	98%	80%	120%				98%	50%	130%
2-Methylnaphthalene	68011	8795647	0.018	0.018	NA	< 0.005	102%	80%	120%				84%	50%	130%
1-Methylnaphthalene	68011	8795647	0.015	0.016	NA	< 0.005	101%	80%	120%				93%	50%	130%
Acenaphthylene	68011	8795647	<0.005	<0.005	NA	< 0.005	101%	80%	120%				92%	50%	130%
Acenaphthene	68011	8795647	<0.005	<0.005	NA	< 0.005	101%	80%	120%				101%	50%	130%
Fluorene	68011	8795647	<0.02	<0.02	NA	< 0.02	99%	80%	120%				92%	50%	130%
Phenanthrene	68011	8795647	0.03	0.03	NA	< 0.02	102%	80%	120%				86%	60%	130%
Anthracene	68011	8795647	<0.004	<0.004	NA	< 0.004	101%	80%	120%				100%	60%	130%
Fluoranthene	68011	8795647	<0.01	<0.01	NA	< 0.01	98%	80%	120%				102%	60%	130%

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Quality Assurance

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AGAT WORK ORDER: 17F269272
PROJECT: 1657709.6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Nov 10, 2017			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
Pyrene	68011	8795647	<0.01	<0.01	NA	< 0.01	98%	80%	120%				98%	60%	130%
Benzo(a)anthracene	68011	8795647	<0.03	<0.03	NA	< 0.03	101%	80%	120%				98%	60%	130%
Chrysene	68011	8795647	<0.05	<0.05	NA	< 0.05	101%	80%	120%				98%	60%	130%
Benzo(b)fluoranthene	68011	8795647	<0.05	<0.05	NA	< 0.05	110%	80%	120%				87%	60%	130%
Benzo(j)fluoranthene	68011	8795647	<0.05	<0.05	NA	< 0.05	102%	80%	120%				88%	60%	130%
Benzo(k)fluoranthene	68011	8795647	<0.05	<0.05	NA	< 0.05	102%	80%	120%				93%	60%	130%
Benzo(a)pyrene	68011	8795647	<0.03	<0.03	NA	< 0.03	104%	80%	120%				85%	60%	130%
Indeno(1,2,3-c,d)pyrene	68011	8795647	<0.02	<0.02	NA	< 0.02	97%	80%	120%				106%	60%	130%
Dibenzo(a,h)anthracene	68011	8795647	<0.005	<0.005	NA	< 0.005	98%	80%	120%				103%	60%	130%
Benzo(g,h,i)perylene	68011	8795647	<0.05	<0.05	NA	< 0.05	98%	80%	120%				105%	60%	130%
Quinoline	68011	8795647	<0.05	<0.05	NA	< 0.05	100%	80%	120%				99%	50%	130%
EPH C10-C19	68011	8795647	34	29	NA	< 20	104%	70%	130%				89%	65%	120%
EPH C19-C32	68011	8795647	77	68	NA	< 20	97%	70%	130%				85%	80%	120%
Naphthalene - d8	68011	8795647	69	79	13.5%		99%	80%	120%				89%	50%	130%
2-Fluorobiphenyl	68011	8795647	68	76	11.1%		102%	80%	120%				92%	50%	130%
P-Terphenyl - d14	68011	8795647	77	87	12.2%		94%	80%	120%				95%	60%	130%
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68103	8795648	0.941	0.970	3.0%	< 0.005	101%	80%	120%				93%	50%	130%
2-Methylnaphthalene	68103	8795648	4.14	4.43	6.8%	< 0.005	96%	80%	120%				90%	50%	130%
1-Methylnaphthalene	68103	8795648	2.22	2.29	3.1%	< 0.005	101%	80%	120%				102%	50%	130%
Acenaphthylene	68103	8795648	<0.005	<0.005	NA	< 0.005	101%	80%	120%				97%	50%	130%
Acenaphthene	68103	8795648	<0.005	<0.005	NA	< 0.005	101%	80%	120%				99%	50%	130%
Fluorene	68103	8795648	0.06	0.06	NA	< 0.02	101%	80%	120%				104%	50%	130%
Phenanthrene	68103	8795648	0.08	0.07	NA	< 0.02	98%	80%	120%				80%	60%	130%
Anthracene	68103	8795648	<0.004	<0.004	NA	< 0.004	102%	80%	120%				92%	60%	130%
Fluoranthene	68103	8795648	<0.01	<0.01	NA	< 0.01	101%	80%	120%				92%	60%	130%
Pyrene	68103	8795648	0.01	0.01	NA	< 0.01	100%	80%	120%				97%	60%	130%
Benzo(a)anthracene	68103	8795648	<0.03	<0.03	NA	< 0.03	101%	80%	120%				89%	60%	130%
Chrysene	68103	8795648	<0.05	<0.05	NA	< 0.05	101%	80%	120%				100%	60%	130%
Benzo(b)fluoranthene	68103	8795648	<0.05	<0.05	NA	< 0.05	98%	80%	120%				89%	60%	130%
Benzo(j)fluoranthene	68103	8795648	<0.05	<0.05	NA	< 0.05	103%	80%	120%				96%	60%	130%
Benzo(k)fluoranthene	68103	8795648	<0.05	<0.05	NA	< 0.05	102%	80%	120%				99%	60%	130%
Benzo(a)pyrene	68103	8795648	<0.03	<0.03	NA	< 0.03	103%	80%	120%				97%	60%	130%
Indeno(1,2,3-c,d)pyrene	68103	8795648	<0.02	<0.02	NA	< 0.02	100%	80%	120%				87%	60%	130%
Dibenzo(a,h)anthracene	68103	8795648	<0.005	<0.005	NA	< 0.005	101%	80%	120%				81%	60%	130%
Benzo(g,h,i)perylene	68103	8795648	0.05	<0.05	NA	< 0.05	101%	80%	120%				95%	60%	130%
Quinoline	68103	8795648	<0.05	<0.05	NA	< 0.05	100%	80%	120%				111%	50%	130%
EPH C10-C19	68103	8795648	356	327	8.5%	< 20	106%	70%	130%				93%	65%	120%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F269272

PROJECT: 1657709.6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Nov 10, 2017			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
EPH C19-C32	68103	8795648	90	76	NA	< 20	100%	70%	130%				90%	80%	120%
Naphthalene - d8	68103	8795648	88	95	7.7%		115%	80%	120%				104%	50%	130%
2-Fluorobiphenyl	68103	8795648	94	101	7.2%		113%	80%	120%				103%	50%	130%
P-Terphenyl - d14	68103	8795648	99	103	4.0%		117%	80%	120%				103%	60%	130%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68012	8795656	0.727	0.687	5.7%	< 0.005	98%	80%	120%				94%	50%	130%
2-Methylnaphthalene	68012	8795656	1.71	1.59	7.3%	< 0.005	102%	80%	120%				80%	50%	130%
1-Methylnaphthalene	68012	8795656	1.44	1.29	11.0%	< 0.005	101%	80%	120%				88%	50%	130%
Acenaphthylene	68012	8795656	<0.005	<0.005	NA	< 0.005	101%	80%	120%				86%	50%	130%
Acenaphthene	68012	8795656	<0.005	<0.005	NA	< 0.005	101%	80%	120%				98%	50%	130%
Fluorene	68012	8795656	0.07	0.07	NA	< 0.02	99%	80%	120%				87%	50%	130%
Phenanthrene	68012	8795656	0.14	0.14	0.0%	< 0.02	102%	80%	120%				83%	60%	130%
Anthracene	68012	8795656	<0.004	<0.004	NA	< 0.004	101%	80%	120%				85%	60%	130%
Fluoranthene	68012	8795656	<0.01	0.01	NA	< 0.01	98%	80%	120%				95%	60%	130%
Pyrene	68012	8795656	0.01	0.02	NA	< 0.01	98%	80%	120%				99%	60%	130%
Benzo(a)anthracene	68012	8795656	<0.03	<0.03	NA	< 0.03	101%	80%	120%				89%	60%	130%
Chrysene	68012	8795656	<0.05	0.06	NA	< 0.05	101%	80%	120%				97%	60%	130%
Benzo(b)fluoranthene	68012	8795656	<0.05	<0.05	NA	< 0.05	110%	80%	120%				95%	60%	130%
Benzo(j)fluoranthene	68012	8795656	<0.05	<0.05	NA	< 0.05	102%	80%	120%				96%	60%	130%
Benzo(k)fluoranthene	68012	8795656	<0.05	<0.05	NA	< 0.05	102%	80%	120%				87%	60%	130%
Benzo(a)pyrene	68012	8795656	<0.03	<0.03	NA	< 0.03	104%	80%	120%				83%	60%	130%
Indeno(1,2,3-c,d)pyrene	68012	8795656	<0.02	<0.02	NA	< 0.02	97%	80%	120%				84%	60%	130%
Dibenzo(a,h)anthracene	68012	8795656	<0.005	<0.005	NA	< 0.005	98%	80%	120%				79%	60%	130%
Benzo(g,h,i)perylene	68012	8795656	<0.05	0.05	NA	< 0.05	98%	80%	120%				95%	60%	130%
Quinoline	68012	8795656	<0.05	<0.05	NA	< 0.05	100%	80%	120%				106%	50%	130%
EPH C10-C19	68012	8795656	420	341	20.8%	< 20	104%	70%	130%				89%	65%	120%
EPH C19-C32	68012	8795656	112	102	9.3%	< 20	97%	70%	130%				85%	80%	120%
Naphthalene - d8	68012	8795656	64	83	25.9%		99%	80%	120%				85%	50%	130%
2-Fluorobiphenyl	68012	8795656	67	71	5.8%		102%	80%	120%				90%	50%	130%
P-Terphenyl - d14	68012	8795656	78	93	17.5%		94%	80%	120%				90%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

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Method Summary

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SAMPLING SITE:

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Benzene	TO-0570	EPA SW-846 8260	GC/MS
Toluene	TO-0570	EPA SW-846 8260	GC/MS
Ethylbenzene	TO-0570	EPA SW-846 8260	GC/MS
Xylenes	TO-0570	EPA SW-846 8260	GC/MS
Styrene	TO-0570	EPA SW-846 8260	GC/MS
VH (S C6-10)	TO-0570	B.C. ENVIRONMENT	GC/FID
VPH	TO-0570	B.C. ENVIRONMENT	GC/MS/FID
Moisture Content	TO-0560	CCME Tier 1 Method-S %	GRAVIMETRIC
Toluene-d8 (BTEX)	TO-0570	EPA SW-846 8260	GC/MS
Methylene Chloride	TO-0340	EPA SW-846 8260	GC/MS
Toluene-d8	TO-0330	EPA SW-846 8260	GC/MS

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17F269272

No. 04258 page 1 of 4

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709/6000		Laboratory Name: AGAT	
Short Title: Kia Remediation	Golder Contact: Eric O'Brien	Address: 6600 Glenlyon Parkway Burnaby, BC	
Golder E-mail Address 1: andrew_bruemmer@golder.com	Golder E-mail Address 2: EOBRIEN@golder.com	Telephone/Fax: 778. 452 4009	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 48233859

EQuIS upload: ☒

OCT 7 AM 8:45

Turnaround Time: ☒ 24 hr RUSH ☐ 48 hr ☐ 72 hr ☒ ~~Regular (5 Days)~~ JS 06/10/17

Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX / VPH / VH	LEPH / EPH (C10 < C19)	Naphthalene	2-Methylnaphthalene					H2S O.D.	RUSH (Select TAT above)	Remarks (over)
04258 - 01	EX17-01-W7A		0.5	SOIL	04/10/17	~~13:25~~ 12:25	Grab			4									X		8795645
04258 - 02	EX17-01-W7B		1.5			12:35													X		646
04258 - 03	EX17-01-W7C		2.5			12:45					X	X	X	X							647
04258 - 04	EX17-01-W7D		3.5			12:55		FDA	04258-05										X		648
04258 - 05	EX17-01-W7D		3.5			~~13:05~~		FD	04258-04		X								X		649
04258 - 06	EX17-01-W7E		4.5			13:05					X	X	X	X							650
04258 - 07	EX17-01-W7F		5.5			13:15 ~~13:05~~													X		651
04258 - 08	EX17-01-W8A		0.5			~~13:25~~					X	X	X	X							652
04258 - 09	EX17-01-W8B		1.5			~~13:35~~													X		653
04258 - 10	EX17-01-W8C		2.5			~~13:45~~		FDA	04258-11										X		654
04258 - 11	EX17-01-W8C		2.5			~~13:30~~		FD	04258-10										X		655
04258 - 12	EX17-01-W8D		3.5			13:55 ~~14:05~~					X	X	X	X							656

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 06/10/17	Time: 14:00	Received by: Signature	Company: AGAT	
Comments: ON ICE RUSH TAT	Method of Shipment:	Waybill No.:	Received for Lab by: S. Napier	Date: Oct 6/17	Time: 2:13pm		
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 3°C	Cooler opened by: S. Napier	Date: 07-OCT-17	Time: 8:45 AM	

WHITE: Golder Copy YELLOW: Lab Copy

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CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17F269272
No. 04259 page 2 of 4

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 / 6000			Laboratory Name: AGAT
Short Title: K19 Remediation	Golder Contact: Tara O'Brien		Address: 8600 Glenlyon Parkway, Burnaby, B
Golder E-mail Address 1: andrew_brenner@golder.com	Golder E-mail Address 2: AGarrido@golder.com EOBrien@golder.com	Telephone/Fax: 778 452 - 4009	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 48233859
EQuIS upload: ☒

Turnaround Time: ☒ 24 hr Thurs 1-1 ☐ 48 hr ☐ 72 hr ~~☒ Regular (5 Days)~~ SS 06/10/17
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

OCT 7 AM 8:45

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX / VPH / VH	LEPH / EPH (C10-C19)	Naphthalene	2-Methylnaphthalene	HOLD	RUSH (Select TAT above)	Remarks (over)
04259 - 01	EX17-01	W8E	4.5	SOIL	04/10/17	14:00	Grab			4					X		8795657
04259 - 02		W8F	5.5			14:05									X		658
04259 - 03		W9A	0.5			14:05									X		659
04259 - 04		W9B	1.5			14:15					X	X	X	X			660
04259 - 05		W9C	2.5			14:20									X		661
04259 - 06		W9D	3.5			14:25									X		662
04259 - 07		W9E	4.5			14:35									X		663
04259 - 08		W9F	5.5			14:45					X	X	X	X			664
04259 - 09		W10A	5.5			14:55									X		665
04259 - 10		B3	5.5			15:00		FDA	04259-11		X	X	X	X			666
04259 - 11		B3	5.5			15:00		FD	04259-10		X	X	X	X			667
04259 - 12		B4	5.5			15:05					X	X	X	X			668

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 06/10/17	Time: 14:00	Received by: Signature / Company: AGAT
Comments: ON ICE RUSH TAT	Method of Shipment:	Waybill No.:	Received for Lab by: Shopei	Date: 10/6/17	Time: 2:13pm
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 3°C	Cooler opened by:	Date: 07-OCT-17 / Time: 8:45am

WHITE: Golder Copy YELLOW: Lab Copy

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17F269272

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04260 page 3 of 4

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709.9/60000			Laboratory Name: AGAT
Short Title: K19 Remediation	Golder Contact: Erin O'Brien		Address: 8600 Glenlyon Parkway Burnaby, BC
Golder E-mail Address 1: andrew_bruemmer@golder.com	Golder E-mail Address 2: AGarrido @golder.com EOBrien@golder.com	Telephone/Fax: 778-452-4009	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 48233859
EQuIS upload: ☒

OCT 7 AM 8:45

Turnaround Time: ☒ 24 hr RUSH ☐ 48 hr ☐ 72 hr ☒ ~~Regular (5 Days)~~ SS 06/10/17
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX / VPH / VH	LEPH / HEPH (EPH 10-19)	Naphthalene	2-Methylnaphthalene	RUSH (Select TAT above)	Remarks (over)
04260 - 01	EX17-01-B5		5.5	Soil	04/10/17	15:15	Grab			4	X	X	X	X		669 8759 (SN)
04260 - 02	EX17-01-B6		5.5	↓	↓	15:25	↓			↓	X	X	X	X		~~669~~ 670
- 03																
- 04																
- 05																
- 06																
- 07																
- 08																
- 09																
- 10																
- 11																
- 12																

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 06/10/17	Time: 14:00	Received by: Signature	Company: AGAT
Comments: ON ICE RUSH TAT	Method of Shipment:	Waybill No.:	Received for Lab by: SNap	Date: 06/10/17	Time: 9:13pm	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 3°C	Cooler opened by:	Date: 07-OCT-17	Time: 8:45

WHITE: Golder Copy YELLOW: Lab Copy

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17F269272

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04262 page 4 of 4

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709/6000
Short Title: K19 Remediation
Golder Contact: Erin O'Brien
Golder E-mail Address 1: ABruemmer @golder.com
Golder E-mail Address 2: AGarrido @golder.com EOBrien@golder.com

Laboratory Name: AGAT
Address: 8600 Glenlyon parkway, BBY
Telephone/Fax: 778 452 4009
Contact: Maggie Chan

Office Name: Vancouver
EQuIS Facility Code: 48233859
EQuIS upload: ☒

OCT 7 @ 8:45

Turnaround Time: ☒ 24 hr RUSH ☐ 48 hr ☐ 72 hr ☒ ~~Regular (5 Days)~~ SS 06/10/17
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX/VPH/VH	LEPH/EPH (C10-C19)	Naphthalene	2-Methylnaphthalene					HOLD	RUSH (Select TAT above)	Remarks (over)
04262-01	EX17-01-	BA	2.5	SO	05/10/17	11:45	GRAB			4	~~X~~	~~X~~	~~X~~	~~X~~							8795671
-02	↓	13B	3.5	↓	↓	11:50	↓			↓	X	X	X	X							672
-03		12A	2.5			12:00		FDA	04262-04		X	X	X	X							673
-04		12A	↓			↓		FD	04262-03		X	X	X	X							674
-05		12B	3.5			12:05					X	X	X	X							675
-06		11A	2.5			12:15					X	X	X	X							676
-07		11B	3.5			12:20					X	X	X	X							677
-08		14A	2.5			12:30					X	X	X	X							678
-09		14B	3.5			12:35					X	X	X	X							679
-10		15A	2.5			12:45													X		680
-11		15B	3.5			12:50		FDA	04262-12		X	X	X	X							681
-12	↓	↓	↓	↓	↓	↓	↓	FD	04262-11	↓	X	X	X	X							682

Sampler's Signature: [signature]
Relinquished by: Signature [signature] Company: Golder Date: 06/10/17 Time: 14:00
Received by: Signature [signature] Company: AGAT Date: Oct 6/17 Time: 2:30pm

Comments: ON ICE RUSH TAT
Method of Shipment:
Waybill No.:
Received for Lab by: SNapa [signature]
Shipped by:
Shipment Condition:
Seal Intact:
Temp (°C): 3°C
Cooler opened by: [signature]
Date: 07-OCT-17 Time: 8:45 AM

WHITE: Golder Copy YELLOW: Lab Copy

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM – BRANCH RECEIPT

Sending From Branch: EDM☐ GP☐ FN☐ FM☐ RD☐ VAN☐ LYD☐ FS☐ VEST☑ Other:_____

Company/Consultant: Golder

TAT: <24hr ☐ 24-48hr ☑ 48-72hr ☐ Reg ☐ Other_____ Cooler Quantity: 3

TIME SENSITIVE ISSUES:

Earliest Date Sampled: Oct 4/17

Microbiology: Test: _____

Hydrocarbons: Test: _____

Are samples received >5 days after sampling: Yes☐ No☑

ALREADY EXCEEDED? Yes☐ No☑

Expiry: _____

Expiry: _____

(TEMPERATURE MUST BE MAINTAINED IF RECEIVED <10 DEGREES C)

3 temperatures of samples* and average of each cooler (taken on jars only): NA (only bags on coolers)

(1) 1 + 0 + 4 = ___°C (2) 4 + 5 + 0 = ___°C (3) 6 + 0 + 5 = ___°C (4) ___ + ___ + ___ = ___°C

Additional integrity issues (note here and on COC next to the sample ID):

_____

SR-9503.004
March 10, 2014

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17F269272

RECEIVING BASICS:

Received From: Norex Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 3 Containers: 152

TIME SENSITIVE ISSUES:

Earliest Date Sampled: 04-OCT-17 ALREADY EXCEEDED? Yes (No)

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) 2+3+3 = 3 °C (2) 3+4+5=3 °C (3) 2+2+1=2 °C (4) ___+___+___=___ °C

Was ice or ice pack present: (Yes) No (3°C)

Integrity Issues:

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date and Time: _____

ADDITIONAL NOTES:

AGAT Laboratories

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: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709.6000

AGAT WORK ORDER: 17F272731

TRACE ORGANICS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

DATE REPORTED: Nov 10, 2017

PAGES (INCLUDING COVER): 19

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 2: Sample receipt temperature 1°C.

Version 2 issued on November 10, 2017 to report the full LEPH/HEPH/PAH package as requested by Erin O'Brien Golder. Version 2 is an amendment to all version 1.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17F272731

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-17

DATE REPORTED: 2017-11-10

SAMPLE DESCRIPTION:				04265-01-5.0m	04265-02-5.0m	04265-03-5.0m	04265-04-5.0m	04265-05-5.0m	04265-06-5.0m		04265-07-5.0m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil		Soil
DATE SAMPLED:				2017-10-13	2017-10-13	2017-10-13	2017-10-13	2017-10-13	2017-10-13		2017-10-13
Parameter	Unit	G / S	RDL	8824252	8824253	8824254	8824255	8824256	8824257	RDL	8824258
Naphthalene	µg/g		0.005	0.132	0.232	0.093	0.048	0.084	0.241	0.05	0.32
2-Methylnaphthalene	µg/g		0.005	0.536	0.920	0.459	0.294	0.501	0.799	0.05	1.05
1-Methylnaphthalene	µg/g		0.005	0.318	0.494	0.279	0.172	0.290	0.514	0.05	0.62
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.05	<0.05
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.05	<0.05
Fluorene	µg/g		0.02	0.09	0.10	0.09	0.06	0.09	0.11	0.2	<0.2
Phenanthrene	µg/g		0.02	0.27	0.27	0.22	0.20	0.26	0.28	0.2	0.3
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.04	<0.04
Fluoranthene	µg/g		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Pyrene	µg/g		0.01	0.03	0.03	0.03	0.02	0.03	0.03	0.01	0.03
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03
Chrysene	µg/g		0.05	0.05	0.05	<0.05	<0.05	0.05	0.05	0.05	0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.10	0.08	0.07	0.06	0.09	0.08	0.05	0.08
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	0.6	<0.6	<0.6	0.6	0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
EPH C10-C19	µg/g		20	49	52	101	92	47	100	20	111
EPH C19-C32	µg/g		20	55	54	48	40	48	54	20	61
LEPH C10-C19	µg/g		20	48	51	100	92	46	99	20	110
HEPH C19-C32	µg/g		20	55	54	48	40	48	54	20	61
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17F272731

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-17

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:	04265-01-5.0m	04265-02-5.0m	04265-03-5.0m	04265-04-5.0m	04265-05-5.0m	04265-06-5.0m	04265-07-5.0m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-13	2017-10-13	2017-10-13	2017-10-13	2017-10-13	2017-10-13	2017-10-13
Surrogate	Unit	Acceptable Limits	8824252	8824253	8824254	8824255	8824256	8824257	8824258
Naphthalene - d8	%	50-130	76	79	77	55	80	85	83
2-Fluorobiphenyl	%	50-130	82	85	84	60	87	94	91
P-Terphenyl - d14	%	60-130	88	78	78	67	85	90	86

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17F272731

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-17

DATE REPORTED: 2017-11-10

SAMPLE DESCRIPTION:				04265-08-5.0m	04265-10-1.5m	04264-01-4.25m	04264-06-5.0m	04264-07-4.25m	04264-11-5.0m	04266-01-4.0m	04266-02-4.0m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-10-13	2017-10-14	2017-10-13	2017-10-13	2017-10-13	2017-10-13	2017-10-15	2017-10-15
Parameter	Unit	G / S	RDL	8824259	8824262	8824266	8824274	8824275	8824279	8824280	8824282
Naphthalene	µg/g		0.005	0.086	<0.005	<0.005	0.121	0.011	0.080	<0.005	<0.005
2-Methylnaphthalene	µg/g		0.005	0.478	<0.005	<0.005	0.473	0.128	0.376	<0.005	<0.005
1-Methylnaphthalene	µg/g		0.005	0.272	0.006	0.014	0.274	0.072	0.217	0.014	0.023
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	0.10	<0.02	<0.02	0.07	0.04	0.08	<0.02	<0.02
Phenanthrene	µg/g		0.02	0.26	0.03	0.07	0.22	0.16	0.23	0.05	0.05
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	<0.01	0.01	0.01	0.01	0.01	0.01	0.01
Pyrene	µg/g		0.01	0.03	<0.01	0.04	0.03	0.04	0.03	0.02	0.03
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	0.05	<0.05	0.05	<0.05	0.05	0.05	0.07	0.07
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.08	<0.05	0.06	0.07	0.08	0.09	0.06	0.09
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	<0.6	0.6	<0.6	0.6	0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	74	42	71	50	51	46	152	172
EPH C19-C32	µg/g		20	51	49	72	42	43	45	227	265
LEPH C10-C19	µg/g		20	74	42	70	49	51	45	152	172
HEPH C19-C32	µg/g		20	51	49	72	42	43	45	227	265
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17F272731

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-17

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:	04265-08-5.0m	04265-10-1.5m	04264-01-4.25m	04264-06-5.0m	04264-07-4.25m	04264-11-5.0m	04266-01-4.0m	04266-02-4.0m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-13	2017-10-14	2017-10-13	2017-10-13	2017-10-13	2017-10-13	2017-10-15	2017-10-15
Surrogate	Unit	Acceptable Limits	8824259	8824262	8824266	8824274	8824275	8824279	8824280	8824282
Naphthalene - d8	%	50-130	80	72	73	66	80	91	77	89
2-Fluorobiphenyl	%	50-130	88	82	79	73	87	99	79	92
P-Terphenyl - d14	%	60-130	85	92	74	76	81	95	82	96

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AGAT WORK ORDER: 17F272731

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-17

DATE REPORTED: 2017-11-10

SAMPLE DESCRIPTION:				04266-03-4.0m	04266-04-4.0m	04266-07-4.0m	04266-08-4.0m	04266-09-4.0m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-10-15	2017-10-15	2017-10-15	2017-10-15	2017-10-15
Parameter	Unit	G / S	RDL	8824283	8824284	8824287	8824288	8824289
Naphthalene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2-Methylnaphthalene	µg/g		0.005	<0.005	0.033	<0.005	<0.005	<0.005
1-Methylnaphthalene	µg/g		0.005	0.024	0.025	0.007	0.007	0.022
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phenanthrene	µg/g		0.02	0.03	0.03	0.02	0.02	0.04
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	<0.01	<0.01	<0.01	0.01
Pyrene	µg/g		0.01	0.02	0.02	<0.01	<0.01	0.03
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	0.08	0.06	<0.05	<0.05	0.07
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.07	0.06	<0.05	<0.05	0.06
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	0.6	<0.6	<0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	140	172	<20	<20	174
EPH C19-C32	µg/g		20	196	315	49	53	268
LEPH C10-C19	µg/g		20	140	172	<20	<20	174
HEPH C19-C32	µg/g		20	196	315	49	53	268
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17F272731

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-17

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:	04266-03-4.0m	04266-04-4.0m	04266-07-4.0m	04266-08-4.0m	04266-09-4.0m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-15	2017-10-15	2017-10-15	2017-10-15	2017-10-15
Surrogate	Unit	Acceptable Limits	8824283	8824284	8824287	8824288	8824289
Naphthalene - d8	%	50-130	80	77	80	71	88
2-Fluorobiphenyl	%	50-130	79	76	91	77	86
P-Terphenyl - d14	%	60-130	88	83	85	70	97

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8824252-8824257 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8824258 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample dilution.

8824259-8824289 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

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Certificate of Analysis

AGAT WORK ORDER: 17F272731

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-10-17

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:		04265-01-5.0m	04265-02-5.0m	04265-03-5.0m	04265-04-5.0m	04265-05-5.0m	04265-06-5.0m	04265-07-5.0m	04265-08-5.0m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-10-13	2017-10-13	2017-10-13	2017-10-13	2017-10-13	2017-10-13	2017-10-13	2017-10-13
Parameter	Unit	G / S	RDL	8824252	8824253	8824254	8824255	8824256	8824257	8824258	8824259
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	10	12	<10	<10	10	<10	<10	<10
VH	µg/g		10	10	12	<10	<10	10	<10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		104	108	112	110	107	105	105	104
Dibromofluoromethane	%	60-140		104	102	104	102	103	97	98	94
Toluene - d8	%	60-140		114	117	118	118	121	114	120	115

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Certificate of Analysis

AGAT WORK ORDER: 17F272731

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-10-17

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:		04265-10-1.5m	04264-01-4.25m	04264-06-5.0m	04264-07-4.25m	04264-11-5.0m	04266-01-4.0m	04266-02-4.0m	04266-03-4.0m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-10-14	2017-10-13	2017-10-13	2017-10-13	2017-10-13	2017-10-15	2017-10-15	2017-10-15
Parameter	Unit	G / S	RDL	8824262	8824266	8824274	8824275	8824279	8824280	8824282	8824283
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
VH	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		110	106	104	106	118	109	101	112
Dibromofluoromethane	%	60-140		96	97	96	100	104	102	96	99
Toluene - d8	%	60-140		122	120	116	118	126	121	117	126

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 17F272731

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-10-17

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:		04266-04-4.0m	04266-07-4.0m	04266-08-4.0m	04266-09-4.0m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-10-15	2017-10-15	2017-10-15	2017-10-15
Parameter	Unit	G / S	RDL	8824284	8824287	8824288	8824289
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	<10	<10
VH	µg/g		10	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits					
Bromofluorobenzene	%	60-140		105	106	104	108
Dibromofluoromethane	%	60-140		93	95	93	97
Toluene - d8	%	60-140		118	117	119	123

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8824252-8824289 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

Certified By:

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F272731

PROJECT: 1657709.6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Nov 10, 2017

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68099	8824252	<0.1	<0.1	NA	< 0.1	96%	80%	120%				108%	70%	130%
Benzene	68099	8824252	<0.02	<0.02	NA	< 0.02	96%	80%	120%				103%	70%	130%
Toluene	68099	8824252	<0.05	<0.05	NA	< 0.05	94%	80%	120%				108%	70%	130%
Ethylbenzene	68099	8824252	<0.05	<0.05	NA	< 0.05	94%	80%	120%				105%	70%	130%
m&p-Xylene	68099	8824252	<0.05	<0.05	NA	< 0.05	92%	80%	120%				106%	70%	130%
o-Xylene	68099	8824252	<0.05	<0.05	NA	< 0.05	92%	80%	120%				105%	70%	130%
Styrene	68099	8824252	<0.05	<0.05	NA	< 0.05	99%	80%	120%				104%	70%	130%
VPH	68099	8824252	10	<10	NA	< 10									
VH	68099	8824252	10	10	NA	< 10									
Bromofluorobenzene	68099	8824252	104	114	9.2%		97%	60%	140%				102%	60%	140%
Dibromofluoromethane	68099	8824252	104	112	7.4%		99%	60%	140%				103%	60%	140%
Toluene - d8	68099	8824252	114	124	8.4%		98%	60%	140%				112%	60%	140%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68099	8824252	0.132	0.135	2.2%	< 0.005	101%	80%	120%				84%	50%	130%
2-Methylnaphthalene	68099	8824252	0.536	0.578	7.5%	< 0.005	101%	80%	120%				83%	50%	130%
1-Methylnaphthalene	68099	8824252	0.318	0.339	6.4%	< 0.005	100%	80%	120%				93%	50%	130%
Acenaphthylene	68099	8824252	<0.005	<0.005	NA	< 0.005	103%	80%	120%				89%	50%	130%
Acenaphthene	68099	8824252	<0.005	<0.005	NA	< 0.005	101%	80%	120%				101%	50%	130%
Fluorene	68099	8824252	0.09	0.10	NA	< 0.02	102%	80%	120%				94%	50%	130%
Phenanthrene	68099	8824252	0.27	0.30	10.5%	< 0.02	102%	80%	120%				74%	60%	130%
Anthracene	68099	8824252	<0.004	<0.004	NA	< 0.004	100%	80%	120%				100%	60%	130%
Fluoranthene	68099	8824252	0.01	0.01	NA	< 0.01	101%	80%	120%				91%	60%	130%
Pyrene	68099	8824252	0.03	0.03	NA	< 0.01	101%	80%	120%				98%	60%	130%
Benzo(a)anthracene	68099	8824252	<0.03	<0.03	NA	< 0.03	103%	80%	120%				88%	60%	130%
Chrysene	68099	8824252	0.05	0.06	NA	< 0.05	100%	80%	120%				98%	60%	130%
Benzo(b)fluoranthene	68099	8824252	<0.05	<0.05	NA	< 0.05	107%	80%	120%				74%	60%	130%
Benzo(j)fluoranthene	68099	8824252	<0.05	<0.05	NA	< 0.05	98%	80%	120%				105%	60%	130%
Benzo(k)fluoranthene	68099	8824252	<0.05	<0.05	NA	< 0.05	103%	80%	120%				95%	60%	130%
Benzo(a)pyrene	68099	8824252	<0.03	<0.03	NA	< 0.03	103%	80%	120%				83%	60%	130%
Indeno(1,2,3-c,d)pyrene	68099	8824252	<0.02	<0.02	NA	< 0.02	89%	80%	120%				87%	60%	130%
Dibenzo(a,h)anthracene	68099	8824252	<0.005	<0.005	NA	< 0.005	85%	80%	120%				82%	60%	130%
Benzo(g,h,i)perylene	68099	8824252	0.10	0.09	NA	< 0.05	94%	80%	120%				93%	60%	130%
Quinoline	68099	8824252	<0.05	<0.05	NA	< 0.05	100%	80%	120%				115%	50%	130%
EPH C10-C19	68099	8824252	49	56	NA	< 20	107%	70%	130%				83%	65%	120%
EPH C19-C32	68099	8824252	55	62	NA	< 20	101%	70%	130%				85%	80%	120%
Naphthalene - d8	68099	8824252	76	79	3.9%		102%	80%	120%				100%	50%	130%
2-Fluorobiphenyl	68099	8824252	82	86	4.8%		96%	80%	120%				103%	50%	130%

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F272731

PROJECT: 1657709.6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Nov 10, 2017			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
P-Terphenyl - d14	68099	8824252	88	93	5.5%		98%	80%	120%				99%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By:

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F272731

PROJECT: 1657709.6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F272731

PROJECT: 1657709.6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17F272731 No. 04265 page 1 of 3

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 -6000			Laboratory Name: AGAT
Short Title: K19 Remediation	Golder Contact: Erin O'brien		Address: 120-8000 Glenlyon Parkway
Golder E-mail Address 1: Andrew-bruemmer@golder.com	Golder E-mail Address 2: e'obrien @golder.com		Telephone/Fax: 250 774 6900
			Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 4823859

EQuIS upload: ☒

Alvaro Garrido-hernandgamez OCT 17 PM 12:17

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☐ Regular (5 Days)

Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM) SCN Related	Sample Type (over)	QAQC Code (over)	Time Related SCN (over)	Number of Containers	BTEX/VPH/VH	LEPH/EPH (40-19)	Naphthalene	2-Methylnaphthalene					Hold	RUSH (Select TAT above)	Remarks (over)
04265-01	EX17-01	B7	5.0	Soil	13/10/17		GRAB	N	1445	4	X	X	X	X							8824252
-02		B8						N	1450		X	X	X	X							53
-03		B9				04265-04		FDA	1455		X	X	X	X							54
-04		~~B10~~ B9				04265-03		FD	1455		X	X	X	X							55
-05		B10						~~FDA~~ N	1500		X	X	X	X							56
-06		B11				04265-07		FDA	1505		X	X	X	X							57
-07		B11				04265-06		FD	1505		X	X	X	X							58
04265-08		B12						~~FDA~~ N	1510		X	X	X	X							59
-09		W16A	0.5		14/10/17			N	09:55										X		60
-10		W16B	1.5					N	10:00		X	X	X	X							62
-11		W16C	2.0					N	10:05										X		64
-12																					

Sampler's Signature:	Relinquished by: Signature	Company Golder	Date 15/10/17	Time 18:00	Received by: Signature	Company AGAT	
Comments: CCME	Method of Shipment:	Waybill No.:	Received for Lab by: Kean Kay	Date Oct 16	Time 8:50am		
	Shipped by:	Shipment Condition: Seal Intact:	Temp.(°C) 1	Cooler opened by:	Date	Time	

WHITE: Golder Copy **YELLOW:** Lab Copy

ESED

17F27271

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04264 page 2 of 3

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1057709 - 6000			Laboratory Name: AGAT
Short Title: EA19 Remediation	Golder Contact: Erin O'brien		Address: 120-8660 Glenlyon Parkway
Golder E-mail Address 1: Abruemmer @golder.com	Golder E-mail Address 2: EObrien @golder.com	Telephone/Fax: 250 774-6500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 4823859 Alvaro_Garridoherman-Gomez@Golder.com

EQuIS upload: ☐

OCT 17 PM 12:17

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☐ Regular (5 Days)

Criteria: ~~☒~~ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX/VPH/VH	LEPH/EPH (Cr6+)	Naphthalene	2-Methylnaphthalene	Hold	RUSH (Select TAT above)	Remarks (over)
04264 - 01	EX17-01	W13C	4.25	SOIL	13/10/17	13:00	Grab			4					X		8824266
- 02		W13D	5.0			13:10				4					X		70
- 03		W12C	4.25			13:20		N		4					X		71
- 04		W12D	5.0			13:30				4					X		72
- 05		W11C	4.25			13:40				4					X		73
- 06		W11D	5.0			13:50				4					X		74
- 07		W14C	4.25			14:00				4					X		75
- 08		W14D	5.0			14:10				4					X		76
- 09		W15C	4.25			14:20		FDA	04264-10	4					X		77
- 10		W15C	4.25			14:25		FD	04264-09	4					X		78
- 11		W15D	5.0			14:35									X		79
- 12																	

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 15/10/17	Time: 18:00	Received by: Signature: Marina Benoit	Company: AGAT	
Comments: ON ICE	Method of Shipment:	Waybill No.:	Received for Lab by: Keen Kay	Date: Oct 16	Time: 8:50am		
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 1	Cooler opened by:	Date	Time	

WHITE: Golder Copy YELLOW: Lab Copy

ESED

MR27273

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04266 page 3 of 3

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 -6000			Laboratory Name: AGAT
Short Title: K19 Remediation	Golder Contact: Erin O'Brien		Address: 120 - 8600 Glenlyon Parkway
Golder E-mail Address 1: Abruemmer @golder.com	Golder E-mail Address 2: EObrien @golder.com	Telephone/Fax: 250 774 6500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 48233459
EQuIS upload: ☐

Alvaro_Garridohernan - golder.com
OCT 17 PM 12:18

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☐ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX/VPH/VH	LEPH EPH(Diesel)	Naphthalene	2-Methylnaphthalene					90 H	RUSH (Select TAT above)	Remarks (over)
4266 - 01	EX17-01	B13	4.0	S	15Oct17	10[00]	GRAB			4	X	X	X	X							8824280
- 02		B16	4.0			10[05]					X	X	X	X							82
- 03		B15	4.0			13[00]					X	X	X	X							83
- 04		B16	4.0			13[05]					X	X	X	X							84
- 05		W16d	2.5			13[10]													X		85
- 06		W16e	3.5			13[15]													X		86
- 07		W16f	4.0			13[20]		FDA	04266-08		X	X	X	X							87
- 08		W16F	4.0			1320		FD	4266-07		X	X	X	X							88
- 09		B17	4.0			1430				4	X	X	X	X							89
- 10																					
- 11																					
- 12																					

Sampler's Signature:	Relinquished by: Signature	Company Golder	Date 15/10/17	Time 18:00	Received by: Signature	Company AGAT	
Comments: DN ICE	Method of Shipment:	Waybill No.:	Received for Lab by: Keen Kof	Date Oct 16	Time 8:50am		
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C) 1	Cooler opened by:	Date	Time	

WHITE: Golder Co YELLOW: Lab Copy

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM – BRANCH RECEIPT

Sending From Branch: EDM☐ GP☐ FN☐ FM☐ RD☐ VAN☐ LYD☐ FSJ☑ EST☐ Other:_____

Company/Consultant: Golder

TAT: <24hr ☐ 24-48hr ☐ 48-72hr ☐ Reg ☑ Other_____ Cooler Quantity: 2

TIME SENSITIVE ISSUES:

Earliest Date Sampled: Oct 13/17

Microbiology: Test: _____

Hydrocarbons: Test: _____

Are samples received >5 days after sampling: Yes☐ No☑

ALREADY EXCEEDED? Yes☐ No☑

Expiry: _____

Expiry: _____

(TEMPERATURE MUST BE MAINTAINED IF RECEIVED <10 DEGREES C)

3 temperatures of samples* and average of each cooler (taken on jars only): NA (only bags on coolers)

(1) -1 + -3 + 0 = ___°C (2) 0 + 0 + -1 = ___°C (3) ___+___+___=___°C (4) ___+___+___=___°C

Additional integrity issues (note here and on COC next to the sample ID):

Samples left in drop box. Custody seals intact

SR-9503.004
March 10, 2014

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17F272731

RECEIVING BASICS:
Received From: NOVEX Waybill #: _____

SAMPLE QUANTITIES:
Coolers: 2 Containers: 62

TIME SENSITIVE ISSUES:
Earliest Date Sampled: Oct 13, 2017 ALREADY EXCEEDED? Yes (No)

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) 1 + 1 + 1 = 1 °C (2) 2 + 2 + 2 = 2 °C (3) ___ + ___ + ___ = ___ °C (4) ___ + ___ + ___ = ___ °C

Was ice or ice pack present: (Yes) No

Integrity Issues:

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date and Time: _____

ADDITIONAL NOTES:

AGAT Laboratories

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: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709-6000

AGAT WORK ORDER: 17N275674

TRACE ORGANICS REVIEWED BY: Angela Bond, Technical Reviewer

DATE REPORTED: Nov 10, 2017

PAGES (INCLUDING COVER): 16

VERSION*: 3

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 3: Sample receipt temperature 4°C.

Version 3 issued on November 20, 2017 to report additional BTEX/VPH/LEPH/HEPH on 04273-02 as requested by Alvaro Garrido Hernan-Gomez of Golder. Version 3 is an amendment to all previous versions.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-24

DATE REPORTED: 2017-11-10

SAMPLE DESCRIPTION:				04272-01-4.0m	04272-02-4.0m		04272-09-2.0m	04272-10-2.0m		04272-11-5.0m	04272-12-5.0m
SAMPLE TYPE:				Soil	Soil		Soil	Soil		Soil	Soil
DATE SAMPLED:				2017-10-20	2017-10-20		2017-10-21	2017-10-21		2017-10-22	2017-10-22
Parameter	Unit	G / S	RDL	8846687	8846689	RDL	8846696	8846697	RDL	8846698	8846700
Naphthalene	µg/g		0.005	<0.005	0.013	0.05	0.07	<0.05	0.005	0.006	0.058
2-Methylnaphthalene	µg/g		0.005	0.014	0.075	0.05	<0.05	<0.05	0.005	0.095	0.341
1-Methylnaphthalene	µg/g		0.005	0.013	0.056	0.25	4.39	9.64	0.005	0.059	0.211
Acenaphthylene	µg/g		0.005	<0.005	<0.005	0.025	<0.025	<0.025	0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	0.025	<0.025	<0.025	0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	0.03	0.1	0.4	0.5	0.02	0.05	0.07
Phenanthrene	µg/g		0.02	0.03	0.12	0.02	0.33	0.42	0.02	0.17	0.23
Anthracene	µg/g		0.004	<0.004	<0.004	0.02	<0.02	<0.02	0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	0.02	0.01	<0.01	<0.01	0.01	0.01	0.01
Pyrene	µg/g		0.01	0.02	0.04	0.01	<0.01	<0.01	0.01	0.03	0.04
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	0.03	<0.03	<0.03	0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	0.08	0.05	<0.05	<0.05	0.05	0.05	0.07
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	0.03	<0.03	<0.03	0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	0.02	<0.02	<0.02	0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	0.005	<0.005	<0.005	0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.05	0.09	0.05	<0.05	<0.05	0.05	0.07	0.09
Quinoline	µg/g		0.05	<0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	0.6	0.6	<0.6	<0.6	0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	110	89	20	1090	1280	20	40	79
EPH C19-C32	µg/g		20	142	73	20	54	54	20	39	59
LEPH C10-C19	µg/g		20	110	89	20	1090	1280	20	40	79
HEPH C19-C32	µg/g		20	142	73	20	54	54	20	39	59
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05	<0.05

Certified By: Angela Bond

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-24

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:	04272-01-4.0m	04272-02-4.0m	04272-09-2.0m	04272-10-2.0m	04272-11-5.0m	04272-12-5.0m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-20	2017-10-20	2017-10-21	2017-10-21	2017-10-22	2017-10-22
Surrogate	Unit	Acceptable Limits	8846687	8846689	8846696	8846697	8846698	8846700
Naphthalene - d8	%	50-130	75	77	88	122	74	81
2-Fluorobiphenyl	%	50-130	82	85	87	90	82	89
P-Terphenyl - d14	%	60-130	90	91	90	94	87	97

Certified By: Angela Bond

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Certificate of Analysis

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-24

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:		04273-01-5.0m		04273-02-2.5m
		SAMPLE TYPE:		Soil		Soil
		DATE SAMPLED:		2017-10-22		2017-10-22
Parameter	Unit	G / S	RDL	8846701	RDL	8846707
Naphthalene	µg/g		0.005	0.057	0.05	5.92
2-Methylnaphthalene	µg/g		0.005	0.393	0.5	18.5
1-Methylnaphthalene	µg/g		0.005	0.224	0.5	14.0
Acenaphthylene	µg/g		0.005	<0.005	0.05	<0.05
Acenaphthene	µg/g		0.005	<0.005	0.05	<0.05
Fluorene	µg/g		0.02	0.08	0.2	1.1
Phenanthrene	µg/g		0.02	0.23	0.2	1.1
Anthracene	µg/g		0.004	<0.004	0.04	<0.04
Fluoranthene	µg/g		0.01	0.01	0.1	0.1
Pyrene	µg/g		0.01	0.03	0.1	0.2
Benzo(a)anthracene	µg/g		0.03	<0.03	0.03	<0.03
Chrysene	µg/g		0.05	0.06	0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.08	0.05	<0.05
Quinoline	µg/g		0.05	<0.05	0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	0.05	<0.05
EPH C10-C19	µg/g		20	50	20	5940
EPH C19-C32	µg/g		20	50	20	360
LEPH C10-C19	µg/g		20	50	20	5930
HEPH C19-C32	µg/g		20	50	20	360
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-24

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:	04273-01-5.0m	04273-02-2.5m
		SAMPLE TYPE:	Soil	Soil
		DATE SAMPLED:	2017-10-22	2017-10-22
Surrogate	Unit	Acceptable Limits	8846701	8846707
Naphthalene - d8	%	50-130	67	94
2-Fluorobiphenyl	%	50-130	73	86
P-Terphenyl - d14	%	60-130	85	80

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8846687-8846689 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8846696-8846697 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample dilution.

8846698-8846701 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8846707 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Literature holding time exceeded.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

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AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-10-24

DATE REPORTED: 2017-11-10

	SAMPLE DESCRIPTION:			04272-01-4.0m	04272-02-4.0m	04272-10-2.0m	04272-11-5.0m	04272-12-5.0m	04273-01-5.0m	04273-02-2.5m
	SAMPLE TYPE:			Soil	Soil	Soil	Soil	Soil	Soil	Soil
	DATE SAMPLED:			2017-10-20	2017-10-20	2017-10-21	2017-10-22	2017-10-22	2017-10-22	2017-10-22
Parameter	Unit	G / S	RDL	8846687	8846689	8846697	8846698	8846700	8846701	8846707
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	0.68	<0.02	<0.02	<0.02	0.06
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	0.90	<0.05	<0.05	<0.05	0.67
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.37
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	34	<10	13	<10	215
VH	µg/g		10	<10	<10	36	<10	13	<10	217
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4
Surrogate	Unit	Acceptable Limits								
Bromofluorobenzene	%	60-140		93	89	98	106	106	102	101
Dibromofluoromethane	%	60-140		108	108	115	112	113	115	103
Toluene - d8	%	60-140		106	103	97	102	101	97	99

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8846687-8846707 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

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Certificate of Analysis

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-10-24

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:		04272-09-2.0m
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-10-21
Parameter	Unit	G / S	RDL	8846696
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1
Benzene	µg/g		0.02	0.68
Toluene	µg/g		0.05	<0.05
Ethylbenzene	µg/g		0.05	0.90
m&p-Xylene	µg/g		0.05	<0.05
o-Xylene	µg/g		0.05	<0.05
Styrene	µg/g		0.05	<0.05
Dichloromethane	µg/g		0.05	<0.05
VPH	µg/g		10	35
VH	µg/g		10	37
Total Xylenes	ug/g		0.1	<0.1
Surrogate	Unit	Acceptable Limits		
Bromofluorobenzene	%	60-140		91
Dibromofluoromethane	%	60-140		116
Toluene - d8	%	60-140		104

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8846696 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Nov 10, 2017

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68144	8846696	<0.1	<0.1	NA	< 0.1	100%	80%	120%				78%	70%	130%
Benzene	68144	8846696	0.68	0.60	12.5%	< 0.02	100%	80%	120%				117%	70%	130%
Toluene	68144	8846696	<0.05	<0.05	NA	< 0.05	100%	80%	120%				111%	70%	130%
Ethylbenzene	68144	8846696	0.90	0.91	1.1%	< 0.05	100%	80%	120%				104%	70%	130%
m&p-Xylene	68144	8846696	<0.05	1.12	NA	< 0.05	100%	80%	120%				99%	70%	130%
o-Xylene	68144	8846696	<0.05	<0.05	NA	< 0.05	101%	80%	120%				102%	70%	130%
Styrene	68144	8846696	<0.05	<0.05	NA	< 0.05	101%	80%	120%				101%	70%	130%
VPH	68144	8846696	35	34	NA	< 10									
VH	68144	8846696	37	37	NA	< 10									
Bromofluorobenzene	68144	8846696	91	104	13.3%		100%	60%	140%				90%	60%	140%
Dibromofluoromethane	68144	8846696	116	116	0.0%		101%	60%	140%				100%	60%	140%
Toluene - d8	68144	8846696	104	101	2.9%		84%	60%	140%				110%	60%	140%
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68144	8846364	<0.005	<0.005	NA	< 0.005	95%	80%	120%				97%	50%	130%
2-Methylnaphthalene	68144	8846364	<0.005	<0.005	NA	< 0.005	97%	80%	120%				91%	50%	130%
1-Methylnaphthalene	68144	8846364	<0.005	<0.005	NA	< 0.005	97%	80%	120%				94%	50%	130%
Acenaphthylene	68144	8846364	<0.005	<0.005	NA	< 0.005	102%	80%	120%				91%	50%	130%
Acenaphthene	68144	8846364	<0.005	<0.005	NA	< 0.005	101%	80%	120%				93%	50%	130%
Fluorene	68144	8846364	<0.02	<0.02	NA	< 0.02	102%	80%	120%				94%	50%	130%
Phenanthrene	68144	8846364	<0.02	<0.02	NA	< 0.02	98%	80%	120%				90%	60%	130%
Anthracene	68144	8846364	<0.004	<0.004	NA	< 0.004	103%	80%	120%				95%	60%	130%
Fluoranthene	68144	8846364	<0.01	<0.01	NA	< 0.01	104%	80%	120%				93%	60%	130%
Pyrene	68144	8846364	<0.01	<0.01	NA	< 0.01	103%	80%	120%				96%	60%	130%
Benzo(a)anthracene	68144	8846364	<0.03	<0.03	NA	< 0.03	104%	80%	120%				95%	60%	130%
Chrysene	68144	8846364	<0.05	<0.05	NA	< 0.05	99%	80%	120%				97%	60%	130%
Benzo(b)fluoranthene	68144	8846364	<0.05	<0.05	NA	< 0.05	101%	80%	120%				91%	60%	130%
Benzo(j)fluoranthene	68144	8846364	<0.05	<0.05	NA	< 0.05	102%	80%	120%				96%	60%	130%
Benzo(k)fluoranthene	68144	8846364	<0.05	<0.05	NA	< 0.05	106%	80%	120%				93%	60%	130%
Benzo(a)pyrene	68144	8846364	<0.03	<0.03	NA	< 0.03	93%	80%	120%				85%	60%	130%
Indeno(1,2,3-c,d)pyrene	68144	8846364	<0.02	<0.02	NA	< 0.02	104%	80%	120%				94%	60%	130%
Dibenzo(a,h)anthracene	68144	8846364	<0.005	<0.005	NA	< 0.005	93%	80%	120%				91%	60%	130%
Benzo(g,h,i)perylene	68144	8846364	<0.05	<0.05	NA	< 0.05	97%	80%	120%				100%	60%	130%
Quinoline	68144	8846364	<0.05	<0.05	NA	< 0.05	98%	80%	120%				100%	50%	130%
EPH C10-C19	68144	8846364	<20	<20	NA	< 20	111%	70%	130%				88%	65%	120%
EPH C19-C32	68144	8846364	<20	<20	NA	< 20	104%	70%	130%				84%	80%	120%
Naphthalene - d8	68144	8846364	75	76	1.3%		102%	80%	120%				103%	50%	130%
2-Fluorobiphenyl	68144	8846364	82	82	0.0%		109%	80%	120%				110%	50%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17N275674
PROJECT: 1657709-6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Nov 10, 2017			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
P-Terphenyl - d14	68144	8846364	97	85	13.2%		120%	80%	120%				110%	60%	130%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68291	8908112	<0.1	<0.1	NA	< 0.1	98%	80%	120%				83%	70%	130%
Benzene	68291	8908112	<0.02	<0.02	NA	< 0.02	100%	80%	120%				95%	70%	130%
Toluene	68291	8908112	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	70%	130%
Ethylbenzene	68291	8908112	<0.05	<0.05	NA	< 0.05	99%	80%	120%				96%	70%	130%
m&p-Xylene	68291	8908112	<0.05	<0.05	NA	< 0.05	98%	80%	120%				96%	70%	130%
o-Xylene	68291	8908112	<0.05	<0.05	NA	< 0.05	98%	80%	120%				96%	70%	130%
Styrene	68291	8908112	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	70%	130%
VPH	68291	8908112	<10	<10	NA	< 10									
VH	68291	8908112	<10	<10	NA	< 10									
Bromofluorobenzene	68291	8908112	97	97	0.0%		100%	60%	140%				94%	60%	140%
Dibromofluoromethane	68291	8908112	104	104	0.0%		101%	60%	140%				91%	60%	140%
Toluene - d8	68291	8908112	106	106	0.0%		100%	60%	140%				90%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68289	8904753	0.008	0.011	NA	< 0.005	101%	80%	120%				119%	50%	130%
2-Methylnaphthalene	68289	8904753	0.074	0.077	4.0%	< 0.005	100%	80%	120%				106%	50%	130%
1-Methylnaphthalene	68289	8904753	0.037	0.047	23.8%	< 0.005	102%	80%	120%				119%	50%	130%
Acenaphthylene	68289	8904753	<0.005	<0.005	NA	< 0.005	100%	80%	120%				114%	50%	130%
Acenaphthene	68289	8904753	<0.005	<0.005	NA	< 0.005	99%	80%	120%				114%	50%	130%
Fluorene	68289	8904753	0.02	0.03	NA	< 0.02	101%	80%	120%				120%	50%	130%
Phenanthrene	68289	8904753	0.03	0.02	NA	< 0.02	101%	80%	120%				114%	60%	130%
Anthracene	68289	8904753	<0.004	<0.004	NA	< 0.004	97%	80%	120%				109%	60%	130%
Fluoranthene	68289	8904753	<0.01	<0.01	NA	< 0.01	102%	80%	120%				111%	60%	130%
Pyrene	68289	8904753	<0.01	<0.01	NA	< 0.01	98%	80%	120%				102%	60%	130%
Benzo(a)anthracene	68289	8904753	<0.03	<0.03	NA	< 0.03	103%	80%	120%				119%	60%	130%
Chrysene	68289	8904753	<0.05	<0.05	NA	< 0.05	101%	80%	120%				112%	60%	130%
Benzo(b)fluoranthene	68289	8904753	<0.05	<0.05	NA	< 0.05	99%	80%	120%				106%	60%	130%
Benzo(j)fluoranthene	68289	8904753	<0.05	<0.05	NA	< 0.05	96%	80%	120%				99%	60%	130%
Benzo(k)fluoranthene	68289	8904753	<0.05	<0.05	NA	< 0.05	104%	80%	120%				108%	60%	130%
Benzo(a)pyrene	68289	8904753	<0.03	<0.03	NA	< 0.03	97%	80%	120%				100%	60%	130%
Indeno(1,2,3-c,d)pyrene	68289	8904753	<0.02	<0.02	NA	< 0.02	98%	80%	120%				96%	60%	130%
Dibenzo(a,h)anthracene	68289	8904753	<0.005	<0.005	NA	< 0.005	98%	80%	120%				90%	60%	130%
Benzo(g,h,i)perylene	68289	8904753	<0.05	<0.05	NA	< 0.05	104%	80%	120%				84%	60%	130%
Quinoline	68289	8904753	<0.05	<0.05	NA	< 0.05	99%	80%	120%				88%	50%	130%
EPH C10-C19	68289	8904753	<20	<20	NA	< 20	111%	70%	130%				95%	65%	120%

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Nov 10, 2017			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
EPH C19-C32	68289	8904753	<20	<20	NA	< 20	103%	70%	130%				96%	80%	120%
Naphthalene - d8	68289	8904753	78	79	1.3%		99%	80%	120%				107%	50%	130%
2-Fluorobiphenyl	68289	8904753	89	93	4.4%		100%	80%	120%				108%	50%	130%
P-Terphenyl - d14	68289	8904753	94	98	4.2%		100%	80%	120%				109%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By: Angela Bond

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
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TEL (778)452-4000
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http://www.agatlabs.com

Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dichloromethane	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04272 page 1 of 2

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709-6000		Laboratory Name: AGAT	IAN 275674
Short Title: K19 Remediation	Golder Contact: Erin O'Brien	Address: 160-6600 Glenlyon Parkway	
Golder E-mail Address 1: Abouemmer @golder.com	Golder E-mail Address 2: EObrien @golder.com	Telephone/Fax: 250 TA 6500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 48233859
EQuIS upload: ☒

Alvaro_Garridohernan-gomez@Golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days) 5 DAY
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX IVPH /VH	LEPH EPH (C10-C19)	Naphthalene	2-methylnaphthalene		Dichloromethane		Hold		RUSH (Select TAT above)	AGAT Sample ID Remarks (over)
04272-01	Ex17-01	B25	4.0	Soil	20/Oct/17	11:30	GRAB	N		4	X	X	X	X							884687
-02		B26	4.0		20Oct17	11:45					X	X	X	X							689
-03	Ex17-01	W26a	0.5		21Oct17	9:10												X			690
-04		W26b	1.5			9:15												X			691
-05		W27a	0.5			9:25												X			692
-06		W27b	1.5			9:30												X			693
-07		W28a	0.5			9:35												X			694
-08		W28b	1.5			9:40		N										X			695
-09		W28c	2.0			9:45		FDA	04272-10		X	X	X	X		X					696
-10		W28c	2.0		↓	9:45		FD	04272-09		X	X	X	X							697
-11		B28	5.0		22Oct17	14:45		N			X	X	X	X							698
04272-12		B23	5.0		↓	14:10		N			X	X	X	X							700

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 23Oct17	Time: 8:00	Received by: Signature	Company	
Comments: ON ICE	Method of Shipment: Pick-up.	Waybill No.:	Received for Lab by: Ann	Date	Time		
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 4°C	Cooler opened by:	Date		

V112569

WHITE: Golder Co YELLOW: Lab Copy

ESED

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04273 page 2 of 2

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 -6000			Laboratory Name: AGAT 17W275674
Short Title: HQ Remediation	Golder Contact: Erin O'brien		Address: 120-6000 Glenlivon Parkway
Golder E-mail Address 1: Apruemmer@golder.com	Golder E-mail Address 2: EOBrien@golder.com		Telephone/Fax: 2507746500 Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 48233859
EQuIS upload: ☒

Alvaro_Garridonernan-Gomez@Golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days) 3 day
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX VPH VH	LEPH HEPH (C10<C19)	Naphthalene	2-methylnaphthalene	Dichloromethane	Hold	RUSH (Select TAT above)	Remarks (over)
4273-01	EX17-01	W20d	5.0	Soil	20Oct17	1415	GRAB	N		4	X	X	X	X				701
-02	↓	W19d	2.5	↓	↓	1420	↓	↓		↓						X		707
4273-03	↓	W19e	3.5	↓	↓	1425	↓	↓		4						X		708
-04																		
-05																		
-06																		
-07																		
-08																		
-09																		
-10																		
-11																		
-12																		

Remarks (over): AGAT Samples

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: Oct 23/17	Time: 8:00	Received by: Signature	Company	
Comments: ON ICE	Method of Shipment: PICK-UP	Waybill No.:	Received for Lab by: Ann		Date	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 4°C	Cooler opened by:	Date	V112570	

WHITE: Golder Copy YELLOW: Lab Copy

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: GOLDER

Courier: _____ Prepaid, Collect

Waybill# _____

Branch: EDM GP (FN) FM RD VAN LYD FSJ EST Other: _____

Custody Seal Intact: Yes (No) NA

TAT: <24hr 24-48hr 48-72hr Reg Other 3 DAYS

Cooler Quantity: 1

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry: _____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken: _____

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: Yes (No)

Coolant Used: (Icepack) Bagged Ice Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) 0 + 2 + 1 = 1 °C 2(Bottle/Jar) ___ + ___ + ___ = ___ °C

3 (Bottle/Jar) ___ + ___ + ___ = ___ °C 4 (Bottle/Jar) ___ + ___ + ___ = ___ °C

5 (Bottle/Jar) ___ + ___ + ___ = ___ °C 6 (Bottle/Jar) ___ + ___ + ___ = ___ °C

7 (Bottle/Jar) ___ + ___ + ___ = ___ °C 8 (Bottle/Jar) ___ + ___ + ___ = ___ °C

9 (Bottle/Jar) ___ + ___ + ___ = ___ °C 10 (Bottle/Jar) ___ + ___ + ___ = ___ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: _____

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial _____

General Comments: _____

* Subcontracted Analysis (See CPM)

Date issued: May 22, 2015

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17N275679

RECEIVING BASICS:

Received From: NOV ex

Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 1 Containers: 60

TIME SENSITIVE ISSUES:

Earliest Date Sampled: Oct 20, 2017

ALREADY EXCEEDED? Yes (No)

1

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) 4 + 4 + 4 = 4 °C (2) ___+___+___=____°C (3) ___+___+___=____°C (4) ___+___+___=____°C

Was ice or ice pack present: (Yes) No

Integrity Issues:

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date and Time: _____

ADDITIONAL NOTES:

custody seal intact

AGAT Laboratories

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: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709.6000

AGAT WORK ORDER: 17N273185

SOIL ANALYSIS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

TRACE ORGANICS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

DATE REPORTED: Oct 23, 2017

PAGES (INCLUDING COVER): 20

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 2: Sample receipt temperature 1°C.

Version 2 issued on November 9, 2017 to report the full LEPH/HEPH/PAH package and additional analysis for sample 04267-05 as requested by Alvaro Garrido Hernan-Gomez of Golder. Version 2 is an amendment to version 1.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17N273185

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works Metals in Soil

DATE RECEIVED: 2017-10-18

DATE REPORTED: 2017-10-23

		SAMPLE DESCRIPTION:		04267-05-1.5m
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-10-16
Parameter	Unit	G / S	RDL	8827970
Aluminum	µg/g		10	5360
Antimony	µg/g		0.1	0.4
Arsenic	µg/g		0.1	5.9
Barium	µg/g		0.5	210
Beryllium	µg/g		0.1	0.3
Bismuth	µg/g		0.5	<0.5
Cadmium	µg/g		0.01	0.23
Calcium	µg/g		10	20900
Chromium	µg/g		1	12
Cobalt	µg/g		0.1	2.8
Copper	µg/g		0.2	10.1
Iron	µg/g		10	13300
Lead	µg/g		0.1	6.8
Lithium	µg/g		0.5	5.2
Magnesium	µg/g		10	5080
Manganese	µg/g		1	74
Mercury	µg/g		0.01	0.03
Molybdenum	µg/g		0.2	1.1
Nickel	µg/g		0.5	13.3
Phosphorus	µg/g		5	645
Potassium	µg/g		5	1160
Selenium	µg/g		0.1	0.3
Silver	µg/g		0.5	<0.5
Sodium	µg/g		5	74
Strontium	µg/g		1	41
Thallium	µg/g		0.1	0.1
Tin	µg/g		0.2	0.2
Titanium	µg/g		1	42
Uranium	µg/g		0.2	0.8
Vanadium	µg/g		1	28

Certified By:

AGAT Laboratories

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17N273185

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works Metals in Soil

DATE RECEIVED: 2017-10-18

DATE REPORTED: 2017-10-23

		SAMPLE DESCRIPTION:		04267-05-1.5m
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-10-16
Parameter	Unit	G / S	RDL	8827970
Zinc	µg/g		1	40
Zirconium	µg/g		0.1	1.5
pH 1:2	pH units		0.05	8.03

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8827970 Results are based on the dry weight of the sample

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17N273185

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-18

DATE REPORTED: 2017-10-23

SAMPLE DESCRIPTION:				04267-01-5.0m	04267-02-5.0m	04267-03-5.0m		04267-05-1.5m		04267-08-2.5m	04267-10-4.0m
SAMPLE TYPE:				Soil	Soil	Soil		Soil		Soil	Soil
DATE SAMPLED:				2017-10-16	2017-10-16	2017-10-16		2017-10-16		2017-10-16	2017-10-16
Parameter	Unit	G / S	RDL	8827964	8827967	8827968	RDL	8827970	RDL	8827973	8827975
Naphthalene	µg/g		0.005	0.015	0.026	0.096	0.02	<0.02	0.005	<0.005	<0.005
2-Methylnaphthalene	µg/g		0.005	0.189	0.220	0.445	0.02	<0.02	0.005	0.005	<0.005
1-Methylnaphthalene	µg/g		0.005	0.106	0.128	0.265	0.02	<0.02	0.005	0.007	0.010
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	0.02	<0.02	0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	0.02	<0.02	0.005	<0.005	<0.005
Fluorene	µg/g		0.02	0.05	0.07	0.10	0.1	<0.1	0.02	<0.02	<0.02
Phenanthrene	µg/g		0.02	0.14	0.18	0.24	0.1	1.3	0.02	0.03	0.03
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	0.02	<0.02	0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	0.01	0.01	0.05	0.31	0.01	<0.01	<0.01
Pyrene	µg/g		0.01	0.02	0.03	0.04	0.05	0.86	0.01	<0.01	0.02
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	0.2	<0.2	0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	<0.05	0.06	0.2	<0.2	0.05	<0.05	0.06
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.2	<0.2	0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.2	<0.2	0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.2	<0.2	0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	0.2	<0.2	0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	0.1	<0.1	0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	0.02	<0.02	0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.05	0.06	0.07	0.2	<0.2	0.05	<0.05	0.06
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	0.2	<0.2	0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	0.6	3	<3	0.6	<0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	0.2	<0.2	0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	37	38	50	20	2660	20	<20	43
EPH C19-C32	µg/g		20	36	41	47	20	2340	20	35	66
LEPH C10-C19	µg/g		20	36	38	49	20	2660	20	<20	43
HEPH C19-C32	µg/g		20	36	41	47	20	2340	20	35	66
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17N273185

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-18

DATE REPORTED: 2017-10-23

		SAMPLE DESCRIPTION:	04267-01-5.0m	04267-02-5.0m	04267-03-5.0m	04267-05-1.5m	04267-08-2.5m	04267-10-4.0m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-16	2017-10-16	2017-10-16	2017-10-16	2017-10-16	2017-10-16
Surrogate	Unit	Acceptable Limits	8827964	8827967	8827968	8827970	8827973	8827975
Naphthalene - d8	%	50-130	74	69	79	82	70	83
2-Fluorobiphenyl	%	50-130	77	72	86	83	76	91
P-Terphenyl - d14	%	60-130	83	80	92	96	86	102

Certified By:

AGAT Laboratories
Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
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Certificate of Analysis

AGAT WORK ORDER: 17N273185

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-18

DATE REPORTED: 2017-10-23

		SAMPLE DESCRIPTION:		04267-11-2.5m	04267-12-3.5m	04268-02-4.0m	04268-03-4.0m	04268-04-4.0m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-10-16	2017-10-16	2017-10-16	2017-10-16	2017-10-16
Parameter	Unit	G / S	RDL	8827976	8827977	8827979	8827980	8827981
Naphthalene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2-Methylnaphthalene	µg/g		0.005	<0.005	0.005	<0.005	0.015	0.031
1-Methylnaphthalene	µg/g		0.005	<0.005	0.008	0.005	0.016	0.019
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phenanthrene	µg/g		0.02	0.02	0.03	0.02	0.02	0.03
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	<0.01	<0.01	0.01	0.01
Pyrene	µg/g		0.01	<0.01	<0.01	0.02	0.03	0.03
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	<0.05	0.05	0.08	0.07
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	<0.05	0.06	0.07	0.07
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	<20	23	66	96	96
EPH C19-C32	µg/g		20	28	41	91	165	152
LEPH C10-C19	µg/g		20	<20	23	66	96	96
HEPH C19-C32	µg/g		20	28	41	91	165	152
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17N273185

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-18

DATE REPORTED: 2017-10-23

		SAMPLE DESCRIPTION:	04267-11-2.5m	04267-12-3.5m	04268-02-4.0m	04268-03-4.0m	04268-04-4.0m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-16	2017-10-16	2017-10-16	2017-10-16	2017-10-16
Surrogate	Unit	Acceptable Limits	8827976	8827977	8827979	8827980	8827981
Naphthalene - d8	%	50-130	62	80	72	79	74
2-Fluorobiphenyl	%	50-130	69	87	75	82	76
P-Terphenyl - d14	%	60-130	76	97	81	91	86

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8827964-8827968 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8827970 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Literature holding time exceeded.
Soil sample is visibly heterogeneous.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8827973-8827981 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

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Certificate of Analysis

AGAT WORK ORDER: 17N273185

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-10-18

DATE REPORTED: 2017-10-23

		SAMPLE DESCRIPTION:		04267-01-5.0m	04267-02-5.0m	04267-03-5.0m	04267-08-2.5m	04267-10-4.0m	04267-11-2.5m	04268-02-4.0m	04268-03-4.0m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-10-16	2017-10-16	2017-10-16	2017-10-16	2017-10-16	2017-10-16	2017-10-16	2017-10-16
Parameter	Unit	G / S	RDL	8827964	8827967	8827968	8827973	8827975	8827976	8827979	8827980
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
VH	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		102	108	99	100	98	102	101	98
Dibromofluoromethane	%	60-140		112	122	113	101	107	96	104	114
Toluene - d8	%	60-140		111	118	107	111	109	116	109	113

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Certificate of Analysis

AGAT WORK ORDER: 17N273185

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-10-18

DATE REPORTED: 2017-10-23

		SAMPLE DESCRIPTION:		04268-04-4.0m
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-10-16
Parameter	Unit	G / S	RDL	8827981
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1
Benzene	µg/g		0.02	<0.02
Toluene	µg/g		0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05
o-Xylene	µg/g		0.05	<0.05
Styrene	µg/g		0.05	<0.05
VPH	µg/g		10	<10
VH	µg/g		10	<10
Total Xylenes	ug/g		0.1	<0.1
Surrogate	Unit	Acceptable Limits		
Bromofluorobenzene	%	60-140		102
Dibromofluoromethane	%	60-140		109
Toluene - d8	%	60-140		106

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8827964-8827981 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17N273185
PROJECT: 1657709.6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Soil Analysis

RPT Date: Oct 23, 2017			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
Public Works Metals in Soil															
Aluminum	8829786		4110	4630	12.0%	< 10	103%	70%	130%	105%	90%	110%			
Antimony	8864788		0.2	0.1	NA	< 0.1	92%	70%	130%	94%	90%	110%			
Barium	8864788		151	142	6.2%	< 0.5	90%	70%	130%	96%	90%	110%			
Beryllium	8864788		0.2	0.2	NA	< 0.1	92%	70%	130%	91%	90%	110%			
Bismuth	8864788		<0.5	<0.5	NA	< 0.5				98%	85%	115%			
Cadmium	8864788		0.19	0.18	3.3%	< 0.01	92%	70%	130%	95%	90%	110%			
Calcium	8829786		16200	16900	4.6%	< 10	111%	70%	130%	108%	90%	110%			
Chromium	8864788		54	54	0.2%	< 1	103%	70%	130%	99%	90%	110%			
Cobalt	8864788		10.3	9.5	7.8%	< 0.1	98%	70%	130%	95%	90%	110%			
Copper	8864788		37.8	36.8	2.7%	< 0.2	94%	70%	130%	97%	90%	110%			
Iron	8829786		10300	13800	29.3%	< 10	101%	70%	130%	107%	90%	110%			
Lead	8864788		47.4	46.1	2.7%	< 0.1	91%	70%	130%	93%	90%	110%			
Lithium	8864788		23.8	23.4	1.7%	< 0.5				91%	85%	115%			
Magnesium	8829786		4880	7000	35.7%	< 10	111%	70%	130%	109%	90%	110%			
Manganese	8864788		405	388	4.2%	< 1	91%	70%	130%	93%	90%	110%			
Mercury	8864788		0.08	0.09	7.7%	< 0.01	81%	70%	130%	92%	90%	110%			
Molybdenum	8864788		1.7	1.9	6.5%	< 0.2	89%	70%	130%	91%	90%	110%			
Nickel	8864788		15.4	14.3	7.5%	< 0.5	96%	70%	130%	93%	90%	110%			
Phosphorus	8829786		355	441	21.6%	< 5	105%	70%	130%	106%	90%	110%			
Potassium	8829786		353	425	18.5%	< 5	110%	70%	130%	105%	90%	110%			
Selenium	8864788		0.9	0.9	4.1%	< 0.1				95%	90%	110%			
Silver	8864788		<0.5	<0.5	NA	< 0.5	111%	70%	130%	100%	90%	110%			
Sodium	8829786		830	819	1.2%	< 5	110%	70%	130%	103%	90%	110%			
Strontium	8864788		26	24	6.0%	< 1	99%	70%	130%	94%	90%	110%			
Thallium	8864788		0.1	0.1	NA	< 0.1	109%	70%	130%	99%	90%	110%			
Titanium	8829786		258	329	24.0%	< 1	126%	70%	130%	106%	90%	110%			
Uranium	8864788		0.4	0.4	NA	< 0.2	98%	70%	130%	100%	90%	110%			
Vanadium	8864788		138	141	1.8%	< 1	102%	70%	130%	97%	90%	110%			
Zinc	8864788		93	94	1.6%	< 1	96%	70%	130%	93%	90%	110%			
Zirconium	8864788		0.2	0.2	NA	< 0.1	NA	70%	130%	90%	90%	110%			
pH 1:2	8829786		9.30	9.33	0.3%		94%	90%	110%	100%	95%	105%			

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N273185

PROJECT: 1657709.6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Oct 23, 2017

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68107	8809249	<0.1	<0.1	NA	< 0.1	96%	80%	120%				110%	70%	130%
Benzene	68107	8809249	<0.02	<0.02	NA	< 0.02	96%	80%	120%				102%	70%	130%
Toluene	68107	8809249	<0.05	<0.05	NA	< 0.05	94%	80%	120%				106%	70%	130%
Ethylbenzene	68107	8809249	<0.05	<0.05	NA	< 0.05	94%	80%	120%				103%	70%	130%
m&p-Xylene	68107	8809249	<0.05	<0.05	NA	< 0.05	92%	80%	120%				104%	70%	130%
o-Xylene	68107	8809249	<0.05	<0.05	NA	< 0.05	92%	80%	120%				102%	70%	130%
Styrene	68107	8809249	<0.05	<0.05	NA	< 0.05	99%	80%	120%				103%	70%	130%
VPH	68107	8809249	<10	<10	NA	< 10									
VH	68107	8809249	<10	<10	NA	< 10									
Bromofluorobenzene	68107	8809249	100	100	0.0%		97%	60%	140%				89%	60%	140%
Dibromofluoromethane	68107	8809249	111	115	3.5%		99%	60%	140%				95%	60%	140%
Toluene - d8	68107	8809249	115	115	0.0%		98%	60%	140%				100%	60%	140%
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68218	8874935	<0.005	<0.005	NA	< 0.005	99%	80%	120%				107%	50%	130%
2-Methylnaphthalene	68218	8874935	<0.005	<0.005	NA	< 0.005	95%	80%	120%				84%	50%	130%
1-Methylnaphthalene	68218	8874935	<0.005	<0.005	NA	< 0.005	99%	80%	120%				99%	50%	130%
Acenaphthylene	68218	8874935	<0.005	<0.005	NA	< 0.005	101%	80%	120%				99%	50%	130%
Acenaphthene	68218	8874935	<0.005	<0.005	NA	< 0.005	101%	80%	120%				109%	50%	130%
Fluorene	68218	8874935	<0.02	<0.02	NA	< 0.02	101%	80%	120%				103%	50%	130%
Phenanthrene	68218	8874935	<0.02	<0.02	NA	< 0.02	99%	80%	120%				83%	60%	130%
Anthracene	68218	8874935	<0.004	<0.004	NA	< 0.004	101%	80%	120%				114%	60%	130%
Fluoranthene	68218	8874935	<0.01	<0.01	NA	< 0.01	100%	80%	120%				105%	60%	130%
Pyrene	68218	8874935	<0.01	<0.01	NA	< 0.01	101%	80%	120%				110%	60%	130%
Benzo(a)anthracene	68218	8874935	<0.03	<0.03	NA	< 0.03	101%	80%	120%				101%	60%	130%
Chrysene	68218	8874935	<0.05	<0.05	NA	< 0.05	100%	80%	120%				108%	60%	130%
Benzo(b)fluoranthene	68218	8874935	<0.05	<0.05	NA	< 0.05	96%	80%	120%				93%	60%	130%
Benzo(j)fluoranthene	68218	8874935	<0.05	<0.05	NA	< 0.05	102%	80%	120%				113%	60%	130%
Benzo(k)fluoranthene	68218	8874935	<0.05	<0.05	NA	< 0.05	102%	80%	120%				99%	60%	130%
Benzo(a)pyrene	68218	8874935	<0.03	<0.03	NA	< 0.03	100%	80%	120%				110%	60%	130%
Indeno(1,2,3-c,d)pyrene	68218	8874935	<0.02	<0.02	NA	< 0.02	100%	80%	120%				95%	60%	130%
Dibenzo(a,h)anthracene	68218	8874935	<0.005	<0.005	NA	< 0.005	100%	80%	120%				94%	60%	130%
Benzo(g,h,i)perylene	68218	8874935	<0.05	<0.05	NA	< 0.05	100%	80%	120%				94%	60%	130%
Quinoline	68218	8874935	<0.05	<0.05	NA	< 0.05	101%	80%	120%				106%	50%	130%
EPH C10-C19	68218	8874935	<20	<20	NA	< 20	107%	70%	130%				108%	65%	120%
EPH C19-C32	68218	8874935	<20	<20	NA	< 20	98%	70%	130%				94%	80%	120%
Naphthalene - d8	68218	8874935	72	70	2.8%		100%	80%	120%				100%	50%	130%
2-Fluorobiphenyl	68218	8874935	70	69	1.4%		100%	80%	120%				101%	50%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17N273185
PROJECT: 1657709.6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Oct 23, 2017			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
P-Terphenyl - d14	68218	8874935	84	75	11.3%		100%	80%	120%				107%	60%	130%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68107	8809249	<0.005	<0.005	NA	< 0.005	101%	80%	120%				95%	50%	130%
2-Methylnaphthalene	68107	8809249	<0.005	<0.005	NA	< 0.005	101%	80%	120%				83%	50%	130%
1-Methylnaphthalene	68107	8809249	<0.005	<0.005	NA	< 0.005	101%	80%	120%				92%	50%	130%
Acenaphthylene	68107	8809249	<0.005	<0.005	NA	< 0.005	101%	80%	120%				79%	50%	130%
Acenaphthene	68107	8809249	<0.005	<0.005	NA	< 0.005	100%	80%	120%				98%	50%	130%
Fluorene	68107	8809249	<0.02	<0.02	NA	< 0.02	101%	80%	120%				90%	50%	130%
Phenanthrene	68107	8809249	<0.02	<0.02	NA	< 0.02	100%	80%	120%				75%	60%	130%
Anthracene	68107	8809249	<0.004	<0.004	NA	< 0.004	102%	80%	120%				80%	60%	130%
Fluoranthene	68107	8809249	<0.01	<0.01	NA	< 0.01	101%	80%	120%				86%	60%	130%
Pyrene	68107	8809249	<0.01	<0.01	NA	< 0.01	101%	80%	120%				92%	60%	130%
Benzo(a)anthracene	68107	8809249	<0.03	<0.03	NA	< 0.03	101%	80%	120%				82%	60%	130%
Chrysene	68107	8809249	<0.05	<0.05	NA	< 0.05	101%	80%	120%				85%	60%	130%
Benzo(b)fluoranthene	68107	8809249	<0.05	<0.05	NA	< 0.05	105%	80%	120%				81%	60%	130%
Benzo(j)fluoranthene	68107	8809249	<0.05	<0.05	NA	< 0.05	102%	80%	120%				89%	60%	130%
Benzo(k)fluoranthene	68107	8809249	<0.05	<0.05	NA	< 0.05	93%	80%	120%				84%	60%	130%
Benzo(a)pyrene	68107	8809249	<0.03	<0.03	NA	< 0.03	102%	80%	120%				86%	60%	130%
Indeno(1,2,3-c,d)pyrene	68107	8809249	<0.02	<0.02	NA	< 0.02	101%	80%	120%				76%	60%	130%
Dibenzo(a,h)anthracene	68107	8809249	<0.005	<0.005	NA	< 0.005	102%	80%	120%				79%	60%	130%
Benzo(g,h,i)perylene	68107	8809249	<0.05	<0.05	NA	< 0.05	101%	80%	120%				94%	60%	130%
Quinoline	68107	8809249	<0.05	<0.05	NA	< 0.05	100%	80%	120%				103%	50%	130%
EPH C10-C19	68107	8809249	<20	<20	NA	< 20	107%	70%	130%				85%	65%	120%
EPH C19-C32	68107	8809249	<20	<20	NA	< 20	101%	70%	130%				85%	80%	120%
Naphthalene - d8	68107	8809249	75	80	6.5%		110%	80%	120%				97%	50%	130%
2-Fluorobiphenyl	68107	8809249	82	87	5.9%		105%	80%	120%				98%	50%	130%
P-Terphenyl - d14	68107	8809249	86	97	12.0%		105%	80%	120%				97%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By:

AGAT Laboratories
Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17N273185
PROJECT: 1657709.6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Antimony	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Arsenic	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Barium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Beryllium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Bismuth	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cadmium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Calcium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Chromium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cobalt	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Copper	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Iron	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Lead	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Lithium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Magnesium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Manganese	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Mercury	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Molybdenum	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Nickel	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Phosphorus	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Potassium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Selenium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Silver	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Sodium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Strontium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Thallium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Tin	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N273185

PROJECT: 1657709.6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Titanium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Uranium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Vanadium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zinc	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zirconium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
pH 1:2	INOR-181-6031	BC MOE Lab Manual B (pH, Electrometric, Soil)	PH METER

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N273185

PROJECT: 1657709.6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N273185

PROJECT: 1657709.6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

1N273185 10C

No. 04267 page 1 of 2

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 6000		Laboratory Name: AGAT	OCT 18 AM 9:09
Short Title: Kia Remediation	Golder Contact: Erin O'brien	Address: 120-8600 Glenlyon Parkway	
Golder E-mail Address 1: Abruemmer@golder.com	Golder E-mail Address 2: Eobrien @golder.com	Telephone/Fax: 250 774 4500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 48233859
EQuIS upload: ☐

Alvaro_Garrido@golder.com hernan-gomez@golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days) 4DAYS
Criteria: ☐ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	Analyses Required: BTEX/VPH/VH	LEPH/HEPH (160-CH)	Naphthalene	2-methylnaphthalene	RUSH (Select TAT above)	Remarks (over)
04267 - 01	Ex17-01	B18	5.0	Soil	160ct17	8:50	GRAB			4	X	X	X	X		8827964
- 02		B19	5.0			9:10					X	X	X	X		67
- 03		B20	5.0			9:40					X	X	X	X		68
- 04		W17a	0.5			11:00										69
- 05		W17b	1.5			11:05					X	X	X	X		70
- 06		W18a	0.5			11:15										71
- 07		W18b	1.5			11:20										72
- 08		W18c	2.5			13:30					X	X	X	X		73
- 09		W18d	3.5			13:35										74
- 10		W18e	4.0			13:40					X	X	X	X		75
- 11		W17c	2.5			13:50										76
04267 - 12		W17a	3.5		160ct17	13:55				4	X	X	X	X		77

Sampler's Signature:	Relinquished by: Signature	Company: AGAT	Date: 17/10/17	Time: 8:00	Received by: Signature	Company	
Comments: ON ICE	Method of Shipment: Pick UP	Waybill No.:	Received for Lab by:		Date	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	Time	

WHITE: Golder Copy YELLOW: Lab Copy

ESED

17N273185
1°C

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04268 page 2 of 2

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709-1600
Short Title: KIA Remediation
Golder Contact: Erin O'Brien
Golder E-mail Address 1: ABluemmer @golder.com
Golder E-mail Address 2: EObrien @golder.com
Laboratory Name: AGAT
Address: 120-8600 Glenlyon Parkway
Telephone/Fax: 250 774 10500
Contact: Maggie Chan

Office Name: Vancouver
EQuIS Facility Code: 48233859
EQuIS upload: ☐
Alvaro_garrido-hernan-Gomez@Golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☐ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail
Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX/VPH/VH	LEPH EPH (C10-C19)	Naphthalene	2-methylnaphthalene			Hold				RUSH (Select TAT above)	Remarks (over)
04268 - 01	Ex17.01	WAe	4.0	Soil	16Oct17	14:00	GRAB			4												8827978
- 02	↓	B21	4.0			14:10					X	X	X	X								79
- 03		B22	4.0	↓	↓	14:20		FDA	04268-04		X	X	X	X								80
- 04	↓	B22	4.0	Soil	16Oct17	1420	↓	FD	04268-03		X	X	X	X								81
04268 - 05	W17 product		1.5	Soil	16Oct17	1555	GRAB			4							X					82
- 06																						
- 07																						
- 08																						
- 09																						
- 10																						
- 11																						
- 12																						

Sampler's Signature: [signature]
Relinquished by: Signature [signature]
Company: AGAT
Date: 17/10/17
Time: 8:00
Received by: Signature [signature]
Company: AGAT

Comments: ON ICE
Method of Shipment: Pick up
Waybill No.:
Received for Lab by: [signature]
Date:
Time:
Shipped by:
Shipment Condition:
Seal Intact:
Temp (°C):
Cooler opened by:
Date:
Time:

WHITE: Golder Copy YELLOW: Lab Copy

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: GOLDER

Courier: CMA (Prepaid) Collect

Waybill#: _____

Branch: EDM GP (FN) FM RD VAN LYD FSJ EST Other: _____

Custody Seal Intact: Yes (No) NA

TAT: <24hr 24-48hr 48-72hr (Reg) Other _____

Cooler Quantity: 1

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry: _____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken: _____

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: Yes (No)

Coolant Used: Icepack (Bagged Ice) Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) 7 + 6 + 2 = 5 °C 2(Bottle/Jar) ___ + ___ + ___ = ___ °C

3 (Bottle/Jar) ___ + ___ + ___ = ___ °C 4 (Bottle/Jar) ___ + ___ + ___ = ___ °C

5 (Bottle/Jar) ___ + ___ + ___ = ___ °C 6 (Bottle/Jar) ___ + ___ + ___ = ___ °C

7 (Bottle/Jar) ___ + ___ + ___ = ___ °C 8 (Bottle/Jar) ___ + ___ + ___ = ___ °C

9 (Bottle/Jar) ___ + ___ + ___ = ___ °C 10 (Bottle/Jar) ___ + ___ + ___ = ___ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: _____

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial _____

General Comments: _____

* Subcontracted Analysis (See CPM)

Date issued: May 22, 2015

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17W273185

RECEIVING BASICS:

Received From: NOVEK Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 1 Containers: 68

TIME SENSITIVE ISSUES:

Earliest Date Sampled: OCT 16, 2017 ALREADY EXCEEDED? Yes (No)

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) 1 + 1 + 1 = 1 °C (2) ___ + ___ + ___ = ___ °C (3) ___ + ___ + ___ = ___ °C (4) ___ + ___ + ___ = ___ °C

Was ice or ice pack present: (Yes) No

Integrity Issues:

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date and Time: _____

ADDITIONAL NOTES:

AGAT Laboratories

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: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709

AGAT WORK ORDER: 17N274395

TRACE ORGANICS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

DATE REPORTED: Nov 01, 2017

PAGES (INCLUDING COVER): 14

VERSION*: 4

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 4: Sample receipt temperature 3°C.

Version 4 issued on November 17, 2017 to report benzene re-analysis data, the full LEPH/HEPH/PAH package and additional BTEX/VPH analysis as requested by Alvaro Garrido Hernan-Gomez of Golder. Version 2 is an amendment to version 1.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories
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TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17N274395

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-20

DATE REPORTED: 2017-11-01

SAMPLE DESCRIPTION:				04269-03-2.0m	04269-05-3.5m	04269-06-3.5m		04269-09-0.5m
SAMPLE TYPE:				Soil	Soil	Soil		Soil
DATE SAMPLED:				2017-10-17	2017-10-17	2017-10-17		2017-10-18
Parameter	Unit	G / S	RDL	8837195	8837198	8837199	RDL	8837212
Naphthalene	µg/g		0.05	0.30	2.34	2.40	0.005	<0.005
2-Methylnaphthalene	µg/g		0.05	0.37	1.98	2.08	0.005	<0.005
1-Methylnaphthalene	µg/g		0.05	0.90	2.72	3.29	0.005	0.005
Acenaphthylene	µg/g		0.05	<0.05	<0.05	<0.05	0.005	<0.005
Acenaphthene	µg/g		0.05	<0.05	<0.05	<0.05	0.005	<0.005
Fluorene	µg/g		0.2	<0.2	<0.2	0.3	0.02	<0.02
Phenanthrene	µg/g		0.02	0.10	0.40	0.47	0.02	<0.02
Anthracene	µg/g		0.04	<0.04	<0.04	<0.04	0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	0.02	0.02	0.01	<0.01
Pyrene	µg/g		0.01	<0.01	0.03	0.03	0.01	<0.01
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	0.03	<0.03
Chrysene	µg/g		0.05	<0.05	0.07	0.08	0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	0.05	0.05	0.05	<0.05
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	0.6	0.6	0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05
EPH C10-C19	µg/g		20	319	1560	2030	20	44
EPH C19-C32	µg/g		20	84	168	206	20	129
LEPH C10-C19	µg/g		20	319	1550	2020	20	44
HEPH C19-C32	µg/g		20	84	168	206	20	129
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17N274395

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-20

DATE REPORTED: 2017-11-01

		SAMPLE DESCRIPTION:	04269-03-2.0m	04269-05-3.5m	04269-06-3.5m	04269-09-0.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-17	2017-10-17	2017-10-17	2017-10-18
Surrogate	Unit	Acceptable Limits	8837195	8837198	8837199	8837212
Naphthalene - d8	%	50-130	77	81	91	61
2-Fluorobiphenyl	%	50-130	86	97	82	67
P-Terphenyl - d14	%	60-130	97	89	91	81

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8837195-8837199 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample dilution.

8837212 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 17N274395

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-10-20

DATE REPORTED: 2017-11-01

SAMPLE DESCRIPTION:				04269-01-0.5m	04269-03-2.0m		04269-05-3.5m		04269-06-3.5m	04269-09-0.5m	04269-10-1.5m
SAMPLE TYPE:				Soil	Soil		Soil		Soil	Soil	Soil
DATE SAMPLED:				2017-10-17	2017-10-17		2017-10-17		2017-10-17	2017-10-18	2017-10-18
Parameter	Unit	G / S	RDL	8837192	8837195	RDL	8837198	RDL	8837199	8837212	8837223
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	0.1	<0.1	0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	0.02	0.62	0.02	0.76	0.21	0.21
Toluene	µg/g		0.05	<0.05	<0.05	0.05	0.59	0.05	0.87	0.07	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	0.05	3.64	0.05	5.76	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05	0.05	4.16	0.05	6.18	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	0.05	0.41	0.05	0.51	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	15	100	171	10	250	<10	<10
VH	µg/g		10	<10	15	100	181	10	264	<10	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1	0.1	4.6	0.1	6.7	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		101	106		99		104	103	95
Dibromofluoromethane	%	60-140		120	97		86		89	92	112
Toluene - d8	%	60-140		109	119		118		126	118	104

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8837192-8837195 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

8837198 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.
BTEX/VPH detection limits increased due to sample dilution.

8837199-8837223 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

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Certificate of Analysis

AGAT WORK ORDER: 17N274395

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX Analysis - Leachate

DATE RECEIVED: 2017-10-20

DATE REPORTED: 2017-11-01

		SAMPLE DESCRIPTION:		04269-06-3.5m
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-10-17
Parameter	Unit	G / S	RDL	8837199
Benzene - Leachable	mg/L		0.005	0.006
Toluene - Leachable	mg/L		0.005	0.007
Ethylbenzene - Leachable	mg/L		0.005	0.036
Xylenes - Leachable	mg/L		0.005	0.051
Surrogate	Unit	Acceptable Limits		
Bromofluorobenzene	%	70-130		98
Dibromofluoromethane	%	70-130		95
Toluene - d8	%	70-130		99

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8837199 Analysis based on "as received"

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 17N274395

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Benzene re-analysis

DATE RECEIVED: 2017-10-20

DATE REPORTED: 2017-11-01

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: 04269-09-0.5m reanalysis 1	04269-09-0.5m reanalysis 2
				SAMPLE TYPE: Soil	Soil
				DATE SAMPLED: 2017-10-18	2017-10-18
				8893092	8893095
Benzene	µg/g		0.02	0.56	0.57
Surrogate	Unit	Acceptable Limits			
Bromofluorobenzene	%	60-140		95	96
Dibromofluoromethane	%	60-140		106	108
Toluene - d8	%	60-140		94	96

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8893092-8893095 Results are based on dry weight of sample.

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AGAT WORK ORDER: 17N274395

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Dichloromethane in Soil

DATE RECEIVED: 2017-10-20

DATE REPORTED: 2017-11-01

SAMPLE DESCRIPTION:				04269-03-2.0m	04269-05-3.5m	04269-06-3.5m
SAMPLE TYPE:				Soil	Soil	Soil
DATE SAMPLED:				2017-10-17	2017-10-17	2017-10-17
Parameter	Unit	G / S	RDL	8837195	8837198	8837199
Dichloromethane	µg/g		0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits				
Bromofluorobenzene	%	60-140		120	110	129
Dibromofluoromethane	%	60-140		96	73	86
Toluene - d8	%	60-140		122	106	121

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8837195-8837199 Results are based on dry weight of sample.

Certified By:

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17N274395
PROJECT: 1657709
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Nov 01, 2017

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68121	8829747	<0.1	<0.1	NA	< 0.1	100%	80%	120%				89%	70%	130%
Benzene	68121	8829747	<0.02	<0.02	NA	< 0.02	102%	80%	120%				82%	70%	130%
Toluene	68121	8829747	<0.05	<0.05	NA	< 0.05	100%	80%	120%				98%	70%	130%
Ethylbenzene	68121	8829747	<0.05	<0.05	NA	< 0.05	101%	80%	120%				101%	70%	130%
m&p-Xylene	68121	8829747	<0.05	<0.05	NA	< 0.05	100%	80%	120%				103%	70%	130%
o-Xylene	68121	8829747	<0.05	<0.05	NA	< 0.05	99%	80%	120%				98%	70%	130%
Styrene	68121	8829747	<0.05	<0.05	NA	< 0.05	101%	80%	120%				102%	70%	130%
VPH	68121	8829747	<10	<10	NA	< 10									
VH	68121	8829747	<10	<10	NA	< 10									
Bromofluorobenzene	68121	8829747	101	94	7.2%		100%	60%	140%				110%	60%	140%
Dibromofluoromethane	68121	8829747	85	90	5.7%		104%	60%	140%				85%	60%	140%
Toluene - d8	68121	8829747	86	129	40.0%		100%	60%	140%				105%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Dichloromethane in Soil															
Dichloromethane	68121	8854259	<0.05	<0.05	NA	< 0.05	102%	80%	120%				86%	70%	130%
Bromofluorobenzene	68121	8854259	118	113	4.3%		109%	60%	140%				103%	60%	140%
Dibromofluoromethane	68121	8854259	84	78	7.4%		101%	60%	140%				101%	60%	140%
Toluene - d8	68121	8854259	115	108	6.3%		107%	60%	140%				105%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
BTEX Analysis - Leachate															
Benzene - Leachable	68195	8837199	0.006	0.006	NA	< 0.005	101%	80%	120%				92%	70%	130%
Toluene - Leachable	68195	8837199	0.007	0.007	NA	< 0.005	101%	80%	120%				91%	70%	130%
Ethylbenzene - Leachable	68195	8837199	0.036	0.035	2.8%	< 0.005	99%	80%	120%				90%	70%	130%
Bromofluorobenzene	68195	8837199	98	98	0.0%		99%	60%	140%				97%	60%	140%
Dibromofluoromethane	68195	8837199	95	95	0.0%		100%	60%	140%				101%	60%	140%
Toluene - d8	68195	8837199	99	101	2.0%		100%	60%	140%				99%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68121	8829747	<0.005	<0.005	NA	< 0.005	101%	80%	120%				101%	50%	130%
2-Methylnaphthalene	68121	8829747	<0.005	<0.005	NA	< 0.005	96%	80%	120%				85%	50%	130%
1-Methylnaphthalene	68121	8829747	<0.005	<0.005	NA	< 0.005	101%	80%	120%				98%	50%	130%
Acenaphthylene	68121	8829747	<0.005	<0.005	NA	< 0.005	101%	80%	120%				87%	50%	130%
Acenaphthene	68121	8829747	<0.005	<0.005	NA	< 0.005	101%	80%	120%				94%	50%	130%
Fluorene	68121	8829747	<0.02	<0.02	NA	< 0.02	100%	80%	120%				95%	50%	130%
Phenanthrene	68121	8829747	<0.02	<0.02	NA	< 0.02	99%	80%	120%				84%	60%	130%
Anthracene	68121	8829747	<0.004	<0.004	NA	< 0.004	102%	80%	120%				85%	60%	130%
Fluoranthene	68121	8829747	<0.01	<0.01	NA	< 0.01	101%	80%	120%				97%	60%	130%

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N274395

PROJECT: 1657709

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Nov 01, 2017			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
Pyrene	68121	8829747	<0.01	<0.01	NA	< 0.01	101%	80%	120%				98%	60%	130%
Benzo(a)anthracene	68121	8829747	<0.03	<0.03	NA	< 0.03	102%	80%	120%				88%	60%	130%
Chrysene	68121	8829747	<0.05	<0.05	NA	< 0.05	101%	80%	120%				95%	60%	130%
Benzo(b)fluoranthene	68121	8829747	<0.05	<0.05	NA	< 0.05	97%	80%	120%				86%	60%	130%
Benzo(j)fluoranthene	68121	8829747	<0.05	<0.05	NA	< 0.05	103%	80%	120%				101%	60%	130%
Benzo(k)fluoranthene	68121	8829747	<0.05	<0.05	NA	< 0.05	102%	80%	120%				80%	60%	130%
Benzo(a)pyrene	68121	8829747	<0.03	<0.03	NA	< 0.03	102%	80%	120%				98%	60%	130%
Indeno(1,2,3-c,d)pyrene	68121	8829747	<0.02	<0.02	NA	< 0.02	101%	80%	120%				105%	60%	130%
Dibenzo(a,h)anthracene	68121	8829747	<0.005	<0.005	NA	< 0.005	101%	80%	120%				100%	60%	130%
Benzo(g,h,i)perylene	68121	8829747	<0.05	<0.05	NA	< 0.05	100%	80%	120%				98%	60%	130%
Quinoline	68121	8829747	<0.05	<0.05	NA	< 0.05	100%	80%	120%				111%	50%	130%
EPH C10-C19	68121	8829747	<20	<20	NA	< 20	105%	70%	130%				89%	65%	120%
EPH C19-C32	68121	8829747	<20	<20	NA	< 20	99%	70%	130%				90%	80%	120%
Naphthalene - d8	68121	8829747	73	70	4.2%		104%	80%	120%				104%	50%	130%
2-Fluorobiphenyl	68121	8829747	77	74	4.0%		107%	80%	120%				95%	50%	130%
P-Terphenyl - d14	68121	8829747	90	85	5.7%		104%	80%	120%				109%	60%	130%
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68276	8894978	<0.1	<0.1	NA	< 0.1	99%	80%	120%				116%	70%	130%
Benzene	68276	8894978	<0.02	<0.02	NA	< 0.02	99%	80%	120%				95%	70%	130%
Toluene	68276	8894978	<0.05	<0.05	NA	< 0.05	100%	80%	120%				93%	70%	130%
Ethylbenzene	68276	8894978	<0.05	<0.05	NA	< 0.05	100%	80%	120%				91%	70%	130%
m&p-Xylene	68276	8894978	<0.05	<0.05	NA	< 0.05	99%	80%	120%				91%	70%	130%
o-Xylene	68276	8894978	<0.05	<0.05	NA	< 0.05	99%	80%	120%				92%	70%	130%
Styrene	68276	8894978	<0.05	<0.05	NA	< 0.05	100%	80%	120%				93%	70%	130%
VPH	68276	8894978	<10	<10	NA	< 10									
VH	68276	8894978	<10	<10	NA	< 10									
Bromofluorobenzene	68276	8894978	92	94	2.2%		101%	60%	140%				94%	60%	140%
Dibromofluoromethane	68276	8894978	103	106	2.9%		100%	60%	140%				100%	60%	140%
Toluene - d8	68276	8894978	110	110	0.0%		101%	60%	140%				88%	60%	140%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By:

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N274395

PROJECT: 1657709

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N274395

PROJECT: 1657709

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Benzene - Leachable	ORG-180-5130, ORG-180-5135	BC Lab Manual section D, and EPA 1311	GC/MS/FID
Toluene - Leachable	ORG-180-5130, ORG-180-5135	BC Lab Manual section D, and EPA 1311	GC/MS/FID
Ethylbenzene - Leachable	ORG-180-5130, ORG-180-5135	BC Lab Manual section D, and EPA 1311	GC/MS/FID
Dichloromethane	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS
Bromofluorobenzene	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS
Dibromofluoromethane	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS
Toluene - d8	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

30C 17N274395

No. 04269 page 1 of _

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709
Short Title: K14 Remediation
Golder Contact: Erin O'brien
Golder E-mail Address 1: Abruemmer @golder.com
Golder E-mail Address 2: EObrien @golder.com

Laboratory Name: AGAT OCT 20 AM 9:17
Address: 160-6600 Glenlyon Parkway OCT 20 AM 9:17
Telephone/Fax: 250 774 6500
Contact: Maggie Chan

Office Name: Vancouver
EQuIS Facility Code: 48233859
EQuIS upload: X
Alvaro_Garridohernan-gamez@Golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days) 4DAY
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail
Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX/VPH/VH	EPH(C10<C19)	LEPH	Naphthalene	2-methylnaphthalene	Dichloromethane		Hold		RUSH (Select TAT above)	Remarks (over)
04269-01	Ex17-01	WR9a	0.5	Soil	17Oct17	1230	GRAB			4								X			3837192
-02		W19b	1.5			1235				4								X			193
-03		W19c	2.0			1240				4	X	X	X	X							195
-04		W20a	2.5			1540				4								X			197
-05		W20b	3.5			1545		FDA	04269-06	4	X	X	X	X							198
-06		W20b	3.5			1545		FD	04269-05	4	X	X	X	X							199
-07		W20c	4.0			1550				4								X			209
-08		B23	4.0			1555				4	NO SAMPLE										
-09		W21a	0.5		18Oct17	930				4	X	X	X	X	KT						212
-10		W21b	1.5			940				4								X			223
-11		W22a	0.5			950				4								X			225
-12		W22b	1.5			955				4								X			226

Sampler's Signature:
Relinquished by: Signature
Company: AGAT
Date: Oct 19-17
Time: 800
Received by: Signature
Company

Comments: ON ICE
Method of Shipment: PICK-UP
Waybill No.:
Received for Lab by:
Date
Time

Shipped by:
Shipment Condition:
Seal Intact:
Temp (°C)
Cooler opened by:
Date
Time

WHITE: Golder Copy YELLOW: Lab Copy

V112554

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: GOLDER

Courier: _____ (Prepaid) Collect

Waybill# _____

Branch: EDM GP (FN) FM RD VAN LYD FSJ EST Other: _____

Custody Seal Intact: (Yes) No NA

TAT: <24hr 24-48hr 48-72hr (Reg) 4DAY Other _____

Cooler Quantity: 1

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry: _____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken: _____

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: Yes (No)

Coolant Used: Icepack (Bagged Ice) Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) -2 + 0 + -1 = -1 °C 2(Bottle/Jar) ___ + ___ + ___ = ___ °C

3 (Bottle/Jar) ___ + ___ + ___ = ___ °C 4 (Bottle/Jar) ___ + ___ + ___ = ___ °C

5 (Bottle/Jar) ___ + ___ + ___ = ___ °C 6 (Bottle/Jar) ___ + ___ + ___ = ___ °C

7 (Bottle/Jar) ___ + ___ + ___ = ___ °C 8 (Bottle/Jar) ___ + ___ + ___ = ___ °C

9 (Bottle/Jar) ___ + ___ + ___ = ___ °C 10 (Bottle/Jar) ___ + ___ + ___ = ___ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: _____

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial _____

General Comments: FLAT RATE $225 FOR PICK UP SAMPLES @ PROPHET RIVER B.C.

* Subcontracted Analysis (See CPM)

Date issued: May 22, 2015

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17Z274395

RECEIVING BASICS:

Received From: Maxxam Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 1 Containers: 44

TIME SENSITIVE ISSUES:

Earliest Date Sampled: Oct 17, 2017 ALREADY EXCEEDED? Yes (No)

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) 3 + 2 + 3 = 3 °C (2) ___ + ___ + ___ = ___ °C (3) ___ + ___ + ___ = ___ °C (4) ___ + ___ + ___ = ___ °C

Was ice or ice pack present: (Yes) No

Integrity Issues:

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date and Time: _____

ADDITIONAL NOTES:

AGAT Laboratories

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: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709-6000

AGAT WORK ORDER: 17N275674

TRACE ORGANICS REVIEWED BY: Angela Bond, Technical Reviewer

DATE REPORTED: Nov 10, 2017

PAGES (INCLUDING COVER): 16

VERSION*: 3

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 3: Sample receipt temperature 4°C.

Version 3 issued on November 20, 2017 to report additional BTEX/VPH/LEPH/HEPH on 04273-02 as requested by Alvaro Garrido Hernan-Gomez of Golder. Version 3 is an amendment to all previous versions.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Certificate of Analysis

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-24

DATE REPORTED: 2017-11-10

SAMPLE DESCRIPTION:				04272-01-4.0m	04272-02-4.0m		04272-09-2.0m	04272-10-2.0m		04272-11-5.0m	04272-12-5.0m
SAMPLE TYPE:				Soil	Soil		Soil	Soil		Soil	Soil
DATE SAMPLED:				2017-10-20	2017-10-20		2017-10-21	2017-10-21		2017-10-22	2017-10-22
Parameter	Unit	G / S	RDL	8846687	8846689	RDL	8846696	8846697	RDL	8846698	8846700
Naphthalene	µg/g		0.005	<0.005	0.013	0.05	0.07	<0.05	0.005	0.006	0.058
2-Methylnaphthalene	µg/g		0.005	0.014	0.075	0.05	<0.05	<0.05	0.005	0.095	0.341
1-Methylnaphthalene	µg/g		0.005	0.013	0.056	0.25	4.39	9.64	0.005	0.059	0.211
Acenaphthylene	µg/g		0.005	<0.005	<0.005	0.025	<0.025	<0.025	0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	0.025	<0.025	<0.025	0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	0.03	0.1	0.4	0.5	0.02	0.05	0.07
Phenanthrene	µg/g		0.02	0.03	0.12	0.02	0.33	0.42	0.02	0.17	0.23
Anthracene	µg/g		0.004	<0.004	<0.004	0.02	<0.02	<0.02	0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	0.02	0.01	<0.01	<0.01	0.01	0.01	0.01
Pyrene	µg/g		0.01	0.02	0.04	0.01	<0.01	<0.01	0.01	0.03	0.04
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	0.03	<0.03	<0.03	0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	0.08	0.05	<0.05	<0.05	0.05	0.05	0.07
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	0.03	<0.03	<0.03	0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	0.02	<0.02	<0.02	0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	0.005	<0.005	<0.005	0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.05	0.09	0.05	<0.05	<0.05	0.05	0.07	0.09
Quinoline	µg/g		0.05	<0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	0.6	0.6	<0.6	<0.6	0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	110	89	20	1090	1280	20	40	79
EPH C19-C32	µg/g		20	142	73	20	54	54	20	39	59
LEPH C10-C19	µg/g		20	110	89	20	1090	1280	20	40	79
HEPH C19-C32	µg/g		20	142	73	20	54	54	20	39	59
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05	<0.05

Certified By: Angela Bond

AGAT Laboratories

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-24

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:	04272-01-4.0m	04272-02-4.0m	04272-09-2.0m	04272-10-2.0m	04272-11-5.0m	04272-12-5.0m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-20	2017-10-20	2017-10-21	2017-10-21	2017-10-22	2017-10-22
Surrogate	Unit	Acceptable Limits	8846687	8846689	8846696	8846697	8846698	8846700
Naphthalene - d8	%	50-130	75	77	88	122	74	81
2-Fluorobiphenyl	%	50-130	82	85	87	90	82	89
P-Terphenyl - d14	%	60-130	90	91	90	94	87	97

Certified By: Angela Bond

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Certificate of Analysis

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-24

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:		04273-01-5.0m		04273-02-2.5m
		SAMPLE TYPE:		Soil		Soil
		DATE SAMPLED:		2017-10-22		2017-10-22
Parameter	Unit	G / S	RDL	8846701	RDL	8846707
Naphthalene	µg/g		0.005	0.057	0.05	5.92
2-Methylnaphthalene	µg/g		0.005	0.393	0.5	18.5
1-Methylnaphthalene	µg/g		0.005	0.224	0.5	14.0
Acenaphthylene	µg/g		0.005	<0.005	0.05	<0.05
Acenaphthene	µg/g		0.005	<0.005	0.05	<0.05
Fluorene	µg/g		0.02	0.08	0.2	1.1
Phenanthrene	µg/g		0.02	0.23	0.2	1.1
Anthracene	µg/g		0.004	<0.004	0.04	<0.04
Fluoranthene	µg/g		0.01	0.01	0.1	0.1
Pyrene	µg/g		0.01	0.03	0.1	0.2
Benzo(a)anthracene	µg/g		0.03	<0.03	0.03	<0.03
Chrysene	µg/g		0.05	0.06	0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.08	0.05	<0.05
Quinoline	µg/g		0.05	<0.05	0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	0.05	<0.05
EPH C10-C19	µg/g		20	50	20	5940
EPH C19-C32	µg/g		20	50	20	360
LEPH C10-C19	µg/g		20	50	20	5930
HEPH C19-C32	µg/g		20	50	20	360
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05

Certified By: Angela Bond

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Certificate of Analysis

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-24

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:	04273-01-5.0m	04273-02-2.5m
		SAMPLE TYPE:	Soil	Soil
		DATE SAMPLED:	2017-10-22	2017-10-22
Surrogate	Unit	Acceptable Limits	8846701	8846707
Naphthalene - d8	%	50-130	67	94
2-Fluorobiphenyl	%	50-130	73	86
P-Terphenyl - d14	%	60-130	85	80

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8846687-8846689 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8846696-8846697 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample dilution.

8846698-8846701 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8846707 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Literature holding time exceeded.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

Certified By: Angela Bond

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-10-24

DATE REPORTED: 2017-11-10

	SAMPLE DESCRIPTION:			04272-01-4.0m	04272-02-4.0m	04272-10-2.0m	04272-11-5.0m	04272-12-5.0m	04273-01-5.0m	04273-02-2.5m
	SAMPLE TYPE:			Soil	Soil	Soil	Soil	Soil	Soil	Soil
	DATE SAMPLED:			2017-10-20	2017-10-20	2017-10-21	2017-10-22	2017-10-22	2017-10-22	2017-10-22
Parameter	Unit	G / S	RDL	8846687	8846689	8846697	8846698	8846700	8846701	8846707
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	0.68	<0.02	<0.02	<0.02	0.06
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	0.90	<0.05	<0.05	<0.05	0.67
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.37
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	34	<10	13	<10	215
VH	µg/g		10	<10	<10	36	<10	13	<10	217
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4
Surrogate	Unit	Acceptable Limits								
Bromofluorobenzene	%	60-140		93	89	98	106	106	102	101
Dibromofluoromethane	%	60-140		108	108	115	112	113	115	103
Toluene - d8	%	60-140		106	103	97	102	101	97	99

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8846687-8846707 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

Certified By: Angela Bond

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-10-24

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:		04272-09-2.0m
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-10-21
Parameter	Unit	G / S	RDL	8846696
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1
Benzene	µg/g		0.02	0.68
Toluene	µg/g		0.05	<0.05
Ethylbenzene	µg/g		0.05	0.90
m&p-Xylene	µg/g		0.05	<0.05
o-Xylene	µg/g		0.05	<0.05
Styrene	µg/g		0.05	<0.05
Dichloromethane	µg/g		0.05	<0.05
VPH	µg/g		10	35
VH	µg/g		10	37
Total Xylenes	ug/g		0.1	<0.1
Surrogate	Unit	Acceptable Limits		
Bromofluorobenzene	%	60-140		91
Dibromofluoromethane	%	60-140		116
Toluene - d8	%	60-140		104

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8846696 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

Certified By: Angela Bond

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Nov 10, 2017

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68144	8846696	<0.1	<0.1	NA	< 0.1	100%	80%	120%				78%	70%	130%
Benzene	68144	8846696	0.68	0.60	12.5%	< 0.02	100%	80%	120%				117%	70%	130%
Toluene	68144	8846696	<0.05	<0.05	NA	< 0.05	100%	80%	120%				111%	70%	130%
Ethylbenzene	68144	8846696	0.90	0.91	1.1%	< 0.05	100%	80%	120%				104%	70%	130%
m&p-Xylene	68144	8846696	<0.05	1.12	NA	< 0.05	100%	80%	120%				99%	70%	130%
o-Xylene	68144	8846696	<0.05	<0.05	NA	< 0.05	101%	80%	120%				102%	70%	130%
Styrene	68144	8846696	<0.05	<0.05	NA	< 0.05	101%	80%	120%				101%	70%	130%
VPH	68144	8846696	35	34	NA	< 10									
VH	68144	8846696	37	37	NA	< 10									
Bromofluorobenzene	68144	8846696	91	104	13.3%		100%	60%	140%				90%	60%	140%
Dibromofluoromethane	68144	8846696	116	116	0.0%		101%	60%	140%				100%	60%	140%
Toluene - d8	68144	8846696	104	101	2.9%		84%	60%	140%				110%	60%	140%
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68144	8846364	<0.005	<0.005	NA	< 0.005	95%	80%	120%				97%	50%	130%
2-Methylnaphthalene	68144	8846364	<0.005	<0.005	NA	< 0.005	97%	80%	120%				91%	50%	130%
1-Methylnaphthalene	68144	8846364	<0.005	<0.005	NA	< 0.005	97%	80%	120%				94%	50%	130%
Acenaphthylene	68144	8846364	<0.005	<0.005	NA	< 0.005	102%	80%	120%				91%	50%	130%
Acenaphthene	68144	8846364	<0.005	<0.005	NA	< 0.005	101%	80%	120%				93%	50%	130%
Fluorene	68144	8846364	<0.02	<0.02	NA	< 0.02	102%	80%	120%				94%	50%	130%
Phenanthrene	68144	8846364	<0.02	<0.02	NA	< 0.02	98%	80%	120%				90%	60%	130%
Anthracene	68144	8846364	<0.004	<0.004	NA	< 0.004	103%	80%	120%				95%	60%	130%
Fluoranthene	68144	8846364	<0.01	<0.01	NA	< 0.01	104%	80%	120%				93%	60%	130%
Pyrene	68144	8846364	<0.01	<0.01	NA	< 0.01	103%	80%	120%				96%	60%	130%
Benzo(a)anthracene	68144	8846364	<0.03	<0.03	NA	< 0.03	104%	80%	120%				95%	60%	130%
Chrysene	68144	8846364	<0.05	<0.05	NA	< 0.05	99%	80%	120%				97%	60%	130%
Benzo(b)fluoranthene	68144	8846364	<0.05	<0.05	NA	< 0.05	101%	80%	120%				91%	60%	130%
Benzo(j)fluoranthene	68144	8846364	<0.05	<0.05	NA	< 0.05	102%	80%	120%				96%	60%	130%
Benzo(k)fluoranthene	68144	8846364	<0.05	<0.05	NA	< 0.05	106%	80%	120%				93%	60%	130%
Benzo(a)pyrene	68144	8846364	<0.03	<0.03	NA	< 0.03	93%	80%	120%				85%	60%	130%
Indeno(1,2,3-c,d)pyrene	68144	8846364	<0.02	<0.02	NA	< 0.02	104%	80%	120%				94%	60%	130%
Dibenzo(a,h)anthracene	68144	8846364	<0.005	<0.005	NA	< 0.005	93%	80%	120%				91%	60%	130%
Benzo(g,h,i)perylene	68144	8846364	<0.05	<0.05	NA	< 0.05	97%	80%	120%				100%	60%	130%
Quinoline	68144	8846364	<0.05	<0.05	NA	< 0.05	98%	80%	120%				100%	50%	130%
EPH C10-C19	68144	8846364	<20	<20	NA	< 20	111%	70%	130%				88%	65%	120%
EPH C19-C32	68144	8846364	<20	<20	NA	< 20	104%	70%	130%				84%	80%	120%
Naphthalene - d8	68144	8846364	75	76	1.3%		102%	80%	120%				103%	50%	130%
2-Fluorobiphenyl	68144	8846364	82	82	0.0%		109%	80%	120%				110%	50%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17N275674
PROJECT: 1657709-6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Nov 10, 2017			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
P-Terphenyl - d14	68144	8846364	97	85	13.2%		120%	80%	120%				110%	60%	130%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68291	8908112	<0.1	<0.1	NA	< 0.1	98%	80%	120%				83%	70%	130%
Benzene	68291	8908112	<0.02	<0.02	NA	< 0.02	100%	80%	120%				95%	70%	130%
Toluene	68291	8908112	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	70%	130%
Ethylbenzene	68291	8908112	<0.05	<0.05	NA	< 0.05	99%	80%	120%				96%	70%	130%
m&p-Xylene	68291	8908112	<0.05	<0.05	NA	< 0.05	98%	80%	120%				96%	70%	130%
o-Xylene	68291	8908112	<0.05	<0.05	NA	< 0.05	98%	80%	120%				96%	70%	130%
Styrene	68291	8908112	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	70%	130%
VPH	68291	8908112	<10	<10	NA	< 10									
VH	68291	8908112	<10	<10	NA	< 10									
Bromofluorobenzene	68291	8908112	97	97	0.0%		100%	60%	140%				94%	60%	140%
Dibromofluoromethane	68291	8908112	104	104	0.0%		101%	60%	140%				91%	60%	140%
Toluene - d8	68291	8908112	106	106	0.0%		100%	60%	140%				90%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68289	8904753	0.008	0.011	NA	< 0.005	101%	80%	120%				119%	50%	130%
2-Methylnaphthalene	68289	8904753	0.074	0.077	4.0%	< 0.005	100%	80%	120%				106%	50%	130%
1-Methylnaphthalene	68289	8904753	0.037	0.047	23.8%	< 0.005	102%	80%	120%				119%	50%	130%
Acenaphthylene	68289	8904753	<0.005	<0.005	NA	< 0.005	100%	80%	120%				114%	50%	130%
Acenaphthene	68289	8904753	<0.005	<0.005	NA	< 0.005	99%	80%	120%				114%	50%	130%
Fluorene	68289	8904753	0.02	0.03	NA	< 0.02	101%	80%	120%				120%	50%	130%
Phenanthrene	68289	8904753	0.03	0.02	NA	< 0.02	101%	80%	120%				114%	60%	130%
Anthracene	68289	8904753	<0.004	<0.004	NA	< 0.004	97%	80%	120%				109%	60%	130%
Fluoranthene	68289	8904753	<0.01	<0.01	NA	< 0.01	102%	80%	120%				111%	60%	130%
Pyrene	68289	8904753	<0.01	<0.01	NA	< 0.01	98%	80%	120%				102%	60%	130%
Benzo(a)anthracene	68289	8904753	<0.03	<0.03	NA	< 0.03	103%	80%	120%				119%	60%	130%
Chrysene	68289	8904753	<0.05	<0.05	NA	< 0.05	101%	80%	120%				112%	60%	130%
Benzo(b)fluoranthene	68289	8904753	<0.05	<0.05	NA	< 0.05	99%	80%	120%				106%	60%	130%
Benzo(j)fluoranthene	68289	8904753	<0.05	<0.05	NA	< 0.05	96%	80%	120%				99%	60%	130%
Benzo(k)fluoranthene	68289	8904753	<0.05	<0.05	NA	< 0.05	104%	80%	120%				108%	60%	130%
Benzo(a)pyrene	68289	8904753	<0.03	<0.03	NA	< 0.03	97%	80%	120%				100%	60%	130%
Indeno(1,2,3-c,d)pyrene	68289	8904753	<0.02	<0.02	NA	< 0.02	98%	80%	120%				96%	60%	130%
Dibenzo(a,h)anthracene	68289	8904753	<0.005	<0.005	NA	< 0.005	98%	80%	120%				90%	60%	130%
Benzo(g,h,i)perylene	68289	8904753	<0.05	<0.05	NA	< 0.05	104%	80%	120%				84%	60%	130%
Quinoline	68289	8904753	<0.05	<0.05	NA	< 0.05	99%	80%	120%				88%	50%	130%
EPH C10-C19	68289	8904753	<20	<20	NA	< 20	111%	70%	130%				95%	65%	120%

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Nov 10, 2017			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
EPH C19-C32	68289	8904753	<20	<20	NA	< 20	103%	70%	130%				96%	80%	120%
Naphthalene - d8	68289	8904753	78	79	1.3%		99%	80%	120%				107%	50%	130%
2-Fluorobiphenyl	68289	8904753	89	93	4.4%		100%	80%	120%				108%	50%	130%
P-Terphenyl - d14	68289	8904753	94	98	4.2%		100%	80%	120%				109%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By: Angela Bond

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N275674

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dichloromethane	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04272 page 1 of 2

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709-6000		Laboratory Name: AGAT	IAN 275674
Short Title: K19 Remediation	Golder Contact: Erin O'Brien	Address: 160-6600 Glenlyon Parkway	
Golder E-mail Address 1: Abouemmer @golder.com	Golder E-mail Address 2: EObrien @golder.com	Telephone/Fax: 250 TA 6500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 48233859
EQuIS upload: ☒

Alvaro_Garridohernan-gomez@Golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days) 5 DAY
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX IVPH /VH	LEPH EPH (C10-C19)	Naphthalene	2-methylnaphthalene		Dichloromethane		Hold		RUSH (Select TAT above)	AGAT Sample ID Remarks (over)
04272-01	Ex17-01	B25	4.0	Soil	20/Oct/17	11:30	GRAB	N		4	X	X	X	X							884687
-02		B26	4.0		20Oct17	11:45					X	X	X	X							689
-03	Ex17-01	W26a	0.5		21Oct17	9:10												X			690
-04		W26b	1.5			9:15												X			691
-05		W27a	0.5			9:25												X			692
-06		W27b	1.5			9:30												X			693
-07		W28a	0.5			9:35												X			694
-08		W28b	1.5			9:40		N										X			695
-09		W28c	2.0			9:45		FDA	04272-10		X	X	X	X		X					696
-10		W28c	2.0		↓	9:45		FD	04272-09		X	X	X	X							697
-11		B28	5.0		22Oct17	14:45		N			X	X	X	X							698
04272-12		B23	5.0		↓	14:10		N			X	X	X	X							700

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 23Oct17	Time: 8:00	Received by: Signature	Company	
Comments: ON ICE	Method of Shipment: Pick-up.	Waybill No.:	Received for Lab by: Ann	Date	Time		
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 4°C	Cooler opened by:	Date		

V112569

WHITE: Golder Co YELLOW: Lab Copy

ESED

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04273 page 2 of 2

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 -6000			Laboratory Name: AGAT 17W275674
Short Title: HQ Remediation	Golder Contact: Erin O'brien		Address: 120-6000 Glenlivon Parkway
Golder E-mail Address 1: Apruemmer@golder.com	Golder E-mail Address 2: EOBrien@golder.com		Telephone/Fax: 2507746500 Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 48233859
EQuIS upload: ☒

Alvaro_Garridonernan-Gomez@Golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days) 3 day
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX VPH VH	LEPH HEPH (C10<C19)	Naphthalene	2-methylnaphthalene	Dichloromethane	Hold	RUSH (Select TAT above)	Remarks (over)
4273-01	EX17-01	W20d	5.0	Soil	20Oct17	1415	GRAB	N		4	X	X	X	X				701
-02	↓	W19d	2.5	↓	↓	1420	↓	↓		↓						X		707
4273-03	↓	W19e	3.5	↓	↓	1425	↓	↓		4						X		708
-04																		
-05																		
-06																		
-07																		
-08																		
-09																		
-10																		
-11																		
-12																		

Remarks (over): AGAT Samples

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: Oct 23/17	Time: 8:00	Received by: Signature	Company	
Comments: ON ICE	Method of Shipment: PICK-UP	Waybill No.:	Received for Lab by: Ann		Date	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 4°C	Cooler opened by:	Date	V112570	

WHITE: Golder Copy YELLOW: Lab Copy

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: GOLDER

Courier: _____ Prepaid, Collect

Waybill# _____

Branch: EDM GP (FN) FM RD VAN LYD FSJ EST Other: _____

Custody Seal Intact: Yes (No) NA

TAT: <24hr 24-48hr 48-72hr Reg Other 3 DAYS

Cooler Quantity: 1

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry: _____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken: _____

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: Yes (No)

Coolant Used: (Icepack) Bagged Ice Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) 0 + 2 + 1 = 1 °C 2(Bottle/Jar) ___ + ___ + ___ = ___ °C

3 (Bottle/Jar) ___ + ___ + ___ = ___ °C 4 (Bottle/Jar) ___ + ___ + ___ = ___ °C

5 (Bottle/Jar) ___ + ___ + ___ = ___ °C 6 (Bottle/Jar) ___ + ___ + ___ = ___ °C

7 (Bottle/Jar) ___ + ___ + ___ = ___ °C 8 (Bottle/Jar) ___ + ___ + ___ = ___ °C

9 (Bottle/Jar) ___ + ___ + ___ = ___ °C 10 (Bottle/Jar) ___ + ___ + ___ = ___ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: _____

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial _____

General Comments: _____

* Subcontracted Analysis (See CPM)

Date issued: May 22, 2015

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17N275679

RECEIVING BASICS:

Received From: NOV ex

Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 1 Containers: 60

TIME SENSITIVE ISSUES:

Earliest Date Sampled: Oct 20, 2017

ALREADY EXCEEDED? Yes (No)

1

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) 4 + 4 + 4 = 4 °C (2) ___+___+___=____°C (3) ___+___+___=____°C (4) ___+___+___=____°C

Was ice or ice pack present: (Yes) No

Integrity Issues:

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date and Time: _____

ADDITIONAL NOTES:

custody seal intact

AGAT Laboratories

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CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709-6000

AGAT WORK ORDER: 17N276808

TRACE ORGANICS REVIEWED BY: Angela Bond, Technical Reviewer

DATE REPORTED: Nov 08, 2017

PAGES (INCLUDING COVER): 18

VERSION*: 3

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 3: Sample receipt temperature 6°C.

Version 3 issued on November 20, 2017 to report additional BTEX/VPH/LEPH/HEPH on 04275-03 as requested by Alvaro Garrido Hernan-Gomez of Golder. Version 3 is an amendment to all previous versions.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Certificate of Analysis

AGAT WORK ORDER: 17N276808

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-26

DATE REPORTED: 2017-11-08

		SAMPLE DESCRIPTION:		04274-01-6.0m	04274-02-6.0m	04274-06-5.5m	04274-08-2.5m		04274-10-4.5m	04274-12-3.5m	04275-02-3.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil		Soil	Soil	Soil
		DATE SAMPLED:		2017-10-23	2017-10-23	2017-10-23	2017-10-24		2017-10-24	2017-10-24	2017-10-24
Parameter	Unit	G / S	RDL	8854201	8854241	8854245	8854247	RDL	8854249	8854251	8854253
Naphthalene	µg/g		0.005	0.023	0.027	0.290	0.005	0.05	5.14	1.39	1.56
2-Methylnaphthalene	µg/g		0.005	<0.005	<0.005	0.287	<0.005	0.05	2.07	0.43	0.56
1-Methylnaphthalene	µg/g		0.005	<0.005	0.065	0.176	<0.005	0.05	0.87	0.16	0.21
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	0.05	<0.05	<0.05	<0.05
Fluorene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	0.2	<0.2	<0.2	<0.2
Phenanthrene	µg/g		0.02	0.13	0.13	0.11	0.03	0.2	<0.2	<0.2	<0.2
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	0.04	<0.04	<0.04	<0.04
Fluoranthene	µg/g		0.01	0.03	0.02	0.01	<0.01	0.01	<0.01	<0.01	<0.01
Pyrene	µg/g		0.01	0.07	0.08	0.05	<0.01	0.01	0.01	<0.01	<0.01
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	0.13	0.14	0.09	<0.05	0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	0.05	0.06	0.06	<0.05	0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	0.12	0.08	<0.05	0.05	<0.05	<0.05	<0.05
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.7	0.8	0.8	<0.6	0.6	<0.6	<0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	263	291	198	24	20	534	152	143
EPH C19-C32	µg/g		20	292	347	110	40	20	90	57	57
LEPH C10-C19	µg/g		20	263	291	197	24	20	529	150	142
HEPH C19-C32	µg/g		20	292	346	110	40	20	90	57	57
Benzo(b+j)fluoranthene	µg/g		0.05	0.05	0.06	0.06	<0.05	0.05	<0.05	<0.05	<0.05

Certified By: Angela Bond

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17N276808

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-26

DATE REPORTED: 2017-11-08

		SAMPLE DESCRIPTION:	04274-01-6.0m	04274-02-6.0m	04274-06-5.5m	04274-08-2.5m	04274-10-4.5m	04274-12-3.5m	04275-02-3.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-23	2017-10-23	2017-10-23	2017-10-24	2017-10-24	2017-10-24	2017-10-24
Surrogate	Unit	Acceptable Limits	8854201	8854241	8854245	8854247	8854249	8854251	8854253
Naphthalene - d8	%	50-130	80	74	79	58	78	71	80
2-Fluorobiphenyl	%	50-130	73	71	74	61	73	69	77
P-Terphenyl - d14	%	60-130	102	92	87	88	93	89	89

Certified By: Angela Bond

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Certificate of Analysis

AGAT WORK ORDER: 17N276808

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-26

DATE REPORTED: 2017-11-08

		SAMPLE DESCRIPTION:		04275-03-2.5m		04275-05-4.5m	04275-07-3.5m	04275-08-3.5m
		SAMPLE TYPE:		Soil		Soil	Soil	Soil
		DATE SAMPLED:		2017-10-24		2017-10-24	2017-10-24	2017-10-24
Parameter	Unit	G / S	RDL	8854254	RDL	8854256	8854258	8854259
Naphthalene	µg/g		0.05	0.93	0.05	2.28	1.59	1.66
2-Methylnaphthalene	µg/g		0.005	0.184	0.05	1.02	0.92	0.94
1-Methylnaphthalene	µg/g		0.005	0.172	0.05	0.43	0.41	0.38
Acenaphthylene	µg/g		0.005	<0.005	0.05	<0.05	<0.05	<0.05
Acenaphthene	µg/g		0.005	<0.005	0.05	<0.05	<0.05	<0.05
Fluorene	µg/g		0.02	<0.02	0.2	<0.2	<0.2	<0.2
Phenanthrene	µg/g		0.02	0.05	0.2	<0.2	<0.2	<0.2
Anthracene	µg/g		0.004	<0.004	0.04	<0.04	<0.04	<0.04
Fluoranthene	µg/g		0.01	<0.01	0.01	<0.01	<0.01	<0.01
Pyrene	µg/g		0.01	<0.01	0.01	0.01	0.01	<0.01
Benzo(a)anthracene	µg/g		0.03	<0.03	0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	0.05	<0.05	<0.05	<0.05
Quinoline	µg/g		0.05	<0.05	0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	0.6	<0.6	<0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	130	20	313	370	384
EPH C19-C32	µg/g		20	49	20	82	90	92
LEPH C10-C19	µg/g		20	129	20	311	369	382
HEPH C19-C32	µg/g		20	49	20	82	90	92
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	<0.05	<0.05

Certified By: Angela Bond

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Certificate of Analysis

AGAT WORK ORDER: 17N276808

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-26

DATE REPORTED: 2017-11-08

		SAMPLE DESCRIPTION:	04275-03-2.5m	04275-05-4.5m	04275-07-3.5m	04275-08-3.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-24	2017-10-24	2017-10-24	2017-10-24
Surrogate	Unit	Acceptable Limits	8854254	8854256	8854258	8854259
Naphthalene - d8	%	50-130	80	73	73	69
2-Fluorobiphenyl	%	50-130	91	67	67	68
P-Terphenyl - d14	%	60-130	102	91	92	89

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8854201-8854247 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8854249-8854253 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample dilution.

8854254 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Literature holding time exceeded.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8854256-8854259 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample dilution.

Certified By: Angela Bond

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Certificate of Analysis

AGAT WORK ORDER: 17N276808

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-10-26

DATE REPORTED: 2017-11-08

		SAMPLE DESCRIPTION:		04274-01-6.0m	04274-02-6.0m	04274-06-5.5m	04274-08-2.5m		04274-10-4.5m		04274-12-3.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil		Soil		Soil
		DATE SAMPLED:		2017-10-23	2017-10-23	2017-10-23	2017-10-24		2017-10-24		2017-10-24
Parameter	Unit	G / S	RDL	8854201	8854241	8854245	8854247	RDL	8854249	RDL	8854251
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1	<0.1
Benzene	µg/g		0.02	3.53	0.60	5.48	0.03	0.2	11.1	0.02	3.45
Toluene	µg/g		0.05	2.36	0.15	0.28	<0.05	0.05	2.28	0.05	0.20
Ethylbenzene	µg/g		0.05	0.25	<0.05	1.48	<0.05	0.5	14.0	0.05	5.10
m&p-Xylene	µg/g		0.05	1.03	<0.05	1.29	<0.05	0.5	17.1	0.05	4.69
o-Xylene	µg/g		0.05	0.27	<0.05	<0.05	<0.05	0.05	1.57	0.05	0.08
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
VPH	µg/g		10	58	11	138	<10	100	1750	10	245
VH	µg/g		10	66	12	146	<10	100	1790	10	259
Total Xylenes	ug/g		0.1	1.3	<0.1	1.3	<0.1	0.1	18.7	0.1	4.8
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		102	111	107	109		112		117
Dibromofluoromethane	%	60-140		81	94	80	98		86		83
Toluene - d8	%	60-140		107	117	110	109		113		114

Certified By: Angela Bond

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Certificate of Analysis

AGAT WORK ORDER: 17N276808

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-10-26

DATE REPORTED: 2017-11-08

SAMPLE DESCRIPTION:				04275-02-3.5m	04275-03-2.5m		04275-05-4.5m		04275-07-3.5m	04275-08-3.5m
SAMPLE TYPE:				Soil	Soil		Soil		Soil	Soil
DATE SAMPLED:				2017-10-24	2017-10-24		2017-10-24		2017-10-24	2017-10-24
Parameter	Unit	G / S	RDL	8854253	8854254	RDL	8854256	RDL	8854258	8854259
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	0.1	<0.1	0.1	<0.1	<0.1
Benzene	µg/g		0.02	4.48	2.59	0.02	7.31	0.02	1.20	1.15
Toluene	µg/g		0.05	0.37	0.16	0.05	0.71	0.05	0.21	0.19
Ethylbenzene	µg/g		0.05	6.49	4.02	0.05	9.22	0.05	2.51	1.84
m&p-Xylene	µg/g		0.05	5.82	1.68	0.05	11.1	0.05	3.74	2.04
o-Xylene	µg/g		0.05	0.17	0.14	0.05	0.33	0.05	0.09	0.08
Styrene	µg/g		0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
VPH	µg/g		10	325	145	100	958	10	526	365
VH	µg/g		10	342	154	100	986	10	534	370
Total Xylenes	ug/g		0.1	6.0	1.8	0.1	11.4	0.1	3.8	2.1
Surrogate	Unit	Acceptable Limits								
Bromofluorobenzene	%	60-140		122	96		111		116	118
Dibromofluoromethane	%	60-140		87	91		83		81	84
Toluene - d8	%	60-140		119	97		111		109	115

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8854201-8854247 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

8854249 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.
BTEX/VPH detection limits increased due to sample dilution.

8854251-8854254 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

8854256 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.
VH/VPH detection limits increased due to sample dilution.

8854258-8854259 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

Certified By: Angela Bond

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Certificate of Analysis

AGAT WORK ORDER: 17N276808

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX Analysis - Leachate

DATE RECEIVED: 2017-10-26

DATE REPORTED: 2017-11-08

		SAMPLE DESCRIPTION:		04274-10-4.5m
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-10-24
Parameter	Unit	G / S	RDL	8854249
Benzene - Leachable	mg/L		0.005	0.015
Toluene - Leachable	mg/L		0.005	0.011
Ethylbenzene - Leachable	mg/L		0.005	0.116
Xylenes - Leachable	mg/L		0.005	0.168
Surrogate	Unit	Acceptable Limits		
Bromofluorobenzene	%	70-130		101
Dibromofluoromethane	%	70-130		107
Toluene - d8	%	70-130		99

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8854249 Analysis based on "as received"

Certified By: Angela Bond

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Certificate of Analysis

AGAT WORK ORDER: 17N276808

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Dichloromethane in Soil

DATE RECEIVED: 2017-10-26

DATE REPORTED: 2017-11-08

SAMPLE DESCRIPTION:				04274-06-5.5m	04274-08-2.5m	04274-10-4.5m	04274-12-3.5m	04275-02-3.5m	04275-05-4.5m	04275-07-3.5m	04275-08-3.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-10-23	2017-10-24	2017-10-24	2017-10-24	2017-10-24	2017-10-24	2017-10-24	2017-10-24
Parameter	Unit	G / S	RDL	8854245	8854247	8854249	8854251	8854253	8854256	8854258	8854259
Dichloromethane	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		107	109	112	117	122	111	116	118
Dibromofluoromethane	%	60-140		80	98	86	83	87	83	81	84
Toluene - d8	%	60-140		110	109	113	114	119	111	109	115

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8854245-8854259 Results are based on dry weight of sample.

Certified By: Angela Bond

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17N276808
PROJECT: 1657709-6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Nov 08, 2017			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
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68174	8854259	<0.1	<0.1	NA	< 0.1	102%	80%	120%				101%	70%	130%
Benzene	68174	8854259	1.15	1.08	6.3%	< 0.02	101%	80%	120%				104%	70%	130%
Toluene	68174	8854259	0.19	0.17	NA	< 0.05	101%	80%	120%				99%	70%	130%
Ethylbenzene	68174	8854259	1.84	1.77	3.9%	< 0.05	101%	80%	120%				94%	70%	130%
m&p-Xylene	68174	8854259	2.04	1.94	5.0%	< 0.05	101%	80%	120%				96%	70%	130%
o-Xylene	68174	8854259	0.08	0.07	NA	< 0.05	102%	80%	120%				93%	70%	130%
Styrene	68174	8854259	<0.05	<0.05	NA	< 0.05	100%	80%	120%				88%	70%	130%
VPH	68174	8854259	365	359	1.7%	< 10									
VH	68174	8854259	370	364	1.6%	< 10									
Bromofluorobenzene	68174	8854259	118	113	4.3%		109%	60%	140%				103%	60%	140%
Dibromofluoromethane	68174	8854259	84	78	7.4%		101%	60%	140%				101%	60%	140%
Toluene - d8	68174	8854259	115	108	6.3%		107%	60%	140%				105%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Dichloromethane in Soil															
Dichloromethane	68174	8854259	<0.05	<0.05	NA	< 0.05	102%	80%	120%				86%	70%	130%
Bromofluorobenzene	68174	8854259	118	113	4.3%		109%	60%	140%				103%	60%	140%
Dibromofluoromethane	68174	8854259	84	78	7.4%		101%	60%	140%				101%	60%	140%
Toluene - d8	68174	8854259	115	108	6.3%		107%	60%	140%				105%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
BTEX Analysis - Leachate															
Benzene - Leachable	68224	8854249	0.015	0.015	NA	< 0.005	101%	80%	120%				88%	70%	130%
Toluene - Leachable	68224	8854249	0.011	0.011	NA	< 0.005	99%	80%	120%				90%	70%	130%
Ethylbenzene - Leachable	68224	8854249	0.116	0.116	0.0%	< 0.005	99%	80%	120%				92%	70%	130%
Bromofluorobenzene	68224	8854249	101	99	2.0%		100%	60%	140%				101%	60%	140%
Dibromofluoromethane	68224	8854249	107	107	0.0%		100%	60%	140%				101%	60%	140%
Toluene - d8	68224	8854249	99	98	1.0%		99%	60%	140%				101%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68174	8797769	0.010	0.009	NA	< 0.005	100%	80%	120%				106%	50%	130%
2-Methylnaphthalene	68174	8797769	0.037	0.031	17.6%	< 0.005	100%	80%	120%				86%	50%	130%
1-Methylnaphthalene	68174	8797769	0.011	0.010	NA	< 0.005	101%	80%	120%				94%	50%	130%
Acenaphthylene	68174	8797769	<0.005	<0.005	NA	< 0.005	100%	80%	120%				84%	50%	130%
Acenaphthene	68174	8797769	<0.005	<0.005	NA	< 0.005	100%	80%	120%				98%	50%	130%
Fluorene	68174	8797769	<0.02	<0.02	NA	< 0.02	100%	80%	120%				93%	50%	130%
Phenanthrene	68174	8797769	<0.02	<0.02	NA	< 0.02	100%	80%	120%				83%	60%	130%
Anthracene	68174	8797769	<0.004	<0.004	NA	< 0.004	101%	80%	120%				86%	60%	130%
Fluoranthene	68174	8797769	<0.01	<0.01	NA	< 0.01	101%	80%	120%				98%	60%	130%

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17N276808
PROJECT: 1657709-6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Nov 08, 2017			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
Pyrene	68174	8797769	<0.01	<0.01	NA	< 0.01	101%	80%	120%				94%	60%	130%
Benzo(a)anthracene	68174	8797769	<0.03	<0.03	NA	< 0.03	100%	80%	120%				89%	60%	130%
Chrysene	68174	8797769	<0.05	<0.05	NA	< 0.05	101%	80%	120%				97%	60%	130%
Benzo(b)fluoranthene	68174	8797769	<0.05	<0.05	NA	< 0.05	105%	80%	120%				80%	60%	130%
Benzo(j)fluoranthene	68174	8797769	<0.05	<0.05	NA	< 0.05	105%	80%	120%				92%	60%	130%
Benzo(k)fluoranthene	68174	8797769	<0.05	<0.05	NA	< 0.05	104%	80%	120%				88%	60%	130%
Benzo(a)pyrene	68174	8797769	<0.03	<0.03	NA	< 0.03	101%	80%	120%				90%	60%	130%
Indeno(1,2,3-c,d)pyrene	68174	8797769	<0.02	<0.02	NA	< 0.02	100%	80%	120%				88%	60%	130%
Dibenzo(a,h)anthracene	68174	8797769	<0.005	<0.005	NA	< 0.005	100%	80%	120%				86%	60%	130%
Benzo(g,h,i)perylene	68174	8797769	<0.05	<0.05	NA	< 0.05	100%	80%	120%				96%	60%	130%
Quinoline	68174	8797769	<0.05	<0.05	NA	< 0.05	101%	80%	120%				99%	50%	130%
EPH C10-C19	68174	8797769	24	<20	NA	< 20	111%	70%	130%				115%	65%	120%
EPH C19-C32	68174	8797769	109	104	4.7%	< 20	105%	70%	130%				107%	80%	120%
Naphthalene - d8	68174	8797769	91	91	0.0%		100%	80%	120%				97%	50%	130%
2-Fluorobiphenyl	68174	8797769	90	91	1.1%		101%	80%	120%				97%	50%	130%
P-Terphenyl - d14	68174	8797769	101	105	3.9%		100%	80%	120%				108%	60%	130%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68291	8908112	<0.1	<0.1	NA	< 0.1	98%	80%	120%				83%	70%	130%
Benzene	68291	8908112	<0.02	<0.02	NA	< 0.02	100%	80%	120%				95%	70%	130%
Toluene	68291	8908112	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	70%	130%
Ethylbenzene	68291	8908112	<0.05	<0.05	NA	< 0.05	99%	80%	120%				96%	70%	130%
m&p-Xylene	68291	8908112	<0.05	<0.05	NA	< 0.05	98%	80%	120%				96%	70%	130%
o-Xylene	68291	8908112	<0.05	<0.05	NA	< 0.05	98%	80%	120%				96%	70%	130%
Styrene	68291	8908112	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	70%	130%
VPH	68291	8908112	<10	<10	NA	< 10									
VH	68291	8908112	<10	<10	NA	< 10									
Bromofluorobenzene	68291	8908112	97	97	0.0%		100%	60%	140%				94%	60%	140%
Dibromofluoromethane	68291	8908112	104	104	0.0%		101%	60%	140%				91%	60%	140%
Toluene - d8	68291	8908112	106	106	0.0%		100%	60%	140%				90%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68289	8904753	0.008	0.011	NA	< 0.005	101%	80%	120%				119%	50%	130%
2-Methylnaphthalene	68289	8904753	0.074	0.077	4.0%	< 0.005	100%	80%	120%				106%	50%	130%
1-Methylnaphthalene	68289	8904753	0.037	0.047	23.8%	< 0.005	102%	80%	120%				119%	50%	130%
Acenaphthylene	68289	8904753	<0.005	<0.005	NA	< 0.005	100%	80%	120%				114%	50%	130%
Acenaphthene	68289	8904753	<0.005	<0.005	NA	< 0.005	99%	80%	120%				114%	50%	130%
Fluorene	68289	8904753	0.02	0.03	NA	< 0.02	101%	80%	120%				120%	50%	130%

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N276808

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Nov 08, 2017			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
Phenanthrene	68289	8904753	0.03	0.02	NA	< 0.02	101%	80%	120%				114%	60%	130%
Anthracene	68289	8904753	<0.004	<0.004	NA	< 0.004	97%	80%	120%				109%	60%	130%
Fluoranthene	68289	8904753	<0.01	<0.01	NA	< 0.01	102%	80%	120%				111%	60%	130%
Pyrene	68289	8904753	<0.01	<0.01	NA	< 0.01	98%	80%	120%				102%	60%	130%
Benzo(a)anthracene	68289	8904753	<0.03	<0.03	NA	< 0.03	103%	80%	120%				119%	60%	130%
Chrysene	68289	8904753	<0.05	<0.05	NA	< 0.05	101%	80%	120%				112%	60%	130%
Benzo(b)fluoranthene	68289	8904753	<0.05	<0.05	NA	< 0.05	99%	80%	120%				106%	60%	130%
Benzo(j)fluoranthene	68289	8904753	<0.05	<0.05	NA	< 0.05	96%	80%	120%				99%	60%	130%
Benzo(k)fluoranthene	68289	8904753	<0.05	<0.05	NA	< 0.05	104%	80%	120%				108%	60%	130%
Benzo(a)pyrene	68289	8904753	<0.03	<0.03	NA	< 0.03	97%	80%	120%				100%	60%	130%
Indeno(1,2,3-c,d)pyrene	68289	8904753	<0.02	<0.02	NA	< 0.02	98%	80%	120%				96%	60%	130%
Dibenzo(a,h)anthracene	68289	8904753	<0.005	<0.005	NA	< 0.005	98%	80%	120%				90%	60%	130%
Benzo(g,h,i)perylene	68289	8904753	<0.05	<0.05	NA	< 0.05	104%	80%	120%				84%	60%	130%
Quinoline	68289	8904753	<0.05	<0.05	NA	< 0.05	99%	80%	120%				88%	50%	130%
EPH C10-C19	68289	8904753	<20	<20	NA	< 20	111%	70%	130%				95%	65%	120%
EPH C19-C32	68289	8904753	<20	<20	NA	< 20	103%	70%	130%				96%	80%	120%
Naphthalene - d8	68289	8904753	78	79	1.3%		99%	80%	120%				107%	50%	130%
2-Fluorobiphenyl	68289	8904753	89	93	4.4%		100%	80%	120%				108%	50%	130%
P-Terphenyl - d14	68289	8904753	94	98	4.2%		100%	80%	120%				109%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By: Angela Bond

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N276808

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N276808

PROJECT: 1657709-6000

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SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Benzene - Leachable	ORG-180-5130, ORG-180-5135	BC Lab Manual section D, and EPA 1311	GC/MS/FID
Toluene - Leachable	ORG-180-5130, ORG-180-5135	BC Lab Manual section D, and EPA 1311	GC/MS/FID
Ethylbenzene - Leachable	ORG-180-5130, ORG-180-5135	BC Lab Manual section D, and EPA 1311	GC/MS/FID
Dichloromethane	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS
Bromofluorobenzene	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS
Dibromofluoromethane	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS
Toluene - d8	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS

17N276808

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04274 page 1 of _

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1665 7709-6000			Laboratory Name: AGAT
Short Title: K9 Remediation	Golder Contact: Erin O'brien		Address: 120-8160 Glenlyon
Golder E-mail Address 1: ABruemmer @golder.com	Golder E-mail Address 2: EObrien @golder.com	Telephone/Fax: 250 774 6500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: ~~AB~~ BC2133859

EQuIS upload: ☒

Alvaro_Garridohernan-Gomez@Golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ ~~Regular~~ (5 Days) 4DAN

Criteria: ☒ ~~CSR~~ ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX VPH	LEPH EPH (C10-C19)	Naphthalene	2-methylnaphthalene	Dichloromethane	Hold	RUSH (Select TAT above)	Remarks (over)
A274 - 01	Ex17-01	B29	6.0	Soil	23Oct17	1420	GRAB	N		4	X	X	X	X				8854201
- 02		B30	6.0			1425					X	X	X	X				241
- 03		W28d	2.5			1430										X		242
- 04		W28e	3.5			1435										X		243
- 05		W28f	4.5			1440										X		244
- 06		W28g	5.5			1445					X	X	X	X	X			245
- 07		W28h	6.0		↓	1450										X		246
- 08		W27d	2.5		24Oct17	1230					X	X	X	X	X			247
- 09		W27e	3.5			1235										X		248
- 10		W27f	A.5			1240										X		249
↓ - 11		W26d	2.5			1250		↓								X		250
04274 - 12		W26e	3.5	↓		1255	↓	FDA	04275-02	↓	X	X	X	X	X			251

Sampler's Signature:	Relinquished by: Signature	Company: GAL	Date: 25Oct17	Time: 8:00	Received by: Signature / Company: AGAT
Comments: ON ICE	Method of Shipment: PICK UP	Waybill No.:	Received for Lab by: Ann	Date	Time
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 6	Cooler opened by:	Date / Time

WHITE: Golder Co YELLOW: Lab Copy

ESED

17N276808 OCT 29 PM 1:03

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04275 page 2 of _

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709-6000			Laboratory Name: AGAT
Short Title: K19 Remediation	Golder Contact: Erin O'brien		Address: 120-8600 Glenlyon
Golder E-mail Address 1: Abruemmer@golder.com	Golder E-mail Address 2: EObrien@golder.com	Telephone/Fax: 2507746500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 481433859
EQuIS upload: ☒

Alvaro_Garridohernan-gamez@golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days) 3 Day
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX/VPH/VP	LEPH/HEPH (C10-C19)	Naphthalene	2-methylnaphthalene	Dichloromethane	Hold	RUSH (Select TAT above)	Remarks (over)
04275-01	EX17-01	W22a	4.5	Soil	24Oct17	13:00	GRAB	N		4						X		8854252
-02		W22e	3.5			12:55		FD	04274-12		X	X	X		X			253
-03		W22c	2.5			13:10		N								X		254
-04		W22d	3.5			13:15		N								X		255
-05		W22e	4.5e			13:20		N			X	X	X	X	X			256
-06		W21c	2.5			13:25		N								X		257
-07		W21d	3.5			13:30		FDA	04275-08		X	X	X	X	X			258
-08		W21d	3.5			13:30		FD	04275-07		X	X	X	X	X			259
-09		W21e	4.5			13:35		N								X		260
-10																		
-11																		
-12																		

Sampler's Signature:	Relinquished by: Signature	Company: GAL	Date: 25Oct17	Time: 8:00	Received by: Signature	Company: AGAT
Comments: ON ICE	Method of Shipment: Pick-up.	Waybill No.:	Received for Lab by: Ana	Date	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 6	Cooler opened by:	Date	Time

WHITE: Golder Copy YELLOW: Lab Copy

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17N276808

RECEIVING BASICS:
Received From: NOV ex Waybill #: _____

SAMPLE QUANTITIES:
Coolers: 1 Containers: 84

TIME SENSITIVE ISSUES:
Earliest Date Sampled: 23-OCT-17 ALREADY EXCEEDED? Yes (No)

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 + 6 = 6 °C (2) ___ + ___ + ___ = ___ °C (3) ___ + ___ + ___ = ___ °C (4) ___ + ___ + ___ = ___ °C

Was ice or ice pack present: (Yes) No

Integrity Issues:

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date and Time: _____

ADDITIONAL NOTES:
custody seal intact

Document #: SR-186-9504.001
Revision Date: July 9, 2014

Page 1 of 1

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: HOLDER

Courier: CMA Prepaid Collect

Waybill#

Branch: EDM GP (FN) FM RD VAN LYD FSJ EST Other:

Custody Seal Intact: Yes No NA

TAT: <24hr 24-48hr 48-72hr Reg Other 4 DAYS

Cooler Quantity: 1

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry:

Hydrocarbons: Earliest Expiry

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken:

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: Yes (No)

Coolant Used: Icepack (Bagged Ice) Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) 0 + -1 + 5 = 3 °C 2(Bottle/Jar)___+___+___=___°C

3 (Bottle/Jar)___+___+___=___°C 4 (Bottle/Jar)___+___+___=___°C

5 (Bottle/Jar)___+___+___=___°C 6 (Bottle/Jar)___+___+___=___°C

7 (Bottle/Jar)___+___+___=___°C 8 (Bottle/Jar)___+___+___=___°C

9 (Bottle/Jar)___+___+___=___°C 10 (Bottle/Jar)___+___+___=___°C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No:

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other:

Account Project Manager: have they been notified of the above issues: Yes No

Whom spoken to: Date/Time:

CPM Initial

General Comments:

* Subcontracted Analysis (See CPM)

Date issued: May 22, 2015

AGAT Laboratories

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: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709

AGAT WORK ORDER: 17N280287

SOIL ANALYSIS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

TRACE ORGANICS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

DATE REPORTED: Nov 08, 2017

PAGES (INCLUDING COVER): 22

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 1: Sample receipt temperature 2°C.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17N280287

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works Metals in Soil

DATE RECEIVED: 2017-11-03

DATE REPORTED: 2017-11-06

		SAMPLE DESCRIPTION:		04284-01
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-11-01
Parameter	Unit	G / S	RDL	8877558
Aluminum	µg/g		10	6020
Antimony	µg/g		0.1	0.4
Arsenic	µg/g		0.1	6.5
Barium	µg/g		0.5	191
Beryllium	µg/g		0.1	0.3
Bismuth	µg/g		0.5	<0.5
Cadmium	µg/g		0.01	0.35
Calcium	µg/g		10	67700
Chromium	µg/g		1	14
Cobalt	µg/g		0.1	6.1
Copper	µg/g		0.2	12.6
Iron	µg/g		10	25700
Lead	µg/g		0.1	5.8
Lithium	µg/g		0.5	9.5
Magnesium	µg/g		10	13000
Manganese	µg/g		1	481
Mercury	µg/g		0.01	0.04
Molybdenum	µg/g		0.2	1.8
Nickel	µg/g		0.5	17.4
Phosphorus	µg/g		5	485
Potassium	µg/g		5	1280
Selenium	µg/g		0.1	0.4
Silver	µg/g		0.5	<0.5
Sodium	µg/g		5	227
Strontium	µg/g		1	70
Thallium	µg/g		0.1	0.2
Tin	µg/g		0.2	0.3
Titanium	µg/g		1	187
Uranium	µg/g		0.2	1.4
Vanadium	µg/g		1	24

Certified By:

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AGAT WORK ORDER: 17N280287

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works Metals in Soil

DATE RECEIVED: 2017-11-03

DATE REPORTED: 2017-11-06

			SAMPLE DESCRIPTION:	04284-01
			SAMPLE TYPE:	Soil
			DATE SAMPLED:	2017-11-01
Parameter	Unit	G / S	RDL	8877558
Zinc	µg/g		1	61
Zirconium	µg/g		0.1	3.3
pH 1:2	pH units		0.05	8.44

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8877558 Results are based on the dry weight of the sample

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 17N280287

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-03

DATE REPORTED: 2017-11-07

SAMPLE DESCRIPTION:				04277-01-6.0m	04277-02-6.0m	04277-03-6.0m	04277-04-6.0m	04277-05-6.0m	04277-06-6.0m	04277-09-6.0m	04277-11-4.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-10-31
Parameter	Unit	G / S	RDL	8877516	8877527	8877528	8877529	8877532	8877535	8877541	8877543
Naphthalene	µg/g		0.005	<0.005	0.115	0.005	0.016	0.012	<0.005	0.005	<0.005
2-Methylnaphthalene	µg/g		0.005	0.020	0.426	0.042	0.161	0.107	<0.005	<0.005	<0.005
1-Methylnaphthalene	µg/g		0.005	0.012	0.253	0.024	0.089	0.060	0.019	0.012	<0.005
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	0.03	0.07	0.03	0.06	0.04	<0.02	<0.02	<0.02
Phenanthrene	µg/g		0.02	0.11	0.20	0.10	0.18	0.18	0.06	0.06	0.03
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	0.01	<0.01	0.01	0.01	0.02	0.01	0.01
Pyrene	µg/g		0.01	0.02	0.02	0.02	0.02	0.03	0.04	0.02	0.02
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	0.05	0.07	<0.05	0.06
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.06	0.07	0.05	0.05	0.06	0.06	<0.05	0.06
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	<0.6	<0.6	0.6	0.6	<0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	31	54	30	41	84	164	82	134
EPH C19-C32	µg/g		20	60	73	49	46	85	262	95	201
LEPH C10-C19	µg/g		20	31	54	30	41	84	164	82	134
HEPH C19-C32	µg/g		20	60	73	49	46	85	262	95	201
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 17N280287

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-03

DATE REPORTED: 2017-11-07

		SAMPLE DESCRIPTION:	04277-01-6.0m	04277-02-6.0m	04277-03-6.0m	04277-04-6.0m	04277-05-6.0m	04277-06-6.0m	04277-09-6.0m	04277-11-4.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-10-31
Surrogate	Unit	Acceptable Limits	8877516	8877527	8877528	8877529	8877532	8877535	8877541	8877543
Naphthalene - d8	%	50-130	90	89	84	83	88	75	84	80
2-Fluorobiphenyl	%	50-130	92	91	86	86	91	77	80	76
P-Terphenyl - d14	%	60-130	97	100	94	92	95	89	91	86

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AGAT WORK ORDER: 17N280287

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-03

DATE REPORTED: 2017-11-07

SAMPLE DESCRIPTION:				04277-12-4.5m	04278-03-1.5m	04278-05-5.5m	04278-08-2.5m	04284-01	04284-02-6.0m	04284-03-6.0m	04284-05-4.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-11-01	2017-11-01	2017-11-01	2017-11-01
Parameter	Unit	G / S	RDL	8877544	8877548	8877551	8877554	8877558	8877560	8877561	8877563
Naphthalene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2-Methylnaphthalene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1-Methylnaphthalene	µg/g		0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	0.019	<0.005
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phenanthrene	µg/g		0.02	0.03	0.02	0.09	0.03	<0.02	0.10	0.10	0.10
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	<0.01	0.01	<0.01	<0.01	0.02	0.01	0.01
Pyrene	µg/g		0.01	0.03	<0.01	0.03	<0.01	<0.01	0.03	0.03	0.03
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	0.08	<0.05	0.07	<0.05	<0.05	0.07	0.08	0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.07	<0.05	0.07	<0.05	<0.05	0.07	0.07	0.05
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	<0.6	0.6	<0.6	<0.6	0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	163	26	234	31	<20	184	248	158
EPH C19-C32	µg/g		20	235	42	384	64	<20	281	370	210
LEPH C10-C19	µg/g		20	163	26	234	31	<20	184	248	158
HEPH C19-C32	µg/g		20	235	42	384	64	<20	281	369	210
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 17N280287

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-03

DATE REPORTED: 2017-11-07

		SAMPLE DESCRIPTION:	04277-12-4.5m	04278-03-1.5m	04278-05-5.5m	04278-08-2.5m	04284-01	04284-02-6.0m	04284-03-6.0m	04284-05-4.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-11-01	2017-11-01	2017-11-01	2017-11-01
Surrogate	Unit	Acceptable Limits	8877544	8877548	8877551	8877554	8877558	8877560	8877561	8877563
Naphthalene - d8	%	50-130	85	83	79	82	68	92	90	88
2-Fluorobiphenyl	%	50-130	81	88	77	85	73	93	83	83
P-Terphenyl - d14	%	60-130	92	91	89	95	86	100	97	99

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8877516-8877563 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.

Certified By:

AGAT Laboratories

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PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-03

DATE REPORTED: 2017-11-07

		SAMPLE DESCRIPTION:		04277-01-6.0m	04277-02-6.0m	04277-03-6.0m	04277-04-6.0m	04277-05-6.0m	04277-06-6.0m	04277-09-6.0m	04277-11-4.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-10-31
Parameter	Unit	G / S	RDL	8877516	8877527	8877528	8877529	8877532	8877535	8877541	8877543
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	0.83	3.11	0.34	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	0.11	0.09	0.89	0.09	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.36	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
VH	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		89	96	99	94	98	94	96	97
Dibromofluoromethane	%	60-140		101	107	110	105	109	106	109	110
Toluene - d8	%	60-140		86	92	94	89	93	93	93	94

Certified By:

AGAT Laboratories
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Certificate of Analysis

AGAT WORK ORDER: 17N280287

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-03

DATE REPORTED: 2017-11-07

		SAMPLE DESCRIPTION:		04277-12-4.5m	04278-03-1.5m	04278-05-5.5m	04278-08-2.5m	04284-01	04284-02-6.0m	04284-03-6.0m	04284-05-4.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-10-31	2017-10-31	2017-10-31	2017-10-31	2017-11-01	2017-11-01	2017-11-01	2017-11-01
Parameter	Unit	G / S	RDL	8877544	8877548	8877551	8877554	8877558	8877560	8877561	8877563
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
VH	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		95	99	95	99	95	98	96	96
Dibromofluoromethane	%	60-140		107	110	108	111	108	110	109	109
Toluene - d8	%	60-140		92	95	92	95	91	94	92	92

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8877516-8877563 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

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Certificate of Analysis

AGAT WORK ORDER: 17N280287

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Dichloromethane in Soil

DATE RECEIVED: 2017-11-03

DATE REPORTED: 2017-11-08

		SAMPLE DESCRIPTION:		04277-05-6.0m
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-10-31
Parameter	Unit	G / S	RDL	8877532
Dichloromethane	µg/g		0.05	<0.05
Surrogate	Unit	Acceptable Limits		
Bromofluorobenzene	%	60-140		105
Dibromofluoromethane	%	60-140		109
Toluene - d8	%	60-140		117

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8877532 Results are based on dry weight of sample.

Certified By:

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N280287

PROJECT: 1657709

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date:			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
Public Works Metals in Soil															
Aluminum	8829786		4110	4630	12.0%	< 10	103%	70%	130%	105%	90%	110%			
Antimony	8864788		0.2	0.1	NA	< 0.1	92%	70%	130%	94%	90%	110%			
Barium	8864788		151	142	6.2%	< 0.5	90%	70%	130%	96%	90%	110%			
Beryllium	8864788		0.2	0.2	NA	< 0.1	92%	70%	130%	91%	90%	110%			
Bismuth	8864788		<0.5	<0.5	NA	< 0.5				98%	85%	115%			
Cadmium	8864788		0.19	0.18	3.3%	< 0.01	92%	70%	130%	95%	90%	110%			
Calcium	8829786		16200	16900	4.6%	< 10	111%	70%	130%	108%	90%	110%			
Chromium	8864788		54	54	0.2%	< 1	103%	70%	130%	99%	90%	110%			
Cobalt	8864788		10.3	9.5	7.8%	< 0.1	98%	70%	130%	95%	90%	110%			
Copper	8864788		37.8	36.8	2.7%	< 0.2	94%	70%	130%	97%	90%	110%			
Iron	8829786		10300	13800	29.3%	< 10	101%	70%	130%	107%	90%	110%			
Lead	8864788		47.4	46.1	2.7%	< 0.1	91%	70%	130%	93%	90%	110%			
Lithium	8864788		23.8	23.4	1.7%	< 0.5				91%	85%	115%			
Magnesium	8864788		12300	12200	0.8%	< 10	111%	70%	130%	109%	90%	110%			
Manganese	8864788		405	388	4.2%	< 1	91%	70%	130%	93%	90%	110%			
Mercury	8864788		0.08	0.09	7.7%	< 0.01	81%	70%	130%	92%	90%	110%			
Molybdenum	8864788		1.7	1.9	6.5%	< 0.2	89%	70%	130%	91%	90%	110%			
Nickel	8864788		15.4	14.3	7.5%	< 0.5	96%	70%	130%	93%	90%	110%			
Phosphorus	8829786		355	441	21.6%	< 5	105%	70%	130%	106%	90%	110%			
Potassium	8829786		353	425	18.5%	< 5	110%	70%	130%	105%	90%	110%			
Selenium	8864788		0.9	0.9	4.1%	< 0.1				95%	90%	110%			
Silver	8864788		<0.5	<0.5	NA	< 0.5	111%	70%	130%	100%	90%	110%			
Sodium	8829786		830	819	1.2%	< 5	110%	70%	130%	103%	90%	110%			
Strontium	8864788		26	24	6.0%	< 1	99%	70%	130%	94%	90%	110%			
Thallium	8864788		0.1	0.1	NA	< 0.1	109%	70%	130%	99%	90%	110%			
Titanium	8829786		258	329	24.0%	< 1	126%	70%	130%	106%	90%	110%			
Uranium	8864788		0.4	0.4	NA	< 0.2	98%	70%	130%	100%	90%	110%			
Vanadium	8864788		138	141	1.8%	< 1	102%	70%	130%	97%	90%	110%			
Zinc	8864788		93	94	1.6%	< 1	96%	70%	130%	93%	90%	110%			
Zirconium	8864788		0.2	0.2	NA	< 0.1				90%	90%	110%			
pH 1:2	8829786		9.30	9.33	0.3%		94%	90%	110%	100%	95%	105%			

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By:

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17N280287
PROJECT: 1657709
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date:			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
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68223	8877532	<0.1	<0.1	NA	< 0.1	100%	80%	120%				92%	70%	130%
Benzene	68223	8877532	0.83	0.83	0.0%	< 0.02	101%	80%	120%				92%	70%	130%
Toluene	68223	8877532	0.09	0.09	NA	< 0.05	99%	80%	120%				90%	70%	130%
Ethylbenzene	68223	8877532	<0.05	<0.05	NA	< 0.05	99%	80%	120%				89%	70%	130%
m&p-Xylene	68223	8877532	<0.05	<0.05	NA	< 0.05	98%	80%	120%				88%	70%	130%
o-Xylene	68223	8877532	<0.05	<0.05	NA	< 0.05	98%	80%	120%				89%	70%	130%
Styrene	68223	8877532	<0.05	<0.05	NA	< 0.05	100%	80%	120%				93%	70%	130%
VPH	68223	8877532	<10	<10	NA	< 10									
VH	68223	8877532	<10	<10	NA	< 10									
Bromofluorobenzene	68223	8877532	98	98	0.0%		100%	60%	140%				97%	60%	140%
Dibromofluoromethane	68223	8877532	109	109	0.0%		100%	60%	140%				100%	60%	140%
Toluene - d8	68223	8877532	93	93	0.0%		99%	60%	140%				87%	60%	140%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68223	8877532	0.012	0.010	NA	< 0.005	99%	80%	120%				99%	50%	130%
2-Methylnaphthalene	68223	8877532	0.107	0.094	12.9%	< 0.005	93%	80%	120%				81%	50%	130%
1-Methylnaphthalene	68223	8877532	0.060	0.053	12.4%	< 0.005	99%	80%	120%				101%	50%	130%
Acenaphthylene	68223	8877532	<0.005	<0.005	NA	< 0.005	100%	80%	120%				98%	50%	130%
Acenaphthene	68223	8877532	<0.005	<0.005	NA	< 0.005	101%	80%	120%				96%	50%	130%
Fluorene	68223	8877532	0.04	0.04	NA	< 0.02	100%	80%	120%				104%	50%	130%
Phenanthrene	68223	8877532	0.18	0.17	5.7%	< 0.02	98%	80%	120%				85%	60%	130%
Anthracene	68223	8877532	<0.004	<0.004	NA	< 0.004	103%	80%	120%				93%	60%	130%
Fluoranthene	68223	8877532	0.01	0.01	NA	< 0.01	100%	80%	120%				96%	60%	130%
Pyrene	68223	8877532	0.03	0.03	NA	< 0.01	100%	80%	120%				95%	60%	130%
Benzo(a)anthracene	68223	8877532	<0.03	<0.03	NA	< 0.03	101%	80%	120%				98%	60%	130%
Chrysene	68223	8877532	0.05	0.05	NA	< 0.05	101%	80%	120%				99%	60%	130%
Benzo(b)fluoranthene	68223	8877532	<0.05	<0.05	NA	< 0.05	96%	80%	120%				87%	60%	130%
Benzo(j)fluoranthene	68223	8877532	<0.05	<0.05	NA	< 0.05	101%	80%	120%				102%	60%	130%
Benzo(k)fluoranthene	68223	8877532	<0.05	<0.05	NA	< 0.05	101%	80%	120%				94%	60%	130%
Benzo(a)pyrene	68223	8877532	<0.03	<0.03	NA	< 0.03	102%	80%	120%				101%	60%	130%
Indeno(1,2,3-c,d)pyrene	68223	8877532	<0.02	<0.02	NA	< 0.02	101%	80%	120%				96%	60%	130%
Dibenzo(a,h)anthracene	68223	8877532	<0.005	<0.005	NA	< 0.005	101%	80%	120%				90%	60%	130%
Benzo(g,h,i)perylene	68223	8877532	0.06	0.05	NA	< 0.05	101%	80%	120%				97%	60%	130%
Quinoline	68223	8877532	<0.05	<0.05	NA	< 0.05	101%	80%	120%				103%	50%	130%
EPH C10-C19	68223	8877532	84	74	NA	< 20	105%	70%	130%				111%	65%	120%
EPH C19-C32	68223	8877532	85	74	NA	< 20	98%	70%	130%				99%	80%	120%
Naphthalene - d8	68223	8877532	88	81	8.3%		102%	80%	120%				113%	50%	130%
2-Fluorobiphenyl	68223	8877532	91	84	8.0%		105%	80%	120%				104%	50%	130%

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N280287

PROJECT: 1657709

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date:			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
P-Terphenyl - d14	68223	8877532	95	92	3.2%		100%	80%	120%				105%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Dichloromethane in Soil															
Dichloromethane	68223	8877532	<0.05	<0.05	NA	< 0.05	100%	80%	120%				92%	70%	130%
Bromofluorobenzene	68223	8877532	105	102	2.9%		107%	60%	140%				107%	60%	140%
Dibromofluoromethane	68223	8877532	109	104	4.7%		102%	60%	140%				99%	60%	140%
Toluene - d8	68223	8877532	117	113	3.5%		100%	60%	140%				104%	60%	140%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N280287

PROJECT: 1657709

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Antimony	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Arsenic	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Barium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Beryllium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Bismuth	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cadmium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Calcium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Chromium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cobalt	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Copper	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Iron	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Lead	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Lithium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Magnesium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Manganese	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Mercury	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Molybdenum	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Nickel	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Phosphorus	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Potassium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Selenium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Silver	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Sodium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Strontium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Thallium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Tin	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N280287

PROJECT: 1657709

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Titanium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Uranium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Vanadium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zinc	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zirconium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
pH 1:2	INOR-181-6031	BC MOE Lab Manual B (pH, Electrometric, Soil)	PH METER

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N280287

PROJECT: 1657709

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
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CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N280287

PROJECT: 1657709

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dichloromethane	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS
Bromofluorobenzene	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS
Dibromofluoromethane	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS
Toluene - d8	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17N280287

No. 04277 page 1 of 3

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709		Laboratory Name: AGAT	
Short Title: Kia Remediation	Golder Contact: Erin O'brien	Address: 60-8600 Glenlyon	
Golder E-mail Address 1: EObrien @golder.com	Golder E-mail Address 2: Abruemmer @golder.com	Telephone/Fax: 250 7746500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

Alvaro-Garci.Hernan-Gomez@golder.com

Turnaround Time: ☐ 24 hr ☒ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX VPH VP	LEPH EPA(C10-C19)	Naphthalene	2-methylnaphthalene	Dichloromethane	Hold	RUSH (Select TAT above)	Remarks (over)
04277 - 01	EX17-01	B34	6.0	Soil	31/10/17	12:00	Grab			4	X	X	X	X				8877516
- 02		B35				12:05					X	X	X	X				27
- 03		B36				12:10					X	X	X	X				28
- 04		B37				12:20					X	X	X	X				29
- 05		B38				12:30					X	X	X	X	X			32
- 06		B39				12:40					X	X	X	X		Hold		35
- 07		W28I				12:50		FDA	04277-08							X		~~Rush 48hr~~ 38
- 08		W28I				12:50		FD	04277-07							X		~~Rush 48hr~~ 40
- 09		B40				13:00					X	X	X	X		Hold		41
- 10		W29F	5.5			15:00										X		~~Rush 48hr~~ 42
- 11		W29E	4.5			15:05		FDA	04277-12		X	X	X	X				Rush 48hr 43
- 12		W29F	4.5			15:05		FD	04277-11		X	X	X	X				Rush 48hr 44

Sampler's Signature:	Relinquished by: Signature	Company: GOLDER	Date: 02/11/17	Time: 06:30	Received by: Signature / Company
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by:	Date	Time
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date / Time

WHITE: Golder Copy YELLOW: Lab Copy

Keen Kay

ESED

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17N285287

No. 04278 page 2 of 3

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 16577109		Laboratory Name: AGAT NOV 3 AM 11:42	
Short Title: KIA Remediation	Golder Contact: Erin Donen	Address: 120 8600 Glenlyon	
Golder E-mail Address 1: Abruemmer @golder.com	Golder E-mail Address 2: EDonen @golder.com	Telephone/Fax: 2507746500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: EQuIS upload: ☒ 28433859

Alvaro_Garridohernan-gomez@Golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX VPH VH	LEPH EPH (C10-C19)	Naphthalene	2-methylnaphthalene		Dichloromethane		Hold		RUSH (Select TAT above)	Remarks (over)
04278 - 01	EX17-01	W29D	3.5	SOIL	31/10/17	15:10	GRAB			4								X			8877546
- 02		W29C	2.5			15:20				4								X			47
- 03		W29B	1.5			15:30				4	X	X	X	X							Rush 48 hr
- 04		W29A	0.5			15:40				4								X			
- 05		W30F	5.5			15:50				4	X	X	X	X							Rush 48 hr
- 06		W30E	4.5			16:00				4								X			
- 07		W30D	3.5			16:10				4								X			
- 08		W30C	2.5			16:20				4	X	X	X	X							Rush 48 hr
- 09		W30B	1.5			16:25				4								X			
- 10		W30A	0.5			16:30				4								X			
- 11																					
- 12																					

48 49 51 52 53 54 55 56

Sampler's Signature:	Relinquished by: Signature	Company: GOLDER	Date: 02/11/17	Time: 06:30	Received by: Signature	Company	
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by:		Date	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	Time	

WHITE: Golder Co YELLOW: Lab Copy

Keen

ESED

17N280287

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04284 page 3 of 3

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709

Short Title: KIA Remediation

Golder Contact: Erin Obrien

Golder E-mail Address 1: Aloruemmer @golder.com

Golder E-mail Address 2: Eobrien @golder.com

Laboratory Name: AGAT NOV 3 ... 2°C

Address: 120-8600 Glenlyon

Telephone/Fax: 2507746500

Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433859 Alvaro_Garrido Hernan Gomez @golder.com

EQuIS upload: ☒

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☐ Regular (5 Days)

Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX VPH VH	LEPH EPH (C10-C19)	Naphthalene	2-methylnaphthalene	BTEX/VPH	Dichloromethane	LEPH/HEPH/PAHs	Hold	Metals	RUSH (Select TAT above)	Remarks (over)
04284 - 01	BACKFILL	3	—	SOIL	01/11/17	09:30	COMP			4					X		X		X		8877558
- 02	EX17-01-B41		6.0	↓	↓	14:00	Grab			↓	X	X	X	X				X (scribbled)			60
- 03	EX17-01-B42		6.0			14:05					X	X	X	X							61
- 04	EX17-01-W31F		5.5			14:10												X			62
- 05	EX17-01-W31E		4.5			14:20					X	X	X	X							Rush 48hr 63
- 06	EX17-01-W31D		3.5	↓	↓	14:30	↓			↓								X			65
- 07																					
- 08																					
- 09																					
- 10																					
- 11																					
- 12																					

Sampler's Signature: [signature]

Relinquished by: Signature [signature] | Company: GOLDER | Date: 02/11/17 | Time: 06:30

Received by: Signature | Company

Comments:

Method of Shipment:

Waybill No.:

Received for Lab by: | Date | Time

Shipped by:

Shipment Condition:

Seal Intact:

Temp (°C) | Cooler opened by: | Date | Time

WHITE: Golder Copy YELLOW: Lab Copy

Keen Kdf

ESED

04277

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: GOLDER

Courier: _____ (Prepaid) Collect

Waybill# _____

Branch: EDM GP FN FM RD VAN LYD FSJ EST Other: _____

Custody Seal Intact: Yes No NA

TAT: <24hr 24-48hr 48-72hr (Reg) Other _____

Cooler Quantity: 2

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry: _____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken: _____

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: Yes (No)

Coolant Used: Icepack (Bagged Ice) Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) 4 + 5 + 2 = 4 °C

2 (Bottle/Jar) -6 + -2 + 1 = -2 °C

3 (Bottle/Jar) ___ + ___ + ___ = ___ °C

4 (Bottle/Jar) ___ + ___ + ___ = ___ °C

5 (Bottle/Jar) ___ + ___ + ___ = ___ °C

6 (Bottle/Jar) ___ + ___ + ___ = ___ °C

7 (Bottle/Jar) ___ + ___ + ___ = ___ °C

8 (Bottle/Jar) ___ + ___ + ___ = ___ °C

9 (Bottle/Jar) ___ + ___ + ___ = ___ °C

10 (Bottle/Jar) ___ + ___ + ___ = ___ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: _____

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial _____

General Comments: _____

* Subcontracted Analysis (See CPM)

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17N28087

RECEIVING BASICS:

Received From: LOVEX (CMA) Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 2 Containers: 112

TIME SENSITIVE ISSUES:

Earliest Date Sampled: Oct 31, 2017 ALREADY EXCEEDED? Yes (No)

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) 2 + 1 + 2 = 2 °C (2) 1 + 3 + 3 = 2 °C (3) ___ + ___ + ___ = ___ °C (4) ___ + ___ + ___ = ___ °C

Was ice or ice pack present: (Yes) No

Integrity Issues:

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date and Time: _____

ADDITIONAL NOTES:

AGAT Laboratories

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: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709

AGAT WORK ORDER: 17N280522

TRACE ORGANICS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

DATE REPORTED: Nov 09, 2017

PAGES (INCLUDING COVER): 21

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 2: Sample receipt temperature 3°C.

Version 2 issued on November 17, 2017 to report benzene reanalysis results. Version 2 is an amendment to version 1.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17N280522

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-04

DATE REPORTED: 2017-11-09

SAMPLE DESCRIPTION:				04285-01-5.5m	04285-02-5.5m	04285-03-5.5m	04285-06-2.5m	04285-11-0.5m	04286-03-3.5m	04286-06-0.5m	04286-07-4.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02
Parameter	Unit	G / S	RDL	8879480	8879484	8879485	8879488	8879493	8879497	8879500	8879501
Naphthalene	µg/g		0.005	<0.005	0.007	0.010	<0.005	<0.005	<0.005	<0.005	<0.005
2-Methylnaphthalene	µg/g		0.005	<0.005	<0.005	0.047	<0.005	<0.005	<0.005	<0.005	<0.005
1-Methylnaphthalene	µg/g		0.005	0.021	0.029	0.035	<0.005	<0.005	<0.005	<0.005	0.012
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phenanthrene	µg/g		0.02	0.10	0.17	0.18	0.03	<0.02	0.02	<0.02	0.03
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	0.02	0.02	<0.01	<0.01	<0.01	<0.01	0.01
Pyrene	µg/g		0.01	0.03	0.04	0.03	0.01	<0.01	<0.01	<0.01	0.03
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	0.07	0.08	0.09	<0.05	<0.05	<0.05	<0.05	0.07
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.08	0.10	0.11	<0.05	<0.05	<0.05	<0.05	0.07
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	0.6	0.6	<0.6	<0.6	<0.6	<0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	278	253	286	77	<20	45	<20	126
EPH C19-C32	µg/g		20	442	385	435	160	72	82	29	154
LEPH C10-C19	µg/g		20	278	253	286	77	<20	45	<20	126
HEPH C19-C32	µg/g		20	442	385	435	160	72	82	29	154
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17N280522

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-04

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:	04285-01-5.5m	04285-02-5.5m	04285-03-5.5m	04285-06-2.5m	04285-11-0.5m	04286-03-3.5m	04286-06-0.5m	04286-07-4.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02
Surrogate	Unit	Acceptable Limits	8879480	8879484	8879485	8879488	8879493	8879497	8879500	8879501
Naphthalene - d8	%	50-130	87	94	85	70	71	64	85	93
2-Fluorobiphenyl	%	50-130	80	91	83	84	74	66	91	84
P-Terphenyl - d14	%	60-130	94	101	89	97	93	97	108	99

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Certificate of Analysis

AGAT WORK ORDER: 17N280522

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-04

DATE REPORTED: 2017-11-09

SAMPLE DESCRIPTION:				04286-12-1.5m	04287-02-5.0m	04287-04-3.5m	04287-06-1.5m	04287-09-3.5m		04287-11-1.5m	04287-12-1.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil		Soil	Soil
DATE SAMPLED:				2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02		2017-11-02	2017-11-02
Parameter	Unit	G / S	RDL	8879506	8879508	8879510	8879512	8879515	RDL	8879517	8879518
Naphthalene	µg/g		0.005	<0.005	<0.005	<0.005	0.006	<0.005	0.005	0.229	0.238
2-Methylnaphthalene	µg/g		0.005	<0.005	0.058	<0.005	<0.005	<0.005	0.005	<0.005	<0.005
1-Methylnaphthalene	µg/g		0.005	<0.005	0.094	0.005	0.016	0.008	0.05	1.55	1.59
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	0.008	<0.005	0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.14	0.13
Phenanthrene	µg/g		0.02	<0.02	0.05	0.03	0.03	0.06	0.02	0.16	0.14
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01
Pyrene	µg/g		0.01	<0.01	0.03	<0.01	<0.01	0.03	0.01	<0.01	<0.01
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	0.05	<0.05	<0.05	0.05	0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	0.05	<0.05	<0.05	0.05	0.05	<0.05	<0.05
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	0.6	<0.6	<0.6	0.6	0.6	<0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	<20	131	40	32	66	20	1150	1140
EPH C19-C32	µg/g		20	150	129	52	42	65	20	44	43
LEPH C10-C19	µg/g		20	<20	131	40	32	65	20	1150	1140
HEPH C19-C32	µg/g		20	150	129	52	42	65	20	44	43
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17N280522

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-04

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:	04286-12-1.5m	04287-02-5.0m	04287-04-3.5m	04287-06-1.5m	04287-09-3.5m	04287-11-1.5m	04287-12-1.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02
Surrogate	Unit	Acceptable Limits	8879506	8879508	8879510	8879512	8879515	8879517	8879518
Naphthalene - d8	%	50-130	82	97	68	86	89	102	111
2-Fluorobiphenyl	%	50-130	87	102	73	90	87	87	93
P-Terphenyl - d14	%	60-130	108	108	99	104	100	112	108

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PROJECT: 1657709

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ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-04

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:		04288-02-4.5m	04288-04-2.5m
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		2017-11-02	2017-11-02
Parameter	Unit	G / S	RDL	8879520	8879522
Naphthalene	µg/g		0.005	<0.005	<0.005
2-Methylnaphthalene	µg/g		0.005	<0.005	<0.005
1-Methylnaphthalene	µg/g		0.005	0.009	0.006
Acenaphthylene	µg/g		0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02
Phenanthrene	µg/g		0.02	0.03	0.03
Anthracene	µg/g		0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	<0.01
Pyrene	µg/g		0.01	<0.01	<0.01
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	<0.05
Quinoline	µg/g		0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	42	55
EPH C19-C32	µg/g		20	54	42
LEPH C10-C19	µg/g		20	41	55
HEPH C19-C32	µg/g		20	54	42
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05

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AGAT WORK ORDER: 17N280522

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-04

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:	04288-02-4.5m	04288-04-2.5m
		SAMPLE TYPE:	Soil	Soil
		DATE SAMPLED:	2017-11-02	2017-11-02
Surrogate	Unit	Acceptable Limits	8879520	8879522
Naphthalene - d8	%	50-130	89	89
2-Fluorobiphenyl	%	50-130	92	96
P-Terphenyl - d14	%	60-130	101	101

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8879480-8879493 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.

8879497 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8879500-8879515 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.

8879517-8879518 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8879520-8879522 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.

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AGAT WORK ORDER: 17N280522

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-04

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:		04285-01-5.5m	04285-02-5.5m	04285-03-5.5m	04285-06-2.5m	04285-11-0.5m	04286-03-3.5m	04286-06-0.5m	04286-07-4.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02
Parameter	Unit	G / S	RDL	8879480	8879484	8879485	8879488	8879493	8879497	8879500	8879501
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
VH	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		91	92	90	95	96	98	89	88
Dibromofluoromethane	%	60-140		108	107	104	110	112	110	107	107
Toluene - d8	%	60-140		85	87	86	91	92	91	82	86

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AGAT WORK ORDER: 17N280522

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-04

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:		04286-12-1.5m	04287-02-5.0m	04287-04-3.5m	04287-06-1.5m	04287-09-3.5m	04287-11-1.5m	04287-12-1.5m	04288-02-4.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02	2017-11-02
Parameter	Unit	G / S	RDL	8879506	8879508	8879510	8879512	8879515	8879517	8879518	8879520
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	0.15	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	<10	<10	<10	19	28	<10
VH	µg/g		10	<10	<10	<10	<10	<10	19	28	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		99	91	100	93	95	104	105	103
Dibromofluoromethane	%	60-140		113	113	115	110	113	115	108	108
Toluene - d8	%	60-140		93	88	93	95	92	92	91	91

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 17N280522

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-04

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:		04288-04-2.5m
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-11-02
Parameter	Unit	G / S	RDL	8879522
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1
Benzene	µg/g		0.02	<0.02
Toluene	µg/g		0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05
o-Xylene	µg/g		0.05	<0.05
Styrene	µg/g		0.05	<0.05
VPH	µg/g		10	<10
VH	µg/g		10	<10
Total Xylenes	ug/g		0.1	<0.1
Surrogate	Unit	Acceptable Limits		
Bromofluorobenzene	%	60-140		98
Dibromofluoromethane	%	60-140		110
Toluene - d8	%	60-140		96

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8879480-8879522 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 17N280522

PROJECT: 1657709

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Benzene re-analysis

DATE RECEIVED: 2017-11-04

DATE REPORTED: 2017-11-09

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: 04287-02-5.0m reanalysis 1	SAMPLE DESCRIPTION: 04287-02-5.0m reanalysis 2
			SAMPLE TYPE:	Soil	Soil
			DATE SAMPLED:	2017-11-02	2017-11-02
Benzene	µg/g		0.02	0.04	0.04
Surrogate	Unit	Acceptable Limits			
Bromofluorobenzene	%	60-140		91	92
Dibromofluoromethane	%	60-140		102	103
Toluene - d8	%	60-140		89	90

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8893012-8893019 Results are based on dry weight of sample.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17N280522
PROJECT: 1657709
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Nov 09, 2017

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68228	8879480	<0.1	<0.1	NA	< 0.1	100%	80%	120%				93%	70%	130%
Benzene	68228	8879480	0.03	0.02	NA	< 0.02	101%	80%	120%				95%	70%	130%
Toluene	68228	8879480	<0.05	<0.05	NA	< 0.05	99%	80%	120%				90%	70%	130%
Ethylbenzene	68228	8879480	<0.05	<0.05	NA	< 0.05	99%	80%	120%				88%	70%	130%
m&p-Xylene	68228	8879480	<0.05	<0.05	NA	< 0.05	98%	80%	120%				87%	70%	130%
o-Xylene	68228	8879480	<0.05	<0.05	NA	< 0.05	98%	80%	120%				88%	70%	130%
Styrene	68228	8879480	<0.05	<0.05	NA	< 0.05	100%	80%	120%				87%	70%	130%
VPH	68228	8879480	<10	<10	NA	< 10									
VH	68228	8879480	<10	<10	NA	< 10									
Bromofluorobenzene	68228	8879480	91	90	1.1%		100%	60%	140%				95%	60%	140%
Dibromofluoromethane	68228	8879480	108	108	0.0%		100%	60%	140%				101%	60%	140%
Toluene - d8	68228	8879480	85	89	4.6%		99%	60%	140%				84%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68235	8879485	0.010	0.008	NA	< 0.005	99%	80%	120%				105%	50%	130%
2-Methylnaphthalene	68235	8879485	0.047	0.045	4.3%	< 0.005	93%	80%	120%				83%	50%	130%
1-Methylnaphthalene	68235	8879485	0.035	0.030	15.4%	< 0.005	99%	80%	120%				116%	50%	130%
Acenaphthylene	68235	8879485	<0.005	<0.005	NA	< 0.005	100%	80%	120%				99%	50%	130%
Acenaphthene	68235	8879485	<0.005	<0.005	NA	< 0.005	101%	80%	120%				101%	50%	130%
Fluorene	68235	8879485	0.02	0.02	NA	< 0.02	100%	80%	120%				102%	50%	130%
Phenanthrene	68235	8879485	0.18	0.18	0.0%	< 0.02	98%	80%	120%				87%	60%	130%
Anthracene	68235	8879485	<0.004	<0.004	NA	< 0.004	103%	80%	120%				102%	60%	130%
Fluoranthene	68235	8879485	0.02	0.02	NA	< 0.01	100%	80%	120%				104%	60%	130%
Pyrene	68235	8879485	0.03	0.04	NA	< 0.01	100%	80%	120%				108%	60%	130%
Benzo(a)anthracene	68235	8879485	<0.03	<0.03	NA	< 0.03	101%	80%	120%				100%	60%	130%
Chrysene	68235	8879485	0.09	0.08	NA	< 0.05	101%	80%	120%				105%	60%	130%
Benzo(b)fluoranthene	68235	8879485	<0.05	<0.05	NA	< 0.05	96%	80%	120%				101%	60%	130%
Benzo(j)fluoranthene	68235	8879485	<0.05	<0.05	NA	< 0.05	101%	80%	120%				94%	60%	130%
Benzo(k)fluoranthene	68235	8879485	<0.05	<0.05	NA	< 0.05	101%	80%	120%				100%	60%	130%
Benzo(a)pyrene	68235	8879485	<0.03	<0.03	NA	< 0.03	102%	80%	120%				102%	60%	130%
Indeno(1,2,3-c,d)pyrene	68235	8879485	<0.02	<0.02	NA	< 0.02	101%	80%	120%				96%	60%	130%
Dibenzo(a,h)anthracene	68235	8879485	<0.005	<0.005	NA	< 0.005	101%	80%	120%				96%	60%	130%
Benzo(g,h,i)perylene	68235	8879485	0.11	0.10	NA	< 0.05	101%	80%	120%				101%	60%	130%
Quinoline	68235	8879485	<0.05	<0.05	NA	< 0.05	101%	80%	120%				97%	50%	130%
EPH C10-C19	68235	8879485	286	268	6.5%	< 20	107%	70%	130%				101%	65%	120%
EPH C19-C32	68235	8879485	435	396	9.4%	< 20	100%	70%	130%				97%	80%	120%
Naphthalene - d8	68235	8879485	85	79	7.3%		102%	80%	120%				112%	50%	130%
2-Fluorobiphenyl	68235	8879485	83	81	2.4%		105%	80%	120%				106%	50%	130%

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N280522

PROJECT: 1657709

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Nov 09, 2017			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
P-Terphenyl - d14	68235	8879485	89	94	5.5%		100%	80%	120%				101%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By:

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N280522

PROJECT: 1657709

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N280522

PROJECT: 1657709

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS

17N280522

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04285 page 1 of 4

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709			Laboratory Name: AGAT
Short Title: K19 Remediation	Golder Contact: Erin Obrien		Address: 120-8000 Glenlyon
Golder E-mail Address 1: EObrien@golder.com	Golder E-mail Address 2: Aboemmer@golder.com	Telephone/Fax: 2507746500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

Alvaro_Garrido Hernan_gomc7@golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX VPH	LEPH EPH (C10<C19)	Naphthalene	2-methylnaphthalene	Dichloromethane	Hold	RUSH (Select TAT above)	Remarks (over)
04285 - 01	EX17-01	B43	5.5	SOIL	02/11/17	08:40	GRAB			4	X	X	X	X				8879480
- 02		W32F	5.5			08:45		FDA	04285-03		X	X	X	X				484
- 03		W32F	5.5			08:45		FD	04285-02		X	X	X	X				485
- 04		W32E	4.5			08:50										X		486
- 05		W32D	3.5			08:00										X		487
- 06		W32C	2.5			09:10					X	X	X	X				488
- 07		W32B	1.5			09:20										X		489
- 08		W32A	0.5			09:30					[illegible]					X		490
- 09		W31C	2.5			09:40										X		491
- 10		W31B	1.5			09:50					[illegible]					X		492
- 11		W31A	0.5			10:00					X	X	X	X				493
- 12		W34F	5.5			10:05										X		494

Sampler's Signature:	Relinquished by: Signature	Company: GOLDER	Date: 03/11/17	Time: 06:30	Received by: Signature	Company
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by: S. Napier	Date: 04-Nov-17	Time: 8:45AM	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 3	Cooler opened by: Sam	Date: 04-Nov-17	Time: 8:45am

WHITE: Golder Copy YELLOW: Lab Copy

ESED

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17N280522

No. 04286 page 2 of 4

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709		Laboratory Name: AGAT	
Short Title: K19 Remediation	Golder Contact: Eric O'Brien	Address: 120-8600 Glenlyon	
Golder E-mail Address 1: EObrien@golder.com	Golder E-mail Address 2: ABruemmer@golder.com	Telephone/Fax: 7507746500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

Alvaro_Garrido Heman-gomez@golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX VP VPH	VPH/EPH (C10<C19)	Naphthalene	2-methylnaphthalene	Dichloromethane	F1-F4	RUSH (Select TAT above)	Remarks (over)
04286-01	EX17-01	W34E	4.5	Soil	02/11/17	10:10	Grab	FDA	04286-02	4						X		8879495
-02		W34E	4.5			10:10		FD	04286-01							X		496
-03		W34D	3.5			10:15					X	X	X	X				497
-04		W34C	2.5			10:20										X		498
-05		W34B	1.5			10:25										X		499
-06		W34A	0.5			10:30					X	X	X	X				500
-07		W33E	4.5			10:35					X	X	X	X				501
-08		W33F	5.5			10:40										X		502
-09		W33D	3.5			10:45										X		503
-10		W33C	2.5			10:50		FDA	04286-11							X		504
-11		W33C	2.5			10:55		FD	04286-10							X		505
-12		W33B	1.5			11:00					X	X	X	X				506

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 03/11/17	Time: 15:30	Received by: Signature	Company
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by: S. Napier	Date	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	Time

WHITE: Golder Copy YELLOW: Lab Copy

ESED

17N280522

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04287 page 3 of 4

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709/6000
Short Title: Kia Remediation
Golder Contact: Erin O'Brien
Golder E-mail Address 1: Erin-O'brien @golder.com
Golder E-mail Address 2: andrew-bruenner @golder.com

Laboratory Name: AGAT
Address: 120-8600 Glenlyon
Telephone/Fax: 2507746500
Contact: Maggie Chan

Office Name: Vancouver
EQuIS Facility Code: 28433859
EQuIS upload: ☒
Alvaro-Garrido Hernan-gomez@golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX VPH VH	LEPH HEPH (C10<C19)	Napthalene	2-Methylnaphthalene		Dichloromethane		Hold		RUSH (Select TAT above)	Remarks (over)
04287 - 01	EX17-01	W33A	0.5	SOIL	02/11/17	11:05	Grab			4								X			88179507
- 02	EX17-01	B44	5.0			11:15					X	X	X	X							508
- 03		W35E	4.5			11:20												X			509
- 04		W35D	3.5			11:30					X	X	X	X							510
- 05		W35C	2.5			11:40												X			511
- 06		W35B	1.5			11:50					X	X	X	X							512
- 07		W35A	0.5			12:00												X			513
- 08		W36E	4.5			15:15															514
- 09		W36D	3.5			15:20					X	X	X	X							515
- 10		W36C	2.5			15:25															516
- 11		W36B	1.5			15:30		FDA	04287-12		X	X	X	X							517
- 12		W36B	1.5			15:30		FD	04287-11		X	X	X	X							518

Sampler's Signature: [signature]
Relinquished by: Signature [signature]
Company: Golder
Date: 03/11/17
Time: 6:30
Received by: Signature
Company
Comments:
Method of Shipment:
Waybill No.:
Received for Lab by: S. Napier
Date
Time
Shipped by:
Shipment Condition:
Seal Intact:
Temp (°C)
Cooler opened by:
Date
Time

WHITE: Golder Copy YELLOW: Lab Copy

ESED

17N280522

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04288 page 4 of 4

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709/6000			Laboratory Name: AGAT
Short Title: Kia Remediation	Golder Contact: Erin O'Brien		Address: 120-Glenlyon
Golder E-mail Address 1: erin_o'brien @golder.com	Golder E-mail Address 2: andrew_bruemmer @golder.com	Telephone/Fax: 2507746500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

Alvaro_Garrido Hernan-gomez @golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VPH, VH	#LEPH/HEPH (CloCl9)	Naphthalene	2-methylnaphthalene		Dichloroethane		Hold		RUSH (Select TAT above)	Remarks (over)
04288 - 01	EX17-01	W36A	0.5	SOIL	02/11/17	15:40	GRAB			4											8879519
- 02		W37E	4.5			15:50					X	X	X	X							520
- 03		W37D	3.5			15:55															521
- 04		W37C	2.5			16:00					X	X	X	X							522
- 05		W37B	1.5			16:05															523
- 06		W37A	0.5			16:10															524
- 07																					
- 08																					
- 09																					
- 10																					
- 11																					
- 12																					

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 03/11/17	Time: 6:30	Received by: Signature / Company
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by: S. Nagra	Date	Time
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date / Time

WHITE: Golder Copy YELLOW: Lab Copy

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17N280522

RECEIVING BASICS:

Received From: Novex Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 2 Containers: 168

TIME SENSITIVE ISSUES:

Earliest Date Sampled: 02-Nov-17 ALREADY EXCEEDED? Yes (No)

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) 2 + 1 + 2 = 2 °C (2) 3 + 4 + 2 = 3 °C (3) ___ + ___ + ___ = ___ °C (4) ___ + ___ + ___ = ___ °C

Was ice or ice pack present: (Yes) No

Integrity Issues: (3°C)

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

RECEIVING BASICS - Shipping

Company/Consultant: GOLDER

Courier: CMA (Prepaid) Collect

Waybill#_____

Branch: EDM GP (FN) FM RD VAN LYD FSJ EST Other:_____

Custody Seal Intact: (Yes) No NA

TAT: <24hr 24-48hr 48-72hr (Reg) Other_____

Cooler Quantity: 2

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry:_____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken:_____

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: Yes (No)

Coolant Used: (Icepack) Bagged Ice Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) -7 + -8 + -3 = -6 °C 2(Bottle/Jar) -3 + -3 + -6 = -4 °C

3 (Bottle/Jar)___+___+___=____ °C 4 (Bottle/Jar)___+___+___=____ °C

5 (Bottle/Jar)___+___+___=____ °C 6 (Bottle/Jar)___+___+___=____ °C

7 (Bottle/Jar)___+___+___=____ °C 8 (Bottle/Jar)___+___+___=____ °C

9 (Bottle/Jar)___+___+___=____ °C 10 (Bottle/Jar)___+___+___=____ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: _____

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial_____

General Comments: _____

_____

_____

_____

_____

* Subcontracted Analysis (See CPM)

Date issued: May 22, 2015

AGAT Laboratories

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: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709-6000

AGAT WORK ORDER: 17N281394

TRACE ORGANICS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

DATE REPORTED: Nov 10, 2017

PAGES (INCLUDING COVER): 23

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 1: Sample receipt temperature 0°C.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

SAMPLE DESCRIPTION:				04289-02-2.5m	04289-04-0.5m	04289-05-3.5m		04289-07-1.5m		04289-08-1.5m
SAMPLE TYPE:				Soil	Soil	Soil		Soil		Soil
DATE SAMPLED:				2017-11-03	2017-11-03	2017-11-03		2017-11-03		2017-11-03
Parameter	Unit	G / S	RDL	8887274	8887278	8887280	RDL	8887297	RDL	8887298
Naphthalene	µg/g		0.005	0.006	0.062	0.014	0.05	6.50	0.05	4.24
2-Methylnaphthalene	µg/g		0.005	0.021	<0.005	0.053	0.5	11.7	0.05	6.20
1-Methylnaphthalene	µg/g		0.005	0.019	0.322	0.048	0.5	12.1	0.5	10.0
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	0.05	<0.05	0.05	<0.05
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	0.05	<0.05	0.05	<0.05
Fluorene	µg/g		0.02	<0.02	0.09	<0.02	0.2	1.3	0.2	1.3
Phenanthrene	µg/g		0.02	0.04	0.18	0.05	0.2	2.4	0.2	2.2
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	0.04	<0.04	0.04	<0.04
Fluoranthene	µg/g		0.01	<0.01	0.02	<0.01	0.01	<0.01	0.1	<0.1
Pyrene	µg/g		0.01	0.01	0.07	0.01	0.01	0.09	0.1	0.2
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	0.03	<0.03	0.03	<0.03
Chrysene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	0.03	<0.03	0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	0.005	<0.005	0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	<0.6	0.6	<0.6	0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
EPH C10-C19	µg/g		20	71	999	157	20	3810	20	3980
EPH C19-C32	µg/g		20	96	294	148	20	617	20	666
LEPH C10-C19	µg/g		20	71	998	157	20	3800	20	3980
HEPH C19-C32	µg/g		20	96	294	148	20	617	20	666
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:	04289-02-2.5m	04289-04-0.5m	04289-05-3.5m	04289-07-1.5m	04289-08-1.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-03	2017-11-03	2017-11-03	2017-11-03	2017-11-03
Surrogate	Unit	Acceptable Limits	8887274	8887278	8887280	8887297	8887298
Naphthalene - d8	%	50-130	92	84	69	98	82
2-Fluorobiphenyl	%	50-130	97	89	74	98	90
P-Terphenyl - d14	%	60-130	112	102	99	96	98

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SAMPLING SITE:

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DATE RECEIVED: 2017-11-07

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		SAMPLE DESCRIPTION:		04289-10-3.75m		04289-11-3.75m		04289-12-3.75m		04290-01-3.75m
		SAMPLE TYPE:		Soil		Soil		Soil		Soil
		DATE SAMPLED:		2017-11-03		2017-11-03		2017-11-03		2017-11-03
Parameter	Unit	G / S	RDL	8887300	RDL	8887301	RDL	8887302	RDL	8887303
Naphthalene	µg/g		0.005	0.053	0.005	0.322	0.005	0.477	0.05	0.85
2-Methylnaphthalene	µg/g		0.005	0.296	0.05	0.71	0.05	1.07	0.05	1.87
1-Methylnaphthalene	µg/g		0.005	0.173	0.05	0.49	0.005	0.582	0.05	1.13
Acenaphthylene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005
Fluorene	µg/g		0.02	0.07	0.02	0.09	0.02	0.07	0.02	0.08
Phenanthrene	µg/g		0.02	0.21	0.02	0.23	0.02	0.21	0.02	0.22
Anthracene	µg/g		0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Pyrene	µg/g		0.01	0.02	0.01	0.02	0.01	0.03	0.01	0.03
Benzo(a)anthracene	µg/g		0.03	<0.03	0.03	<0.03	0.03	<0.03	0.03	<0.03
Chrysene	µg/g		0.05	<0.05	0.05	<0.05	0.05	0.05	0.05	0.06
Benzo(b)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	0.03	<0.03	0.03	<0.03	0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.06	0.05	0.08	0.05	0.09	0.05	0.09
Quinoline	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	0.6	<0.6	0.6	0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
EPH C10-C19	µg/g		20	90	20	144	20	353	20	364
EPH C19-C32	µg/g		20	54	20	54	20	87	20	76
LEPH C10-C19	µg/g		20	90	20	144	20	352	20	363
HEPH C19-C32	µg/g		20	54	20	54	20	87	20	75
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:	04289-10-3.75m	04289-11-3.75m	04289-12-3.75m	04290-01-3.75m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-03	2017-11-03	2017-11-03	2017-11-03
Surrogate	Unit	Acceptable Limits	8887300	8887301	8887302	8887303
Naphthalene - d8	%	50-130	71	77	78	74
2-Fluorobiphenyl	%	50-130	75	81	80	77
P-Terphenyl - d14	%	60-130	90	93	97	92

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SAMPLING SITE:

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Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

SAMPLE DESCRIPTION:				04290-04-1.75m	04290-05-4.0m	04290-07-2.5m	04290-08-1.75m	04290-09-1.75m	04290-10-3.5m	04290-11-2.5m	04291-01-3.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04
Parameter	Unit	G / S	RDL	8887306	8887307	8887309	8887310	8887311	8887312	8887313	8887315
Naphthalene	µg/g		0.005	<0.005	0.103	0.007	<0.005	<0.005	0.013	<0.005	0.050
2-Methylnaphthalene	µg/g		0.005	0.011	0.534	0.027	0.011	0.012	0.099	0.010	0.283
1-Methylnaphthalene	µg/g		0.005	0.008	0.322	0.025	0.009	0.008	0.057	0.008	0.169
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	0.10	<0.02	<0.02	<0.02	0.05	<0.02	0.08
Phenanthrene	µg/g		0.02	<0.02	0.28	0.13	0.04	0.02	0.15	0.03	0.24
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	0.01	0.01	<0.01	<0.01	0.01	<0.01	0.02
Pyrene	µg/g		0.01	<0.01	0.03	0.02	<0.01	<0.01	0.03	<0.01	0.04
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	0.05	0.05	<0.05	<0.05	<0.05	<0.05	0.07
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	0.10	0.05	<0.05	<0.05	0.08	<0.05	0.11
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	0.6	0.6	<0.6	<0.6	<0.6	<0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	21	80	34	<20	<20	44	36	70
EPH C19-C32	µg/g		20	46	61	41	28	42	40	34	68
LEPH C10-C19	µg/g		20	21	80	34	<20	<20	44	35	70
HEPH C19-C32	µg/g		20	46	61	41	28	42	40	34	68
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:	04290-04-1.75m	04290-05-4.0m	04290-07-2.5m	04290-08-1.75m	04290-09-1.75m	04290-10-3.5m	04290-11-2.5m	04291-01-3.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04
Surrogate	Unit	Acceptable Limits	8887306	8887307	8887309	8887310	8887311	8887312	8887313	8887315
Naphthalene - d8	%	50-130	65	75	81	72	68	80	69	79
2-Fluorobiphenyl	%	50-130	70	80	87	78	73	83	76	83
P-Terphenyl - d14	%	60-130	91	95	97	102	93	92	100	99

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ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

SAMPLE DESCRIPTION:				04291-04-0.5m	04291-06-2.5m	04291-07-1.5m	04291-09-4.0m	04291-10-4.0m	04291-11-4.0m	04291-12-4.0m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-11-04	2017-11-04	2017-11-04	2017-11-05	2017-11-05	2017-11-05	2017-11-05
Parameter	Unit	G / S	RDL	8887319	8887321	8887322	8887324	8887326	8887329	8887330
Naphthalene	µg/g		0.005	<0.005	<0.005	<0.005	0.042	0.015	<0.005	<0.005
2-Methylnaphthalene	µg/g		0.005	<0.005	0.009	<0.005	0.211	0.119	<0.005	<0.005
1-Methylnaphthalene	µg/g		0.005	<0.005	0.012	<0.005	0.132	0.069	<0.005	<0.005
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02	<0.02	0.05	0.06	<0.02	<0.02
Phenanthrene	µg/g		0.02	<0.02	0.05	<0.02	0.15	0.18	0.06	0.07
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	0.01	<0.01	0.01	0.01	0.02	0.02
Pyrene	µg/g		0.01	<0.01	0.02	<0.01	0.02	0.03	0.03	0.04
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	0.05	<0.05	<0.05	0.05	0.05	0.06
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	<0.05	<0.05	0.07	0.08	0.08	0.10
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	<0.6	<0.6	0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	<20	26	<20	60	67	73	86
EPH C19-C32	µg/g		20	32	32	25	42	55	62	71
LEPH C10-C19	µg/g		20	<20	26	<20	60	67	73	86
HEPH C19-C32	µg/g		20	32	32	25	41	55	62	71
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:	04291-04-0.5m	04291-06-2.5m	04291-07-1.5m	04291-09-4.0m	04291-10-4.0m	04291-11-4.0m	04291-12-4.0m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-04	2017-11-04	2017-11-04	2017-11-05	2017-11-05	2017-11-05	2017-11-05
Surrogate	Unit	Acceptable Limits	8887319	8887321	8887322	8887324	8887326	8887329	8887330
Naphthalene - d8	%	50-130	80	75	71	81	86	81	81
2-Fluorobiphenyl	%	50-130	87	80	77	85	92	88	89
P-Terphenyl - d14	%	60-130	105	98	93	104	102	98	97

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8887274-8887280 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.

8887297-8887298 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8887300 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.

8887301-8887303 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8887306-8887330 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.

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Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-08

		SAMPLE DESCRIPTION:		04289-02-2.5m	04289-04-0.5m	04289-05-3.5m	04289-07-1.5m	04289-08-1.5m	04289-10-3.75m	04289-11-3.75m	04289-12-3.75m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-03	2017-11-03	2017-11-03	2017-11-03	2017-11-03	2017-11-03	2017-11-03	2017-11-03
Parameter	Unit	G / S	RDL	8887274	8887278	8887280	8887297	8887298	8887300	8887301	8887302
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	0.03	0.03	<0.02	0.09	0.14
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.23	0.27
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	1.06	0.93	<0.05	0.26	0.48
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	0.38	0.29	0.15	1.10	1.55
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.24	0.37
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	<10	128	54	17	26	28
VH	µg/g		10	<10	<10	<10	130	56	17	28	30
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	0.4	0.3	0.2	1.3	1.9
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		93	98	102	104	105	106	102	98
Dibromofluoromethane	%	60-140		105	109	103	102	101	98	97	96
Toluene - d8	%	60-140		97	101	100	100	98	102	105	102

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Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-08

SAMPLE DESCRIPTION:				04290-01-3.75m	04290-04-1.75m	04290-05-4.0m	04290-07-2.5m	04290-08-1.75m	04290-09-1.75m	04290-10-3.5m	04290-11-2.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-11-03	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04
Parameter	Unit	G / S	RDL	8887303	8887306	8887307	8887309	8887310	8887311	8887312	8887313
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	0.65	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	2.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	1.39	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	4.97	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	1.90	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	67	<10	11	<10	<10	<10	<10	<10
VH	µg/g		10	78	<10	11	<10	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	6.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		101	96	96	97	97	96	94	97
Dibromofluoromethane	%	60-140		93	98	97	99	101	99	100	101
Toluene - d8	%	60-140		105	102	100	101	102	101	100	100

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Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-08

		SAMPLE DESCRIPTION:		04291-01-3.5m	04291-04-0.5m	04291-06-2.5m	04291-07-1.5m	04291-09-4.0m	04291-10-4.0m	04291-11-4.0m	04291-12-4.0m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-05	2017-11-05	2017-11-05	2017-11-05
Parameter	Unit	G / S	RDL	8887315	8887319	8887321	8887322	8887324	8887326	8887329	8887330
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	14	<10	<10	<10	<10	<10	<10	<10
VH	µg/g		10	14	<10	<10	<10	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		96	97	96	96	101	99	99	108
Dibromofluoromethane	%	60-140		100	102	103	103	96	94	93	104
Toluene - d8	%	60-140		103	102	101	103	110	107	105	115

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8887274-8887330 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

Certified By:

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AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Dichloromethane in Soil

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-08

SAMPLE DESCRIPTION:				04289-10-3.75m	04289-11-3.75m	04289-12-3.75m	04290-01-3.75m
SAMPLE TYPE:				Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-11-03	2017-11-03	2017-11-03	2017-11-03
Parameter	Unit	G / S	RDL	8887300	8887301	8887302	8887303
Dichloromethane	µg/g		0.05	<0.05	<0.05	<0.05	<0.05

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8887300-8887303 Results are based on dry weight of sample.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date:			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
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68243	8887301	<0.1	<0.1	NA	< 0.1	102%	80%	120%				92%	70%	130%
Benzene	68243	8887301	0.09	0.09	NA	< 0.02	102%	80%	120%				94%	70%	130%
Toluene	68243	8887301	0.23	0.23	NA	< 0.05	98%	80%	120%				94%	70%	130%
Ethylbenzene	68243	8887301	0.26	0.26	0.0%	< 0.05	99%	80%	120%				93%	70%	130%
m&p-Xylene	68243	8887301	1.10	1.10	0.0%	< 0.05	99%	80%	120%				93%	70%	130%
o-Xylene	68243	8887301	0.24	0.23	NA	< 0.05	94%	80%	120%				93%	70%	130%
Styrene	68243	8887301	<0.05	<0.05	NA	< 0.05	99%	80%	120%				98%	70%	130%
VPH	68243	8887301	26	19	NA	< 10									
VH	68243	8887301	28	21	NA	< 10									
Bromofluorobenzene	68243	8887301	102	102	0.0%		103%	60%	140%				94%	60%	140%
Dibromofluoromethane	68243	8887301	97	98	1.0%		102%	60%	140%				94%	60%	140%
Toluene - d8	68243	8887301	105	105	0.0%		101%	60%	140%				90%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68243	8887301	0.322	0.292	9.8%	< 0.005	99%	80%	120%				121%	50%	130%
2-Methylnaphthalene	68243	8887301	0.713	0.704	1.3%	< 0.005	99%	80%	120%				98%	50%	130%
1-Methylnaphthalene	68243	8887301	0.488	0.408	17.9%	< 0.005	99%	80%	120%				116%	50%	130%
Acenaphthylene	68243	8887301	<0.005	<0.005	NA	< 0.005	98%	80%	120%				103%	50%	130%
Acenaphthene	68243	8887301	<0.005	<0.005	NA	< 0.005	100%	80%	120%				106%	50%	130%
Fluorene	68243	8887301	0.09	0.09	NA	< 0.02	99%	80%	120%				103%	50%	130%
Phenanthrene	68243	8887301	0.23	0.23	0.0%	< 0.02	102%	80%	120%				99%	60%	130%
Anthracene	68243	8887301	<0.004	<0.004	NA	< 0.004	100%	80%	120%				103%	60%	130%
Fluoranthene	68243	8887301	0.01	0.01	NA	< 0.01	100%	80%	120%				107%	60%	130%
Pyrene	68243	8887301	0.02	0.02	NA	< 0.01	100%	80%	120%				107%	60%	130%
Benzo(a)anthracene	68243	8887301	<0.03	<0.03	NA	< 0.03	100%	80%	120%				105%	60%	130%
Chrysene	68243	8887301	<0.05	<0.05	NA	< 0.05	101%	80%	120%				101%	60%	130%
Benzo(b)fluoranthene	68243	8887301	<0.05	<0.05	NA	< 0.05	99%	80%	120%				106%	60%	130%
Benzo(j)fluoranthene	68243	8887301	<0.05	<0.05	NA	< 0.05	101%	80%	120%				101%	60%	130%
Benzo(k)fluoranthene	68243	8887301	<0.05	<0.05	NA	< 0.05	101%	80%	120%				100%	60%	130%
Benzo(a)pyrene	68243	8887301	<0.03	<0.03	NA	< 0.03	100%	80%	120%				104%	60%	130%
Indeno(1,2,3-c,d)pyrene	68243	8887301	<0.02	<0.02	NA	< 0.02	103%	80%	120%				105%	60%	130%
Dibenzo(a,h)anthracene	68243	8887301	<0.005	<0.005	NA	< 0.005	103%	80%	120%				105%	60%	130%
Benzo(g,h,i)perylene	68243	8887301	0.08	<0.05	NA	< 0.05	101%	80%	120%				109%	60%	130%
Quinoline	68243	8887301	<0.05	<0.05	NA	< 0.05	101%	80%	120%				103%	50%	130%
EPH C10-C19	68243	8887301	144	175	19.4%	< 20	107%	70%	130%				103%	65%	120%
EPH C19-C32	68243	8887301	54	54	NA	< 20	100%	70%	130%				100%	80%	120%
Naphthalene - d8	68243	8887301	77	76	1.3%		100%	80%	120%				108%	50%	130%
2-Fluorobiphenyl	68243	8887301	81	85	4.8%		99%	80%	120%				107%	50%	130%

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17N281394
PROJECT: 1657709-6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date:			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
P-Terphenyl - d14	68243	8887301	93	99	6.3%		102%	80%	120%				103%	60%	130%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68240	8887330	<0.1	<0.1	NA	< 0.1	102%	80%	120%				88%	70%	130%
Benzene	68240	8887330	<0.02	<0.02	NA	< 0.02	101%	80%	120%				83%	70%	130%
Toluene	68240	8887330	<0.05	<0.05	NA	< 0.05	102%	80%	120%				85%	70%	130%
Ethylbenzene	68240	8887330	<0.05	<0.05	NA	< 0.05	98%	80%	120%				83%	70%	130%
m&p-Xylene	68240	8887330	<0.05	<0.05	NA	< 0.05	96%	80%	120%				86%	70%	130%
o-Xylene	68240	8887330	<0.05	<0.05	NA	< 0.05	96%	80%	120%				91%	70%	130%
Styrene	68240	8887330	<0.05	<0.05	NA	< 0.05	100%	80%	120%				89%	70%	130%
VPH	68240	8887330	<10	<10	NA	< 10									
VH	68240	8887330	<10	<10	NA	< 10									
Bromofluorobenzene	68240	8887330	108	95	12.8%		101%	60%	140%				95%	60%	140%
Dibromofluoromethane	68240	8887330	104	90	14.4%		108%	60%	140%				85%	60%	140%
Toluene - d8	68240	8887330	115	100	14.0%		108%	60%	140%				97%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68240	8887330	<0.005	<0.005	NA	< 0.005	99%	80%	120%				118%	50%	130%
2-Methylnaphthalene	68240	8887330	<0.005	<0.005	NA	< 0.005	99%	80%	120%				97%	50%	130%
1-Methylnaphthalene	68240	8887330	<0.005	<0.005	NA	< 0.005	99%	80%	120%				111%	50%	130%
Acenaphthylene	68240	8887330	<0.005	<0.005	NA	< 0.005	98%	80%	120%				108%	50%	130%
Acenaphthene	68240	8887330	<0.005	<0.005	NA	< 0.005	100%	80%	120%				96%	50%	130%
Fluorene	68240	8887330	<0.02	<0.02	NA	< 0.02	99%	80%	120%				94%	50%	130%
Phenanthrene	68240	8887330	0.07	0.08	NA	< 0.02	102%	80%	120%				95%	60%	130%
Anthracene	68240	8887330	<0.004	<0.004	NA	< 0.004	100%	80%	120%				104%	60%	130%
Fluoranthene	68240	8887330	0.02	0.02	NA	< 0.01	100%	80%	120%				100%	60%	130%
Pyrene	68240	8887330	0.04	0.04	NA	< 0.01	100%	80%	120%				99%	60%	130%
Benzo(a)anthracene	68240	8887330	<0.03	<0.03	NA	< 0.03	100%	80%	120%				104%	60%	130%
Chrysene	68240	8887330	0.06	0.06	NA	< 0.05	101%	80%	120%				96%	60%	130%
Benzo(b)fluoranthene	68240	8887330	<0.05	<0.05	NA	< 0.05	99%	80%	120%				110%	60%	130%
Benzo(j)fluoranthene	68240	8887330	<0.05	<0.05	NA	< 0.05	101%	80%	120%				96%	60%	130%
Benzo(k)fluoranthene	68240	8887330	<0.05	<0.05	NA	< 0.05	101%	80%	120%				110%	60%	130%
Benzo(a)pyrene	68240	8887330	<0.03	<0.03	NA	< 0.03	100%	80%	120%				102%	60%	130%
Indeno(1,2,3-c,d)pyrene	68240	8887330	<0.02	<0.02	NA	< 0.02	103%	80%	120%				104%	60%	130%
Dibenzo(a,h)anthracene	68240	8887330	<0.005	<0.005	NA	< 0.005	103%	80%	120%				104%	60%	130%
Benzo(g,h,i)perylene	68240	8887330	0.10	0.10	NA	< 0.05	101%	80%	120%				97%	60%	130%
Quinoline	68240	8887330	<0.05	<0.05	NA	< 0.05	101%	80%	120%				109%	50%	130%
EPH C10-C19	68240	8887330	86	83	NA	< 20	107%	70%	130%				107%	65%	120%

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date:			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
EPH C19-C32	68240	8887330	71	70	NA	< 20	100%	70%	130%				105%	80%	120%
Naphthalene - d8	68240	8887330	81	85	4.8%		100%	80%	120%				98%	50%	130%
2-Fluorobiphenyl	68240	8887330	89	93	4.4%		99%	80%	120%				114%	50%	130%
P-Terphenyl - d14	68240	8887330	97	103	6.0%		102%	80%	120%				102%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Dichloromethane in Soil															
Dichloromethane	68243	8887301	<0.05	<0.05	NA	< 0.05	100%	80%	120%				96%	70%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By:

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
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http://www.agatlabs.com

Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dichloromethane	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17N 281394
No. 04289 page 1 of 3

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709/6000		Laboratory Name: AGAT	OE
Short Title: K19 Remediation	Golder Contact: Erin O'Brien	Address: 120 - Glenlyon	
Golder E-mail Address 1: erin_o'brien@golder.com	Golder E-mail Address 2: andrew_bowerman@golder.com	Telephone/Fax: 2507746500	Contact: Margie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

AGarrido@golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VPH, VH	LEPH EPH (C10<C19)	Naphthalene	2-Methylnaphthalene	Dichloromethane	H&D	RUSH (Select TAT above)	AGAT Sample Remarks (over)
04289-01	EX17-01	W38D	3.5	Soil	03/11/17	8:50	Grab			4						X		3887271
-02		W38C	2.5			8:55					X	X	X	X				274
-03		W38B	1.5			9:00										X		275
-04		W38A	0.5			9:05					X	X	X	X				278
-05		W39D	3.5			9:10					X	X	X	X				280
-06		W39C	2.5			9:15										X		290
-07		W39B	1.5			9:20		FDA	04289-08		X	X	X	X				297
-08		W39B	1.5			9:20		FD	04289-07		X	X	X	X				298
-09		W39A	0.5			9:25										X		299
-10	EX17-02	B01	3.75			14:30					X	X	X	X	X			300
-11		B02				14:40					X	X	X	X	X			301
-12		B03				14:50					X	X	X	X	X			302

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 06/11/17	Time: 06:30	Received by: Signature	Company	
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by:	Date	Time		
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	V112629	

WHITE: Golder Copy YELLOW: Lab Copy

ESED

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17N238394

No. 04290 page 2 of 3

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 / 6000		Laboratory Name: AGAT	0°C
Short Title: K19 Remediation	Golder Contact: Erin O'Brien	Address: 120 - Glenlyon	
Golder E-mail Address 1: erin_o'brien@golder.com	Golder E-mail Address 2: andrew_bruemmer@golder.com	Telephone/Fax: 2507746500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

AGarrido@golder.com

NOV 7 AM 11:20

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VPH, VH	LEPH, EPH (e10<e19)	Naphthalene	2-Methylnaphthalene	Dichloromethane	HOLD	RUSH (Select TAT above)	Remarks (over)
04290 - 01	EX17-02-B04	3.75	SOIL	03/11/17	15:00	GRAB			4	X	X	X	X	X			303
- 02		W1C	3.5		04/11/17	14:00									X		304
- 03		W1B	2.5			14:05									X		305
- 04		W1A	1.75			14:10				X	X	X	X				306
- 05		B05	4.0			14:20				X	X	X	X				307
- 06		W2C	3.5			14:25									X		308
- 07		W2B	2.5			14:30				X	X	X	X				309
- 08		W2A	1.75			14:35		FDA	04290-09	X	X	X	X				310
- 09		W2A	1.75			14:35		FD	04290-08	X	X	X	X				311
- 10		W3C	3.5			14:40				X	X	X	X				312
- 11		W3B	2.5			14:50				X	X	X	X				313
- 12		W3A	1.75			14:55									X		314

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 06/11/17	Time: 06:30	Received by: Signature	Company	
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by:	Date	Time		
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date		

V112630

WHITE: Golder Copy YELLOW: Lab Copy

Keen KOT

ESED

17N281394

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04291 page 3 of 3

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709/6000		Laboratory Name: AGAT	OE
Short Title: K19 Remediation	Golder Contact: Erin O'Brien	Address: 120- Gleneagles Parkway	
Golder E-mail Address 1: erin_obrien@golder.com	Golder E-mail Address 2: andrew_bevenmer@golder.com	Telephone/Fax: 250-746500	Contact: Maggie Chen

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

AGarrido@golder.com

NOV 7 AM 11:23

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VPH	LEPH, HEPH (PAH)	Naphthalene	2-methylnaphthalene	HOLD	RUSH (Select TAT above)	Remarks (over)
04291 - 01	EX17-02-W4D		3.5	SOIL	04/11/17	15:00	GRAB			4	X	X	X	X			315
- 02		W4C	2.5			15:05									X		317
- 03		W4B	1.5			15:10									X		318
- 04		W4A	0.5			15:20					X	X	X	X			319
- 05		W5D	3.5			15:30									X		320
- 06		W5C	2.5			15:40					X	X	X	X			321
- 07		W5B	1.5			15:50					X	X	X	X			322
- 08		W5A	0.5			16:00									X		323
- 09		B06	4.0		05/11/17	14:00					X	X	X	X			324
- 10		B07				14:10					X	X	X	X			326
- 11		B08				14:15		FDA	04291-12		X	X	X	X			329
- 12		B08				14:15		FD	04291-11		X	X	X	X			330

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 06/11/17	Time: 06:30	Received by: Signature	Company
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by:	Date	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	V112231

WHITE: Golder Copy YELLOW: Lab Copy

Keen KT

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: GOLDER

Courier: _____ (Prepaid) Collect

Waybill# _____

Branch: EDM GP (FN) FM RD VAN LYD FSJ EST Other:_____

Custody Seal Intact: (Yes) No NA

TAT: <24hr 24-48hr 48-72hr (Reg) Other_____

Cooler Quantity: 2

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry:_____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken:_____

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: (Yes) No

Coolant Used: (Icepack) Bagged Ice Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) -9 + -10 + -11 = -10 °C

2(Bottle/Jar)___+___+___=____ °C

3 (Bottle/Jar) -12 + -9 + -10 = -10 °C

4 (Bottle/Jar)___+___+___=____ °C

5 (Bottle/Jar)___+___+___=____ °C

6 (Bottle/Jar)___+___+___=____ °C

7 (Bottle/Jar)___+___+___=____ °C

8 (Bottle/Jar)___+___+___=____ °C

9 (Bottle/Jar)___+___+___=____ °C

10 (Bottle/Jar)___+___+___=____ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: _____

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial_____

General Comments: _____

_____

_____

_____

_____

* Subcontracted Analysis (See CPM)

Date issued: May 22, 2015

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17N281394

RECEIVING BASICS:

Received From: NOVEX #2 Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 2 Containers: 144

TIME SENSITIVE ISSUES:

Earliest Date Sampled: NOV 03, 2017 ALREADY EXCEEDED? Yes (No)

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) 0 + 0 + 0 = 0 °C (2) 0 + 0 + 0 = 0 °C (3) ___ + ___ + ___ = ___ °C (4) ___ + ___ + ___ = ___ °C

Was ice or ice pack present: (Yes) No

Integrity Issues:

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date and Time: _____

ADDITIONAL NOTES:

Samples are not frozen

AGAT Laboratories

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: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709.6000

AGAT WORK ORDER: 17V268098

TRACE ORGANICS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

DATE REPORTED: Nov 10, 2017

PAGES (INCLUDING COVER): 15

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 2: Sample receipt temperature 2°C.

Version 2 issued on November 10, 2017 to report full LEPH/HEPH/PAH package as requested by Erin O'Brien of Golder. Version 2 is an amendment to version 1.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17V268098

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-04

DATE REPORTED: 2017-11-10

SAMPLE DESCRIPTION:				04256-02-3.5m	04256-03-2.5m	04256-05-2.5m	04256-06-3.5m	04256-08-3.5m	04256-09-2.5m	04256-10-3.5m	04256-12-3.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-09-30	2017-09-30	2017-09-30	2017-09-30	2017-09-30	2017-09-30	2017-09-30	2017-09-30
Parameter	Unit	G / S	RDL	8786787	8786788	8786790	8786791	8786793	8786794	8786795	8786797
Naphthalene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2-Methylnaphthalene	µg/g		0.005	<0.005	0.006	0.008	0.008	<0.005	<0.005	<0.005	0.006
1-Methylnaphthalene	µg/g		0.005	<0.005	0.010	0.011	0.014	0.008	0.008	0.009	0.009
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phenanthrene	µg/g		0.02	0.05	0.04	0.04	0.04	0.03	0.03	0.04	0.03
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	µg/g		0.01	0.02	0.01	<0.01	0.02	0.01	0.01	0.01	0.01
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	0.07	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.07	<0.05	<0.05	0.05	<0.05	0.05	0.05	<0.05
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	<0.6	<0.6	0.6	<0.6	<0.6	<0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	91	39	29	56	43	37	38	46
EPH C19-C32	µg/g		20	162	74	48	107	83	70	73	71
LEPH C10-C19	µg/g		20	91	38	29	56	43	37	38	46
HEPH C19-C32	µg/g		20	162	74	48	107	83	70	73	71
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17V268098

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-04

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:	04256-02-3.5m	04256-03-2.5m	04256-05-2.5m	04256-06-3.5m	04256-08-3.5m	04256-09-2.5m	04256-10-3.5m	04256-12-3.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-09-30	2017-09-30	2017-09-30	2017-09-30	2017-09-30	2017-09-30	2017-09-30	2017-09-30
Surrogate	Unit	Acceptable Limits	8786787	8786788	8786790	8786791	8786793	8786794	8786795	8786797
Naphthalene - d8	%	50-130	86	74	69	70	67	74	74	70
2-Fluorobiphenyl	%	50-130	93	78	72	73	70	78	77	73
P-Terphenyl - d14	%	60-130	108	95	82	83	81	84	84	82

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17V268098

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-04

DATE REPORTED: 2017-11-10

SAMPLE DESCRIPTION:				04257-01-3.5m	04257-02-4.5m	04257-03-4.5m	04257-05-4.5m	04257-07-4.5m	04257-08-5.0m	04257-09-5.0m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-09-30	2017-10-01	2017-10-01	2017-10-01	2017-10-01	2017-10-01	2017-10-01
Parameter	Unit	G / S	RDL	8786827	8786828	8786829	8786831	8786833	8786834	8786837
Naphthalene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2-Methylnaphthalene	µg/g		0.005	<0.005	<0.005	0.014	<0.005	<0.005	<0.005	<0.005
1-Methylnaphthalene	µg/g		0.005	0.010	<0.005	<0.005	<0.005	0.011	<0.005	0.023
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phenanthrene	µg/g		0.02	0.05	0.11	0.10	0.05	0.05	0.15	0.17
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	0.02	0.01	0.01	<0.01	0.01	0.02
Pyrene	µg/g		0.01	0.02	0.05	0.03	0.03	0.02	0.04	0.04
Benzo(a)anthracene	µg/g		0.03	<0.03	0.12	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	0.06	0.11	0.06	0.06	0.05	0.10	0.09
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.05	0.11	0.06	0.06	0.05	0.10	0.09
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	0.9	0.6	0.6	0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	52	157	95	87	72	164	152
EPH C19-C32	µg/g		20	77	206	108	130	104	228	201
LEPH C10-C19	µg/g		20	52	157	95	87	72	164	151
HEPH C19-C32	µg/g		20	77	206	108	130	104	228	201
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17V268098

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-04

DATE REPORTED: 2017-11-10

		SAMPLE DESCRIPTION:	04257-01-3.5m	04257-02-4.5m	04257-03-4.5m	04257-05-4.5m	04257-07-4.5m	04257-08-5.0m	04257-09-5.0m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-09-30	2017-10-01	2017-10-01	2017-10-01	2017-10-01	2017-10-01	2017-10-01
Surrogate	Unit	Acceptable Limits	8786827	8786828	8786829	8786831	8786833	8786834	8786837
Naphthalene - d8	%	50-130	80	82	66	77	65	75	79
2-Fluorobiphenyl	%	50-130	84	75	67	77	65	74	74
P-Terphenyl - d14	%	60-130	96	85	79	90	77	82	89

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8786787-8786837 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 17V268098

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

CCME BTEX (Soil)

DATE RECEIVED: 2017-10-04

DATE REPORTED: 2017-11-10

SAMPLE DESCRIPTION:				04256-02-3.5m	04256-03-2.5m	04256-05-2.5m	04256-06-3.5m	04256-08-3.5m	04256-09-2.5m	04256-10-3.5m	04256-12-3.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-09-30	2017-09-30	2017-09-30	2017-09-30	2017-09-30	2017-09-30	2017-09-30	2017-09-30
Parameter	Unit	G / S	RDL	8786787	8786788	8786790	8786791	8786793	8786794	8786795	8786797
Benzene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
m&p-Xylene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
o-Xylene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Moisture	%		0.5	6.04	8.03	8.23	6.06	6.21	8.16	8.48	11.5
VH	µg/g		10	<10	<10	38	<10	<10	<10	<10	<10
VPH	µg/g		10	<10	<10	38	<10	<10	<10	<10	<10
Total Xylenes	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		95	104	102	99	107	98	107	100
Dibromofluoromethane	%	60-140		109	116	113	123	119	108	119	111
Toluene - d8	%	60-140		99	107	104	96	111	99	110	103

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Certificate of Analysis

AGAT WORK ORDER: 17V268098

PROJECT: 1657709.6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

CCME BTEX (Soil)

DATE RECEIVED: 2017-10-04

DATE REPORTED: 2017-11-10

SAMPLE DESCRIPTION:				04257-01-3.5m	04257-02-4.5m	04257-03-4.5m	04257-05-4.5m	04257-07-4.5m	04257-08-5.0m	04257-09-5.0m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-09-30	2017-10-01	2017-10-01	2017-10-01	2017-10-01	2017-10-01	2017-10-01
Parameter	Unit	G / S	RDL	8786827	8786828	8786829	8786831	8786833	8786834	8786837
Benzene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
m&p-Xylene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
o-Xylene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Moisture	%		0.5	12.5	6.27	7.27	6.44	11.9	4.99	5.56
VH	µg/g		10	<10	<10	<10	<10	<10	<10	<10
VPH	µg/g		10	<10	<10	<10	<10	<10	<10	<10
Total Xylenes	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits								
Bromofluorobenzene	%	60-140		96	102	96	99	104	94	99
Dibromofluoromethane	%	60-140		108	113	110	111	118	106	112
Toluene - d8	%	60-140		98	104	99	101	107	97	103

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8786787-8786837 Results are based on the dry weight of the sample.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17V268098
PROJECT: 1657709.6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Nov 10, 2017

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
CCME BTEX (Soil)															
Benzene	68006	8786787	<0.005	<0.005	NA	< 0.005	100%	80%	120%				94%	60%	140%
Toluene	68006	8786787	<0.05	<0.05	NA	< 0.05	107%	80%	120%				90%	60%	140%
Ethylbenzene	68006	8786787	<0.01	<0.01	NA	< 0.01	99%	80%	120%				88%	60%	140%
m&p-Xylene	68006	8786787	<0.02	<0.02	NA	< 0.02	99%	80%	120%				84%	60%	140%
o-Xylene	68006	8786787	<0.02	<0.02	NA	< 0.02	99%	80%	120%				85%	60%	140%
Bromofluorobenzene	68006	8786787	95	91	4.3%		100%	60%	140%				89%	60%	140%
Dibromofluoromethane	68006	8786787	109	104	4.7%		99%	60%	140%				92%	60%	140%
Toluene - d8	68006	8786787	99	95	4.1%		104%	60%	140%				85%	60%	140%
VH	68006	8786787	<10	<10	NA	< 10									
VPH	68006	8786787	<10	<10	NA	< 10									

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68008	8786787	<0.005	<0.005	NA	< 0.005	102%	80%	120%				107%	50%	130%
2-Methylnaphthalene	68008	8786787	<0.005	<0.005	NA	< 0.005	102%	80%	120%				98%	50%	130%
1-Methylnaphthalene	68008	8786787	<0.005	<0.005	NA	< 0.005	101%	80%	120%				105%	50%	130%
Acenaphthylene	68008	8786787	<0.005	<0.005	NA	< 0.005	101%	80%	120%				103%	50%	130%
Acenaphthene	68008	8786787	<0.005	<0.005	NA	< 0.005	101%	80%	120%				111%	50%	130%
Fluorene	68008	8786787	<0.02	<0.02	NA	< 0.02	101%	80%	120%				105%	50%	130%
Phenanthrene	68008	8786787	0.05	0.04	NA	< 0.02	103%	80%	120%				90%	60%	130%
Anthracene	68008	8786787	<0.004	<0.004	NA	< 0.004	98%	80%	120%				98%	60%	130%
Fluoranthene	68008	8786787	0.01	<0.01	NA	< 0.01	101%	80%	120%				99%	60%	130%
Pyrene	68008	8786787	0.02	0.02	NA	< 0.01	100%	80%	120%				100%	60%	130%
Benzo(a)anthracene	68008	8786787	<0.03	<0.03	NA	< 0.03	101%	80%	120%				100%	60%	130%
Chrysene	68008	8786787	0.07	0.05	NA	< 0.05	101%	80%	120%				97%	60%	130%
Benzo(b)fluoranthene	68008	8786787	<0.05	<0.05	NA	< 0.05	97%	80%	120%				100%	60%	130%
Benzo(j)fluoranthene	68008	8786787	<0.05	<0.05	NA	< 0.05	99%	80%	120%				96%	60%	130%
Benzo(k)fluoranthene	68008	8786787	<0.05	<0.05	NA	< 0.05	103%	80%	120%				91%	60%	130%
Benzo(a)pyrene	68008	8786787	<0.03	<0.03	NA	< 0.03	101%	80%	120%				94%	60%	130%
Indeno(1,2,3-c,d)pyrene	68008	8786787	<0.02	<0.02	NA	< 0.02	100%	80%	120%				104%	60%	130%
Dibenzo(a,h)anthracene	68008	8786787	<0.005	<0.005	NA	< 0.005	101%	80%	120%				104%	60%	130%
Benzo(g,h,i)perylene	68008	8786787	0.07	0.05	NA	< 0.05	101%	80%	120%				106%	60%	130%
Quinoline	68008	8786787	<0.05	<0.05	NA	< 0.05	100%	80%	120%				92%	50%	130%
EPH C10-C19	68008	8786787	91	86	NA	< 20	108%	70%	130%				92%	65%	120%
EPH C19-C32	68008	8786787	162	162	0.0%	< 20	102%	70%	130%				89%	80%	120%
Naphthalene - d8	68008	8786787	86	77	11.0%		102%	80%	120%				105%	50%	130%
2-Fluorobiphenyl	68008	8786787	93	81	13.8%		102%	80%	120%				106%	50%	130%
P-Terphenyl - d14	68008	8786787	108	89	19.3%		100%	80%	120%				110%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17V268098

PROJECT: 1657709.6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Nov 10, 2017			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

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17V268098

PROJECT: 1657709.6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17V268098

PROJECT: 1657709.6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Benzene	ORG-180-5100	EPA SW-846 8260-S	GC/MS/FID
Toluene	ORG-180-5100	EPA SW-846 8260-S	GC/MS/FID
Ethylbenzene	ORG-180-5100	EPA SW-846 8260-S	GC/MS/FID
m&p-Xylene	ORG-180-5100	EPA SW-846 8260-S	GC/MS/FID
o-Xylene	ORG-180-5100	EPA SW-846 8260-S	GC/MS/FID
Moisture	INOR-181-6030	SSMA Chapter 70 (2nd Ed)	GRAVIMETRIC
Bromofluorobenzene			GC/MS
Dibromofluoromethane			GC/MS
Toluene - d8			GC/MS
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID

17V268098

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04256 page 1 of 2

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709/6000			Laboratory Name: AGAT
Short Title: EK19 Remediation	Golder Contact: Erin O'Brien		Address: 8600 Glenlyon Parkway Burnaby, BC
Golder E-mail Address 1: Alvaro-GarridoHerrero@golder.com	Golder E-mail Address 2: erin-o'brien@golder.com	Telephone/Fax: 778-482-4009	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	LEPH/EPH C10-19	Naphthalene	2-Methylnaphthalene	BTEX/VPH/VH							RUSH (Select TAT above)	Remarks (over)
04256 - 01	EX17-01-W1A		2.5	Soil	30/09/17	13:30	District			4												8786786
- 02	EX17-01-W1B		3.5			13:30				4	X	X	X	X								787
- 03	EX17-01-W2A		2.5			13:39				4	X	X	X	X								788
- 04	EX17-01-W2B		3.5			13:39				4												789
- 05	EX17-01-W3A		2.5			13:56				4	X	X	X	X								790
- 06	EX17-01-W3B		3.5			13:56				4	X	X	X	X								791
- 07	EX17-01-W4A		2.5			14:06				4	X	X	X	X								792
- 08	EX17-01-W4B		3.5			14:06				4	X	X	X	X								793
- 09	EX17-01-W5A		2.5			14:22				4	X	X	X	X								794
- 10	EX17-01-W5B		3.5			14:22				4	X	X	X	X								795
- 11	EX17-01-W6A		2.5			14:38				4												796
- 12	EX17-01-W6B		3.5			14:38		FDA	04257-01	4	X	X	X	X								797

Sampler's Signature: Dave Osguthorpe	Relinquished by: Signature	Company	Date	Time	Received by: Signature Heather Bonga	Company AGAT
Comments: Invoice Dave Osguthorpe	Method of Shipment:	Waybill No.:	Received for Lab by: Maggie	Date Oct 2/17	Time 3:40 PM	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C) 2°C	Cooler opened by:	Date	Time

WHITE: Golder Copy YELLOW: Lab Copy

ESED

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17V268098

No. 04257 page 2 of 2

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709/6000			Laboratory Name: AGAT
Short Title: K19 Remediation	Golder Contact: Erin O'Brien		Address: 6600 Graybar Parkway, Burnaby, BC
Golder E-mail Address 1: Alvaro_Gonzalez@golder.com	Golder E-mail Address 2: andrew_bruemmer@golder.com		Telephone/Fax: 482-4009 / 777-[illegible] Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☐

OCT 4 AM 10:19

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☑ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	LEPH/EPH C10-19	Naphthalene	2-Methylnaphthalene	BTEX/VPH/VH							RUSH (Select TAT above)	Remarks (over)
04257 - 01	EX17-01-W6B		3.5	Soil	30/09/17	14:38	Discrete	FD	04256-12	4	X	X	X	X								8786827
- 02	EX17-01-W1C		4.5		01/10/17	09:30				4	X	X	X	X								828
- 03	EX17-01-W2C		4.5			09:35				4	X	X	X	X								829
- 04	EX17-01-W3C		4.5			09:45				4												830
- 05	EX17-01-W4C		4.5			09:50				4	X	X	X	X								831
- 06	EX17-01-W5C		4.5			10:00				4												832
- 07	EX17-01-W6C		4.5			10:10				4	X	X	X	X								833
- 08	EX17-01-B1		5.0			10:20				4	X	X	X	X								834
- 09	EX17-01-B2		5.0			10:30				4	X	X	X	X								837
- 10																						
- 11																						
- 12												-										

Sampler's Signature:	Relinquished by: Signature	Company	Date	Time	Received by: Signature	Company
					Heather Benoit	AGAT
Comments: Invoice Date Osgoode	Method of Shipment:	Waybill No.:	Received for Lab by: Maggie	Date 00/2/17	Time 3:46pm	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C) 2°C	Cooler opened by:	Date	Time

WHITE: Golder Copy **YELLOW:** Lab Copy

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM – BRANCH RECEIPT

Sending From Branch: EDM☐ GP☐ FN☐ FM☐ RD☐ VAN☐ LYD☐ FSJ☑ EST☐ Other:_____

Company/Consultant: Golder

TAT: <24hr ☐ 24-48hr ☐ 48-72hr ☐ Reg ☑ Other_____ Cooler Quantity: 8 1 Filled with methanol vials no samples

TIME SENSITIVE ISSUES:

Earliest Date Sampled: Sept 27/17

Microbiology: Test: _____

Hydrocarbons: Test: _____

Are samples received >5 days after sampling: Yes☐ No☐

ALREADY EXCEEDED? Yes☐ No☐

Expiry: 5

Expiry: _____

(TEMPERATURE MUST BE MAINTAINED IF RECEIVED <10 DEGREES C)

3 temperatures of samples* and average of each cooler (taken on jars only): NA (only bags on coolers)

(1) 1 + 2 + 4 = ___ °C (2) 5 + 4 + 3 = ___ °C (3) 1 + 5 + 3 = ___ °C (4) ___ + ___ + ___ = ___ °C bag

(5) 7 + 2 + 2 = ___

(6) 1 + 0 + 1 = ___

(7) 1 + 1 + 1 = ___

Additional integrity issues (note here and on COC next to the sample ID):

_____

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17V268098

RECEIVING BASICS:
Received From: Movex #2 Waybill #: _____

SAMPLE QUANTITIES:
Coolers: 6 Containers: 42

TIME SENSITIVE ISSUES:
Earliest Date Sampled: 30SEP-17 ALREADY EXCEEDED? Yes (No)

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) 0 + 0 + 0 = 0 °C (2) 7 + 7 + 7 = 7 °C (3) 3 + 1 + 4 = 3 °C (4) 0 + 0 + 0 = 0 °C

Was ice or ice pack present: (Yes) No

Integrity Issues:

5/ 0 0 1 = 0

6/ 0 - 0 = 0

20C

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date and Time: _____

ADDITIONAL NOTES:

AGAT Laboratories

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: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709 6000

AGAT WORK ORDER: 17V284467

SOIL ANALYSIS REVIEWED BY: Angela Bond, Technical Reviewer

TRACE ORGANICS REVIEWED BY: Angela Bond, Technical Reviewer

DATE REPORTED: Nov 20, 2017

PAGES (INCLUDING COVER): 25

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 1: Sample receipt temperature 8°C.

Version 1 issued on November 20, 2017 to report partial results. Version 2 will be issued when LEPH/HEPH/PAH analysis is complete.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-20

		SAMPLE DESCRIPTION:		04295-01-3.5m		04295-02-3.0m		04295-03-2.7m		04295-04-3.5m
		SAMPLE TYPE:		Soil		Soil		Soil		Soil
		DATE SAMPLED:		2017-11-10		2017-11-10		2017-11-10		2017-11-10
Parameter	Unit	G / S	RDL	8908057	RDL	8908065	RDL	8908066	RDL	8908067
Naphthalene	µg/g		0.005	0.098	0.005	0.430	0.005	0.094	0.005	0.236
2-Methylnaphthalene	µg/g		0.005	0.399	0.05	2.34	0.005	0.305	0.05	0.56
1-Methylnaphthalene	µg/g		0.005	0.252	0.05	1.16	0.005	0.193	0.005	0.455
Acenaphthylene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005
Fluorene	µg/g		0.02	0.07	0.02	0.13	0.02	0.10	0.02	0.08
Phenanthrene	µg/g		0.02	0.22	0.02	0.35	0.02	0.23	0.02	0.25
Anthracene	µg/g		0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Pyrene	µg/g		0.01	0.03	0.01	0.04	0.01	0.03	0.01	0.03
Benzo(a)anthracene	µg/g		0.03	<0.03	0.03	<0.03	0.03	<0.03	0.03	<0.03
Chrysene	µg/g		0.05	0.05	0.05	0.07	0.05	0.05	0.05	0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	0.03	<0.03	0.03	<0.03	0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.07	0.05	0.09	0.05	0.08	0.05	0.07
Quinoline	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
EPH C10-C19	µg/g		20	101	20	353	20	91	20	278
EPH C19-C32	µg/g		20	66	20	85	20	58	20	64
LEPH C10-C19	µg/g		20	100	20	352	20	91	20	277
HEPH C19-C32	µg/g		20	66	20	85	20	57	20	64
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05

Certified By: Angela Bond

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-20

		SAMPLE DESCRIPTION:	04295-01-3.5m	04295-02-3.0m	04295-03-2.7m	04295-04-3.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-10	2017-11-10	2017-11-10	2017-11-10
Surrogate	Unit	Acceptable Limits	8908057	8908065	8908066	8908067
Naphthalene - d8	%	50-130	70	74	74	70
2-Fluorobiphenyl	%	50-130	76	84	81	75
P-Terphenyl - d14	%	60-130	80	83	84	85

Certified By: Angela Bond

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-20

SAMPLE DESCRIPTION:				04295-06-1.5m	04295-07-0.5m	04295-08-2.5m	04295-09-1.5m	04296-01-2.5m	04296-03-0.5m	04296-04-2.5m	04296-05-2.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-11	2017-11-11
Parameter	Unit	G / S	RDL	8908069	8908070	8908071	8908072	8908082	8908084	8908085	8908086
Naphthalene	µg/g		0.005	<0.005	<0.005	0.005	<0.005	<0.005	0.431	0.090	0.034
2-Methylnaphthalene	µg/g		0.005	<0.005	<0.005	0.041	<0.005	<0.005	0.150	0.212	0.301
1-Methylnaphthalene	µg/g		0.005	<0.005	<0.005	0.028	<0.005	<0.005	0.560	0.158	0.179
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02	0.10	<0.02	<0.02	0.05	0.02	0.09
Phenanthrene	µg/g		0.02	<0.02	<0.02	0.28	<0.02	<0.02	0.10	0.10	0.27
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.01	0.01
Pyrene	µg/g		0.01	<0.01	<0.01	0.04	<0.01	<0.01	0.03	0.03	0.04
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	0.05	0.07
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	<0.05	0.09	<0.05	<0.05	<0.05	0.06	0.09
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	0.6	<0.6	<0.6	<0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	<20	<20	60	<20	<20	316	202	127
EPH C19-C32	µg/g		20	25	28	59	21	30	69	162	66
LEPH C10-C19	µg/g		20	<20	<20	60	<20	<20	316	202	127
HEPH C19-C32	µg/g		20	25	28	59	21	29	69	162	66
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By: Angela Bond

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-20

		SAMPLE DESCRIPTION:	04295-06-1.5m	04295-07-0.5m	04295-08-2.5m	04295-09-1.5m	04296-01-2.5m	04296-03-0.5m	04296-04-2.5m	04296-05-2.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-11	2017-11-11
Surrogate	Unit	Acceptable Limits	8908069	8908070	8908071	8908072	8908082	8908084	8908085	8908086
Naphthalene - d8	%	50-130	69	71	72	75	77	74	71	72
2-Fluorobiphenyl	%	50-130	74	78	78	82	86	74	77	80
P-Terphenyl - d14	%	60-130	86	85	81	86	94	85	87	87

Certified By: Angela Bond

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
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Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-20

		SAMPLE DESCRIPTION:		04296-06-2.5m		04296-08-0.5m		04296-09-2.5m		04296-10-2.5m	04297-01-1.5m
		SAMPLE TYPE:		Soil		Soil		Soil		Soil	Soil
		DATE SAMPLED:		2017-11-11		2017-11-11		2017-11-11		2017-11-11	2017-11-11
Parameter	Unit	G / S	RDL	8908087	RDL	8908089	RDL	8908090	RDL	8908091	8908107
Naphthalene	µg/g		0.005	0.493	0.005	<0.005	0.005	1.64	0.005	0.024	<0.005
2-Methylnaphthalene	µg/g		0.005	0.641	0.005	<0.005	0.05	3.32	0.005	0.224	<0.005
1-Methylnaphthalene	µg/g		0.05	2.65	0.005	<0.005	0.05	2.00	0.005	0.134	<0.005
Acenaphthylene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005	<0.005
Fluorene	µg/g		0.02	0.19	0.02	<0.02	0.02	0.15	0.02	0.10	<0.02
Phenanthrene	µg/g		0.02	0.31	0.02	<0.02	0.02	0.32	0.02	0.25	<0.02
Anthracene	µg/g		0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.02	0.01	<0.01	0.01	0.01	0.01	0.01	<0.01
Pyrene	µg/g		0.01	0.08	0.01	<0.01	0.01	0.03	0.01	0.03	<0.01
Benzo(a)anthracene	µg/g		0.03	<0.03	0.03	<0.03	0.03	<0.03	0.03	<0.03	<0.03
Chrysene	µg/g		0.05	0.08	0.05	<0.05	0.05	0.05	0.05	0.06	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	0.03	<0.03	0.03	<0.03	0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.09	0.05	<0.05	0.05	0.07	0.05	0.07	<0.05
Quinoline	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	0.6	<0.6	0.6	0.6	0.6	0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	2790	20	30	20	657	20	78	<20
EPH C19-C32	µg/g		20	137	20	35	20	70	20	62	38
LEPH C10-C19	µg/g		20	2790	20	30	20	655	20	78	<20
HEPH C19-C32	µg/g		20	137	20	34	20	70	20	62	38
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-20

		SAMPLE DESCRIPTION:	04296-06-2.5m	04296-08-0.5m	04296-09-2.5m	04296-10-2.5m	04297-01-1.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-11	2017-11-11	2017-11-11	2017-11-11	2017-11-11
Surrogate	Unit	Acceptable Limits	8908087	8908089	8908090	8908091	8908107
Naphthalene - d8	%	50-130	93	69	82	72	70
2-Fluorobiphenyl	%	50-130	109	78	86	78	79
P-Terphenyl - d14	%	60-130	83	84	87	84	94

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Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-20

SAMPLE DESCRIPTION:				04297-02-0.5m	04297-03-2.5m	04297-04-2.5m
SAMPLE TYPE:				Soil	Soil	Soil
DATE SAMPLED:				2017-11-11	2017-11-11	2017-11-12
Parameter	Unit	G / S	RDL	8908108	8908109	8908111
Naphthalene	µg/g		0.005	<0.005	0.062	<0.005
2-Methylnaphthalene	µg/g		0.005	<0.005	0.432	<0.005
1-Methylnaphthalene	µg/g		0.005	<0.005	0.272	0.007
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	0.10	<0.02
Phenanthrene	µg/g		0.02	<0.02	0.25	<0.02
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	0.01	<0.01
Pyrene	µg/g		0.01	<0.01	0.03	<0.01
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	0.07	<0.05
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	<20	86	<20
EPH C19-C32	µg/g		20	32	60	49
LEPH C10-C19	µg/g		20	<20	86	<20
HEPH C19-C32	µg/g		20	32	60	49
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-20

		SAMPLE DESCRIPTION:	04297-02-0.5m	04297-03-2.5m	04297-04-2.5m
		SAMPLE TYPE:	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-11	2017-11-11	2017-11-12
Surrogate	Unit	Acceptable Limits	8908108	8908109	8908111
Naphthalene - d8	%	50-130	79	84	69
2-Fluorobiphenyl	%	50-130	86	92	75
P-Terphenyl - d14	%	60-130	95	96	92

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8908057 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8908065 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8908066 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8908067 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8908069-8908086 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8908087 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8908089 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8908090 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8908091-8908111 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

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Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-17

		SAMPLE DESCRIPTION:		04295-01-3.5m	04295-02-3.0m	04295-03-2.7m	04295-04-3.5m	04295-06-1.5m	04295-07-0.5m	04295-08-2.5m	04295-09-1.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10
Parameter	Unit	G / S	RDL	8908057	8908065	8908066	8908067	8908069	8908070	8908071	8908072
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	0.07	<0.02	0.26	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	0.58	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	0.34	<0.05	0.09	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	0.06	1.58	<0.05	0.46	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	0.72	<0.05	0.06	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	45	<10	12	<10	<10	<10	<10
VH	µg/g		10	<10	49	<10	13	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	2.3	<0.1	0.5	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		94	100	99	92	97	98	97	99
Dibromofluoromethane	%	60-140		101	102	106	97	106	109	106	110
Toluene - d8	%	60-140		98	102	102	95	102	104	101	105

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Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-17

		SAMPLE DESCRIPTION:		04296-01-2.5m	04296-03-0.5m	04296-04-2.5m	04296-05-2.5m	04296-06-2.5m	04296-08-0.5m	04296-09-2.5m	04296-10-2.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-10	2017-11-10	2017-11-11	2017-11-11	2017-11-11	2017-11-11	2017-11-11	2017-11-11
Parameter	Unit	G / S	RDL	8908082	8908084	8908085	8908086	8908087	8908089	8908090	8908091
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	0.04	<0.02	<0.02	0.06	<0.02	1.57	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.65	<0.05
Ethylbenzene	µg/g		0.05	<0.05	0.27	<0.05	<0.05	0.21	<0.05	1.06	<0.05
m&p-Xylene	µg/g		0.05	<0.05	0.80	0.10	<0.05	0.22	<0.05	6.65	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.84	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	17	<10	<10	112	40	36	<10
VH	µg/g		10	<10	19	<10	<10	112	40	47	<10
Total Xylenes	ug/g		0.1	<0.1	0.8	0.1	<0.1	0.2	<0.1	7.5	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		98	102	97	96	104	104	102	99
Dibromofluoromethane	%	60-140		109	110	104	103	106	101	102	103
Toluene - d8	%	60-140		104	104	101	100	101	100	107	104

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Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-17

		SAMPLE DESCRIPTION:		04297-01-1.5m	04297-02-0.5m	04297-03-2.5m	04297-04-2.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-11	2017-11-11	2017-11-11	2017-11-12
Parameter	Unit	G / S	RDL	8908107	8908108	8908109	8908111
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	12	<10
VH	µg/g		10	<10	<10	12	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits					
Bromofluorobenzene	%	60-140		99	97	96	95
Dibromofluoromethane	%	60-140		106	106	102	104
Toluene - d8	%	60-140		106	104	101	101

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8908057-8908111 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date:			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
Public Works Metals in Soil															
Aluminum	8907905		10500	10300	1.3%	< 10	107%	70%	130%	101%	90%	110%			
Antimony	8907283		0.3	0.3	NA	< 0.1	113%	70%	130%	108%	90%	110%			
Arsenic	8907283		3.0	3.2	6.5%	< 0.1	125%	70%	130%	104%	90%	110%			
Barium	8907283		60.7	62.3	2.6%	< 0.5	103%	70%	130%	104%	90%	110%			
Beryllium	8907283		0.2	0.2	NA	< 0.1	104%	70%	130%	97%	90%	110%			
Bismuth	8907283		<0.5	<0.5	NA	< 0.5				92%	85%	115%			
Cadmium	8907283		0.18	0.17	2.3%	< 0.01	114%	70%	130%	102%	90%	110%			
Calcium	8907905		4450	4450	0.0%	< 10	110%	70%	130%	98%	90%	110%			
Chromium	8907283		22	23	0.8%	< 1	96%	70%	130%	99%	90%	110%			
Cobalt	8907283		8.8	8.6	1.9%	< 0.1	111%	70%	130%	109%	90%	110%			
Copper	8907283		17.1	17.4	1.7%	< 0.2	101%	70%	130%	102%	90%	110%			
Iron	8907905		18100	18300	1.2%	< 10	108%	70%	130%	99%	90%	110%			
Lead	8907283		4.5	4.9	8.5%	< 0.1	91%	70%	130%	98%	90%	110%			
Lithium	8907283		8.6	9.1	5.1%	< 0.5				94%	85%	115%			
Magnesium	8907905		4510	4910	8.5%	< 10	115%	70%	130%	106%	90%	110%			
Manganese	8907283		328	336	2.3%	< 1	96%	70%	130%	103%	90%	110%			
Mercury	8907283		0.02	0.03	NA	< 0.01	130%	70%	130%	97%	90%	110%			
Molybdenum	8907283		0.6	0.4	NA	< 0.2	96%	70%	130%	97%	90%	110%			
Nickel	8907283		32.7	34.3	4.7%	< 0.5	108%	70%	130%	106%	90%	110%			
Phosphorus	8907905		375	400	6.6%	< 5	107%	70%	130%	102%	90%	110%			
Potassium	8907905		832	826	0.6%	< 5	105%	70%	130%	101%	90%	110%			
Selenium	8907283		0.6	0.3	NA	< 0.1				102%	90%	110%			
Silver	8907283		<0.5	<0.5	NA	< 0.5	122%	70%	130%	110%	90%	110%			
Sodium	8907905		357	329	8.3%	< 5	113%	70%	130%	101%	90%	110%			
Strontium	8907283		41	43	4.8%	< 1	103%	70%	130%	99%	90%	110%			
Thallium	8907283		<0.1	<0.1	NA	< 0.1	102%	70%	130%	98%	90%	110%			
Tin	8907283		0.4	0.4	NA	< 0.2	107%	70%	130%	102%	90%	110%			
Titanium	8907905		555	600	7.8%	< 1				101%	90%	110%			
Uranium	8907283		0.4	0.4	NA	< 0.2	100%	70%	130%	107%	90%	110%			
Vanadium	8907283		39	39	1.4%	< 1	96%	70%	130%	97%	90%	110%			
Zinc	8907283		45	45	0.1%	< 1	104%	70%	130%	106%	90%	110%			
Zirconium	8907283		3.1	3.9	22.9%	< 0.1				100%	90%	110%			
pH 1:2	8907905		8.90	8.91	0.1%	< 0.1	94%	90%	110%	99%	95%	105%			

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17V284467
PROJECT: 1657709 6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date:			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
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68290	8908057	<0.1	<0.1	NA	< 0.1	98%	80%	120%				85%	70%	130%
Benzene	68290	8908057	<0.02	<0.02	NA	< 0.02	100%	80%	120%				95%	70%	130%
Toluene	68290	8908057	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	70%	130%
Ethylbenzene	68290	8908057	<0.05	<0.05	NA	< 0.05	99%	80%	120%				96%	70%	130%
m&p-Xylene	68290	8908057	0.06	0.06	NA	< 0.05	98%	80%	120%				96%	70%	130%
o-Xylene	68290	8908057	<0.05	<0.05	NA	< 0.05	98%	80%	120%				96%	70%	130%
Styrene	68290	8908057	<0.05	<0.05	NA	< 0.05	100%	80%	120%				98%	70%	130%
VPH	68290	8908057	<10	<10	NA	< 10									
VH	68290	8908057	<10	<10	NA	< 10									
Bromofluorobenzene	68290	8908057	94	94	0.0%		100%	60%	140%				94%	60%	140%
Dibromofluoromethane	68290	8908057	101	101	0.0%		101%	60%	140%				90%	60%	140%
Toluene - d8	68290	8908057	98	96	2.1%		100%	60%	140%				88%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68293	8908066	0.094	0.057	49.0%	< 0.005	101%	80%	120%				117%	50%	130%
2-Methylnaphthalene	68293	8908066	0.305	0.188	47.5%	< 0.005	98%	80%	120%				115%	50%	130%
1-Methylnaphthalene	68293	8908066	0.193	0.126	42.0%	< 0.005	101%	80%	120%				107%	50%	130%
Acenaphthylene	68293	8908066	<0.005	<0.005	NA	< 0.005	102%	80%	120%				115%	50%	130%
Acenaphthene	68293	8908066	<0.005	<0.005	NA	< 0.005	101%	80%	120%				114%	50%	130%
Fluorene	68293	8908066	0.10	0.09	NA	< 0.02	100%	80%	120%				112%	50%	130%
Phenanthrene	68293	8908066	0.23	0.22	4.4%	< 0.02	102%	80%	120%				82%	60%	130%
Anthracene	68293	8908066	<0.004	<0.004	NA	< 0.004	102%	80%	120%				98%	60%	130%
Fluoranthene	68293	8908066	0.01	0.01	NA	< 0.01	104%	80%	120%				114%	60%	130%
Pyrene	68293	8908066	0.03	0.03	NA	< 0.01	100%	80%	120%				113%	60%	130%
Benzo(a)anthracene	68293	8908066	<0.03	<0.03	NA	< 0.03	99%	80%	120%				118%	60%	130%
Chrysene	68293	8908066	0.05	0.05	NA	< 0.05	98%	80%	120%				110%	60%	130%
Benzo(b)fluoranthene	68293	8908066	<0.05	<0.05	NA	< 0.05	102%	80%	120%				85%	60%	130%
Benzo(j)fluoranthene	68293	8908066	<0.05	<0.05	NA	< 0.05	102%	80%	120%				118%	60%	130%
Benzo(k)fluoranthene	68293	8908066	<0.05	<0.05	NA	< 0.05	103%	80%	120%				107%	60%	130%
Benzo(a)pyrene	68293	8908066	<0.03	<0.03	NA	< 0.03	104%	80%	120%				110%	60%	130%
Indeno(1,2,3-c,d)pyrene	68293	8908066	<0.02	<0.02	NA	< 0.02	100%	80%	120%				111%	60%	130%
Dibenzo(a,h)anthracene	68293	8908066	<0.005	<0.005	NA	< 0.005	100%	80%	120%				104%	60%	130%
Benzo(g,h,i)perylene	68293	8908066	0.08	0.08	NA	< 0.05	101%	80%	120%				120%	60%	130%
Quinoline	68293	8908066	<0.05	<0.05	NA	< 0.05	101%	80%	120%				110%	50%	130%
EPH C10-C19	68293	8908066	91	75	NA	< 20	109%	70%	130%				102%	65%	120%
EPH C19-C32	68293	8908066	58	55	NA	< 20	103%	70%	130%				102%	80%	120%
Naphthalene - d8	68293	8908066	74	79	6.5%		102%	80%	120%				98%	50%	130%
2-Fluorobiphenyl	68293	8908066	81	86	6.0%		100%	80%	120%				101%	50%	130%

AGAT Laboratories

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date:			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
P-Terphenyl - d14	68293	8908066	84	83	1.2%		100%	80%	120%				100%	60%	130%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68291	8908112	<0.1	<0.1	NA	< 0.1	98%	80%	120%				83%	70%	130%
Benzene	68291	8908112	<0.02	<0.02	NA	< 0.02	100%	80%	120%				95%	70%	130%
Toluene	68291	8908112	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	70%	130%
Ethylbenzene	68291	8908112	<0.05	<0.05	NA	< 0.05	99%	80%	120%				96%	70%	130%
m&p-Xylene	68291	8908112	<0.05	<0.05	NA	< 0.05	98%	80%	120%				96%	70%	130%
o-Xylene	68291	8908112	<0.05	<0.05	NA	< 0.05	98%	80%	120%				96%	70%	130%
Styrene	68291	8908112	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	70%	130%
VPH	68291	8908112	<10	<10	NA	< 10									
VH	68291	8908112	<10	<10	NA	< 10									
Bromofluorobenzene	68291	8908112	97	97	0.0%		100%	60%	140%				94%	60%	140%
Dibromofluoromethane	68291	8908112	104	104	0.0%		101%	60%	140%				91%	60%	140%
Toluene - d8	68291	8908112	106	106	0.0%		100%	60%	140%				90%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
EPH C10-C19	68296	8908112	<20	<20	NA	< 20	111%	70%	130%				94%	65%	120%
EPH C19-C32	68296	8908112	40	33	NA	< 20	103%	70%	130%				92%	80%	120%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															

Certified By: Angela Bond

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17V284467
PROJECT: 1657709 6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Antimony	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Arsenic	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Barium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Beryllium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Bismuth	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cadmium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Calcium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Chromium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cobalt	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Copper	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Iron	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Lead	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Lithium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Magnesium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Manganese	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Mercury	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Molybdenum	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Nickel	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Phosphorus	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Potassium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Selenium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Silver	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Sodium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Strontium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Thallium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Tin	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Titanium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Uranium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Vanadium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zinc	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zirconium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
pH 1:2	INOR-181-6031	BC MOE Lab Manual B (pH, Electrometric, Soil)	PH METER

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

AGAT Laboratories

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS

17V284467

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04295 page 1 of 4

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 6000			Laboratory Name: ALS
Short Title: K19 Remediation	Golder Contact: Erin O'Brien		Address: 120-8600 Glenlyon Parkway
Golder E-mail Address 1: erin_o'brien @golder.com	Golder E-mail Address 2: andrew_bremner@golder.com		Telephone/Fax: 2507746500 Contact: Maggie Chung

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

NOV 15 AM 11:08

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VPH, VH	LEPH, EPH (C10 to C19)	Naphthalene	2-methylnaphthalene	H2O2	RUSH (Select TAT above)	Remarks (over)
04295-01	EX17-02	B17	3.5	soil	10/11/17	14:00	GRAB			4	X	X	X	X			8908057
-02		B18	3.0			14:05					X	X	X	X			065
-03		B19	2.7			14:10					X	X	X	X			066
-04		B20	3.5			14:15					X	X	X	X			067
-05		W11C	2.5			14:20									X		068
-06		W11B	1.5			1425					X	X	X	X			069
-07		W11A	0.5			1430					X	X	X	X			070
-08		W12C	2.5			1435					X	X	X	X			071
-09		W12B	1.5			1440					X	X	X	X			072
-10		W12A	0.5			1445									X		073
-11		W13D	3.5			1455		FDA	04295-12						X		074
-12		W13D	3.5			1500		FD	04295-11						X		075

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 13/11/17	Time: 19:45	Received by: Signature	Company: ALS
Comments: ON ICE	Method of Shipment:	Waybill No.:	Received for Lab by:	Date: 11/13	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	Time

WHITE: Golder Copy YELLOW: Lab Copy 8°C Ken KH

ESED

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17V284467
No. 04296 page 2 of 4

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 6000
Short Title: K19 Remediation
Golder Contact: Erin O'Brien
Golder E-mail Address 1: erin_o'brien @golder.com
Golder E-mail Address 2: andrew_bruemmer@golder.com

Laboratory Name: AGAT
Address: 120-8600 Glenlyon Parkway
Telephone/Fax: 2507746500
Contact: Maggie Chan

Office Name: Vancouver
EQuIS Facility Code: 28433859
EQuIS upload: ☒
agarrido@golder.com
NOV 15 AM 11:09

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail
Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VPH, VH	LEPH, EPH (C10-C19)	Naphthalene	2-methylnaphthalene	HOLD	RUSH (Select TAT above)	Remarks (over)
04296-01	EX17-02	W13C	2.5	SOIL	10/11/17		GRAB			4	X	X	X	X			8908082
-02		W13B	1.5												X		083
-03		W13A	0.5														084
-04		B21	2.5		11/11/17	13:20					X	X	X	X			085
-05		B22	2.5			13:25					X	X	X	X			086
-06		W14C	2.5			13:30					X	X	X	X	087		~~RUSH 48HR~~ SS 13/11/17
-07		W14B	1.5			13:35									X		088
-08		W14A	0.5			13:40					X	X	X	X	089		~~RUSH 48HR~~
-09		B23	2.5			13:45					X	X	X	X	090		SS 13/11/17
-10		B24	2.5			13:50					X	X	X	X			091
-11		W15C	2.5			13:55		FDA	04296-12						X		092
-12		W15C	2.5			14:00		FD	04296-11						X		093

Sampler's Signature: ON FILE	Relinquished by: Signature	Company: Golder	Date: 13/11/17	Time: 1545	Received by: Signature / Company: AGAT LABS
Comments: ~~See Remarks For Samples on 48HR~~ RUSH	Method of Shipment:	Waybill No.:	Received for Lab by:	Date	Time
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date / Time

WHITE: Golder Copy YELLOW: Lab Copy 8°C Keen Kot

ESED

17V284467

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04297 page 3 of 4

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 6000
Short Title: K19 Remediation
Golder Contact: Erin O'Brien
Golder E-mail Address 1: erin_o'brien @golder.com
Golder E-mail Address 2: andrew_bruemmer @golder.com

Laboratory Name: AGAT
Address: 120-8600 Glenlyon Parkway
Telephone/Fax: 2507246500
Contact: Maggie Chan

Office Name: Vancouver
EQuIS Facility Code: 28433859
EQuIS upload: ☒
agarrido@golder.com

NOV 15 2017 11:08

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VPH, VH	LEPH, EPH (C10-C19)	Napthalene	2-methylnapthalene				HOLD		RUSH (Select TAT above)	Remarks (over)
04297 - 01	EX17-02-	W15B	1.5	Soil	11/11/17	14:05	GRAB			4	X	X	X	X							8908107
- 02		W15A	0.5			14:10					X	X	X	X							108
- 03		B25	2.5			14:15					X	X	X	X							109
- 04		W16C	2.5		12/11/17	13:15					X	X	X	X							111
- 05		W16B	1.5			13:20					X	X	X	X							112
- 06		W16A	0.5			13:25												X			113
- 07		W17C	2.5			13:50					X	X	X	X							117
- 08		W17B	1.5			13:55					X	X	X	X							119
- 09		W17A	0.5			14:05												X			123
- 10		W18C	2.5			14:25					X	X	X	X							127
- 11		W18A	0.5			14:35					X	X	X	X							128
- 12		W18B	1.5			14:30												X			129

Sampler's Signature: [signature]
Relinquished by: Signature [signature]
Company: Golder.
Date: 13/11/17
Time: 1545.
Received by: Signature [signature]
Company: AGAT LABS

Comments: ON ICE

Method of Shipment:
Waybill No.:
Received for Lab by:
Date
Time
Shipped by:
Shipment Condition:
Seal Intact:
Temp (°C)
Cooler opened by:
Date
Time

WHITE: Golder Copy YELLOW: Lab Copy 8°C Keen Koff

ESED

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17V284467

No. 04335 page 4 of 4

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 / 6000		Laboratory Name: AGAT	
Short Title: K14 Remediation	Golder Contact: Erin O'Brien	Address: 120 - 8600 Glenlyon Parkway	
Golder E-mail Address 1: erin_o'brien@golder.com	Golder E-mail Address 2: andrew_brennan@golder.com	Telephone/Fax: 2507746500	Contact: Maggie Cham

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

NOV 15 AM 11:08

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX / VPH	LEPH / HEPH / PAHs	Metals	BTEX, VPH, VH	LEPH, EPH (10 or C19)	Naphthalene	2-methylnaphthalene	HOLD	RUSH (Select TAT above)	Remarks (over)
04335 - 01	Backfills	–	30	13/11/17	08:45	Comp	FDA	04335-02	4	X	X	X							8908130	
↓ - 02	↓		↓	↓	↓	↓	FD	04335-01	4								X		↓ 131	
04335 - 03	EX17-02-W15C2	2.5	30	13/11/17	11:30	GRAB	–		4				~~X~~	~~X~~	~~X~~	~~X~~	X		↓ 132	
- 04														SS 13/11/17.						
- 05																				
- 06																				
- 07																				
- 08																				
- 09																				
- 10																				
- 11																				
- 12																				

Sampler's Signature:	Relinquished by: Signature	Company Golder.	Date 13/11/17	Time 1545.	Received by: Signature	Company AGAT LABS	
Comments: ON ICE	Method of Shipment:	Waybill No.:	Received for Lab by:		Date	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	Time	

WHITE: Golder Copy **YELLOW:** Lab Copy Ken Kot

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17V284467

RECEIVING BASICS:

Received From: HOVER Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 2 Containers: 156

TIME SENSITIVE ISSUES:

Earliest Date Sampled: 10-Nov-17 ALREADY EXCEEDED? Yes (No)

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) 9 + 9 + 9 = 9 °C (2) 6 + 6 + 6 = 6 °C (3) ___ + ___ + ___ = ___ °C (4) ___ + ___ + ___ = ___ °C

Was ice or ice pack present: (Yes) No

Integrity Issues:

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 RECEIPT

Sending From Branch: EDM☐ GP☐ FN☐ FM☐ RD☐ VAN☐ LYD☐ FSJ☒ EST☐ Other:_____

Company/Consultant: Golder Associates

TAT: <24hr ☐ 24-48hr ☐ 48-72hr ☐ Reg ☒ Other_____ Cooler Quantity: 2

TIME SENSITIVE ISSUES:

Earliest Date Sampled: Nov 10

Microbiology: Test: _____

Hydrocarbons: Test: _____

Are samples received >5 days after sampling: Yes☐ No☒

ALREADY EXCEEDED? Yes☐ No☒

Expiry: _____

Expiry: _____

(TEMPERATURE MUST BE MAINTAINED IF RECEIVED <10 DEGREES C)

3 temperatures of samples* and average of each cooler (taken on jars only): NA (only bags on coolers)

(1) -2.5 + -3 + -1 = ___°C (2) 1 + -1 + -1.5 = ___°C (3) ___+___+___=___°C (4) ___+___+___=___°C

Additional integrity issues (note here and on COC next to the sample ID):

_____

SR-9503.004
March 10, 2014

AGAT Laboratories

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: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709-6000

AGAT WORK ORDER: 17Y274566

SOIL ANALYSIS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

TRACE ORGANICS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

DATE REPORTED: Nov 10, 2017

PAGES (INCLUDING COVER): 20

VERSION*: 3

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 3: Sample receipt temperature 2°C.

Version 3 issued on November 10, 2017 to report the complete LEPH/HEPH/PAH package as requested by Erin O'Brien of Golder. Version 3 is an amendment to all previous versions.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17Y274566

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works Metals in Soil

DATE RECEIVED: 2017-10-21

DATE REPORTED: 2017-11-02

		SAMPLE DESCRIPTION:		04270-01
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-10-19
Parameter	Unit	G / S	RDL	8838901
Aluminum	µg/g		10	6010
Antimony	µg/g		0.1	0.5
Arsenic	µg/g		0.1	6.7
Barium	µg/g		0.5	146
Beryllium	µg/g		0.1	0.5
Bismuth	µg/g		0.5	<0.5
Cadmium	µg/g		0.01	0.61
Calcium	µg/g		10	78200
Chromium	µg/g		1	14
Cobalt	µg/g		0.1	6.9
Copper	µg/g		0.2	18.8
Iron	µg/g		10	24200
Lead	µg/g		0.1	6.7
Lithium	µg/g		0.5	8.4
Magnesium	µg/g		10	12700
Manganese	µg/g		1	368
Mercury	µg/g		0.01	0.04
Molybdenum	µg/g		0.2	2.7
Nickel	µg/g		0.5	19.2
Phosphorus	µg/g		5	494
Potassium	µg/g		5	1100
Selenium	µg/g		0.1	0.6
Silver	µg/g		0.5	<0.5
Sodium	µg/g		5	102
Strontium	µg/g		1	60
Thallium	µg/g		0.1	0.2
Tin	µg/g		0.2	0.3
Titanium	µg/g		1	169
Uranium	µg/g		0.2	1.1
Vanadium	µg/g		1	29

Certified By:

AGAT Laboratories

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17Y274566

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works Metals in Soil

DATE RECEIVED: 2017-10-21

DATE REPORTED: 2017-11-02

			SAMPLE DESCRIPTION:	04270-01
			SAMPLE TYPE:	Soil
			DATE SAMPLED:	2017-10-19
Parameter	Unit	G / S	RDL	8838901
Zinc	µg/g		1	80
Zirconium	µg/g		0.1	3.3
pH 1:2	pH units		0.05	8.32

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8838901 Results are based on the dry weight of the sample.

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17Y274566

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-21

DATE REPORTED: 2017-10-26

SAMPLE DESCRIPTION:				04270-01	04270-03-3.5m	04270-06-0.5m	04270-07-4.0m	04270-08-3.5m	04270-09-4.0m	04270-10-4.0m	04270-11-4.0m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-10-19	2017-10-19	2017-10-19	2017-10-19	2017-10-19	2017-10-19	2017-10-19	2017-10-19
Parameter	Unit	G / S	RDL	8838901	8838914	8838917	8838918	8838919	8838920	8838921	8838922
Naphthalene	µg/g		0.005	<0.005	0.090	0.008	<0.005	0.193	<0.005	<0.005	0.037
2-Methylnaphthalene	µg/g		0.005	<0.005	0.290	0.031	<0.005	0.438	0.013	<0.005	0.177
1-Methylnaphthalene	µg/g		0.005	<0.005	0.270	0.023	<0.005	0.371	0.019	<0.005	0.142
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	0.03	<0.02	<0.02	0.03	<0.02	<0.02	<0.02
Phenanthrene	µg/g		0.02	<0.02	0.07	<0.02	0.02	0.06	0.04	0.03	0.03
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.02	0.02	<0.01
Pyrene	µg/g		0.01	<0.01	0.01	<0.01	0.04	<0.01	0.06	0.05	<0.01
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	<0.05	<0.05	0.06	<0.05	0.08	0.08	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	<0.05	<0.05	0.07	<0.05	0.09	0.08	<0.05
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	<0.6	0.6	<0.6	0.6	0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	<20	156	22	110	138	92	86	87
EPH C19-C32	µg/g		20	<20	76	33	127	56	80	78	53
LEPH C10-C19	µg/g		20	<20	156	22	110	137	92	86	87
HEPH C19-C32	µg/g		20	<20	76	33	127	56	80	78	53
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17Y274566

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-21

DATE REPORTED: 2017-10-26

		SAMPLE DESCRIPTION:	04270-01	04270-03-3.5m	04270-06-0.5m	04270-07-4.0m	04270-08-3.5m	04270-09-4.0m	04270-10-4.0m	04270-11-4.0m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-10-19	2017-10-19	2017-10-19	2017-10-19	2017-10-19	2017-10-19	2017-10-19	2017-10-19
Surrogate	Unit	Acceptable Limits	8838901	8838914	8838917	8838918	8838919	8838920	8838921	8838922
Naphthalene - d8	%	50-130	80	72	65	92	82	90	83	77
2-Fluorobiphenyl	%	50-130	84	76	71	93	87	96	89	78
P-Terphenyl - d14	%	60-130	102	93	96	101	101	102	94	99

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
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Certificate of Analysis

AGAT WORK ORDER: 17Y274566

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-21

DATE REPORTED: 2017-10-26

		SAMPLE DESCRIPTION:		04271-02-1.5m
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-10-19
Parameter	Unit	G / S	RDL	8838925
Naphthalene	µg/g		0.005	<0.005
2-Methylnaphthalene	µg/g		0.005	0.009
1-Methylnaphthalene	µg/g		0.005	0.009
Acenaphthylene	µg/g		0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005
Fluorene	µg/g		0.02	<0.02
Phenanthrene	µg/g		0.02	<0.02
Anthracene	µg/g		0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01
Pyrene	µg/g		0.01	<0.01
Benzo(a)anthracene	µg/g		0.03	<0.03
Chrysene	µg/g		0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05
Quinoline	µg/g		0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05
EPH C10-C19	µg/g		20	<20
EPH C19-C32	µg/g		20	30
LEPH C10-C19	µg/g		20	<20
HEPH C19-C32	µg/g		20	30
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
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TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17Y274566

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-10-21

DATE REPORTED: 2017-10-26

		SAMPLE DESCRIPTION:	04271-02-1.5m
		SAMPLE TYPE:	Soil
		DATE SAMPLED:	2017-10-19
Surrogate	Unit	Acceptable Limits	8838925
Naphthalene - d8	%	50-130	74
2-Fluorobiphenyl	%	50-130	78
P-Terphenyl - d14	%	60-130	101

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8838901-8838925 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17Y274566

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-10-21

DATE REPORTED: 2017-10-26

		SAMPLE DESCRIPTION:		04270-01	04270-03-3.5m	04270-06-0.5m	04270-07-4.0m	04270-08-3.5m	04270-09-4.0m	04270-10-4.0m	04270-11-4.0m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-10-19	2017-10-19	2017-10-19	2017-10-19	2017-10-19	2017-10-19	2017-10-19	2017-10-19
Parameter	Unit	G / S	RDL	8838901	8838914	8838917	8838918	8838919	8838920	8838921	8838922
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05	0.18	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
VH	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		97	103	104	99	102	108	102	105
Dibromofluoromethane	%	60-140		94	105	105	99	101	112	108	108
Toluene - d8	%	60-140		113	122	123	119	120	121	124	126

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Certificate of Analysis

AGAT WORK ORDER: 17Y274566

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-10-21

DATE REPORTED: 2017-10-26

		SAMPLE DESCRIPTION:		04271-02-1.5m
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-10-19
Parameter	Unit	G / S	RDL	8838925
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1
Benzene	µg/g		0.02	<0.02
Toluene	µg/g		0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05
o-Xylene	µg/g		0.05	<0.05
Styrene	µg/g		0.05	<0.05
VPH	µg/g		10	<10
VH	µg/g		10	<10
Total Xylenes	ug/g		0.1	<0.1
Surrogate	Unit	Acceptable Limits		
Bromofluorobenzene	%	60-140		107
Dibromofluoromethane	%	60-140		108
Toluene - d8	%	60-140		129

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8838901-8838925 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17Y274566

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date:			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
Public Works Metals in Soil															
Aluminum	8843525		17300	16000	8.3%	< 10	109%	70%	130%	103%	90%	110%			
Antimony	8843525		<0.1	<0.1	NA	< 0.1	108%	70%	130%	101%	90%	110%			
Arsenic	8843525		1.4	1.6	14.4%	< 0.1	121%	70%	130%	90%	90%	110%			
Barium	8843525		76.5	70.2	8.7%	< 0.5	99%	70%	130%	101%	90%	110%			
Beryllium	8843525		0.1	0.1	NA	< 0.1	102%	70%	130%	106%	90%	110%			
Bismuth	8843525		<0.5	<0.5	NA	< 0.5				101%	85%	115%			
Cadmium	8843525		0.10	0.10	1.1%	< 0.01	117%	70%	130%	102%	90%	110%			
Calcium	8843525		3120	2920	6.8%	< 10	117%	70%	130%	103%	90%	110%			
Chromium	8843525		11	10	12.2%	< 1	98%	70%	130%	97%	90%	110%			
Cobalt	8843525		4.6	4.6	1.0%	< 0.1	99%	70%	130%	98%	90%	110%			
Copper	8843525		14.1	12.9	8.6%	< 0.2	99%	70%	130%	106%	90%	110%			
Iron	8843525		20800	18900	9.7%	< 10	107%	70%	130%	105%	90%	110%			
Lead	8843525		2.7	2.4	10.9%	< 0.1	97%	70%	130%	101%	90%	110%			
Magnesium	8843525		3780	3560	6.0%	< 10	113%	70%	130%	108%	90%	110%			
Manganese	8843525		214	209	2.6%	< 1	99%	70%	130%	104%	90%	110%			
Mercury	8843525		<0.01	<0.01	NA	< 0.01	82%	70%	130%	102%	90%	110%			
Molybdenum	8843525		0.2	<0.2	NA	< 0.2	96%	70%	130%	96%	90%	110%			
Nickel	8843525		5.5	4.9	12.0%	< 0.5	101%	70%	130%	100%	90%	110%			
Phosphorus	8843525		375	368	2.0%	< 5	107%	70%	130%	103%	90%	110%			
Potassium	8843525		648	685	5.4%	< 5	108%	70%	130%	102%	90%	110%			
Selenium	8843525		0.2	0.3	NA	< 0.1				102%	90%	110%			
Silver	8843525		<0.5	<0.5	NA	< 0.5	80%	70%	130%	104%	90%	110%			
Sodium	8843525		295	288	2.4%	< 5	116%	70%	130%	102%	90%	110%			
Strontium	8843525		36	28	25.3%	< 1	105%	70%	130%	101%	90%	110%			
Thallium	8843525		<0.1	<0.1	NA	< 0.1	102%	70%	130%	97%	90%	110%			
Tin	8843525		0.2	0.2	NA	< 0.2	96%	70%	130%	103%	90%	110%			
Titanium	8843525		887	876	1.3%	< 1				104%	90%	110%			
Uranium	8843525		0.4	0.4	NA	< 0.2	93%	70%	130%	93%	90%	110%			
Vanadium	8843525		52	48	9.1%	< 1	96%	70%	130%	96%	90%	110%			
Zinc	8843525		27	25	4.5%	< 1	105%	70%	130%	109%	90%	110%			
Zirconium	8843525		1.6	1.7	8.9%	< 0.1				101%	90%	110%			
pH 1:2	8843525		6.22	6.15	1.1%		96%	90%	110%	99%	95%	105%			

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17Y274566
PROJECT: 1657709-6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date:			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
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68148	8838901	<0.1	<0.1	NA	< 0.1	103%	80%	120%				113%	70%	130%
Benzene	68148	8838901	<0.02	<0.02	NA	< 0.02	104%	80%	120%				94%	70%	130%
Toluene	68148	8838901	<0.05	<0.05	NA	< 0.05	104%	80%	120%				116%	70%	130%
Ethylbenzene	68148	8838901	<0.05	<0.05	NA	< 0.05	101%	80%	120%				120%	70%	130%
m&p-Xylene	68148	8838901	<0.05	<0.05	NA	< 0.05	99%	80%	120%				118%	70%	130%
o-Xylene	68148	8838901	<0.05	<0.05	NA	< 0.05	100%	80%	120%				112%	70%	130%
Styrene	68148	8838901	<0.05	<0.05	NA	< 0.05	102%	80%	120%				111%	70%	130%
VPH	68148	8838901	<10	<10	NA	< 10									
VH	68148	8838901	<10	<10	NA	< 10									
Bromofluorobenzene	68148	8838901	97	111	13.5%		103%	60%	140%				98%	60%	140%
Dibromofluoromethane	68148	8838901	94	108	13.9%		102%	60%	140%				89%	60%	140%
Toluene - d8	68148	8838901	113	127	11.7%		102%	60%	140%				116%	60%	140%
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68148	8838919	0.193	0.176	9.2%	< 0.005	101%	80%	120%				99%	50%	130%
2-Methylnaphthalene	68148	8838919	0.438	0.442	0.9%	< 0.005	96%	80%	120%				83%	50%	130%
1-Methylnaphthalene	68148	8838919	0.371	0.377	1.6%	< 0.005	101%	80%	120%				93%	50%	130%
Acenaphthylene	68148	8838919	<0.005	<0.005	NA	< 0.005	101%	80%	120%				89%	50%	130%
Acenaphthene	68148	8838919	<0.005	<0.005	NA	< 0.005	101%	80%	120%				103%	50%	130%
Fluorene	68148	8838919	0.03	0.03	NA	< 0.02	100%	80%	120%				95%	50%	130%
Phenanthrene	68148	8838919	0.06	0.07	NA	< 0.02	99%	80%	120%				81%	60%	130%
Anthracene	68148	8838919	<0.004	<0.004	NA	< 0.004	102%	80%	120%				100%	60%	130%
Fluoranthene	68148	8838919	<0.01	<0.01	NA	< 0.01	101%	80%	120%				101%	60%	130%
Pyrene	68148	8838919	<0.01	0.01	NA	< 0.01	101%	80%	120%				97%	60%	130%
Benzo(a)anthracene	68148	8838919	<0.03	<0.03	NA	< 0.03	102%	80%	120%				91%	60%	130%
Chrysene	68148	8838919	<0.05	<0.05	NA	< 0.05	101%	80%	120%				99%	60%	130%
Benzo(b)fluoranthene	68148	8838919	<0.05	<0.05	NA	< 0.05	97%	80%	120%				86%	60%	130%
Benzo(j)fluoranthene	68148	8838919	<0.05	<0.05	NA	< 0.05	103%	80%	120%				86%	60%	130%
Benzo(k)fluoranthene	68148	8838919	<0.05	<0.05	NA	< 0.05	102%	80%	120%				76%	60%	130%
Benzo(a)pyrene	68148	8838919	<0.03	<0.03	NA	< 0.03	102%	80%	120%				92%	60%	130%
Indeno(1,2,3-c,d)pyrene	68148	8838919	<0.02	<0.02	NA	< 0.02	101%	80%	120%				104%	60%	130%
Dibenzo(a,h)anthracene	68148	8838919	<0.005	<0.005	NA	< 0.005	101%	80%	120%				100%	60%	130%
Benzo(g,h,i)perylene	68148	8838919	<0.05	<0.05	NA	< 0.05	100%	80%	120%				101%	60%	130%
Quinoline	68148	8838919	<0.05	<0.05	NA	< 0.05	100%	80%	120%				99%	50%	130%
EPH C10-C19	68148	8838919	138	166	18.4%	< 20	111%	70%	130%				98%	65%	120%
EPH C19-C32	68148	8838919	56	66	NA	< 20	104%	70%	130%				93%	80%	120%
Naphthalene - d8	68148	8838919	82	64	24.7%		104%	80%	120%				107%	50%	130%
2-Fluorobiphenyl	68148	8838919	87	69	23.1%		107%	80%	120%				109%	50%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17Y274566

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date:			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
P-Terphenyl - d14	68148	8838919	101	102	1.0%		104%	80%	120%				116%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17Y274566
PROJECT: 1657709-6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Antimony	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Arsenic	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Barium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Beryllium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Bismuth	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cadmium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Calcium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Chromium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cobalt	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Copper	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Iron	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Lead	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Lithium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Magnesium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Manganese	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Mercury	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Molybdenum	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Nickel	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Phosphorus	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Potassium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Selenium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Silver	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Sodium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Strontium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Thallium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Tin	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS

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Method Summary

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AGAT WORK ORDER: 17Y274566

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Titanium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Uranium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Vanadium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zinc	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zirconium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
pH 1:2	INOR-181-6031	BC MOE Lab Manual B (pH, Electrometric, Soil)	PH METER

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Method Summary

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PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

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AGAT WORK ORDER: 17Y274566

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS

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CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04270 page 1 of 2

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 -6000			Laboratory Name: AGAT OCT 21 09:40
Short Title: B19 Remediation	Golder Contact: Erin Obrien		Address: 120-8600 Glenlyon Parkway
Golder E-mail Address 1: Abruemmer @golder.com	Golder E-mail Address 2: EObrien @golder.com	Telephone/Fax: 250 774 6500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 48233859
EQuIS upload: ☒

Alvaro_Garridonernan-gomez@Golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days) 4days
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX/VPH / VH LEPH EPH(C10-C19) Naphthalene 2-methylnaphthalene	metals, LEPH HEPH PAH BTEX, VPH	Hold	RUSH (Select TAT above)	Remarks (over)
04270 - 01	Granular	Backfill	–	Soil	19Oct17	11:15	Comp	N		4		X X			8838901
- 02	Ex17-01	w23e	4.0			13:20	Grab			4			X		913
- 03		w23d	3.5			13:15		FDA	04270-08	1	X X X X				914
- 04		w23c	2.5			13:10							X		915
- 05		w23b	1.5			13:05							X		916
- 06		w23a	0.5			13:00					X X X X				917
- 07		B23	4.0			13:25					X X X X				918
- 08		w23d	3.5			13:15		FD	04270-03		X X X X				919
- 09		B24	4.0			13:55		FDA	04270-10		X X X X				920
- 10		B24	4.0			13:55		FD	04270-09		X X X X				921
- 11		w24e	4.0			13:50					X X X X				922
- 12		w24d	3.5			13:45				4			X		923

Sampler's Signature:	Relinquished by: Signature	Company: AGAT	Date: 19Oct17	Time: 800	Received by: Signature	Company: AGAT
Comments: ON ICE	Method of Shipment: PICK-UP	Waybill No.:	Received for Lab by: S.Naper	Date: Oct 20/17	Time: 800am	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 2	Cooler opened by: S.Naper	Date: 21-OCT-17	Time: 9:40am

WHITE: Golder Co YELLOW: Lab Copy

ESED

1742745 66

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04271 page 2 of 2

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709-6000			Laboratory Name: AGAT OCT 21 AM 9:40
Short Title: Bia Remediation	Golder Contact: Erin O'brien		Address: 120 – 8000 Glenlyon Parkway
Golder E-mail Address 1: Abruemmer @golder.com	Golder E-mail Address 2: Eobrien @golder.com		Telephone/Fax: 2507416500
			Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 48233859
EQuIS upload: ☒

Alvaro-Garridoherman-gamez@Golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days) 4 day
Criteria: ~~☒ CSR~~ ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX / LEPH / HEPH (C10 < C19)	Naphthalene	2-methylnaphthalene	Hg	RUSH (Select TAT above)	Remarks (over)
04271 - 01	GW17-01	W24c	2.5	Soil	19Oct17	1340	GRAB	N		4				X		88389924
- 02	↓	W24b	1.5	↓	↓	1335	↓	N		4	X	X	X			925
- 03	↓	W24a	0.5	↓	↓	1330	↓	N		4				X		926
- 04																
- 05																
- 06																
- 07																
- 08																
- 09																
- 10																
- 11																
- 12																

Sampler's Signature:	Relinquished by: Signature	Company AGAT	Date 19Oct17	Time 800	Received by: Signature	Company
Comments: ON ICE	Method of Shipment: PICK-UP	Waybill No.:	Received for Lab by: S.Nape	Date	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C) 2	Cooler opened by: S.Nape	Date 21-OCT-17	Time 9:40am

WHITE: Golder Copy YELLOW: Lab Copy

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17Y274566

RECEIVING BASICS:

Received From: Novex Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 1 Containers: 60

TIME SENSITIVE ISSUES:

Earliest Date Sampled: 19-OCT-17 ALREADY EXCEEDED? Yes (No)

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) 2+2+2=2 °C (2) ___+___+___=___°C (3) ___+___+___=___°C (4) ___+___+___=___°C

Was ice or ice pack present: (Yes) No

Integrity Issues:

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

RECEIVING BASICS - Shipping

Company/Consultant: GOLDER

Courier: _____ Prepaid Collect

Waybill#_____

Branch: EDM GP FN FM RD VAN LYD FSJ EST Other:_____

Custody Seal Intact: Yes No NA

TAT: <24hr 24-48hr 48-72hr Reg Other 4 DAYS

Cooler Quantity: 1

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes No

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry:_____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES NO Precaution Taken:_____

Legal Samples: Yes No

International Samples: Yes No

Tape Sealed: Yes No

Coolant Used: Icepack Bagged Ice Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) 1 + 1 + 5 = 2 °C 2(Bottle/Jar)___+___+___=____°C

3 (Bottle/Jar)___+___+___=____°C 4 (Bottle/Jar)___+___+___=____°C

5 (Bottle/Jar)___+___+___=____°C 6 (Bottle/Jar)___+___+___=____°C

7 (Bottle/Jar)___+___+___=____°C 8 (Bottle/Jar)___+___+___=____°C

9 (Bottle/Jar)___+___+___=____°C 10 (Bottle/Jar)___+___+___=____°C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: _____

Samples Damaged: Yes No If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial_____

General Comments: _____

* Subcontracted Analysis (See CPM)

Date issued: May 22, 2015

AGAT Laboratories

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: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709-6000

AGAT WORK ORDER: 17F285931

SOIL ANALYSIS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

TRACE ORGANICS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

DATE REPORTED: Nov 23, 2017

PAGES (INCLUDING COVER): 16

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES
VERSION 1: Sample receipt temperature: 1°C

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17F285931

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works Metals in Soil

DATE RECEIVED: 2017-11-18

DATE REPORTED: 2017-11-21

		SAMPLE DESCRIPTION:		4298-02
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-11-15
Parameter	Unit	G / S	RDL	8919550
Aluminum	µg/g		10	5940
Antimony	µg/g		0.1	0.6
Arsenic	µg/g		0.1	9.2
Barium	µg/g		0.5	197
Beryllium	µg/g		0.1	0.4
Bismuth	µg/g		0.5	<0.5
Cadmium	µg/g		0.01	0.53
Calcium	µg/g		10	61000
Chromium	µg/g		1	14
Cobalt	µg/g		0.1	8.0
Copper	µg/g		0.2	17.3
Iron	µg/g		10	24400
Lead	µg/g		0.1	8.6
Lithium	µg/g		0.5	9.0
Magnesium	µg/g		10	10500
Manganese	µg/g		1	422
Mercury	µg/g		0.01	0.05
Molybdenum	µg/g		0.2	3.7
Nickel	µg/g		0.5	22.4
Phosphorus	µg/g		5	486
Potassium	µg/g		5	1330
Selenium	µg/g		0.1	0.3
Silver	µg/g		0.5	<0.5
Sodium	µg/g		5	79
Strontium	µg/g		1	56
Thallium	µg/g		0.1	0.3
Tin	µg/g		0.2	0.3
Titanium	µg/g		1	170
Uranium	µg/g		0.2	1.8
Vanadium	µg/g		1	30

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17F285931

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works Metals in Soil

DATE RECEIVED: 2017-11-18

DATE REPORTED: 2017-11-21

			SAMPLE DESCRIPTION:	4298-02
			SAMPLE TYPE:	Soil
			DATE SAMPLED:	2017-11-15
Parameter	Unit	G / S	RDL	8919550
Zinc	µg/g		1	89
Zirconium	µg/g		0.1	3.4
pH 1:2	pH units		0.05	8.52

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8919550 Results are based on the dry weight of the sample

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 17F285931

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-18

DATE REPORTED: 2017-11-22

		SAMPLE DESCRIPTION:		4298-01-4m	4298-02
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		2017-11-14	2017-11-15
Parameter	Unit	G / S	RDL	8919548	8919550
Naphthalene	µg/g		0.005	0.048	<0.005
2-Methylnaphthalene	µg/g		0.005	0.187	<0.005
1-Methylnaphthalene	µg/g		0.005	0.120	<0.005
Acenaphthylene	µg/g		0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005
Fluorene	µg/g		0.02	0.08	<0.02
Phenanthrene	µg/g		0.02	0.23	<0.02
Anthracene	µg/g		0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	<0.01
Pyrene	µg/g		0.01	0.03	<0.01
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03
Chrysene	µg/g		0.05	0.06	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.08	<0.05
Quinoline	µg/g		0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	86	<20
EPH C19-C32	µg/g		20	66	<20
LEPH C10-C19	µg/g		20	86	<20
HEPH C19-C32	µg/g		20	66	<20
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17F285931

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-18

DATE REPORTED: 2017-11-22

		SAMPLE DESCRIPTION:	4298-01-4m	4298-02
		SAMPLE TYPE:	Soil	Soil
		DATE SAMPLED:	2017-11-14	2017-11-15
Surrogate	Unit	Acceptable Limits	8919548	8919550
Naphthalene - d8	%	50-130	81	72
2-Fluorobiphenyl	%	50-130	94	91
P-Terphenyl - d14	%	60-130	85	87

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8919548-8919550 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17F285931

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-18

DATE REPORTED: 2017-11-21

		SAMPLE DESCRIPTION:		4298-01-4m	4298-02
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		2017-11-14	2017-11-15
Parameter	Unit	G / S	RDL	8919548	8919550
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10
VH	µg/g		10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits			
Bromofluorobenzene	%	60-140		93	90
Dibromofluoromethane	%	60-140		96	98
Toluene - d8	%	60-140		108	112

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8919548-8919550 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F285931

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date:			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
Public Works Metals in Soil															
Aluminum	8919550	8919550	5940	5980	0.6%	< 10	105%	70%	130%	90%	90%	110%			
Antimony	8919550	8919550	0.6	0.6	4.6%	< 0.1	104%	70%	130%	104%	90%	110%			
Arsenic	8919550	8919550	9.2	11.0	17.8%	< 0.1	117%	70%	130%	106%	90%	110%			
Barium	8919550	8919550	197	196	0.4%	< 0.5	108%	70%	130%	99%	90%	110%			
Beryllium	8919550	8919550	0.4	0.4	NA	< 0.1	107%	70%	130%	107%	90%	110%			
Bismuth	8919550	8919550	<0.5	<0.5	NA	< 0.5				106%	85%	115%			
Cadmium	8919550	8919550	0.53	0.57	7.0%	< 0.01	103%	70%	130%	103%	90%	110%			
Calcium	8919550	8919550	61000	70000	13.7%	< 10	112%	70%	130%	95%	90%	110%			
Chromium	8919550	8919550	14	14	2.7%	< 1	107%	70%	130%	101%	90%	110%			
Cobalt	8919550	8919550	8.0	7.5	7.0%	< 0.1	111%	70%	130%	101%	90%	110%			
Copper	8919550	8919550	17.3	20.3	15.8%	< 0.2	104%	70%	130%	105%	90%	110%			
Iron	8919550	8919550	24400	22900	6.2%	< 10	101%	70%	130%	94%	90%	110%			
Lead	8919550	8919550	8.6	8.3	4.0%	< 0.1	104%	70%	130%	106%	90%	110%			
Lithium	8919550	8919550	9.0	9.1	1.5%	< 0.5				101%	85%	115%			
Magnesium	8919550	8919550	10500	11700	11.2%	< 10	113%	70%	130%	96%	90%	110%			
Manganese	8919550	8919550	422	406	4.0%	< 1	100%	70%	130%	108%	90%	110%			
Mercury	8919550	8919550	0.05	0.04	NA	< 0.01	101%	70%	130%	105%	90%	110%			
Molybdenum	8919550	8919550	3.7	3.1	15.7%	< 0.2	105%	70%	130%	99%	90%	110%			
Nickel	8919550	8919550	22.4	21.7	3.5%	< 0.5	107%	70%	130%	98%	90%	110%			
Phosphorus	8919550	8919550	486	416	15.4%	< 5	97%	70%	130%	95%	90%	110%			
Potassium	8919550	8919550	1330	1330	0.4%	< 5	114%	70%	130%	101%	90%	110%			
Selenium	8919550	8919550	0.3	0.2	NA	< 0.1				100%	90%	110%			
Silver	8919550	8919550	<0.5	<0.5	NA	< 0.5	116%	70%	130%	109%	90%	110%			
Sodium	8919550	8919550	79	110	32.5%	< 5	116%	70%	130%	96%	90%	110%			
Strontium	8919550	8919550	56	66	15.3%	< 1	109%	70%	130%	98%	90%	110%			
Thallium	8919550	8919550	0.3	0.2	NA	< 0.1	111%	70%	130%	106%	90%	110%			
Tin	8919550	8919550	0.3	0.3	NA	< 0.2	100%	70%	130%	103%	90%	110%			
Titanium	8919550	8919550	170	183	7.5%	< 1				96%	90%	110%			
Uranium	8919550	8919550	1.8	1.5	13.8%	< 0.2	109%	70%	130%	109%	90%	110%			
Vanadium	8919550	8919550	30	27	7.5%	< 1	112%	70%	130%	104%	90%	110%			
Zinc	8919550	8919550	89	84	5.3%	< 1	108%	70%	130%	106%	90%	110%			
Zirconium	8919550	8919550	3.4	3.4	0.7%	< 0.1				100%	90%	110%			
pH 1:2	8918881	8918881	7.70	7.73	0.4%		95%	90%	110%	100%	95%	105%			

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F285931

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date:			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
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68314	8919651	<0.1	<0.1	NA	< 0.1	98%	80%	120%				103%	70%	130%
Benzene	68314	8919651	<0.02	<0.02	NA	< 0.02	99%	80%	120%				97%	70%	130%
Toluene	68314	8919651	<0.05	<0.05	NA	< 0.05	100%	80%	120%				108%	70%	130%
Ethylbenzene	68314	8919651	<0.05	<0.05	NA	< 0.05	101%	80%	120%				107%	70%	130%
m&p-Xylene	68314	8919651	<0.05	<0.05	NA	< 0.05	100%	80%	120%				107%	70%	130%
o-Xylene	68314	8919651	<0.05	<0.05	NA	< 0.05	100%	80%	120%				102%	70%	130%
Styrene	68314	8919651	<0.05	<0.05	NA	< 0.05	100%	80%	120%				101%	70%	130%
VPH	68314	8919651	<10	<10	NA	< 10									
VH	68314	8919651	<10	<10	NA	< 10									
Bromofluorobenzene	68314	8919651	93	91	2.2%		97%	60%	140%				87%	60%	140%
Dibromofluoromethane	68314	8919651	97	97	0.0%		98%	60%	140%				91%	60%	140%
Toluene - d8	68314	8919651	110	112	1.8%		98%	60%	140%				104%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68309	8916332	<0.005	<0.005	NA	< 0.005	102%	80%	120%				93%	50%	130%
2-Methylnaphthalene	68309	8916332	<0.005	<0.005	NA	< 0.005	101%	80%	120%				94%	50%	130%
1-Methylnaphthalene	68309	8916332	<0.005	<0.005	NA	< 0.005	101%	80%	120%				93%	50%	130%
Acenaphthylene	68309	8916332	<0.005	<0.005	NA	< 0.005	99%	80%	120%				92%	50%	130%
Acenaphthene	68309	8916332	<0.005	<0.005	NA	< 0.005	100%	80%	120%				93%	50%	130%
Fluorene	68309	8916332	<0.02	<0.02	NA	< 0.02	100%	80%	120%				91%	50%	130%
Phenanthrene	68309	8916332	<0.02	<0.02	NA	< 0.02	102%	80%	120%				95%	60%	130%
Anthracene	68309	8916332	<0.004	<0.004	NA	< 0.004	102%	80%	120%				82%	60%	130%
Fluoranthene	68309	8916332	<0.01	<0.01	NA	< 0.01	100%	80%	120%				95%	60%	130%
Pyrene	68309	8916332	<0.01	<0.01	NA	< 0.01	99%	80%	120%				90%	60%	130%
Benzo(a)anthracene	68309	8916332	<0.03	<0.03	NA	< 0.03	100%	80%	120%				95%	60%	130%
Chrysene	68309	8916332	<0.05	<0.05	NA	< 0.05	99%	80%	120%				100%	60%	130%
Benzo(b)fluoranthene	68309	8916332	<0.05	<0.05	NA	< 0.05	101%	80%	120%				96%	60%	130%
Benzo(j)fluoranthene	68309	8916332	<0.05	<0.05	NA	< 0.05	99%	80%	120%				83%	60%	130%
Benzo(k)fluoranthene	68309	8916332	<0.05	<0.05	NA	< 0.05	98%	80%	120%				83%	60%	130%
Benzo(a)pyrene	68309	8916332	<0.03	<0.03	NA	< 0.03	101%	80%	120%				87%	60%	130%
Indeno(1,2,3-c,d)pyrene	68309	8916332	<0.02	<0.02	NA	< 0.02	102%	80%	120%				95%	60%	130%
Dibenzo(a,h)anthracene	68309	8916332	<0.005	<0.005	NA	< 0.005	102%	80%	120%				85%	60%	130%
Benzo(g,h,i)perylene	68309	8916332	<0.05	<0.05	NA	< 0.05	100%	80%	120%				80%	60%	130%
Quinoline	68309	8916332	<0.05	<0.05	NA	< 0.05	103%	80%	120%				98%	50%	130%
EPH C10-C19	68309	8916332	<20	<20	NA	< 20	111%	70%	130%				106%	65%	120%
EPH C19-C32	68309	8916332	88	68	NA	< 20	104%	70%	130%				102%	80%	120%
Naphthalene - d8	68309	8916332	70	72	2.8%		99%	80%	120%				102%	50%	130%
2-Fluorobiphenyl	68309	8916332	89	91	2.2%		101%	80%	120%				103%	50%	130%

AGAT Laboratories

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F285931

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date:			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
P-Terphenyl - d14	68309	8916332	84	90	6.9%		102%	80%	120%				101%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By:

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17F285931
PROJECT: 1657709-6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Antimony	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Arsenic	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Barium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Beryllium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Bismuth	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cadmium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Calcium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Chromium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cobalt	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Copper	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Iron	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Lead	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Lithium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Magnesium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Manganese	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Mercury	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Molybdenum	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Nickel	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Phosphorus	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Potassium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Selenium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Silver	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Sodium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Strontium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Thallium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Tin	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F285931

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Titanium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Uranium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Vanadium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zinc	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zirconium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
pH 1:2	INOR-181-6031	BC MOE Lab Manual B (pH, Electrometric, Soil)	PH METER

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Method Summary

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AGAT WORK ORDER: 17F285931

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17F285931

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04298 page 1 of 1

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709-6000		Laboratory Name: AGAT 17F285931	
Short Title: K19 Remediation	Golder Contact: Erin Obrien	Address: 120-8600 Glenlyon	
Golder E-mail Address 1: Abruemmer @golder.com	Golder E-mail Address 2: EObrien @golder.com	Telephone/Fax: 250-774-6500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 48433859
EQuIS upload: ☒

Alvaro_Garridohernan-gomez@golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	Btex VPH/ LEPH/HEPH	Naphalene	2-methylnaphthalene	metals Btex VPH	LEPH/HEPH PAHs	RUSH (Select TAT above)	AGAT Sample ID Remarks (over)
4298 - 01	EX17-02	B26	4	SO	14Nov17	13:20	GRAB			4	X	X	X	X			8919548
↓ - 02	Backfill	5	–	SO	15Nov17	10:00	GRAB			4					X	X	550
- 03																	
- 04																	
- 05																	
- 06																	
- 07																	
- 08																	
- 09																	
- 10																	
- 11																	
- 12																	

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: NOV 17/17	Time: 13:00	Received by: Signature	Company: AGAT
Comments: ON ICE	Method of Shipment: Dropped OFF	Waybill No.:	Received for Lab by: Kyley Nielsen	Date	Time: V112351	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 10C	Cooler opened by:	Date	

WHITE: Golder Copy YELLOW: Lab Copy

Nov 18/17

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM – BRANCH RECEIPT

Sending From Branch: EDM☐ GP☐ FN☐ FM☐ RD☐ VAN☐ LYD☐ FSJ☒ EST☐ Other:_____

Company/Consultant: Golder Associates

TAT: <24hr ☐ 24-48hr ☐ 48-72hr ☐ Reg ☒ Other_____ Cooler Quantity: 1

TIME SENSITIVE ISSUES:

Earliest Date Sampled: Nov 14

ALREADY EXCEEDED? Yes☐ No☒

Microbiology: Test: _____ Expiry: _____

Hydrocarbons: Test: _____ Expiry: _____

Are samples received >5 days after sampling: Yes☐ No☒

(TEMPERATURE MUST BE MAINTAINED IF RECEIVED <10 DEGREES C)

3 temperatures of samples* and average of each cooler (taken on jars only): NA (only bags on coolers)

(1) ___+___+___=___°C (2) ___+___+___=___°C (3) ___+___+___=___°C (4) ___+___+___=___°C

Additional integrity issues (note here and on COC next to the sample ID):

_____

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17F 285931

RECEIVING BASICS:

Received From: Novex Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 1 Containers: 8

TIME SENSITIVE ISSUES:

Earliest Date Sampled: 15-Nov-17 ALREADY EXCEEDED? Yes (No)

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) 1 + 0 + 3 = 1 °C (2) ___ + ___ + ___ = ___ °C (3) ___ + ___ + ___ = ___ °C (4) ___ + ___ + ___ = ___ °C

Was ice or ice pack present: (Yes) No

Integrity Issues:

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date and Time: _____

ADDITIONAL NOTES:

AGAT Laboratories

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CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709-6000

AGAT WORK ORDER: 17N281394

TRACE ORGANICS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

DATE REPORTED: Nov 10, 2017

PAGES (INCLUDING COVER): 23

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 1: Sample receipt temperature 0°C.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

SAMPLE DESCRIPTION:				04289-02-2.5m	04289-04-0.5m	04289-05-3.5m		04289-07-1.5m		04289-08-1.5m
SAMPLE TYPE:				Soil	Soil	Soil		Soil		Soil
DATE SAMPLED:				2017-11-03	2017-11-03	2017-11-03		2017-11-03		2017-11-03
Parameter	Unit	G / S	RDL	8887274	8887278	8887280	RDL	8887297	RDL	8887298
Naphthalene	µg/g		0.005	0.006	0.062	0.014	0.05	6.50	0.05	4.24
2-Methylnaphthalene	µg/g		0.005	0.021	<0.005	0.053	0.5	11.7	0.05	6.20
1-Methylnaphthalene	µg/g		0.005	0.019	0.322	0.048	0.5	12.1	0.5	10.0
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	0.05	<0.05	0.05	<0.05
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	0.05	<0.05	0.05	<0.05
Fluorene	µg/g		0.02	<0.02	0.09	<0.02	0.2	1.3	0.2	1.3
Phenanthrene	µg/g		0.02	0.04	0.18	0.05	0.2	2.4	0.2	2.2
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	0.04	<0.04	0.04	<0.04
Fluoranthene	µg/g		0.01	<0.01	0.02	<0.01	0.01	<0.01	0.1	<0.1
Pyrene	µg/g		0.01	0.01	0.07	0.01	0.01	0.09	0.1	0.2
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	0.03	<0.03	0.03	<0.03
Chrysene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	0.03	<0.03	0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	0.005	<0.005	0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	<0.6	0.6	<0.6	0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05
EPH C10-C19	µg/g		20	71	999	157	20	3810	20	3980
EPH C19-C32	µg/g		20	96	294	148	20	617	20	666
LEPH C10-C19	µg/g		20	71	998	157	20	3800	20	3980
HEPH C19-C32	µg/g		20	96	294	148	20	617	20	666
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:	04289-02-2.5m	04289-04-0.5m	04289-05-3.5m	04289-07-1.5m	04289-08-1.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-03	2017-11-03	2017-11-03	2017-11-03	2017-11-03
Surrogate	Unit	Acceptable Limits	8887274	8887278	8887280	8887297	8887298
Naphthalene - d8	%	50-130	92	84	69	98	82
2-Fluorobiphenyl	%	50-130	97	89	74	98	90
P-Terphenyl - d14	%	60-130	112	102	99	96	98

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SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:		04289-10-3.75m		04289-11-3.75m		04289-12-3.75m		04290-01-3.75m
		SAMPLE TYPE:		Soil		Soil		Soil		Soil
		DATE SAMPLED:		2017-11-03		2017-11-03		2017-11-03		2017-11-03
Parameter	Unit	G / S	RDL	8887300	RDL	8887301	RDL	8887302	RDL	8887303
Naphthalene	µg/g		0.005	0.053	0.005	0.322	0.005	0.477	0.05	0.85
2-Methylnaphthalene	µg/g		0.005	0.296	0.05	0.71	0.05	1.07	0.05	1.87
1-Methylnaphthalene	µg/g		0.005	0.173	0.05	0.49	0.005	0.582	0.05	1.13
Acenaphthylene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005
Fluorene	µg/g		0.02	0.07	0.02	0.09	0.02	0.07	0.02	0.08
Phenanthrene	µg/g		0.02	0.21	0.02	0.23	0.02	0.21	0.02	0.22
Anthracene	µg/g		0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Pyrene	µg/g		0.01	0.02	0.01	0.02	0.01	0.03	0.01	0.03
Benzo(a)anthracene	µg/g		0.03	<0.03	0.03	<0.03	0.03	<0.03	0.03	<0.03
Chrysene	µg/g		0.05	<0.05	0.05	<0.05	0.05	0.05	0.05	0.06
Benzo(b)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	0.03	<0.03	0.03	<0.03	0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.06	0.05	0.08	0.05	0.09	0.05	0.09
Quinoline	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	0.6	<0.6	0.6	0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
EPH C10-C19	µg/g		20	90	20	144	20	353	20	364
EPH C19-C32	µg/g		20	54	20	54	20	87	20	76
LEPH C10-C19	µg/g		20	90	20	144	20	352	20	363
HEPH C19-C32	µg/g		20	54	20	54	20	87	20	75
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:	04289-10-3.75m	04289-11-3.75m	04289-12-3.75m	04290-01-3.75m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-03	2017-11-03	2017-11-03	2017-11-03
Surrogate	Unit	Acceptable Limits	8887300	8887301	8887302	8887303
Naphthalene - d8	%	50-130	71	77	78	74
2-Fluorobiphenyl	%	50-130	75	81	80	77
P-Terphenyl - d14	%	60-130	90	93	97	92

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Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

SAMPLE DESCRIPTION:				04290-04-1.75m	04290-05-4.0m	04290-07-2.5m	04290-08-1.75m	04290-09-1.75m	04290-10-3.5m	04290-11-2.5m	04291-01-3.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04
Parameter	Unit	G / S	RDL	8887306	8887307	8887309	8887310	8887311	8887312	8887313	8887315
Naphthalene	µg/g		0.005	<0.005	0.103	0.007	<0.005	<0.005	0.013	<0.005	0.050
2-Methylnaphthalene	µg/g		0.005	0.011	0.534	0.027	0.011	0.012	0.099	0.010	0.283
1-Methylnaphthalene	µg/g		0.005	0.008	0.322	0.025	0.009	0.008	0.057	0.008	0.169
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	0.10	<0.02	<0.02	<0.02	0.05	<0.02	0.08
Phenanthrene	µg/g		0.02	<0.02	0.28	0.13	0.04	0.02	0.15	0.03	0.24
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	0.01	0.01	<0.01	<0.01	0.01	<0.01	0.02
Pyrene	µg/g		0.01	<0.01	0.03	0.02	<0.01	<0.01	0.03	<0.01	0.04
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	0.05	0.05	<0.05	<0.05	<0.05	<0.05	0.07
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	0.10	0.05	<0.05	<0.05	0.08	<0.05	0.11
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	0.6	0.6	<0.6	<0.6	<0.6	<0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	21	80	34	<20	<20	44	36	70
EPH C19-C32	µg/g		20	46	61	41	28	42	40	34	68
LEPH C10-C19	µg/g		20	21	80	34	<20	<20	44	35	70
HEPH C19-C32	µg/g		20	46	61	41	28	42	40	34	68
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:	04290-04-1.75m	04290-05-4.0m	04290-07-2.5m	04290-08-1.75m	04290-09-1.75m	04290-10-3.5m	04290-11-2.5m	04291-01-3.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04
Surrogate	Unit	Acceptable Limits	8887306	8887307	8887309	8887310	8887311	8887312	8887313	8887315
Naphthalene - d8	%	50-130	65	75	81	72	68	80	69	79
2-Fluorobiphenyl	%	50-130	70	80	87	78	73	83	76	83
P-Terphenyl - d14	%	60-130	91	95	97	102	93	92	100	99

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SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

SAMPLE DESCRIPTION:				04291-04-0.5m	04291-06-2.5m	04291-07-1.5m	04291-09-4.0m	04291-10-4.0m	04291-11-4.0m	04291-12-4.0m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-11-04	2017-11-04	2017-11-04	2017-11-05	2017-11-05	2017-11-05	2017-11-05
Parameter	Unit	G / S	RDL	8887319	8887321	8887322	8887324	8887326	8887329	8887330
Naphthalene	µg/g		0.005	<0.005	<0.005	<0.005	0.042	0.015	<0.005	<0.005
2-Methylnaphthalene	µg/g		0.005	<0.005	0.009	<0.005	0.211	0.119	<0.005	<0.005
1-Methylnaphthalene	µg/g		0.005	<0.005	0.012	<0.005	0.132	0.069	<0.005	<0.005
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02	<0.02	0.05	0.06	<0.02	<0.02
Phenanthrene	µg/g		0.02	<0.02	0.05	<0.02	0.15	0.18	0.06	0.07
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	0.01	<0.01	0.01	0.01	0.02	0.02
Pyrene	µg/g		0.01	<0.01	0.02	<0.01	0.02	0.03	0.03	0.04
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	0.05	<0.05	<0.05	0.05	0.05	0.06
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	<0.05	<0.05	0.07	0.08	0.08	0.10
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	<0.6	<0.6	0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	<20	26	<20	60	67	73	86
EPH C19-C32	µg/g		20	32	32	25	42	55	62	71
LEPH C10-C19	µg/g		20	<20	26	<20	60	67	73	86
HEPH C19-C32	µg/g		20	32	32	25	41	55	62	71
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-09

		SAMPLE DESCRIPTION:	04291-04-0.5m	04291-06-2.5m	04291-07-1.5m	04291-09-4.0m	04291-10-4.0m	04291-11-4.0m	04291-12-4.0m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-04	2017-11-04	2017-11-04	2017-11-05	2017-11-05	2017-11-05	2017-11-05
Surrogate	Unit	Acceptable Limits	8887319	8887321	8887322	8887324	8887326	8887329	8887330
Naphthalene - d8	%	50-130	80	75	71	81	86	81	81
2-Fluorobiphenyl	%	50-130	87	80	77	85	92	88	89
P-Terphenyl - d14	%	60-130	105	98	93	104	102	98	97

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8887274-8887280 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.

8887297-8887298 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8887300 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.

8887301-8887303 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8887306-8887330 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.

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SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-08

		SAMPLE DESCRIPTION:		04289-02-2.5m	04289-04-0.5m	04289-05-3.5m	04289-07-1.5m	04289-08-1.5m	04289-10-3.75m	04289-11-3.75m	04289-12-3.75m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-03	2017-11-03	2017-11-03	2017-11-03	2017-11-03	2017-11-03	2017-11-03	2017-11-03
Parameter	Unit	G / S	RDL	8887274	8887278	8887280	8887297	8887298	8887300	8887301	8887302
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	0.03	0.03	<0.02	0.09	0.14
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.23	0.27
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	1.06	0.93	<0.05	0.26	0.48
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	0.38	0.29	0.15	1.10	1.55
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.24	0.37
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	<10	128	54	17	26	28
VH	µg/g		10	<10	<10	<10	130	56	17	28	30
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	0.4	0.3	0.2	1.3	1.9
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		93	98	102	104	105	106	102	98
Dibromofluoromethane	%	60-140		105	109	103	102	101	98	97	96
Toluene - d8	%	60-140		97	101	100	100	98	102	105	102

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Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-08

SAMPLE DESCRIPTION:				04290-01-3.75m	04290-04-1.75m	04290-05-4.0m	04290-07-2.5m	04290-08-1.75m	04290-09-1.75m	04290-10-3.5m	04290-11-2.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-11-03	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-04
Parameter	Unit	G / S	RDL	8887303	8887306	8887307	8887309	8887310	8887311	8887312	8887313
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	0.65	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	2.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	1.39	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	4.97	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	1.90	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	67	<10	11	<10	<10	<10	<10	<10
VH	µg/g		10	78	<10	11	<10	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	6.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		101	96	96	97	97	96	94	97
Dibromofluoromethane	%	60-140		93	98	97	99	101	99	100	101
Toluene - d8	%	60-140		105	102	100	101	102	101	100	100

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Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-08

		SAMPLE DESCRIPTION:		04291-01-3.5m	04291-04-0.5m	04291-06-2.5m	04291-07-1.5m	04291-09-4.0m	04291-10-4.0m	04291-11-4.0m	04291-12-4.0m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-04	2017-11-04	2017-11-04	2017-11-04	2017-11-05	2017-11-05	2017-11-05	2017-11-05
Parameter	Unit	G / S	RDL	8887315	8887319	8887321	8887322	8887324	8887326	8887329	8887330
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	14	<10	<10	<10	<10	<10	<10	<10
VH	µg/g		10	14	<10	<10	<10	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		96	97	96	96	101	99	99	108
Dibromofluoromethane	%	60-140		100	102	103	103	96	94	93	104
Toluene - d8	%	60-140		103	102	101	103	110	107	105	115

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8887274-8887330 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

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Certificate of Analysis

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Dichloromethane in Soil

DATE RECEIVED: 2017-11-07

DATE REPORTED: 2017-11-08

SAMPLE DESCRIPTION:				04289-10-3.75m	04289-11-3.75m	04289-12-3.75m	04290-01-3.75m
SAMPLE TYPE:				Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-11-03	2017-11-03	2017-11-03	2017-11-03
Parameter	Unit	G / S	RDL	8887300	8887301	8887302	8887303
Dichloromethane	µg/g		0.05	<0.05	<0.05	<0.05	<0.05

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8887300-8887303 Results are based on dry weight of sample.

Certified By:

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date:			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
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68243	8887301	<0.1	<0.1	NA	< 0.1	102%	80%	120%				92%	70%	130%
Benzene	68243	8887301	0.09	0.09	NA	< 0.02	102%	80%	120%				94%	70%	130%
Toluene	68243	8887301	0.23	0.23	NA	< 0.05	98%	80%	120%				94%	70%	130%
Ethylbenzene	68243	8887301	0.26	0.26	0.0%	< 0.05	99%	80%	120%				93%	70%	130%
m&p-Xylene	68243	8887301	1.10	1.10	0.0%	< 0.05	99%	80%	120%				93%	70%	130%
o-Xylene	68243	8887301	0.24	0.23	NA	< 0.05	94%	80%	120%				93%	70%	130%
Styrene	68243	8887301	<0.05	<0.05	NA	< 0.05	99%	80%	120%				98%	70%	130%
VPH	68243	8887301	26	19	NA	< 10									
VH	68243	8887301	28	21	NA	< 10									
Bromofluorobenzene	68243	8887301	102	102	0.0%		103%	60%	140%				94%	60%	140%
Dibromofluoromethane	68243	8887301	97	98	1.0%		102%	60%	140%				94%	60%	140%
Toluene - d8	68243	8887301	105	105	0.0%		101%	60%	140%				90%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68243	8887301	0.322	0.292	9.8%	< 0.005	99%	80%	120%				121%	50%	130%
2-Methylnaphthalene	68243	8887301	0.713	0.704	1.3%	< 0.005	99%	80%	120%				98%	50%	130%
1-Methylnaphthalene	68243	8887301	0.488	0.408	17.9%	< 0.005	99%	80%	120%				116%	50%	130%
Acenaphthylene	68243	8887301	<0.005	<0.005	NA	< 0.005	98%	80%	120%				103%	50%	130%
Acenaphthene	68243	8887301	<0.005	<0.005	NA	< 0.005	100%	80%	120%				106%	50%	130%
Fluorene	68243	8887301	0.09	0.09	NA	< 0.02	99%	80%	120%				103%	50%	130%
Phenanthrene	68243	8887301	0.23	0.23	0.0%	< 0.02	102%	80%	120%				99%	60%	130%
Anthracene	68243	8887301	<0.004	<0.004	NA	< 0.004	100%	80%	120%				103%	60%	130%
Fluoranthene	68243	8887301	0.01	0.01	NA	< 0.01	100%	80%	120%				107%	60%	130%
Pyrene	68243	8887301	0.02	0.02	NA	< 0.01	100%	80%	120%				107%	60%	130%
Benzo(a)anthracene	68243	8887301	<0.03	<0.03	NA	< 0.03	100%	80%	120%				105%	60%	130%
Chrysene	68243	8887301	<0.05	<0.05	NA	< 0.05	101%	80%	120%				101%	60%	130%
Benzo(b)fluoranthene	68243	8887301	<0.05	<0.05	NA	< 0.05	99%	80%	120%				106%	60%	130%
Benzo(j)fluoranthene	68243	8887301	<0.05	<0.05	NA	< 0.05	101%	80%	120%				101%	60%	130%
Benzo(k)fluoranthene	68243	8887301	<0.05	<0.05	NA	< 0.05	101%	80%	120%				100%	60%	130%
Benzo(a)pyrene	68243	8887301	<0.03	<0.03	NA	< 0.03	100%	80%	120%				104%	60%	130%
Indeno(1,2,3-c,d)pyrene	68243	8887301	<0.02	<0.02	NA	< 0.02	103%	80%	120%				105%	60%	130%
Dibenzo(a,h)anthracene	68243	8887301	<0.005	<0.005	NA	< 0.005	103%	80%	120%				105%	60%	130%
Benzo(g,h,i)perylene	68243	8887301	0.08	<0.05	NA	< 0.05	101%	80%	120%				109%	60%	130%
Quinoline	68243	8887301	<0.05	<0.05	NA	< 0.05	101%	80%	120%				103%	50%	130%
EPH C10-C19	68243	8887301	144	175	19.4%	< 20	107%	70%	130%				103%	65%	120%
EPH C19-C32	68243	8887301	54	54	NA	< 20	100%	70%	130%				100%	80%	120%
Naphthalene - d8	68243	8887301	77	76	1.3%		100%	80%	120%				108%	50%	130%
2-Fluorobiphenyl	68243	8887301	81	85	4.8%		99%	80%	120%				107%	50%	130%

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17N281394
PROJECT: 1657709-6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date:			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
P-Terphenyl - d14	68243	8887301	93	99	6.3%		102%	80%	120%				103%	60%	130%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68240	8887330	<0.1	<0.1	NA	< 0.1	102%	80%	120%				88%	70%	130%
Benzene	68240	8887330	<0.02	<0.02	NA	< 0.02	101%	80%	120%				83%	70%	130%
Toluene	68240	8887330	<0.05	<0.05	NA	< 0.05	102%	80%	120%				85%	70%	130%
Ethylbenzene	68240	8887330	<0.05	<0.05	NA	< 0.05	98%	80%	120%				83%	70%	130%
m&p-Xylene	68240	8887330	<0.05	<0.05	NA	< 0.05	96%	80%	120%				86%	70%	130%
o-Xylene	68240	8887330	<0.05	<0.05	NA	< 0.05	96%	80%	120%				91%	70%	130%
Styrene	68240	8887330	<0.05	<0.05	NA	< 0.05	100%	80%	120%				89%	70%	130%
VPH	68240	8887330	<10	<10	NA	< 10									
VH	68240	8887330	<10	<10	NA	< 10									
Bromofluorobenzene	68240	8887330	108	95	12.8%		101%	60%	140%				95%	60%	140%
Dibromofluoromethane	68240	8887330	104	90	14.4%		108%	60%	140%				85%	60%	140%
Toluene - d8	68240	8887330	115	100	14.0%		108%	60%	140%				97%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68240	8887330	<0.005	<0.005	NA	< 0.005	99%	80%	120%				118%	50%	130%
2-Methylnaphthalene	68240	8887330	<0.005	<0.005	NA	< 0.005	99%	80%	120%				97%	50%	130%
1-Methylnaphthalene	68240	8887330	<0.005	<0.005	NA	< 0.005	99%	80%	120%				111%	50%	130%
Acenaphthylene	68240	8887330	<0.005	<0.005	NA	< 0.005	98%	80%	120%				108%	50%	130%
Acenaphthene	68240	8887330	<0.005	<0.005	NA	< 0.005	100%	80%	120%				96%	50%	130%
Fluorene	68240	8887330	<0.02	<0.02	NA	< 0.02	99%	80%	120%				94%	50%	130%
Phenanthrene	68240	8887330	0.07	0.08	NA	< 0.02	102%	80%	120%				95%	60%	130%
Anthracene	68240	8887330	<0.004	<0.004	NA	< 0.004	100%	80%	120%				104%	60%	130%
Fluoranthene	68240	8887330	0.02	0.02	NA	< 0.01	100%	80%	120%				100%	60%	130%
Pyrene	68240	8887330	0.04	0.04	NA	< 0.01	100%	80%	120%				99%	60%	130%
Benzo(a)anthracene	68240	8887330	<0.03	<0.03	NA	< 0.03	100%	80%	120%				104%	60%	130%
Chrysene	68240	8887330	0.06	0.06	NA	< 0.05	101%	80%	120%				96%	60%	130%
Benzo(b)fluoranthene	68240	8887330	<0.05	<0.05	NA	< 0.05	99%	80%	120%				110%	60%	130%
Benzo(j)fluoranthene	68240	8887330	<0.05	<0.05	NA	< 0.05	101%	80%	120%				96%	60%	130%
Benzo(k)fluoranthene	68240	8887330	<0.05	<0.05	NA	< 0.05	101%	80%	120%				110%	60%	130%
Benzo(a)pyrene	68240	8887330	<0.03	<0.03	NA	< 0.03	100%	80%	120%				102%	60%	130%
Indeno(1,2,3-c,d)pyrene	68240	8887330	<0.02	<0.02	NA	< 0.02	103%	80%	120%				104%	60%	130%
Dibenzo(a,h)anthracene	68240	8887330	<0.005	<0.005	NA	< 0.005	103%	80%	120%				104%	60%	130%
Benzo(g,h,i)perylene	68240	8887330	0.10	0.10	NA	< 0.05	101%	80%	120%				97%	60%	130%
Quinoline	68240	8887330	<0.05	<0.05	NA	< 0.05	101%	80%	120%				109%	50%	130%
EPH C10-C19	68240	8887330	86	83	NA	< 20	107%	70%	130%				107%	65%	120%

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date:			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
EPH C19-C32	68240	8887330	71	70	NA	< 20	100%	70%	130%				105%	80%	120%
Naphthalene - d8	68240	8887330	81	85	4.8%		100%	80%	120%				98%	50%	130%
2-Fluorobiphenyl	68240	8887330	89	93	4.4%		99%	80%	120%				114%	50%	130%
P-Terphenyl - d14	68240	8887330	97	103	6.0%		102%	80%	120%				102%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Dichloromethane in Soil															
Dichloromethane	68243	8887301	<0.05	<0.05	NA	< 0.05	100%	80%	120%				96%	70%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By:

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
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http://www.agatlabs.com

Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N281394

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dichloromethane	ORG-180-5103	Modified from BC MOE Lab Manual Section D (VOC)	GC/MS

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17N 281394
No. 04289 page 1 of 3

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709/6000		Laboratory Name: AGAT	OE
Short Title: K19 Remediation	Golder Contact: Erin O'Brien	Address: 120 - Glenlyon	
Golder E-mail Address 1: erin_o'brien@golder.com	Golder E-mail Address 2: andrew_bowerman@golder.com	Telephone/Fax: 2507746500	Contact: Margie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

AGarrido@golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VPH, VH	LEPH EPH (C10<C19)	Naphthalene	2-Methylnaphthalene	Dichloromethane	H&D	RUSH (Select TAT above)	AGAT Sample Remarks (over)
04289-01	EX17-01	W38D	3.5	Soil	03/11/17	8:50	Grab			4						X		3887271
-02		W38C	2.5			8:55					X	X	X	X				274
-03		W38B	1.5			9:00										X		275
-04		W38A	0.5			9:05					X	X	X	X				278
-05		W39D	3.5			9:10					X	X	X	X				280
-06		W39C	2.5			9:15										X		290
-07		W39B	1.5			9:20		FDA	04289-08		X	X	X	X				297
-08		W39B	1.5			9:20		FD	04289-07		X	X	X	X				298
-09		W39A	0.5			9:25										X		299
-10	EX17-02	B01	3.75			14:30					X	X	X	X	X			300
-11		B02				14:40					X	X	X	X	X			301
-12		B03				14:50					X	X	X	X	X			302

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 06/11/17	Time: 06:30	Received by: Signature	Company	
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by:	Date	Time		
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	V112629	

WHITE: Golder Copy YELLOW: Lab Copy

ESED

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17N238394

No. 04290 page 2 of 3

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 / 6000		Laboratory Name: AGAT	0°C
Short Title: K19 Remediation	Golder Contact: Erin O'Brien	Address: 120 - Glenlyon	
Golder E-mail Address 1: erin_o'brien@golder.com	Golder E-mail Address 2: andrew_bruemmer@golder.com	Telephone/Fax: 2507746500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

AGarrido@golder.com

NOV 7 AM 11:20

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VPH, VH	LEPH, EPH (e10<e19)	Naphthalene	2-Methylnaphthalene	Dichloromethane	HOLD	RUSH (Select TAT above)	Remarks (over)
04290 - 01	EX17-02-B04	3.75	SOIL	03/11/17	15:00	GRAB			4	X	X	X	X	X			303
- 02		W1C	3.5		04/11/17	14:00									X		304
- 03		W1B	2.5			14:05									X		305
- 04		W1A	1.75			14:10				X	X	X	X				306
- 05		B05	4.0			14:20				X	X	X	X				307
- 06		W2C	3.5			14:25									X		308
- 07		W2B	2.5			14:30				X	X	X	X				309
- 08		W2A	1.75			14:35		FDA	04290-09	X	X	X	X				310
- 09		W2A	1.75			14:35		FD	04290-08	X	X	X	X				311
- 10		W3C	3.5			14:40				X	X	X	X				312
- 11		W3B	2.5			14:50				X	X	X	X				313
- 12		W3A	1.75			14:55									X		314

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 06/11/17	Time: 06:30	Received by: Signature	Company	
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by:	Date	Time		
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date		

V112630

WHITE: Golder Copy YELLOW: Lab Copy

Keen KOT

ESED

17N281394

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04291 page 3 of 3

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709/6000		Laboratory Name: AGAT	OE
Short Title: K19 Remediation	Golder Contact: Erin O'Brien	Address: 120- Gleneagles Parkway	
Golder E-mail Address 1: erin_obrien@golder.com	Golder E-mail Address 2: andrew_bevenmer@golder.com	Telephone/Fax: 250-746500	Contact: Maggie Chen

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

AGarrido@golder.com

NOV 7 AM 11:23

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VPH	LEPH, HEPH (PAH)	Naphthalene	2-methylnaphthalene	HOLD	RUSH (Select TAT above)	Remarks (over)
04291 - 01	EX17-02-W4D		3.5	SOIL	04/11/17	15:00	GRAB			4	X	X	X	X			315
- 02		W4C	2.5			15:05									X		317
- 03		W4B	1.5			15:10									X		318
- 04		W4A	0.5			15:20					X	X	X	X			319
- 05		W5D	3.5			15:30									X		320
- 06		W5C	2.5			15:40					X	X	X	X			321
- 07		W5B	1.5			15:50					X	X	X	X			322
- 08		W5A	0.5			16:00									X		323
- 09		B06	4.0		05/11/17	14:00					X	X	X	X			324
- 10		B07				14:10					X	X	X	X			326
- 11		B08				14:15		FDA	04291-12		X	X	X	X			329
- 12		B08				14:15		FD	04291-11		X	X	X	X			330

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 06/11/17	Time: 06:30	Received by: Signature	Company
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by:	Date	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	V112231

WHITE: Golder Copy YELLOW: Lab Copy

Keen KT

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: GOLDER

Courier: _____ (Prepaid) Collect

Waybill# _____

Branch: EDM GP (FN) FM RD VAN LYD FSJ EST Other:_____

Custody Seal Intact: (Yes) No NA

TAT: <24hr 24-48hr 48-72hr (Reg) Other_____

Cooler Quantity: 2

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry:_____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken:_____

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: (Yes) No

Coolant Used: (Icepack) Bagged Ice Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) -9 + -10 + -11 = -10 °C

2(Bottle/Jar)___+___+___=____ °C

3 (Bottle/Jar) -12 + -9 + -10 = -10 °C

4 (Bottle/Jar)___+___+___=____ °C

5 (Bottle/Jar)___+___+___=____ °C

6 (Bottle/Jar)___+___+___=____ °C

7 (Bottle/Jar)___+___+___=____ °C

8 (Bottle/Jar)___+___+___=____ °C

9 (Bottle/Jar)___+___+___=____ °C

10 (Bottle/Jar)___+___+___=____ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: _____

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial_____

General Comments: _____

_____

_____

_____

_____

* Subcontracted Analysis (See CPM)

Date issued: May 22, 2015

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17N281394

RECEIVING BASICS:

Received From: NOVEX #2 Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 2 Containers: 144

TIME SENSITIVE ISSUES:

Earliest Date Sampled: NOV 03, 2017 ALREADY EXCEEDED? Yes (No)

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) 0 + 0 + 0 = 0 °C (2) 0 + 0 + 0 = 0 °C (3) ___ + ___ + ___ = ___ °C (4) ___ + ___ + ___ = ___ °C

Was ice or ice pack present: (Yes) No

Integrity Issues:

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date and Time: _____

ADDITIONAL NOTES:

Samples are not frozen

AGAT Laboratories

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: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709-6000

AGAT WORK ORDER: 17N283221

SOIL ANALYSIS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

TRACE ORGANICS REVIEWED BY: Andrew Garrard, B.Sc., General Manager

DATE REPORTED: Dec 13, 2017

PAGES (INCLUDING COVER): 25

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 2: Sample receipt temperature 1°C.

Version 2 issued on December 13, 2017 to report additional metals analysis for 04293-02 and 04293-03 as requested by Alvaro Garrido Hernan-Gomez of Golder. Version 2 is an amendment to version 1.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories
Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17N283221

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works Metals in Soil

DATE RECEIVED: 2017-11-11

DATE REPORTED: 2017-12-13

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: 04293-02-4.0m SAMPLE TYPE: Soil DATE SAMPLED: 2017-11-08 8898337	SAMPLE DESCRIPTION: 04293-03-4.0m SAMPLE TYPE: Soil DATE SAMPLED: 2017-11-08 8898338
Aluminum	µg/g		10	6870	6680
Antimony	µg/g		0.1	0.4	0.5
Arsenic	µg/g		0.1	6.5	11.7
Barium	µg/g		0.5	208	232
Beryllium	µg/g		0.1	0.4	0.5
Bismuth	µg/g		0.5	<0.5	<0.5
Cadmium	µg/g		0.01	0.34	0.36
Calcium	µg/g		10	72300	72300
Chromium	µg/g		1	13	14
Cobalt	µg/g		0.1	5.7	6.1
Copper	µg/g		0.2	13.5	14.0
Iron	µg/g		10	21900	25300
Lead	µg/g		0.1	6.2	7.6
Lithium	µg/g		0.5	11.5	11.8
Magnesium	µg/g		10	11900	14300
Manganese	µg/g		1	447	573
Mercury	µg/g		0.01	0.03	0.03
Molybdenum	µg/g		0.2	1.9	2.4
Nickel	µg/g		0.5	17.0	18.3
Phosphorus	µg/g		5	402	480
Potassium	µg/g		5	1540	1630
Selenium	µg/g		0.1	0.5	0.9
Silver	µg/g		0.5	<0.5	<0.5
Sodium	µg/g		5	205	108
Strontium	µg/g		1	68	94
Thallium	µg/g		0.1	0.2	0.2
Tin	µg/g		0.2	0.3	0.4
Titanium	µg/g		1	268	231
Uranium	µg/g		0.2	1.3	1.2
Vanadium	µg/g		1	28	24

Certified By:

AGAT Laboratories
Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17N283221

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works Metals in Soil

DATE RECEIVED: 2017-11-11

DATE REPORTED: 2017-12-13

SAMPLE DESCRIPTION:				04293-02-4.0m	04293-03-4.0m
SAMPLE TYPE:				Soil	Soil
DATE SAMPLED:				2017-11-08	2017-11-08
Parameter	Unit	G / S	RDL	8898337	8898338
Zinc	µg/g		1	53	63
Zirconium	µg/g		0.1	3.6	4.3
pH 1:2	pH units		0.05	8.52	8.49

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8898337-8898338 Results are based on the dry weight of the sample

Certified By:

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17N283221

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-11

DATE REPORTED: 2017-12-13

SAMPLE DESCRIPTION:				04292-01-4.0m	04292-02-3.5m	04292-04-1.5m	04292-08-2.5m	04292-09-1.75m	04292-10-3.5m	04292-11-3.5m	04292-12-4.0m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-11-05	2017-11-05	2017-11-05	2017-11-07	2017-11-07	2017-11-07	2017-11-07	2017-11-07
Parameter	Unit	G / S	RDL	8898324	8898325	8898327	8898331	8898332	8898333	8898334	8898335
Naphthalene	µg/g		0.005	0.008	<0.005	<0.005	<0.005	<0.005	0.035	0.123	0.005
2-Methylnaphthalene	µg/g		0.005	0.050	<0.005	<0.005	0.019	<0.005	0.248	0.604	0.042
1-Methylnaphthalene	µg/g		0.005	0.038	0.057	<0.005	0.012	<0.005	0.143	0.329	0.028
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	0.03	0.05	<0.02	<0.02	<0.02	0.08	0.10	0.04
Phenanthrene	µg/g		0.02	0.15	0.12	<0.02	0.02	<0.02	0.26	0.27	0.18
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	0.02	<0.01	<0.01	<0.01	0.02	0.01	0.02
Pyrene	µg/g		0.01	0.03	0.05	<0.01	<0.01	<0.01	0.04	0.03	0.06
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	0.06	0.07	<0.05	<0.05	<0.05	0.07	0.05	0.09
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.07	0.06	<0.05	<0.05	<0.05	0.08	0.08	0.11
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	88	598	<20	<20	<20	91	85	87
EPH C19-C32	µg/g		20	68	70	24	38	42	68	50	80
LEPH C10-C19	µg/g		20	88	598	<20	<20	<20	90	85	87
HEPH C19-C32	µg/g		20	68	70	24	38	42	68	50	80
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17N283221

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-11

DATE REPORTED: 2017-12-13

		SAMPLE DESCRIPTION:	04292-01-4.0m	04292-02-3.5m	04292-04-1.5m	04292-08-2.5m	04292-09-1.75m	04292-10-3.5m	04292-11-3.5m	04292-12-4.0m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-05	2017-11-05	2017-11-05	2017-11-07	2017-11-07	2017-11-07	2017-11-07	2017-11-07
Surrogate	Unit	Acceptable Limits	8898324	8898325	8898327	8898331	8898332	8898333	8898334	8898335
Naphthalene - d8	%	50-130	82	88	75	70	75	87	92	93
2-Fluorobiphenyl	%	50-130	90	93	86	75	81	96	99	97
P-Terphenyl - d14	%	60-130	101	98	99	95	102	102	102	99

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PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-11

DATE REPORTED: 2017-12-13

SAMPLE DESCRIPTION:				04293-01-4.0m	04293-02-4.0m	04293-03-4.0m	04293-05-2.5m	04293-07-0.5m	04293-08-4.0m	04293-09-4.0m	04293-10-4.0m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-11-07	2017-11-08	2017-11-08	2017-11-09	2017-11-09	2017-11-09	2017-11-09	2017-11-09
Parameter	Unit	G / S	RDL	8898336	8898337	8898338	8898340	8898343	8898344	8898345	8898346
Naphthalene	µg/g		0.005	0.057	<0.005	<0.005	<0.005	<0.005	0.086	0.013	0.077
2-Methylnaphthalene	µg/g		0.005	0.141	<0.005	<0.005	<0.005	<0.005	0.464	0.066	0.327
1-Methylnaphthalene	µg/g		0.005	0.116	<0.005	<0.005	0.005	<0.005	0.284	0.039	0.184
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	0.06	<0.02	<0.02	<0.02	<0.02	0.09	0.04	0.09
Phenanthrene	µg/g		0.02	0.21	<0.02	<0.02	0.03	<0.02	0.28	0.16	0.28
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.02	<0.01	<0.01	0.01	<0.01	0.02	0.01	0.02
Pyrene	µg/g		0.01	0.04	<0.01	<0.01	0.03	<0.01	0.04	0.04	0.04
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	0.07	<0.05	<0.05	0.05	<0.05	0.07	0.07	0.07
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.08	<0.05	<0.05	<0.05	<0.05	0.09	0.09	0.09
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	77	<20	<20	20	<20	112	90	131
EPH C19-C32	µg/g		20	63	<20	<20	40	202	85	68	70
LEPH C10-C19	µg/g		20	77	<20	<20	20	<20	111	90	130
HEPH C19-C32	µg/g		20	63	<20	<20	40	202	85	68	70
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17N283221

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-11

DATE REPORTED: 2017-12-13

		SAMPLE DESCRIPTION:	04293-01-4.0m	04293-02-4.0m	04293-03-4.0m	04293-05-2.5m	04293-07-0.5m	04293-08-4.0m	04293-09-4.0m	04293-10-4.0m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-07	2017-11-08	2017-11-08	2017-11-09	2017-11-09	2017-11-09	2017-11-09	2017-11-09
Surrogate	Unit	Acceptable Limits	8898336	8898337	8898338	8898340	8898343	8898344	8898345	8898346
Naphthalene - d8	%	50-130	91	84	86	81	84	90	94	92
2-Fluorobiphenyl	%	50-130	102	92	94	90	91	99	96	102
P-Terphenyl - d14	%	60-130	101	96	96	94	102	86	97	96

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ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-11

DATE REPORTED: 2017-12-13

		SAMPLE DESCRIPTION:		04293-11-4.0m	04293-12-3.5m	04294-01-2.5m	04294-04-3.5m	04294-06-1.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-09	2017-11-09	2017-11-09	2017-11-09	2017-11-09
Parameter	Unit	G / S	RDL	8898347	8898348	8898349	8898352	8898354
Naphthalene	µg/g		0.005	0.084	<0.005	0.005	0.035	<0.005
2-Methylnaphthalene	µg/g		0.005	0.316	<0.005	0.022	0.133	0.005
1-Methylnaphthalene	µg/g		0.005	0.177	0.014	0.022	0.084	0.005
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	0.07	<0.02	<0.02	0.03	<0.02
Phenanthrene	µg/g		0.02	0.25	0.07	0.06	0.15	<0.02
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.02	0.02	0.01	0.02	<0.01
Pyrene	µg/g		0.01	0.04	0.07	0.03	0.06	<0.01
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	0.07	0.09	0.06	0.08	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.09	0.12	0.07	0.08	<0.05
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	<0.6	<0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	148	64	37	58	<20
EPH C19-C32	µg/g		20	80	75	68	55	26
LEPH C10-C19	µg/g		20	147	64	37	58	<20
HEPH C19-C32	µg/g		20	80	75	68	55	26
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17N283221

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-11

DATE REPORTED: 2017-12-13

		SAMPLE DESCRIPTION:	04293-11-4.0m	04293-12-3.5m	04294-01-2.5m	04294-04-3.5m	04294-06-1.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-09	2017-11-09	2017-11-09	2017-11-09	2017-11-09
Surrogate	Unit	Acceptable Limits	8898347	8898348	8898349	8898352	8898354
Naphthalene - d8	%	50-130	93	100	80	89	88
2-Fluorobiphenyl	%	50-130	98	99	87	96	95
P-Terphenyl - d14	%	60-130	94	97	92	96	89

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8898324-8898354 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
Soil sample is visibly heterogeneous.

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AGAT WORK ORDER: 17N283221

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-11

DATE REPORTED: 2017-12-13

		SAMPLE DESCRIPTION:		04292-01-4.0m	04292-02-3.5m	04292-04-1.5m	04292-08-2.5m	04292-09-1.75m	04292-10-3.5m	04292-11-3.5m	04292-12-4.0m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-05	2017-11-05	2017-11-05	2017-11-07	2017-11-07	2017-11-07	2017-11-07	2017-11-07
Parameter	Unit	G / S	RDL	8898324	8898325	8898327	8898331	8898332	8898333	8898334	8898335
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05
Ethylbenzene	µg/g		0.05	<0.05	0.10	<0.05	<0.05	<0.05	<0.05	0.09	<0.05
m&p-Xylene	µg/g		0.05	<0.05	0.19	<0.05	<0.05	<0.05	0.05	0.37	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	15	<10	<10	<10	<10	21	<10
VH	µg/g		10	<10	16	<10	<10	<10	<10	22	<10
Total Xylenes	ug/g		0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	0.5	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		91	98	99	98	93	97	96	97
Dibromofluoromethane	%	60-140		105	108	111	112	107	111	104	111
Toluene - d8	%	60-140		96	100	105	105	99	102	99	103

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AGAT WORK ORDER: 17N283221

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-11

DATE REPORTED: 2017-12-13

		SAMPLE DESCRIPTION:		04293-01-4.0m	04293-02-4.0m	04293-03-4.0m	04293-05-2.5m	04293-07-0.5m	04293-08-4.0m	04293-09-4.0m	04293-10-4.0m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-07	2017-11-08	2017-11-08	2017-11-09	2017-11-09	2017-11-09	2017-11-09	2017-11-09
Parameter	Unit	G / S	RDL	8898336	8898337	8898338	8898340	8898343	8898344	8898345	8898346
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	0.07	0.18
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
VH	µg/g		10	<10	<10	<10	<10	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		94	97	94	95	99	97	90	95
Dibromofluoromethane	%	60-140		106	111	107	112	125	110	105	110
Toluene - d8	%	60-140		98	104	101	103	101	101	95	102

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Certificate of Analysis

AGAT WORK ORDER: 17N283221

PROJECT: 1657709-6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-11

DATE REPORTED: 2017-12-13

		SAMPLE DESCRIPTION:		04293-11-4.0m	04293-12-3.5m	04294-01-2.5m	04294-04-3.5m	04294-06-1.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-09	2017-11-09	2017-11-09	2017-11-09	2017-11-09
Parameter	Unit	G / S	RDL	8898347	8898348	8898349	8898352	8898354
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	0.11	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	0.29	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	16	<10	<10	<10	<10
VH	µg/g		10	17	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	0.3	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits						
Bromofluorobenzene	%	60-140		96	93	94	95	91
Dibromofluoromethane	%	60-140		111	111	111	112	111
Toluene - d8	%	60-140		102	101	102	102	98

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8898324-8898354 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

Certified By:

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N283221

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: Dec 13, 2017			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
Public Works Metals in Soil															
Aluminum	8968604		7820	7610	2.6%	< 10	109%	70%	130%	104%	90%	110%			
Antimony	8968604		1.7	1.9	9.0%	< 0.1	107%	70%	130%	107%	90%	110%			
Arsenic	8968604		1.7	2.1	23.4%	< 0.1	119%	70%	130%	108%	90%	110%			
Barium	8968604		52.8	46.5	12.7%	< 0.5	122%	70%	130%	109%	90%	110%			
Beryllium	8968604		<0.1	<0.1	NA	< 0.1	106%	70%	130%	102%	90%	110%			
Bismuth	8968604		<0.5	<0.5	NA	< 0.5				102%	85%	115%			
Cadmium	8968604		0.11	0.13	11.8%	< 0.01	99%	70%	130%	106%	90%	110%			
Calcium	8968604		2700	2620	2.8%	< 10	107%	70%	130%	102%	90%	110%			
Chromium	8968604		10	12	17.3%	< 1	103%	70%	130%	106%	90%	110%			
Cobalt	8968604		3.5	3.6	3.1%	< 0.1	107%	70%	130%	105%	90%	110%			
Copper	8968604		17.7	22.5	23.8%	< 0.2	102%	70%	130%	106%	90%	110%			
Iron	8968604		15600	15700	0.6%	< 10	100%	70%	130%	101%	90%	110%			
Lead	8968604		67.5	57.4	16.2%	< 0.1	98%	70%	130%	105%	90%	110%			
Lithium	8968604		3.2	3.2	1.4%	< 0.5				100%	85%	115%			
Magnesium	8968604		2980	2810	5.7%	< 10	111%	70%	130%	105%	90%	110%			
Manganese	8968604		178	177	0.5%	< 1	105%	70%	130%	104%	90%	110%			
Mercury	8968604		<0.01	<0.01	NA	< 0.01	99%	70%	130%	105%	90%	110%			
Molybdenum	8968604		0.3	0.3	NA	< 0.2	98%	70%	130%	99%	90%	110%			
Nickel	8968604		6.9	8.6	21.4%	< 0.5	118%	70%	130%	98%	90%	110%			
Phosphorus	8968604		287	274	4.6%	< 5	85%	70%	130%	92%	90%	110%			
Potassium	8968604		631	577	8.9%	< 5	117%	70%	130%	104%	90%	110%			
Selenium	8968604		<0.1	0.2	NA	< 0.1				97%	90%	110%			
Silver	8968604		<0.5	<0.5	NA	< 0.5	123%	70%	130%	97%	90%	110%			
Sodium	8968604		253	251	0.6%	< 5	118%	70%	130%	102%	90%	110%			
Strontium	8968604		54	54	1.1%	< 1	121%	70%	130%	102%	90%	110%			
Thallium	8968604		<0.1	<0.1	NA	< 0.1	107%	70%	130%	105%	90%	110%			
Tin	8968604		0.5	0.5	NA	< 0.2	105%	70%	130%	99%	90%	110%			
Titanium	8968604		592	586	1.0%	< 1	100%	70%	130%	98%	90%	110%			
Uranium	8968604		0.3	0.3	NA	< 0.2	108%	70%	130%	104%	90%	110%			
Vanadium	8968604		42	48	12.1%	< 1	102%	70%	130%	100%	90%	110%			
Zinc	8968604		32	33	4.7%	< 1	105%	70%	130%	105%	90%	110%			
Zirconium	8968604		1.8	1.8	4.0%	< 0.1				95%	90%	110%			
pH 1:2	8968604		7.01	6.96	0.7%		93%	90%	110%	99%	95%	105%			

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17N283221
PROJECT: 1657709-6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Dec 13, 2017			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
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68282	8898346	0.077	0.078	1.3%	< 0.005	99%	80%	120%				117%	50%	130%
2-Methylnaphthalene	68282	8898346	0.327	0.304	7.3%	< 0.005	100%	80%	120%				114%	50%	130%
1-Methylnaphthalene	68282	8898346	0.184	0.175	5.0%	< 0.005	102%	80%	120%				119%	50%	130%
Acenaphthylene	68282	8898346	<0.005	<0.005	NA	< 0.005	101%	80%	120%				111%	50%	130%
Acenaphthene	68282	8898346	<0.005	<0.005	NA	< 0.005	102%	80%	120%				117%	50%	130%
Fluorene	68282	8898346	0.09	0.08	NA	< 0.02	101%	80%	120%				119%	50%	130%
Phenanthrene	68282	8898346	0.28	0.25	11.3%	< 0.02	100%	80%	120%				93%	60%	130%
Anthracene	68282	8898346	<0.004	<0.004	NA	< 0.004	99%	80%	120%				103%	60%	130%
Fluoranthene	68282	8898346	0.02	0.02	NA	< 0.01	100%	80%	120%				114%	60%	130%
Pyrene	68282	8898346	0.04	0.04	NA	< 0.01	101%	80%	120%				114%	60%	130%
Benzo(a)anthracene	68282	8898346	<0.03	<0.03	NA	< 0.03	100%	80%	120%				115%	60%	130%
Chrysene	68282	8898346	0.07	0.07	NA	< 0.05	101%	80%	120%				115%	60%	130%
Benzo(b)fluoranthene	68282	8898346	<0.05	<0.05	NA	< 0.05	103%	80%	120%				82%	60%	130%
Benzo(j)fluoranthene	68282	8898346	<0.05	<0.05	NA	< 0.05	100%	80%	120%				100%	60%	130%
Benzo(k)fluoranthene	68282	8898346	<0.05	<0.05	NA	< 0.05	103%	80%	120%				106%	60%	130%
Benzo(a)pyrene	68282	8898346	<0.03	<0.03	NA	< 0.03	100%	80%	120%				104%	60%	130%
Indeno(1,2,3-c,d)pyrene	68282	8898346	<0.02	<0.02	NA	< 0.02	99%	80%	120%				108%	60%	130%
Dibenzo(a,h)anthracene	68282	8898346	<0.005	<0.005	NA	< 0.005	99%	80%	120%				106%	60%	130%
Benzo(g,h,i)perylene	68282	8898346	0.09	0.09	NA	< 0.05	99%	80%	120%				112%	60%	130%
Quinoline	68282	8898346	<0.05	<0.05	NA	< 0.05	99%	80%	120%				105%	50%	130%
EPH C10-C19	68282	8898346	131	118	10.4%	< 20	108%	70%	130%				108%	65%	120%
EPH C19-C32	68282	8898346	70	71	NA	< 20	101%	70%	130%				105%	80%	120%
Naphthalene - d8	68282	8898346	92	91	1.1%		102%	80%	120%				99%	50%	130%
2-Fluorobiphenyl	68282	8898346	102	101	1.0%		99%	80%	120%				98%	50%	130%
P-Terphenyl - d14	68282	8898346	96	90	6.5%		99%	80%	120%				100%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68284	8898352	<0.1	<0.1	NA	< 0.1	98%	80%	120%				93%	70%	130%
Benzene	68284	8898352	<0.02	<0.02	NA	< 0.02	100%	80%	120%				95%	70%	130%
Toluene	68284	8898352	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	70%	130%
Ethylbenzene	68284	8898352	<0.05	<0.05	NA	< 0.05	99%	80%	120%				94%	70%	130%
m&p-Xylene	68284	8898352	<0.05	<0.05	NA	< 0.05	98%	80%	120%				93%	70%	130%
o-Xylene	68284	8898352	<0.05	<0.05	NA	< 0.05	98%	80%	120%				94%	70%	130%
Styrene	68284	8898352	<0.05	<0.05	NA	< 0.05	100%	80%	120%				96%	70%	130%
VPH	68284	8898352	<10	10	NA	< 10									
VH	68284	8898352	<10	10	NA	< 10									
Bromofluorobenzene	68284	8898352	95	95	0.0%		100%	60%	140%				95%	60%	140%
Dibromofluoromethane	68284	8898352	112	112	0.0%		101%	60%	140%				94%	60%	140%

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Quality Assurance

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AGAT WORK ORDER: 17N283221
PROJECT: 1657709-6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Dec 13, 2017			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
Toluene - d8	68284	8898352	102	101	1.0%		100%	60%	140%				90%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68281	8904822	0.008	0.011	NA	< 0.005	100%	80%	120%				110%	50%	130%
2-Methylnaphthalene	68281	8904822	0.007	0.009	NA	< 0.005	101%	80%	120%				107%	50%	130%
1-Methylnaphthalene	68281	8904822	0.006	0.008	NA	< 0.005	100%	80%	120%				107%	50%	130%
Acenaphthylene	68281	8904822	0.030	0.021	NA	< 0.005	101%	80%	120%				117%	50%	130%
Acenaphthene	68281	8904822	0.008	0.013	NA	< 0.005	99%	80%	120%				105%	50%	130%
Fluorene	68281	8904822	<0.02	0.02	NA	< 0.02	100%	80%	120%				105%	50%	130%
Phenanthrene	68281	8904822	0.11	0.17	42.9%	< 0.02	101%	80%	120%				102%	60%	130%
Anthracene	68281	8904822	0.044	0.052	16.7%	< 0.004	100%	80%	120%				108%	60%	130%
Fluoranthene	68281	8904822	0.21	0.23	9.1%	< 0.01	102%	80%	120%				115%	60%	130%
Pyrene	68281	8904822	0.22	0.22	0.0%	< 0.01	100%	80%	120%				113%	60%	130%
Benzo(a)anthracene	68281	8904822	0.11	0.13	NA	< 0.03	103%	80%	120%				119%	60%	130%
Chrysene	68281	8904822	0.12	0.12	NA	< 0.05	100%	80%	120%				113%	60%	130%
Benzo(b)fluoranthene	68281	8904822	0.07	0.07	NA	< 0.05	99%	80%	120%				107%	60%	130%
Benzo(j)fluoranthene	68281	8904822	0.05	<0.05	NA	< 0.05	99%	80%	120%				107%	60%	130%
Benzo(k)fluoranthene	68281	8904822	<0.05	<0.05	NA	< 0.05	102%	80%	120%				105%	60%	130%
Benzo(a)pyrene	68281	8904822	0.12	0.10	NA	< 0.03	103%	80%	120%				100%	60%	130%
Indeno(1,2,3-c,d)pyrene	68281	8904822	0.05	0.05	NA	< 0.02	98%	80%	120%				98%	60%	130%
Dibenzo(a,h)anthracene	68281	8904822	0.020	0.012	NA	< 0.005	99%	80%	120%				89%	60%	130%
Benzo(g,h,i)perylene	68281	8904822	0.06	0.06	NA	< 0.05	99%	80%	120%				93%	60%	130%
Quinoline	68281	8904822	<0.05	<0.05	NA	< 0.05	101%	80%	120%				106%	50%	130%
EPH C10-C19	68281	8904822	<20	<20	NA	< 20	109%	70%	130%				105%	65%	120%
EPH C19-C32	68281	8904822	79	47	NA	< 20	103%	70%	130%				104%	80%	120%
Naphthalene - d8	68281	8904822	100	97	3.0%		99%	80%	120%				103%	50%	130%
2-Fluorobiphenyl	68281	8904822	106	99	6.8%		99%	80%	120%				105%	50%	130%
P-Terphenyl - d14	68281	8904822	107	106	0.9%		102%	80%	120%				99%	60%	130%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68280	8898354	<0.1	<0.1	NA	< 0.1	98%	80%	120%				93%	70%	130%
Benzene	68280	8898354	<0.02	<0.02	NA	< 0.02	100%	80%	120%				95%	70%	130%
Toluene	68280	8898354	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	70%	130%
Ethylbenzene	68280	8898354	<0.05	<0.05	NA	< 0.05	99%	80%	120%				94%	70%	130%
m&p-Xylene	68280	8898354	<0.05	<0.05	NA	< 0.05	98%	80%	120%				93%	70%	130%
o-Xylene	68280	8898354	<0.05	<0.05	NA	< 0.05	98%	80%	120%				94%	70%	130%
Styrene	68280	8898354	<0.05	<0.05	NA	< 0.05	100%	80%	120%				96%	70%	130%
VPH	68280	8898354	<10	<10	NA	< 10									
VH	68280	8898354	<10	<10	NA	< 10									

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N283221

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Dec 13, 2017			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
Bromofluorobenzene	68280	8898354	91	91	0.0%		100%	60%	140%				95%	60%	140%
Dibromofluoromethane	68280	8898354	111	111	0.0%		101%	60%	140%				94%	60%	140%
Toluene - d8	68280	8898354	98	98	0.0%		100%	60%	140%				90%	60%	140%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

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Method Summary

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AGAT WORK ORDER: 17N283221
PROJECT: 1657709-6000
ATTENTION TO: Erin O'Brien
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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Antimony	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Arsenic	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Barium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Beryllium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Bismuth	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cadmium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Calcium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Chromium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cobalt	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Copper	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Iron	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Lead	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Lithium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Magnesium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Manganese	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Mercury	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Molybdenum	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Nickel	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Phosphorus	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Potassium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Selenium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Silver	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Sodium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Strontium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Thallium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Tin	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS

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Method Summary

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PROJECT: 1657709-6000

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SAMPLING SITE:

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Titanium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Uranium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Vanadium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zinc	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zirconium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
pH 1:2	INOR-181-6031	BC MOE Lab Manual B (pH, Electrometric, Soil)	PH METER

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17N283221

PROJECT: 1657709-6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS

17N283221

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04292 page 1 of 3

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709/6000			Laboratory Name: AGAT
Short Title: Kia Remediation	Golder Contact: Erin O'Brien		Address: 120 Glenlyon Parkway
Golder E-mail Address 1: erin_o'brien@golder.com	Golder E-mail Address 2: andrew_brennan@golder.com		Telephone/Fax: 2507746500
			Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

agarrido@golder.com

NOV 11 AM 10:09

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VPH, VH	EPH (C10-C19) EPH (C10-C19)	Naphthalene	2-methylnaphthalene					Hold		RUSH (Select TAT above)	Remarks (over)
04292-01	EX17-02-	B09	4.0	SOIL	05/11/17	14:55	GRAB			4	X	X	X	X								8898324
-02	|	W6D	3.5	|	|	15:05	|			|	X	X	X	X								325
-03	|	W6C	2.5	|	|	15:10	|			|								X			326
-04	|	W6B	1.5	|	|	15:15	|			|	X	X	X	X								327
-05	|	W6A	0.5	|	|	15:20	|			|								X			328
-06	|	W7C	3.5	|	07/11/17	13:56	|	FDA	04292-07		|								X			329
-07	|	W7C	3.5	|	|	13:56	|	FD	04292-06		|								X			330
-08	|	W7B	2.5	|	|	14:00	|			|	X	X	X	X								331
-09	|	W7A	1.75	|	|	14:05	|			|	X	X	X	X								332
-10	|	B10	3.5	|	|	14:15	|			|	X	X	X	X								333
-11	|	B11	3.5	|	|	14:20	|			|	X	X	X	X								334
-12	↓	B12	4.0	↓	↓	14:25	↓				↓	X	X	X	X								↓ 335

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 10/11/17	Time: 0700	Received by: Signature	Company
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by: S.Napet		Date	Time
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 1.2	Cooler opened by: S.Napet	Date	Time

WHITE: Golder Co... YELLOW: Lab Copy

ESED

17N283221

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04293 page 2 of 3

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709/6000		Laboratory Name: AGAT	
Short Title: K19 Remediation	Golder Contact: Erin O'Brien	Address: 120 Glenlyon Parkway	
Golder E-mail Address 1: erin_obrien@golder.com	Golder E-mail Address 2: andrew_bruemmer@golder.com	Telephone/Fax: 2507746500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

agarrido@golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

NOV 11 @ 10:09

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VAH, VH	LEAH/EPH (C10 < C19)	Naphthalene	2-Methylnaphthalene	HOLD	RUSH (Select TAT above)	Remarks (over)
04293-01	EX17-02-B13	4.0		Soil	07/11/17	14:30	Grab			4	X	X	X	X			8898336
-02	Backfill	4			08/11/17	10:30	COMP	FDA	04293-09		X	X	X	X			337
-03	Backfill	4			↓	10:30	COMP	FD	04293-02		X	X	X	X			338
-04	EX17-02-W8D	3.5			09/11/17	14:30	Grab								X		339
-05		W8C	2.5			14:35					X	X	X	X			340
-06		W8B	1.5			14:40									X		342
-07		W8A	0.5			14:45					X	X	X	X			343
-08		B14	4.0			14:55					X	X	X	X			344
-09		B15	4.0			15:00					X	X	X	X			345
-10		B16	4.0			15:05		FDA	04293-11		X	X	X	X			346
-11		B16	4.0			15:05		FD	04293-10		X	X	X	X			347
-12		W9D	3.5			15:15					X	X	X	X			348

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 10/11/17	Time: 0700	Received by: Signature / Company
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by: S.Nap	Date	Time
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 1.5	Cooler opened by: S.Nap	Date / Time

WHITE: Golder Copy YELLOW: Lab Copy

ESED

17N283221

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04294 page 3 of 5

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 / 6000		Laboratory Name: AGAT	
Short Title: K19 Remediation	Golder Contact: Erin O'Brien	Address: 120 - Glenlyon Parkway	
Golder E-mail Address 1: erin_o'brien@golder.com	Golder E-mail Address 2: andrea_bruemmer@golder.com	Telephone/Fax: 2507746500	Contact: Maggie Chan

Office Name: Vancouver

EQuIS Facility Code: 28433854
EQuIS upload: ☒

agamdo@golder.com

NOV 11 2017

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	Analyses Required: BTEX, VPH, VH	LEPH, HEPH (C10-C19)	Naphthalene	2-methylnaphthalene	HOLD	RUSH (Select TAT above)	Remarks (over)
04294 - 01	EX17-02-	W9C	2.5	SOIL	9/11/17	15:20	GRAB			4	X	X	X	X			8898349
- 02		W9B	1.5			15:25									X		350
- 03		W9A	0.5			15:30									X		351
- 04		W10D	3.5			15:35					X	X	X	X			352
- 05		W10C	2.5			15:45									X		353
- 06		W10B	1.5			15:55					X	X	X	X			354
- 07		W10A	0.5			16:00									X		355
- 08																	
- 09																	
- 10																	
- 11																	
- 12																	

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 10/11/17	Time: 07:00	Received by: Signature	Company
Comments:	Method of Shipment:	Waybill No.:	Received for Lab by: S. Naper	Date	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C): 1.2	Cooler opened by: S. Naper	Date	Time

WHITE: Golder Co... YELLOW: Lab Copy

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17N283221

RECEIVING BASICS:

Received From: Novex Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 2 Containers: 124

TIME SENSITIVE ISSUES:

Earliest Date Sampled: 05-Nov-17 ALREADY EXCEEDED? Yes (No)

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) 2 + 2 + 2 = 2 °C (2) 0 + 0 + 0 = 0 °C (3) ___ + ___ + ___ = ___ °C (4) ___ + ___ + ___ = ___ °C

Was ice or ice pack present: (Yes) No (1°)

Integrity Issues:

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

RECEIVING BASICS - Shipping

Company/Consultant: GOLDER

Courier: _____ (Prepaid) Collect

Waybill# _____

Branch: EDM GP (FN) FM RD VAN LYD FSJ EST Other: _____

Custody Seal Intact: Yes (No) NA

TAT: <24hr 24-48hr 48-72hr (Reg) Other _____

Cooler Quantity: 2

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes (No)

Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll* , Chloroamines*

Earliest Expiry: _____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES (NO) Precaution Taken: _____

Legal Samples: Yes (No)

International Samples: Yes (No)

Tape Sealed: Yes (No)

Coolant Used: Icepack (Bagged Ice) Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) -12 + -14 + -10 = -12 °C 2(Bottle/Jar) -11 + -17 + -12 = -12 °C

3 (Bottle/Jar) ___ + ___ + ___ = ___ °C 4 (Bottle/Jar) ___ + ___ + ___ = ___ °C

5 (Bottle/Jar) ___ + ___ + ___ = ___ °C 6 (Bottle/Jar) ___ + ___ + ___ = ___ °C

7 (Bottle/Jar) ___ + ___ + ___ = ___ °C 8 (Bottle/Jar) ___ + ___ + ___ = ___ °C

9 (Bottle/Jar) ___ + ___ + ___ = ___ °C 10 (Bottle/Jar) ___ + ___ + ___ = ___ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: _____

Samples Damaged: Yes (No) If YES why?

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial _____

General Comments: _____

* Subcontracted Analysis (See CPM)

Date issued: May 22, 2015

AGAT Laboratories

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: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
219-800 BURRARD ST
VANCOUVER, BC V6Z 0B9
604-671-1831

ATTENTION TO: Erin O'Brien

PROJECT: 1657709 6000

AGAT WORK ORDER: 17V284467

SOIL ANALYSIS REVIEWED BY: Angela Bond, Technical Reviewer

TRACE ORGANICS REVIEWED BY: Angela Bond, Technical Reviewer

DATE REPORTED: Nov 21, 2017

PAGES (INCLUDING COVER): 31

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (778) 452-4000

*NOTES

VERSION 2: Sample receipt temperature 8°C.

Version 2 issued on November 21, 2017 to report complete results. Version 2 is an amendment to version 1.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works Metals in Soil

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-17

		SAMPLE DESCRIPTION:		04335-01
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-11-13
Parameter	Unit	G / S	RDL	8908130
Aluminum	µg/g		10	5060
Antimony	µg/g		0.1	0.6
Arsenic	µg/g		0.1	10.1
Barium	µg/g		0.5	159
Beryllium	µg/g		0.1	0.3
Bismuth	µg/g		0.5	<0.5
Cadmium	µg/g		0.01	0.47
Calcium	µg/g		10	65200
Chromium	µg/g		1	11
Cobalt	µg/g		0.1	6.4
Copper	µg/g		0.2	12.8
Iron	µg/g		10	20400
Lead	µg/g		0.1	6.1
Lithium	µg/g		0.5	8.6
Magnesium	µg/g		10	10700
Manganese	µg/g		1	336
Mercury	µg/g		0.01	0.04
Molybdenum	µg/g		0.2	2.8
Nickel	µg/g		0.5	18.3
Phosphorus	µg/g		5	407
Potassium	µg/g		5	961
Selenium	µg/g		0.1	0.5
Silver	µg/g		0.5	<0.5
Sodium	µg/g		5	78
Strontium	µg/g		1	65
Thallium	µg/g		0.1	0.2
Tin	µg/g		0.2	0.3
Titanium	µg/g		1	135
Uranium	µg/g		0.2	1.2
Vanadium	µg/g		1	18

Certified By: Angela Bond

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works Metals in Soil

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-17

		SAMPLE DESCRIPTION:		04335-01
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-11-13
Parameter	Unit	G / S	RDL	8908130
Zinc	µg/g		1	75
Zirconium	µg/g		0.1	2.9
pH 1:2	pH units		0.05	8.58

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8908130 Results are based on the dry weight of the sample

Certified By: Angela Bond

AGAT Laboratories

Unit 120, 8600 Glenlyon Parkway
Burnaby, British Columbia
CANADA V5J 0B6
TEL (778)452-4000
FAX (778)452-4074
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-20

		SAMPLE DESCRIPTION:		04295-01-3.5m		04295-02-3.0m		04295-03-2.7m		04295-04-3.5m
		SAMPLE TYPE:		Soil		Soil		Soil		Soil
		DATE SAMPLED:		2017-11-10		2017-11-10		2017-11-10		2017-11-10
Parameter	Unit	G / S	RDL	8908057	RDL	8908065	RDL	8908066	RDL	8908067
Naphthalene	µg/g		0.005	0.098	0.005	0.430	0.005	0.094	0.005	0.236
2-Methylnaphthalene	µg/g		0.005	0.399	0.05	2.34	0.005	0.305	0.05	0.56
1-Methylnaphthalene	µg/g		0.005	0.252	0.05	1.16	0.005	0.193	0.005	0.455
Acenaphthylene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005
Fluorene	µg/g		0.02	0.07	0.02	0.13	0.02	0.10	0.02	0.08
Phenanthrene	µg/g		0.02	0.22	0.02	0.35	0.02	0.23	0.02	0.25
Anthracene	µg/g		0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Fluoranthene	µg/g		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Pyrene	µg/g		0.01	0.03	0.01	0.04	0.01	0.03	0.01	0.03
Benzo(a)anthracene	µg/g		0.03	<0.03	0.03	<0.03	0.03	<0.03	0.03	<0.03
Chrysene	µg/g		0.05	0.05	0.05	0.07	0.05	0.05	0.05	0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	0.03	<0.03	0.03	<0.03	0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.07	0.05	0.09	0.05	0.08	0.05	0.07
Quinoline	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05
EPH C10-C19	µg/g		20	101	20	353	20	91	20	278
EPH C19-C32	µg/g		20	66	20	85	20	58	20	64
LEPH C10-C19	µg/g		20	100	20	352	20	91	20	277
HEPH C19-C32	µg/g		20	66	20	85	20	57	20	64
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-20

		SAMPLE DESCRIPTION:	04295-01-3.5m	04295-02-3.0m	04295-03-2.7m	04295-04-3.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-10	2017-11-10	2017-11-10	2017-11-10
Surrogate	Unit	Acceptable Limits	8908057	8908065	8908066	8908067
Naphthalene - d8	%	50-130	70	74	74	70
2-Fluorobiphenyl	%	50-130	76	84	81	75
P-Terphenyl - d14	%	60-130	80	83	84	85

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Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-20

SAMPLE DESCRIPTION:				04295-06-1.5m	04295-07-0.5m	04295-08-2.5m	04295-09-1.5m	04296-01-2.5m	04296-03-0.5m	04296-04-2.5m	04296-05-2.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-11	2017-11-11
Parameter	Unit	G / S	RDL	8908069	8908070	8908071	8908072	8908082	8908084	8908085	8908086
Naphthalene	µg/g		0.005	<0.005	<0.005	0.005	<0.005	<0.005	0.431	0.090	0.034
2-Methylnaphthalene	µg/g		0.005	<0.005	<0.005	0.041	<0.005	<0.005	0.150	0.212	0.301
1-Methylnaphthalene	µg/g		0.005	<0.005	<0.005	0.028	<0.005	<0.005	0.560	0.158	0.179
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02	0.10	<0.02	<0.02	0.05	0.02	0.09
Phenanthrene	µg/g		0.02	<0.02	<0.02	0.28	<0.02	<0.02	0.10	0.10	0.27
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.01	0.01
Pyrene	µg/g		0.01	<0.01	<0.01	0.04	<0.01	<0.01	0.03	0.03	0.04
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	0.05	0.07
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	<0.05	0.09	<0.05	<0.05	<0.05	0.06	0.09
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6	0.6	<0.6	<0.6	<0.6	0.6	0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	<20	<20	60	<20	<20	316	202	127
EPH C19-C32	µg/g		20	25	28	59	21	30	69	162	66
LEPH C10-C19	µg/g		20	<20	<20	60	<20	<20	316	202	127
HEPH C19-C32	µg/g		20	25	28	59	21	29	69	162	66
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

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AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

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		SAMPLE DESCRIPTION:	04295-06-1.5m	04295-07-0.5m	04295-08-2.5m	04295-09-1.5m	04296-01-2.5m	04296-03-0.5m	04296-04-2.5m	04296-05-2.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-11	2017-11-11
Surrogate	Unit	Acceptable Limits	8908069	8908070	8908071	8908072	8908082	8908084	8908085	8908086
Naphthalene - d8	%	50-130	69	71	72	75	77	74	71	72
2-Fluorobiphenyl	%	50-130	74	78	78	82	86	74	77	80
P-Terphenyl - d14	%	60-130	86	85	81	86	94	85	87	87

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		SAMPLE DESCRIPTION:		04296-06-2.5m		04296-08-0.5m		04296-09-2.5m		04296-10-2.5m	04297-01-1.5m
		SAMPLE TYPE:		Soil		Soil		Soil		Soil	Soil
		DATE SAMPLED:		2017-11-11		2017-11-11		2017-11-11		2017-11-11	2017-11-11
Parameter	Unit	G / S	RDL	8908087	RDL	8908089	RDL	8908090	RDL	8908091	8908107
Naphthalene	µg/g		0.005	0.493	0.005	<0.005	0.005	1.64	0.005	0.024	<0.005
2-Methylnaphthalene	µg/g		0.005	0.641	0.005	<0.005	0.05	3.32	0.005	0.224	<0.005
1-Methylnaphthalene	µg/g		0.05	2.65	0.005	<0.005	0.05	2.00	0.005	0.134	<0.005
Acenaphthylene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005	<0.005
Fluorene	µg/g		0.02	0.19	0.02	<0.02	0.02	0.15	0.02	0.10	<0.02
Phenanthrene	µg/g		0.02	0.31	0.02	<0.02	0.02	0.32	0.02	0.25	<0.02
Anthracene	µg/g		0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	0.02	0.01	<0.01	0.01	0.01	0.01	0.01	<0.01
Pyrene	µg/g		0.01	0.08	0.01	<0.01	0.01	0.03	0.01	0.03	<0.01
Benzo(a)anthracene	µg/g		0.03	<0.03	0.03	<0.03	0.03	<0.03	0.03	<0.03	<0.03
Chrysene	µg/g		0.05	0.08	0.05	<0.05	0.05	0.05	0.05	0.06	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	0.03	<0.03	0.03	<0.03	0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	0.09	0.05	<0.05	0.05	0.07	0.05	0.07	<0.05
Quinoline	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	0.6	0.6	<0.6	0.6	0.6	0.6	0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	2790	20	30	20	657	20	78	<20
EPH C19-C32	µg/g		20	137	20	35	20	70	20	62	38
LEPH C10-C19	µg/g		20	2790	20	30	20	655	20	78	<20
HEPH C19-C32	µg/g		20	137	20	34	20	70	20	62	38
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.05	<0.05	<0.05

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Certificate of Analysis

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PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-15

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		SAMPLE DESCRIPTION:	04296-06-2.5m	04296-08-0.5m	04296-09-2.5m	04296-10-2.5m	04297-01-1.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-11	2017-11-11	2017-11-11	2017-11-11	2017-11-11
Surrogate	Unit	Acceptable Limits	8908087	8908089	8908090	8908091	8908107
Naphthalene - d8	%	50-130	93	69	82	72	70
2-Fluorobiphenyl	%	50-130	109	78	86	78	79
P-Terphenyl - d14	%	60-130	83	84	87	84	94

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SAMPLE DESCRIPTION:				04297-02-0.5m	04297-03-2.5m	04297-04-2.5m	04297-05-1.5m	04297-07-2.5m	04297-08-1.5m		04297-10-2.5m
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil		Soil
DATE SAMPLED:				2017-11-11	2017-11-11	2017-11-12	2017-11-12	2017-11-12	2017-11-12		2017-11-12
Parameter	Unit	G / S	RDL	8908108	8908109	8908111	8908112	8908117	8908119	RDL	8908127
Naphthalene	µg/g		0.005	<0.005	0.062	<0.005	0.009	<0.005	0.018	0.005	0.293
2-Methylnaphthalene	µg/g		0.005	<0.005	0.432	<0.005	0.013	<0.005	0.024	0.05	0.91
1-Methylnaphthalene	µg/g		0.005	<0.005	0.272	0.007	0.013	0.189	0.018	0.005	0.563
Acenaphthylene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005
Fluorene	µg/g		0.02	<0.02	0.10	<0.02	<0.02	0.03	<0.02	0.02	0.03
Phenanthrene	µg/g		0.02	<0.02	0.25	<0.02	<0.02	0.07	0.02	0.02	0.41
Anthracene	µg/g		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.04
Pyrene	µg/g		0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	0.01	0.09
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03
Chrysene	µg/g		0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	0.05	0.16
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	0.07
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005	<0.005	0.007	0.006	<0.005	0.005	0.011
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	0.05	0.22
Quinoline	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	0.6	<0.6	0.6	0.6	<0.6	0.6	1.0
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
EPH C10-C19	µg/g		20	<20	86	<20	<20	457	174	20	232
EPH C19-C32	µg/g		20	32	60	49	40	49	36	20	76
LEPH C10-C19	µg/g		20	<20	86	<20	<20	457	174	20	231
HEPH C19-C32	µg/g		20	32	60	49	40	49	36	20	76
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	0.07

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PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-15

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		SAMPLE DESCRIPTION:	04297-02-0.5m	04297-03-2.5m	04297-04-2.5m	04297-05-1.5m	04297-07-2.5m	04297-08-1.5m	04297-10-2.5m
		SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	2017-11-11	2017-11-11	2017-11-12	2017-11-12	2017-11-12	2017-11-12	2017-11-12
Surrogate	Unit	Acceptable Limits	8908108	8908109	8908111	8908112	8908117	8908119	8908127
Naphthalene - d8	%	50-130	79	84	69	69	75	67	74
2-Fluorobiphenyl	%	50-130	86	92	75	84	82	69	70
P-Terphenyl - d14	%	60-130	95	96	92	103	96	85	79

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		SAMPLE DESCRIPTION:		04297-11-0.5m	04335-01
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		2017-11-12	2017-11-13
Parameter	Unit	G / S	RDL	8908128	8908130
Naphthalene	µg/g		0.005	0.007	<0.005
2-Methylnaphthalene	µg/g		0.005	0.013	<0.005
1-Methylnaphthalene	µg/g		0.005	0.008	<0.005
Acenaphthylene	µg/g		0.005	<0.005	<0.005
Acenaphthene	µg/g		0.005	<0.005	<0.005
Fluorene	µg/g		0.02	<0.02	<0.02
Phenanthrene	µg/g		0.02	<0.02	<0.02
Anthracene	µg/g		0.004	<0.004	<0.004
Fluoranthene	µg/g		0.01	<0.01	<0.01
Pyrene	µg/g		0.01	<0.01	<0.01
Benzo(a)anthracene	µg/g		0.03	<0.03	<0.03
Chrysene	µg/g		0.05	<0.05	<0.05
Benzo(b)fluoranthene	µg/g		0.05	<0.05	<0.05
Benzo(j)fluoranthene	µg/g		0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/g		0.05	<0.05	<0.05
Benzo(a)pyrene	µg/g		0.03	<0.03	<0.03
Indeno(1,2,3-c,d)pyrene	µg/g		0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/g		0.005	<0.005	<0.005
Benzo(g,h,i)perylene	µg/g		0.05	<0.05	<0.05
Quinoline	µg/g		0.05	<0.05	<0.05
IACR CCME (Soil)	µg/g		0.6	<0.6	<0.6
B[a]P TPE (Soil)	µg/g		0.05	<0.05	<0.05
EPH C10-C19	µg/g		20	54	<20
EPH C19-C32	µg/g		20	38	<20
LEPH C10-C19	µg/g		20	54	<20
HEPH C19-C32	µg/g		20	38	<20
Benzo(b+j)fluoranthene	µg/g		0.05	<0.05	<0.05

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Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Public Works LEPH/HEPH in Soil Low Level

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-20

		SAMPLE DESCRIPTION:	04297-11-0.5m	04335-01
		SAMPLE TYPE:	Soil	Soil
		DATE SAMPLED:	2017-11-12	2017-11-13
Surrogate	Unit	Acceptable Limits	8908128	8908130
Naphthalene - d8	%	50-130	69	74
2-Fluorobiphenyl	%	50-130	76	92
P-Terphenyl - d14	%	60-130	90	89

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8908057 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8908065 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8908066 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8908067 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8908069-8908086 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8908087 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8908089 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8908090 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8908091-8908111 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

8908112 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.
PAH detection limits increased due to sample matrix interference. Sample extract was diluted.

8908117-8908130 Results are based on dry weight of sample.
LEPH & HEPH results have been corrected for PAH contributions.

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Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-17

		SAMPLE DESCRIPTION:		04295-01-3.5m	04295-02-3.0m	04295-03-2.7m	04295-04-3.5m	04295-06-1.5m	04295-07-0.5m	04295-08-2.5m	04295-09-1.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10	2017-11-10
Parameter	Unit	G / S	RDL	8908057	8908065	8908066	8908067	8908069	8908070	8908071	8908072
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	0.07	<0.02	0.26	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	0.58	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	0.34	<0.05	0.09	<0.05	<0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	0.06	1.58	<0.05	0.46	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	0.72	<0.05	0.06	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	45	<10	12	<10	<10	<10	<10
VH	µg/g		10	<10	49	<10	13	<10	<10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	2.3	<0.1	0.5	<0.1	<0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		94	100	99	92	97	98	97	99
Dibromofluoromethane	%	60-140		101	102	106	97	106	109	106	110
Toluene - d8	%	60-140		98	102	102	95	102	104	101	105

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Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-17

		SAMPLE DESCRIPTION:		04296-01-2.5m	04296-03-0.5m	04296-04-2.5m	04296-05-2.5m	04296-06-2.5m	04296-08-0.5m	04296-09-2.5m	04296-10-2.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-10	2017-11-10	2017-11-11	2017-11-11	2017-11-11	2017-11-11	2017-11-11	2017-11-11
Parameter	Unit	G / S	RDL	8908082	8908084	8908085	8908086	8908087	8908089	8908090	8908091
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	0.04	<0.02	<0.02	0.06	<0.02	1.57	<0.02
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.65	<0.05
Ethylbenzene	µg/g		0.05	<0.05	0.27	<0.05	<0.05	0.21	<0.05	1.06	<0.05
m&p-Xylene	µg/g		0.05	<0.05	0.80	0.10	<0.05	0.22	<0.05	6.65	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.84	<0.05
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	17	<10	<10	112	40	36	<10
VH	µg/g		10	<10	19	<10	<10	112	40	47	<10
Total Xylenes	ug/g		0.1	<0.1	0.8	0.1	<0.1	0.2	<0.1	7.5	<0.1
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		98	102	97	96	104	104	102	99
Dibromofluoromethane	%	60-140		109	110	104	103	106	101	102	103
Toluene - d8	%	60-140		104	104	101	100	101	100	107	104

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Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-17

		SAMPLE DESCRIPTION:		04297-01-1.5m	04297-02-0.5m	04297-03-2.5m	04297-04-2.5m	04297-05-1.5m	04297-07-2.5m	04297-08-1.5m	04297-10-2.5m
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		2017-11-11	2017-11-11	2017-11-11	2017-11-12	2017-11-12	2017-11-12	2017-11-12	2017-11-12
Parameter	Unit	G / S	RDL	8908107	8908108	8908109	8908111	8908112	8908117	8908119	8908127
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.66
Toluene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2.76
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.91
m&p-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	4.34
o-Xylene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.60
Styrene	µg/g		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10	12	<10	<10	22	<10	97
VH	µg/g		10	<10	<10	12	<10	<10	22	<10	108
Total Xylenes	ug/g		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.9
Surrogate	Unit	Acceptable Limits									
Bromofluorobenzene	%	60-140		99	97	96	95	97	102	103	99
Dibromofluoromethane	%	60-140		106	106	102	104	104	105	104	96
Toluene - d8	%	60-140		106	104	101	101	106	102	102	106

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Certificate of Analysis

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

BTEX / VPH (C6-C10) Soil

DATE RECEIVED: 2017-11-15

DATE REPORTED: 2017-11-17

		SAMPLE DESCRIPTION:		04297-11-0.5m	04335-01
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		2017-11-12	2017-11-13
Parameter	Unit	G / S	RDL	8908128	8908130
Methyl tert-butyl ether (MTBE)	µg/g		0.1	<0.1	<0.1
Benzene	µg/g		0.02	<0.02	<0.02
Toluene	µg/g		0.05	<0.05	<0.05
Ethylbenzene	µg/g		0.05	<0.05	<0.05
m&p-Xylene	µg/g		0.05	<0.05	<0.05
o-Xylene	µg/g		0.05	<0.05	<0.05
Styrene	µg/g		0.05	<0.05	<0.05
VPH	µg/g		10	<10	<10
VH	µg/g		10	<10	<10
Total Xylenes	ug/g		0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits			
Bromofluorobenzene	%	60-140		96	94
Dibromofluoromethane	%	60-140		104	101
Toluene - d8	%	60-140		106	102

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8908057-8908130 Results are based on dry weight of sample.
VPH results have been corrected for BTEX contributions.

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date:			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
Public Works Metals in Soil															
Aluminum	8907905		10500	10300	1.3%	< 10	107%	70%	130%	101%	90%	110%			
Antimony	8907283		0.3	0.3	NA	< 0.1	113%	70%	130%	108%	90%	110%			
Arsenic	8907283		3.0	3.2	6.5%	< 0.1	125%	70%	130%	104%	90%	110%			
Barium	8907283		60.7	62.3	2.6%	< 0.5	103%	70%	130%	104%	90%	110%			
Beryllium	8907283		0.2	0.2	NA	< 0.1	104%	70%	130%	97%	90%	110%			
Bismuth	8907283		<0.5	<0.5	NA	< 0.5				92%	85%	115%			
Cadmium	8907283		0.18	0.17	2.3%	< 0.01	114%	70%	130%	102%	90%	110%			
Calcium	8907905		4450	4450	0.0%	< 10	110%	70%	130%	98%	90%	110%			
Chromium	8907283		22	23	0.8%	< 1	96%	70%	130%	99%	90%	110%			
Cobalt	8907283		8.8	8.6	1.9%	< 0.1	111%	70%	130%	109%	90%	110%			
Copper	8907283		17.1	17.4	1.7%	< 0.2	101%	70%	130%	102%	90%	110%			
Iron	8907905		18100	18300	1.2%	< 10	108%	70%	130%	99%	90%	110%			
Lead	8907283		4.5	4.9	8.5%	< 0.1	91%	70%	130%	98%	90%	110%			
Lithium	8907283		8.6	9.1	5.1%	< 0.5				94%	85%	115%			
Magnesium	8907905		4510	4910	8.5%	< 10	115%	70%	130%	106%	90%	110%			
Manganese	8907283		328	336	2.3%	< 1	96%	70%	130%	103%	90%	110%			
Mercury	8907283		0.02	0.03	NA	< 0.01	130%	70%	130%	97%	90%	110%			
Molybdenum	8907283		0.6	0.4	NA	< 0.2	96%	70%	130%	97%	90%	110%			
Nickel	8907283		32.7	34.3	4.7%	< 0.5	108%	70%	130%	106%	90%	110%			
Phosphorus	8907905		375	400	6.6%	< 5	107%	70%	130%	102%	90%	110%			
Potassium	8907905		832	826	0.6%	< 5	105%	70%	130%	101%	90%	110%			
Selenium	8907283		0.6	0.3	NA	< 0.1				102%	90%	110%			
Silver	8907283		<0.5	<0.5	NA	< 0.5	122%	70%	130%	110%	90%	110%			
Sodium	8907905		357	329	8.3%	< 5	113%	70%	130%	101%	90%	110%			
Strontium	8907283		41	43	4.8%	< 1	103%	70%	130%	99%	90%	110%			
Thallium	8907283		<0.1	<0.1	NA	< 0.1	102%	70%	130%	98%	90%	110%			
Tin	8907283		0.4	0.4	NA	< 0.2	107%	70%	130%	102%	90%	110%			
Titanium	8907905		555	600	7.8%	< 1				101%	90%	110%			
Uranium	8907283		0.4	0.4	NA	< 0.2	100%	70%	130%	107%	90%	110%			
Vanadium	8907283		39	39	1.4%	< 1	96%	70%	130%	97%	90%	110%			
Zinc	8907283		45	45	0.1%	< 1	104%	70%	130%	106%	90%	110%			
Zirconium	8907283		3.1	3.9	22.9%	< 0.1				100%	90%	110%			
pH 1:2	8907905		8.90	8.91	0.1%	< 0.1	94%	90%	110%	99%	95%	105%			

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By:

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17V284467
PROJECT: 1657709 6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date:			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
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68290	8908057	<0.1	<0.1	NA	< 0.1	98%	80%	120%				85%	70%	130%
Benzene	68290	8908057	<0.02	<0.02	NA	< 0.02	100%	80%	120%				95%	70%	130%
Toluene	68290	8908057	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	70%	130%
Ethylbenzene	68290	8908057	<0.05	<0.05	NA	< 0.05	99%	80%	120%				96%	70%	130%
m&p-Xylene	68290	8908057	0.06	0.06	NA	< 0.05	98%	80%	120%				96%	70%	130%
o-Xylene	68290	8908057	<0.05	<0.05	NA	< 0.05	98%	80%	120%				96%	70%	130%
Styrene	68290	8908057	<0.05	<0.05	NA	< 0.05	100%	80%	120%				98%	70%	130%
VPH	68290	8908057	<10	<10	NA	< 10									
VH	68290	8908057	<10	<10	NA	< 10									
Bromofluorobenzene	68290	8908057	94	94	0.0%		100%	60%	140%				94%	60%	140%
Dibromofluoromethane	68290	8908057	101	101	0.0%		101%	60%	140%				90%	60%	140%
Toluene - d8	68290	8908057	98	96	2.1%		100%	60%	140%				88%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68293	8908066	0.094	0.057	49.0%	< 0.005	101%	80%	120%				117%	50%	130%
2-Methylnaphthalene	68293	8908066	0.305	0.188	47.5%	< 0.005	98%	80%	120%				115%	50%	130%
1-Methylnaphthalene	68293	8908066	0.193	0.126	42.0%	< 0.005	101%	80%	120%				107%	50%	130%
Acenaphthylene	68293	8908066	<0.005	<0.005	NA	< 0.005	102%	80%	120%				115%	50%	130%
Acenaphthene	68293	8908066	<0.005	<0.005	NA	< 0.005	101%	80%	120%				114%	50%	130%
Fluorene	68293	8908066	0.10	0.09	NA	< 0.02	100%	80%	120%				112%	50%	130%
Phenanthrene	68293	8908066	0.23	0.22	4.4%	< 0.02	102%	80%	120%				82%	60%	130%
Anthracene	68293	8908066	<0.004	<0.004	NA	< 0.004	102%	80%	120%				98%	60%	130%
Fluoranthene	68293	8908066	0.01	0.01	NA	< 0.01	104%	80%	120%				114%	60%	130%
Pyrene	68293	8908066	0.03	0.03	NA	< 0.01	100%	80%	120%				113%	60%	130%
Benzo(a)anthracene	68293	8908066	<0.03	<0.03	NA	< 0.03	99%	80%	120%				118%	60%	130%
Chrysene	68293	8908066	0.05	0.05	NA	< 0.05	98%	80%	120%				110%	60%	130%
Benzo(b)fluoranthene	68293	8908066	<0.05	<0.05	NA	< 0.05	102%	80%	120%				85%	60%	130%
Benzo(j)fluoranthene	68293	8908066	<0.05	<0.05	NA	< 0.05	102%	80%	120%				118%	60%	130%
Benzo(k)fluoranthene	68293	8908066	<0.05	<0.05	NA	< 0.05	103%	80%	120%				107%	60%	130%
Benzo(a)pyrene	68293	8908066	<0.03	<0.03	NA	< 0.03	104%	80%	120%				110%	60%	130%
Indeno(1,2,3-c,d)pyrene	68293	8908066	<0.02	<0.02	NA	< 0.02	100%	80%	120%				111%	60%	130%
Dibenzo(a,h)anthracene	68293	8908066	<0.005	<0.005	NA	< 0.005	100%	80%	120%				104%	60%	130%
Benzo(g,h,i)perylene	68293	8908066	0.08	0.08	NA	< 0.05	101%	80%	120%				120%	60%	130%
Quinoline	68293	8908066	<0.05	<0.05	NA	< 0.05	101%	80%	120%				110%	50%	130%
EPH C10-C19	68293	8908066	91	75	NA	< 20	109%	70%	130%				102%	65%	120%
EPH C19-C32	68293	8908066	58	55	NA	< 20	103%	70%	130%				102%	80%	120%
Naphthalene - d8	68293	8908066	74	79	6.5%		102%	80%	120%				98%	50%	130%
2-Fluorobiphenyl	68293	8908066	81	86	6.0%		100%	80%	120%				101%	50%	130%

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17V284467
PROJECT: 1657709 6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date:			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
P-Terphenyl - d14	68293	8908066	84	83	1.2%		100%	80%	120%				100%	60%	130%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
BTEX / VPH (C6-C10) Soil															
Methyl tert-butyl ether (MTBE)	68291	8908112	<0.1	<0.1	NA	< 0.1	98%	80%	120%				83%	70%	130%
Benzene	68291	8908112	<0.02	<0.02	NA	< 0.02	100%	80%	120%				95%	70%	130%
Toluene	68291	8908112	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	70%	130%
Ethylbenzene	68291	8908112	<0.05	<0.05	NA	< 0.05	99%	80%	120%				96%	70%	130%
m&p-Xylene	68291	8908112	<0.05	<0.05	NA	< 0.05	98%	80%	120%				96%	70%	130%
o-Xylene	68291	8908112	<0.05	<0.05	NA	< 0.05	98%	80%	120%				96%	70%	130%
Styrene	68291	8908112	<0.05	<0.05	NA	< 0.05	100%	80%	120%				95%	70%	130%
VPH	68291	8908112	<10	<10	NA	< 10									
VH	68291	8908112	<10	<10	NA	< 10									
Bromofluorobenzene	68291	8908112	97	97	0.0%		100%	60%	140%				94%	60%	140%
Dibromofluoromethane	68291	8908112	104	104	0.0%		101%	60%	140%				91%	60%	140%
Toluene - d8	68291	8908112	106	106	0.0%		100%	60%	140%				90%	60%	140%
Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.															
Public Works LEPH/HEPH in Soil Low Level															
Naphthalene	68296	8908112	0.009	0.006	NA	< 0.005	101%	80%	120%				111%	50%	130%
2-Methylnaphthalene	68296	8908112	0.013	0.008	NA	< 0.005	98%	80%	120%				92%	50%	130%
1-Methylnaphthalene	68296	8908112	0.013	0.008	NA	< 0.005	101%	80%	120%				110%	50%	130%
Acenaphthylene	68296	8908112	<0.005	<0.005	NA	< 0.005	102%	80%	120%				106%	50%	130%
Acenaphthene	68296	8908112	<0.005	<0.005	NA	< 0.005	101%	80%	120%				108%	50%	130%
Fluorene	68296	8908112	<0.02	<0.02	NA	< 0.02	100%	80%	120%				107%	50%	130%
Phenanthrene	68296	8908112	<0.02	<0.02	NA	< 0.02	102%	80%	120%				88%	60%	130%
Anthracene	68296	8908112	<0.004	<0.004	NA	< 0.004	102%	80%	120%				112%	60%	130%
Fluoranthene	68296	8908112	<0.01	<0.01	NA	< 0.01	104%	80%	120%				109%	60%	130%
Pyrene	68296	8908112	<0.01	<0.01	NA	< 0.01	100%	80%	120%				104%	60%	130%
Benzo(a)anthracene	68296	8908112	<0.03	<0.03	NA	< 0.03	99%	80%	120%				106%	60%	130%
Chrysene	68296	8908112	<0.05	<0.05	NA	< 0.05	98%	80%	120%				104%	60%	130%
Benzo(b)fluoranthene	68296	8908112	<0.05	<0.05	NA	< 0.05	102%	80%	120%				96%	60%	130%
Benzo(j)fluoranthene	68296	8908112	<0.05	<0.05	NA	< 0.05	102%	80%	120%				95%	60%	130%
Benzo(k)fluoranthene	68296	8908112	<0.05	<0.05	NA	< 0.05	103%	80%	120%				93%	60%	130%
Benzo(a)pyrene	68296	8908112	<0.03	<0.03	NA	< 0.03	104%	80%	120%				96%	60%	130%
Indeno(1,2,3-c,d)pyrene	68296	8908112	<0.02	<0.02	NA	< 0.02	100%	80%	120%				98%	60%	130%
Dibenzo(a,h)anthracene	68296	8908112	0.007	<0.005	NA	< 0.005	100%	80%	120%				96%	60%	130%
Benzo(g,h,i)perylene	68296	8908112	<0.05	<0.05	NA	< 0.05	101%	80%	120%				96%	60%	130%
Quinoline	68296	8908112	<0.05	<0.05	NA	< 0.05	101%	80%	120%				108%	50%	130%
IACR CCME (Soil)	68296	8908112	0.6	<0.6	NA	< 0.6									

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Quality Assurance

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date:			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
B[a]P TPE (Soil)	68296	8908112	<0.05	<0.05	NA	< 0.05									
EPH C10-C19	68296	8908112	<20	<20	NA	< 20	111%	70%	130%				94%	65%	120%
EPH C19-C32	68296	8908112	40	33	NA	< 20	103%	70%	130%				92%	80%	120%
Naphthalene - d8	68296	8908112	69	62	10.7%		102%	80%	120%				101%	50%	130%
2-Fluorobiphenyl	68296	8908112	84	73	14.0%		100%	80%	120%				112%	50%	130%
P-Terphenyl - d14	68296	8908112	103	75	31.5%		100%	80%	120%				105%	60%	130%

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By: Angela Bond

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
AGAT WORK ORDER: 17V284467
PROJECT: 1657709 6000
ATTENTION TO: Erin O'Brien
SAMPLING SITE:
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Antimony	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Arsenic	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Barium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Beryllium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Bismuth	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cadmium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Calcium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Chromium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Cobalt	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Copper	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Iron	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Lead	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Lithium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Magnesium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Manganese	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Mercury	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Molybdenum	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Nickel	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Phosphorus	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Potassium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Selenium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Silver	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Sodium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Strontium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP-MS
Thallium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Tin	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Titanium	MET-181-6106, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6010C	ICP/OES
Uranium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Vanadium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zinc	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
Zirconium	MET-181-6102, LAB-181-4008	BC MOE Lab Manual C (SALM) and EPA 6020A	ICP-MS
pH 1:2	INOR-181-6031	BC MOE Lab Manual B (pH, Electrometric, Soil)	PH METER

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
2-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
1-Methylnaphthalene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Acenaphthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluorene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Phenanthrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Chrysene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(b)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(j)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(k)fluoranthene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(a)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Indeno(1,2,3-c,d)pyrene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Dibenzo(a,h)anthracene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Benzo(g,h,i)perylene	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
Quinoline	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
IACR CCME (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
B[a]P TPE (Soil)	ORG-180-5133	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS
EPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
EPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
LEPH C10-C19	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
HEPH C19-C32	ORG-180-5101	Modified from BCMOE Lab Manual Section D (EPH)	GC/FID
Naphthalene - d8	ORG-180-5102	Modified from BC MOE Lab Manual Section D (PAH)	GC/MS

AGAT Laboratories

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Method Summary

CLIENT NAME: PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

AGAT WORK ORDER: 17V284467

PROJECT: 1657709 6000

ATTENTION TO: Erin O'Brien

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
2-Fluorobiphenyl	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
P-Terphenyl - d14	ORG-180-5102	Modified form BCMOE Lab Manual Section D (PAH)	GC/MS
Methyl tert-butyl ether (MTBE)	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Benzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Toluene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Ethylbenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
m&p-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
o-Xylene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Styrene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VPH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
VH	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS/FID
Bromofluorobenzene	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Dibromofluoromethane	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS
Toluene - d8	ORG-180-5100	Modified from BC MOE Lab Manual Sec D (BTEX, VPH)	GC/MS

17V284467

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04295 page 1 of 4

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 6000			Laboratory Name: ALS
Short Title: K19 Remediation	Golder Contact: Erin O'Brien		Address: 120-8600 Glenlyon Parkway
Golder E-mail Address 1: erin_o'brien@golder.com	Golder E-mail Address 2: andrew_bremner@golder.com		Telephone/Fax: 2507746500 Contact: Maggie Chung

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

NOV 15 AM 11:08

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VPH, VH	LEPH, EPH (C10-C19)	Naphthalene	2-methylnaphthalene	H2O2	RUSH (Select TAT above)	Remarks (over)
04295-01	EX17-02	B17	3.5	soil	10/11/17	14:00	GRAB			4	X	X	X	X			8908057
-02		B18	3.0			14:05					X	X	X	X			065
-03		B19	2.7			14:10					X	X	X	X			066
-04		B20	3.5			14:15					X	X	X	X			067
-05		W11C	2.5			14:20									X		068
-06		W11B	1.5			1425					X	X	X	X			069
-07		W11A	0.5			1430					X	X	X	X			070
-08		W12C	2.5			1435					X	X	X	X			071
-09		W12B	1.5			1440					X	X	X	X			072
-10		W12A	0.5			1445									X		073
-11		W13D	3.5			1455		FDA	04295-12						X		074
-12		W13D	3.5			1500		FD	04295-11						X		075

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 13/11/17	Time: 19:45	Received by: Signature	Company: ALS
Comments: ON ICE	Method of Shipment:	Waybill No.:	Received for Lab by:	Date: 11/13	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	Time

WHITE: Golder Copy YELLOW: Lab Copy 8°C Ken KH

ESED

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17V284467
No. 04296 page 2 of 4

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 6000
Short Title: K19 Remediation
Golder Contact: Erin O'Brien
Golder E-mail Address 1: erin_o'brien @golder.com
Golder E-mail Address 2: andrew_bruemmer@golder.com

Laboratory Name: AGAT
Address: 120-8600 Glenlyon Parkway
Telephone/Fax: 2507746500
Contact: Maggie Chan

Office Name: Vancouver
EQuIS Facility Code: 28433859
EQuIS upload: ☒
agarrido@golder.com
NOV 15 AM 11:09

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail
Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VPH, VH	LEPH, EPH (C10-C19)	Naphthalene	2-methylnaphthalene	HOLD	RUSH (Select TAT above)	Remarks (over)
04296-01	EX17-02	W13C	2.5	SOIL	10/11/17		GRAB			4	X	X	X	X			8908082
-02		W13B	1.5												X		083
-03		W13A	0.5														084
-04		B21	2.5		11/11/17	13:20					X	X	X	X			085
-05		B22	2.5			13:25					X	X	X	X			086
-06		W14C	2.5			13:30					X	X	X	X			RUSH 48HR
-07		W14B	1.5			13:35									087		SS 13/11/17
-08		W14A	0.5			13:40					X						088
-09		B23	2.5			13:45					X	X	X	X			RUSH 48HR
-10		B24	2.5			13:50					X	X	X	X	089		SS 13/11/17
-11		W15C	2.5			13:55		FDA	04296-12		X	X	X	X	090		091
-12		W15C	2.5			14:00		FD	04296-11								092
															X		093
															X		

Sampler's Signature:	Relinquished by: Signature	Company: Golder	Date: 13/11/17	Time: 1545	Received by: Signature / Company: AGAT LABS
Comments: ON FILE ~~See Remarks For Samples on 48HR RUSH~~	Method of Shipment:	Waybill No.:	Received for Lab by:	Date	Time
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date / Time

WHITE: Golder Copy YELLOW: Lab Copy 8°C Keen Kot

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17V284467

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

No. 04297 page 3 of 4

Golder Associates
200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 6000
Short Title: K19 Remediation
Golder Contact: Erin O'Brien
Golder E-mail Address 1: erin_o'brien @golder.com
Golder E-mail Address 2: andrew_bruemmer@golder.com
Laboratory Name: AGAT
Address: 120-8600 Glenlyon Parkway
Telephone/Fax: 2507246500
Contact: Maggie Chan

Office Name: Vancouver
EQuIS Facility Code: 28433859
EQuIS upload: ☒
agarrido@golder.com

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail
Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX, VPH, VH	LEPH, EPH (C10-C19)	Napthalene	2-methylnapthalene			HOLD		RUSH (Select TAT above)	Remarks (over)
04297 - 01	EX17-02-	W15B	1.5	Soil	11/11/17	14:05	GRAB			4	X	X	X	X						8908107
- 02	↓	W15A	0.5	↓	↓	14:10	↓			↓	X	X	X	X						108
- 03		B25	2.5			14:15					X	X	X	X						109
- 04		W16C	2.5		12/11/17	13:15					X	X	X	X						111
- 05		W16B	1.5			13:20					X	X	X	X						112
- 06		W16A	0.5			13:25											X			113
- 07		W17C	2.5			13:50					X	X	X	X						117
- 08		W17B	1.5			13:55					X	X	X	X						119
- 09		W17A	0.5			14:05											X			123
- 10		W18C	2.5			14:25					X	X	X	X						127
- 11		W18A	0.5			14:35					X	X	X	X						128
- 12	↓	W18B	1.5	↓	↓	14:30	↓			↓							X			129

Sampler's Signature: [signature]
Relinquished by: Signature [signature]
Company: Golder
Date: 13/11/17
Time: 1545
Received by: Signature [signature]
Company: AGAT LABS

Comments: ON ICE
Method of Shipment:
Waybill No.:
Received for Lab by:
Date:
Time:
Shipped by:
Shipment Condition:
Seal Intact:
Temp (°C):
Cooler opened by:
Date:
Time:

NOV 15 2017 11:08

WHITE: Golder Copy YELLOW: Lab Copy

Jac Keen Kff

ESED

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

17V284467

No. 04335 page 4 of 4

Golder Associates

200 – 2920 Virtual Way
Vancouver, British Columbia, Canada V5M 0C4
Telephone (604) 296-4200 Fax (604) 298-5253

Project Number: 1657709 / 6000		Laboratory Name: AGAT	
Short Title: K14 Remediation	Golder Contact: Erin O'Brien	Address: 120 - 8600 Glenlyon Parkway	
Golder E-mail Address 1: erin_o'brien@golder.com	Golder E-mail Address 2: andrew_brennan@golder.com	Telephone/Fax: 2507746500	Contact: Maggie Cham

Office Name: Vancouver

EQuIS Facility Code: 28433859
EQuIS upload: ☒

NOV 15 AM 11:08

Turnaround Time: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☒ Regular (5 Days)
Criteria: ☒ CSR ☒ CCME ☐ BC Water Quality ☐ Other

Note: Final Reports to be issued by e-mail

Quote No.:

Analyses Required

Sample Control Number (SCN)	Sample Location	Sa. #	Sample Depth (m)	Sample Matrix (over)	Date Sampled (D / M / Y)	Time Sampled (HH:MM)	Sample Type (over)	QAQC Code (over)	Related SCN (over)	Number of Containers	BTEX / VPH	LEPH / HEPH / PAHs	Metals	BTEX, VPH, VH	LEPH, EPH (10 or C19)	Naphthalene	2-methylnaphthalene	HOLD	RUSH (Select TAT above)	Remarks (over)
04335 - 01	Backfills	–	80	13/11/17	08:45	Comp	FDA	04335-02	4	X	X	X							8908130	
↓ - 02	↓		↓	↓	↓	↓	FD	04335-01	4								X		↓ 131	
04335 - 03	EX17-02-W15C2	2.5	80	13/11/17	11:30	GRAB	–		4				~~X~~	~~X~~	~~X~~	~~X~~	X		↓ 132	
- 04													SS 13/11/17.							
- 05																				
- 06																				
- 07																				
- 08																				
- 09																				
- 10																				
- 11																				
- 12																				

Sampler's Signature:	Relinquished by: Signature	Company Golder.	Date 13/11/17	Time 1545.	Received by: Signature	Company AGAT LABS	
Comments: ON ICE	Method of Shipment:	Waybill No.:	Received for Lab by:		Date	Time	
	Shipped by:	Shipment Condition: Seal Intact:	Temp (°C)	Cooler opened by:	Date	Time	

WHITE: Golder Copy **YELLOW:** Lab Copy Keep Dry

ESED

AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM - BURNABY

Work Order # 17V284467

RECEIVING BASICS:

Received From: HOVER Waybill #: _____

SAMPLE QUANTITIES:

Coolers: 2 Containers: 156

TIME SENSITIVE ISSUES:

Earliest Date Sampled: 10-Nov-17 ALREADY EXCEEDED? Yes (No)

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) 9 + 9 + 9 = 9 °C (2) 6 + 6 + 6 = 6 °C (3) ___ + ___ + ___ = ___ °C (4) ___ + ___ + ___ = ___ °C

Was ice or ice pack present: (Yes) No

Integrity Issues:

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 RECEIPT

Sending From Branch: EDM☐ GP☐ FN☐ FM☐ RD☐ VAN☐ LYD☐ FSJ☒ EST☐ Other:_____

Company/Consultant: Golder Associates

TAT: <24hr ☐ 24-48hr ☐ 48-72hr ☐ Reg ☒ Other_____ Cooler Quantity: 2

TIME SENSITIVE ISSUES:

Earliest Date Sampled: Nov 10

Microbiology: Test: _____

Hydrocarbons: Test: _____

Are samples received >5 days after sampling: Yes☐ No☒

ALREADY EXCEEDED? Yes☐ No☒

Expiry: _____

Expiry: _____

(TEMPERATURE MUST BE MAINTAINED IF RECEIVED <10 DEGREES C)

3 temperatures of samples* and average of each cooler (taken on jars only): NA (only bags on coolers)

(1) -2.5 + -3 + -1 = ___°C (2) 1 + -1 + -1.5 = ___°C (3) ___+___+___=___°C (4) ___+___+___=___°C

Additional integrity issues (note here and on COC next to the sample ID):

_____

SR-9503.004
March 10, 2014

APPENDIX E

Quality Assurance and Quality Control

1.0 QUALITY ASSURANCE AND QUALITY CONTROL PROGRAM METHODS

The review of data quality includes data obtained during soil sampling and analysis for the remedial investigation conducted at the Site from September to November 2017. The following section includes a description of quality control methods used during the work and a detailed report of the results of the Quality Assurance and Quality Control (QA/QC) program.

1.1 Golder Quality Assurance Program

To assess and document that the sampling and analytical data were interpretable, meaningful and reproducible, conformance to a Golder quality assurance and quality control (QA/QC) program was followed.

The quality assurance (QA) measures used in the collection, preservation and shipment of samples included the following management controls:

1) Sampling methods were consistent with established Golder protocols, industry standards and provincial/federal requirements.

2) Field notes were recorded during all stages of the remediation program.

3) Decontamination of sampling equipment using multiple rinses of Liquinox soap and distilled water between sampling events.

4) Chain-of-Custody procedures were used for the shipment of samples to the laboratories; samples included in a shipment were identified on a Golder Chain-of-Custody form, with one copy retained by Golder personnel, after sign-off.

5) Samples were stored in coolers and chilled with ice or ice packs, during transport and prior to submission to the analytical laboratory.

The quality control (QC) measures established for the field program included the following technical aspects:

- Submission of field duplicate samples (i.e., paired sample analyses). A field duplicate sample is a second sample of a certain media (e.g., soil or water) from the same location that is submitted to the analytical laboratory under a separate label such that the laboratory has no prior knowledge that it is a duplicate;
- The relative percent difference (RPD) between paired sample results was used to assess duplicate sample data. The RPD is a measure of the variability between two outcomes from the same procedure or process and is calculated by:

$$RPD\ (\%) = \frac{(X_1 - X_2)}{average(X_1, X_2)} x100$$

where X_1 is the original sample result, and X_2 is the paired analysis result; and

- Where the concentration of a given parameter is less than five times the reported detection limit (RDL), the laboratory results are considered to be less precise, and the RPD is not calculated. For parameters with concentrations less than five times the RDL, but still above the RDL, the difference factor (DF) between paired analyses results is calculated by:

$$DF = \frac{(X_1 - X_2)}{RDL}$$

  where X_1 is the original sample result, and X_2 is the paired analysis result.

In 2015, the BC Ministry of Environment updated the British Columbia Laboratory Manual which contains recommended Data Quality Objectives (DQOs) for laboratories duplicate RPDs. It is recognized that these DQOs are intended for laboratory duplicates and do not include provisions for additional variability in field duplicates. However, these DQOs are considered a conservative screen for assessing the quality of field duplicates.

The DQOs applied to this investigation are as follows:

- For parameters in soil except PAHs, a RPD of less than 35%.
- For PAH parameters in soil, a RPD of less than 50%.
- For parameters in groundwater and surface water a RPD of less than 20%.
- For parameters with concentrations less than five times the RDL, the difference factor should be less than two (2).

Where the DQO was exceeded, further examination was conducted on a case-by-case basis.

1.2 Laboratory Quality Assurance Program

In addition to the field control procedures, the laboratories selected to conduct the analyses was based, in large part, on it having achieved proficiency certification by the Canadian Association for Laboratory Accreditation (CALA) for the analyses conducted. AGAT Laboratories (AGAT) performed the chemical analysis of soil collected at the Site from 30 September to 13 November 2017. AGAT is certified by CALA for the analytical methods used for this program. The analytical laboratory also incorporated and reported the results of internal checks to Golder. These were used to assess the reliability, accuracy and reproducibility of the data. Reports from the laboratory were reviewed internally prior to submission to Golder. If internal QA/QC problems were encountered, the field samples and internal QA/QC samples were re-analyzed. Data quality issues identified by the laboratory were communicated to Golder at the time of data delivery.

Copies of the analytical reports and the corresponding Chain-of-Custody forms are presented in Appendix D.

2.0 QUALITY ASSURANCE AND QUALITY CONTROL PROGRAM RESULTS

Golder QA/QC Program – Alaska Highway Project

Soil

Two hundred and eight (208) soil samples were submitted for laboratory analysis during the remediation program excavations of AECs 1B and 1C, carried out from October 2017 to November 2017 at the Alaska Highway Project of Site K-19. The soil field QA/QC program consisted of field duplicate soil samples for the analysis of LEPH/ HEPH/PAH, BTEX/ VPH, and dichloromethane. The frequency of duplicate sample collection, by parameter, is presented on Table 1, below.

Table 1: Soil Duplicate Pair Analysis

Analyte	Number of Samples	Number of Duplicates	Percentage of Duplicates
LEPH/HEPH/PAH	208	23	11%
BTEX/VPH	208	24	11%
Dichloromethane	21	3	14%

Table Notes:

LEPH = light extractable petroleum hydrocarbons; HEPH = heavy extractable petroleum hydrocarbons; BTEX = benzene, toluene, ethylbenzene, xylenes; VPH = volatile petroleum hydrocarbons

The QA/QC results for duplicate pairs that did not meet the DQOs for RPD and DF are listed below:

- Sample pair 04262-03 and 04262-04, had RPD values greater than 50% for 1-methylnaphthalene, extractable petroleum hydrocarbons (C19 – C32) and naphthalene. This does not have a material effect on the quality of the data as both samples had 1-methylnaphthalene, EPH (C19 – C32) and naphthalene concentrations below the most conservative CSR standard.
- Sample pair 04262-11 and 04262-12, had a RPD value greater than 50% for 1-methylnaphthalene; however, concentrations for the original sample and its duplicate were found to be below the most conservative CSR standard for 1-methylnaphthalene.
- Sample pair 04268-03 and 04268-04, had a RPD value greater than 50% for 1-methylnaphthalene. This does not have a material effect on the quality of the data as both samples had 1-methylnaphthalene concentrations below the most conservative CSR standard.
- Sample pair 04272-09 and 04272-10, had a RPD value greater than 50% for 1-methylnaphthalene; however, concentrations for the original sample and its duplicate were found to be below the most conservative CSR standard for 1-methylnaphthalene.
- Sample pair 04272-09 and 04272-10, had a DF value greater than 2 for 1-methylnaphthalene. This does not have a material effect on the quality of the data as both samples had 1-methylnaphthalene concentrations below the most conservative CSR standard.

- Sample pair 04289-07 and 04289-08, had RPD values greater than 50% for VPHs; however, concentrations for the original sample and its duplicate were found to be below the most conservative CSR standard for VPHs.
- Sample pair 04285-02 and 04285-03, had a RPD value greater than 50% for 2-methylnaphthalene. This does not have a material effect on the quality of the data as both samples had 2-methylnaphthalene concentrations below the most conservative CSR standard.
- Sample pair 04259-10 and 04259-11, had a RPD value greater than 50% for benzene. While benzene concentration in sample 04259-10 was below the CSR standard, benzene concentration in sample 04259-11 exceeded the CSR standard. Given other samples in the immediate vicinity of 04259-10/11 were found to exceed CSR standards, it was concluded that sample 04259-11 was more representative of the surrounding conditions. A high field PID reading (48 ppm) further supports this conclusion. Thus, sample location 04259-10/11 is considered to exceed the CSR standard. Discrepancies in benzene concentrations between the two samples was likely caused by soil heterogeneity.
- Sample pair 04262-03 and 04262-04, had a RPD value greater than 50% for 1-methylnaphthalene, EPHs (C19-C32), and Naphthalene. This does not have a material effect on the quality of the data as both samples had 1-methylnaphthalene concentrations below the most conservative CSR standard.
- Sample pair 04262-11 and 04262-12, had a RPD value greater than 50% for 1-methylnaphthalene; however, concentrations for the original sample and its duplicate were found to be below the most conservative CSR standard for 1-methylnaphthalene.
- Sample pair 04272-09 and 04272-10, had a RPD value greater than 50% for 1-methylnaphthalene. This does not have a material effect on the quality of the data as both samples had 1-methylnaphthalene concentrations below the most conservative CSR standard.
- Sample pair 04270-09 and 04270-10, had a DF value greater than 2 for 1-methylnaphthalene; however, concentrations for the original sample and its duplicate were found to be below the most conservative CSR standard for 1-methylnaphthalene.
- Sample pair 04275-07 and 04275-08, had RPD values greater than 35% for m,p-xylenes and total xylenes. This does not affect the quality of the data as both sample pairs fell below the most conservative CSR standard for m,p-xylenes and total xylenes.
- Sample pair 04293-10 and 04293-11 had RPD values greater than 35% for m,p-xylenes; however, concentrations for the original sample and its duplicate were found to be below the most conservative CSR standard for m,p-xylenes.

Sample re-analysis

QAQC by Golder flagged samples 04269-09 and 04287-02 for re-analysis. For both samples, initial chemical analysis by AGAT determined benzene concentrations in exceedance of the most conservative CSR standard. However, the recorded field PID readings of 17.3 and 1.4, respectively, did not suggest presence of VOCs in concentrations that would exceed CSR standards. At Golders request, samples 04269-09 and 04287-02 were

re-analysed. Results of the re-analysis confirmed initial findings (i.e., benzene concentration in exceedance of CSR standard). The discrepancy between benzene concentration and field PID readings was likely caused by soil heterogeneity and low ambient temperatures during sampling (i.e., reduced volatilization of VOCs in headspace bag leading to low PID readings). For reporting purposes, Golder has only included the results from the original analysis; however, re-analysis results have been included in Appendix D.

The results of the soil QA/QC analyses are provided in Tables E-1, E-2, E-3 and E-4.

Laboratory QA/QC Program

All samples were analyzed within the recommended hold times.

In general, each sample analysis batch included at least one method blank (MB), one matrix spike (MS), one laboratory duplicate (dup) and one reference or control sample (RCS). The results of the internal laboratory QA testing are provided in the laboratory reports included in Appendix D.

A review of the AGAT soil reports did not identified any QA/QC issues related to the reported data.

3.0 CONCLUSION OF QA/QC ANALYSIS

Based on a review of the QA/QC program, the data recovered during the field investigation are considered reproducible and suitable for confirmation of remediation purposes at the Site.

Tables (Attached)

Table E-1: Results of Soil Quality Control Analyses AEC 1B - Hydrocarbons and PAHs
Table E-2: Results of Soil Quality Control Analyses AEC 1B - Volatile Organic Compounds
Table E-3: Results of Soil Quality Control Analyses AEC 1C - Hydrocarbons and PAHs
Table E-4: Results of Soil Quality Control Analyses AEC 1C - Volatile Organic Compounds

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Table E-1
Results of Soil Quality Control Analyses AEC 1b- Polycyclic Aromatic Hydrocarbons
K19 - Trutch Former Townsite
Alaska Highway, BC

Sample Location	EX17-01-W6B	EX17-01-W6B				EX17-01-B3	EX17-01-B3				EX17-01-W12A	EX17-01-W12A				EX17-01-W15B	EX17-01-W15B			
Sample Name	04256-12-3.5m	04257-01-3.5m	**RDL**	**RPD (%)**	**DF**	04259-10-5.5m	04259-11-5.5m	**RDL**	**RPD (%)**	**DF**	04262-03-2.5m	04262-04-2.5m	**RDL**	**RPD (%)**	**DF**	04262-11-3.5m	04262-12-3.5m	**RDL**	**RPD (%)**	**DF**
Sample Collection Date	9/30/2017	9/30/2017				4/10/2017	4/10/2017				5/10/2017	5/10/2017				5/10/2017	5/10/2017			
Sample Matrix	SO	SO				SO	SO				SO	SO				SO	SO			
Sample Depth	3.5 - 3.5 m	3.5 - 3.5 m				5.5 - 5.5 m	5.5 - 5.5 m				2.5 - 2.5 m	2.5 - 2.5 m				3.5 - 3.5 m	3.5 - 3.5 m			
Polycyclic Aromatic Hydrocarbons (PAHs)																				
1-Methylnaphthalene	0.009	0.010	0.005	n/c	0.2	0.044	0.049	0.005	11	n/c	0.092	0.224	0.005	**84**	n/c	0.066	0.133	0.005	**67**	n/c
2-methylnaphthalene	0.006	< 0.005	0.005	n/c	0.2	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
Acenaphthene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
Acenaphthylene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
Anthracene	< 0.004	< 0.004	0.004	n/c	0	< 0.004	< 0.004	0.004	n/c	0	< 0.004	< 0.004	0.004	n/c	0	< 0.004	< 0.004	0.004	n/c	0
Benzo(a)anthracene	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0
Benzo(a)pyrene	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0
Benzo(a)pyrene Total Potency Equivalence (TPE)	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(b)fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	0.05	0.05	0.05	n/c	0
Benzo[j]fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(b,j) fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	0.05	0.05	0.05	n/c	0
Benzo(g,h,i)perylene	< 0.05	0.05	0.05	n/c	0	0.12	0.14	0.05	n/c	0.4	< 0.05	< 0.05	0.05	n/c	0	0.08	0.09	0.05	n/c	0.2
Benzo(k)fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Chrysene	< 0.05	0.06	0.05	n/c	0.2	0.11	0.14	0.05	n/c	0.6	< 0.05	< 0.05	0.05	n/c	0	0.11	0.11	0.05	n/c	0
Dibenzo(a,h)anthracene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
EPH (C10-C19)	46	52	20	n/c	0.3	370	410	20	10	n/c	348	264	20	27	n/c	197	235	20	18	n/c
EPH (C19-C32)	71	77	20	n/c	0.3	466	540	20	15	n/c	521	73	20	**151**	n/c	111	111	20	0	n/c
Fluoranthene	< 0.01	0.01	0.01	n/c	0	0.03	0.03	0.01	n/c	0	< 0.01	< 0.01	0.01	n/c	0	0.02	0.02	0.01	n/c	0
Fluorene	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	0.03	0.03	0.02	n/c	0	0.02	0.04	0.02	n/c	1
Heavy Extractable Petroleum Hydrocarbons (BC Guidelines)	71	77	20	n/c	0.3	466	540	20	15	n/c	521	72	20	151	n/c	111	111	20	0	n/c
Indeno(1,2,3-c,d)pyrene	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0
Index of Additive Cancer Risk (IACR)	< 0.6	0.6	0.6	n/c	0	0.6	0.8	0.6	n/c	0.3	< 0.6	< 0.6	0.6	n/c	0	0.7	0.7	0.6	n/c	0
Light Extractable Petroleum Hydrocarbons (BC Guidelines)	46	52	20	n/c	0.3	369	410	20	11	n/c	348	264	20	27	n/c	197	235	20	18	n/c
Naphthalene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	0.024	0.042	0.005	**55**	n/c	0.010	0.015	0.005	n/c	1
Phenanthrene	0.03	0.05	0.02	n/c	1	0.19	0.22	0.02	15	n/c	0.11	0.12	0.02	9	n/c	0.21	0.26	0.02	21	n/c
Pyrene	0.01	0.02	0.01	n/c	1	0.06	0.08	0.01	29	n/c	0.01	0.01	0.01	n/c	0	0.07	0.07	0.01	0	n/c
Quinoline	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Volatile Hydrocarbon Fraction	< 10	< 10	10	n/c	0	< 10	< 10	10	n/c	0	10	< 10	10	n/c	0	< 10	< 10	10	n/c	0
corrected	< 10	< 10	10	n/c	0	< 10	< 10	10	n/c	0	10	< 10	10	n/c	0	< 10	< 10	10	n/c	0

Notes:
Results are expressed in micrograms per kilogram (mg/kg), unless otherwise indicated.
m - meter
SO - soil
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
Reported Detection Limit (RDL) indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
Relative Percent Difference (RPD) is calculated when the mean value is greater than five times the method reporting limit; Golder's internal QA/QC target is less than 50%.
Difference Factor (DF) is calculated when the mean value is less than five times the method reporting limit; Golder's internal QA/QC target is less than 2.
n/c = not calculated
N/A = not applicable
BOLD font indicates the parameter analysed exceeds Golder's internal QA/QC targets.

Table E-1
Results of Soil Quality Control Analyses AEC 1b- Polycyclic Aromatic Hydrocarbons
K19 - Trutch Former Townsite
Alaska Highway, BC

Sample Location	EX17-01-B9	EX17-01-B9				EX17-01-B11	EX17-01-B11				EX17-01-W16F	EX17-01-W16F				EX17-01-B22	EX17-01-B22			
Sample Name	04265-03-5.0m	04265-04-5.0m				04265-06-5.0m	04265-07-5.0m				04266-07-4.0m	04266-08-4.0m				04268-03-4.0m	04268-04-4.0m			
Sample Collection Date	10/13/2017	10/13/2017	**RDL**	**RPD (%)**	**DF**	10/13/2017	10/13/2017	**RDL**	**RPD (%)**	**DF**	10/15/2017	10/15/2017	**RDL**	**RPD (%)**	**DF**	10/16/2017	10/16/2017	**RDL**	**RPD (%)**	**DF**
Sample Matrix	SO	SO				SO	SO				SO	SO				SO	SO			
Sample Depth	5 - 5 m	5 - 5 m				5 - 5 m	5 - 5 m				4 - 4 m	4 - 4 m				4 - 4 m	4 - 4 m			
Polycyclic Aromatic Hydrocarbons (PAHs)																				
1-Methylnaphthalene	0.279	0.172	0.005	47	n/c	0.514	0.62	0.005	n/c	n/c	0.007	0.007	0.005	n/c	0	0.016	0.019	0.005	n/c	0.6
2-methylnaphthalene	0.370	0.294	0.005	23	n/c	0.675	1.05	0.005	43	n/c	< 0.005	< 0.005	0.005	n/c	0	0.015	0.031	0.005	**70**	n/c
Acenaphthene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.05	0.005	n/c	n/c	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
Acenaphthylene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.05	0.005	n/c	n/c	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
Anthracene	< 0.004	< 0.004	0.004	n/c	0	< 0.004	< 0.04	0.004	n/c	n/c	< 0.004	< 0.004	0.004	n/c	0	< 0.004	< 0.004	0.004	n/c	0
Benzo(a)anthracene	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0
Benzo(a)pyrene	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0
Benzo(a)pyrene Total Potency Equivalence (TPE)	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(b)fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo[j]fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(b,j) fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(g,h,i)perylene	0.07	0.06	0.05	n/c	0.2	0.08	0.08	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	0.07	0.07	0.05	n/c	0
Benzo(k)fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Chrysene	< 0.05	< 0.05	0.05	n/c	0	0.05	0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	0.08	0.07	0.05	n/c	0.2
Dibenzo(a,h)anthracene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
EPH (C10-C19)	101	92	20	9	n/c	100	111	20	10	n/c	< 20	< 20	20	n/c	0	96	96	20	n/c	0
EPH (C19-C32)	48	40	20	n/c	0.4	54	61	20	n/c	0.35	49	53	20	n/c	0.2	165	152	20	8	n/c
Fluoranthene	0.01	0.01	0.01	n/c	0	0.01	0.01	0.01	n/c	0	< 0.01	< 0.01	0.01	n/c	0	0.01	0.01	0.01	n/c	0
Fluorene	0.09	0.06	0.02	n/c	1.5	0.11	< 0.2	0.02	n/c	n/c	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0
Heavy Extractable Petroleum Hydrocarbons (BC Guidelines)	48	40	20	n/c	0.4	54	61	20	n/c	0.35	49	53	20	n/c	0.2	165	152	20	8	n/c
Indeno(1,2,3-c,d)pyrene	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0
Index of Additive Cancer Risk (IACR)	< 0.6	< 0.6	0.6	n/c	0	0.6	0.6	0.6	n/c	0	< 0.6	< 0.6	0.6	n/c	0	0.6	0.6	0.6	n/c	0
Light Extractable Petroleum Hydrocarbons (BC Guidelines)	100	92	20	n/c	0.4	99	110	20	11	n/c	< 20	< 20	20	n/c	0	96	96	20	n/c	0
Naphthalene	0.074	0.048	0.005	43	n/c	0.201	0.320	0.005	46	n/c	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
Phenanthrene	0.22	0.20	0.02	10	n/c	0.28	0.29	0.02	4	n/c	0.02	0.02	0.02	n/c	0	0.02	0.03	0.02	n/c	0.5
Pyrene	0.03	0.02	0.01	n/c	1	0.03	0.03	0.01	n/c	0	< 0.01	< 0.01	0.01	n/c	0	0.03	0.03	0.01	n/c	0
Quinoline	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Volatile Hydrocarbon Fraction	< 10	< 10	10	n/c	0	< 10	< 10	10	n/c	0	< 10	< 10	10	n/c	0	< 10	< 10	10	n/c	0
corrected	< 10	< 10	10	n/c	0	< 10	< 10	10	n/c	0	< 10	< 10	10	n/c	0	< 10	< 10	10	n/c	0

Notes:
Results are expressed in micrograms per kilogram (mg/kg), unless otherwise indicated.
m - meter
SO - soil
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
Reported Detection Limit (RDL) indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
Relative Percent Difference (RPD) is calculated when the mean value is greater than five times the method reporting limit; Golder's internal QA/QC target is less than 50%.
Difference Factor (DF) is calculated when the mean value is less than five times the method reporting limit; Golder's internal QA/QC target is less than 2.
n/c = not calculated
N/A = not applicable
BOLD font indicates the parameter analysed exceeds Golder's internal QA/QC targets.

Table E-1
Results of Soil Quality Control Analyses AEC 1b- Polycyclic Aromatic Hydrocarbons
K19 - Trutch Former Townsite
Alaska Highway, BC

Sample Location	EX17-01-W20B	EX17-01-W20B				EX17-01-W28C	EX17-01-W28C				EX17-01-B25	EX17-01-B25				EX17-01-W21D	EX17-01-W21D			
Sample Name	04269-05-3.5m	04269-06-3.5m				04272-09-2.0m	04272-10-2.0m				04270-09-4.0m	04270-10-4.0m				04275-07-3.5m	04275-08-3.5m			
Sample Collection Date	10/17/2017	10/17/2017	**RDL**	**RPD (%)**	**DF**	10/21/2017	10/21/2017	**RDL**	**RPD (%)**	**DF**	10/19/2017	10/19/2017	**RDL**	**RPD (%)**	**DF**	10/24/2017	10/24/2017	**RDL**	**RPD (%)**	**DF**
Sample Matrix	SO	SO				SO	SO				SO	SO				SO	SO			
Sample Depth	3.5 - 3.5 m	3.5 - 3.5 m				2 - 2 m	2 - 2 m				4 - 4 m	4 - 4 m				3.5 - 3.5 m	3.5 - 3.5 m			
Polycyclic Aromatic Hydrocarbons (PAHs)																				
1-Methylnaphthalene	2.72	3.29	0.05	19	n/c	4.39	9.64	0.25	**75**	n/c	0.019	< 0.005	0.005	n/c	**2.8**	0.41	0.38	0.05	8	n/c
2-methylnaphthalene	1.98	2.08	0.05	5	n/c	< 0.05	< 0.05	0.05	n/c	0	0.013	< 0.005	0.005	n/c	1.6	0.93	0.94	0.05	1	n/c
Acenaphthene	< 0.05	< 0.05	0.05	n/c	0	< 0.025	< 0.025	0.025	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Acenaphthylene	< 0.05	< 0.05	0.05	n/c	0	< 0.025	< 0.025	0.025	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Anthracene	< 0.04	< 0.04	0.04	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.004	< 0.004	0.004	n/c	0	< 0.04	< 0.04	0.04	n/c	0
Benzo(a)anthracene	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0
Benzo(a)pyrene	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0
Benzo(a)pyrene Total Potency Equivalence (TPE)	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(b)fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo[j]fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(b,j) fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(g,h,i)perylene	0.05	0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	0.09	0.08	0.05	n/c	0.2	< 0.05	< 0.05	0.05	n/c	0
Benzo(k)fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Chrysene	0.07	0.08	0.05	n/c	0.2	< 0.05	< 0.05	0.05	n/c	0	0.08	0.08	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Dibenzo(a,h)anthracene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
EPH (C10-C19)	1560	2030	20	26	n/c	1090	1280	20	16	n/c	92	86	20	n/c	0.3	370	384	20	4	n/c
EPH (C19-C32)	168	206	20	20	n/c	54	54	20	n/c	0	80	78	20	n/c	0.1	90	92	20	n/c	0.1
Fluoranthene	0.02	0.02	0.01	n/c	0	< 0.01	< 0.01	0.01	n/c	0	0.02	0.02	0.01	n/c	0	< 0.01	< 0.01	0.01	n/c	0
Fluorene						0.4	0.5	0.1	n/c	1	< 0.02	< 0.02	0.02	n/c	0	< 0.2	< 0.2	0.2	n/c	0
Heavy Extractable Petroleum Hydrocarbons (BC Guidelines)	168	206	20	20	n/c	54	54	20	n/c	0	80	78	20	n/c	0.1	90	92	20	n/c	0.1
Indeno(1,2,3-c,d)pyrene	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0
Index of Additive Cancer Risk (IACR)	0.6	0.6	0.6	n/c	0	< 0.6	< 0.6	0.6	n/c	0	0.6	0.6	0.6	n/c	0	< 0.6	< 0.6	0.6	n/c	0
Light Extractable Petroleum Hydrocarbons (BC Guidelines)	1550	2020	20	26	n/c	1090	1280	20	16	n/c	92	86	20	n/c	0.3	370	384	20	4	n/c
Naphthalene	2.34	2.40	0.005	3	n/c	0.077	< 0.05	0.005	n/c	0.54	< 0.005	< 0.005	0.005	n/c	0	1.59	1.65	0.05	4	n/c
Phenanthrene	0.40	0.47	0.02	16	n/c	0.33	0.42	0.02	24	n/c	0.04	0.03	0.02	n/c	0.5	< 0.2	< 0.2	0.02	n/c	0
Pyrene	0.03	0.03	0.01	n/c	0	< 0.01	< 0.01	0.01	n/c	0	0.06	0.05	0.01	18	n/c	0.01	< 0.01	0.01	n/c	0
Quinoline	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Volatile Hydrocarbon Fraction	181	264	10	n/c	n/c	37	36	10	n/c	0.1	< 10	< 10	10	n/c	0	534	370	10	36	n/c
corrected	171	250	100	n/c	n/c	35	34	10	n/c	0.1	< 10	< 10	10	n/c	0	526	365	10	36	n/c

Notes:
Results are expressed in micrograms per kilogram (mg/kg), unless otherwise indicated.
m - meter
SO - soil
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
Reported Detection Limit (RDL) indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
Relative Percent Difference (RPD) is calculated when the mean value is greater than five times the method reporting limit; Golder's internal QA/QC target is less than 50%.
Difference Factor (DF) is calculated when the mean value is less than five times the method reporting limit; Golder's internal QA/QC target is less than 2.
n/c = not calculated
N/A = not applicable
BOLD font indicates the parameter analysed exceeds Golder's internal QA/QC targets.

Table E-1
Results of Soil Quality Control Analyses AEC 1b- Polycyclic Aromatic Hydrocarbons
K19 - Trutch Former Townsite
Alaska Highway, BC

Sample Location	EX17-01-B32	EX17-01-B32				EX17-01-W29E	EX17-01-W29E				EX17-01-W39B	EX17-01-W39B				EX17-02-W2A	EX17-02-W2A			
Sample Name	04276-07-6.0m	04276-08-6.0m				04277-11-4.5m	04277-12-4.5m				04289-07-1.5m	04289-08-1.5m				04290-08-1.75m	04290-09-1.75m			
Sample Collection Date	10/28/2017	10/28/2017	**RDL**	**RPD (%)**	**DF**	10/31/2017	10/31/2017	**RDL**	**RPD (%)**	**DF**	3/11/2017	3/11/2017	**RDL**	**RPD (%)**	**DF**	4/11/2017	4/11/2017	**RDL**	**RPD (%)**	**DF**
Sample Matrix	SO	SO				SO	SO				SO	SO				SO	SO			
Sample Depth	6 - 6 m	6 - 6 m				4.5 - 4.5 m	4.5 - 4.5 m				1.5 - 1.5 m	1.5 - 1.5 m				1.75 - 1.75 m	1.75 - 1.75 m			
Polycyclic Aromatic Hydrocarbons (PAHs)																				
1-Methylnaphthalene	0.126	0.144	0.005	13	n/c	< 0.005	< 0.005	0.005	n/c	0	12.1	10.0	0.5	19	n/c	0.009	0.008	0.005	n/c	0.2
2-methylnaphthalene	0.218	0.250	0.005	14	n/c	< 0.005	< 0.005	0.005	n/c	0	11.7	6.20	0.05	n/c	n/c	0.011	0.012	0.005	n/c	0.2
Acenaphthene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.005	< 0.005	0.005	n/c	0
Acenaphthylene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.005	< 0.005	0.005	n/c	0
Anthracene	< 0.004	< 0.004	0.004	n/c	0	< 0.004	< 0.004	0.004	n/c	0	< 0.04	< 0.04	0.04	n/c	0	< 0.004	< 0.004	0.004	n/c	0
Benzo(a)anthracene	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0
Benzo(a)pyrene	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0
Benzo(a)pyrene Total Potency Equivalence (TPE)	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(b)fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo[j]fluoranthene	< 0.05	-	0.05	n/c	n/c	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(b,j) fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(g,h,i)perylene	0.06	0.06	0.05	n/c	0	0.06	0.07	0.05	n/c	0.2	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(k)fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Chrysene	< 0.05	< 0.05	0.05	n/c	0	0.06	0.08	0.05	n/c	0.4	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Dibenzo(a,h)anthracene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
EPH (C10-C19)	38	43	20	n/c	0.25	134	163	20	20	n/c	3810	3980	20	4	n/c	< 20	< 20	20	n/c	0
EPH (C19-C32)	41	43	20	n/c	0.1	201	235	20	16	n/c	617	666	20	8	n/c	28	42	20	n/c	0.7
Fluoranthene	0.01	0.01	0.01	n/c	0	0.01	0.01	0.01	n/c	0	< 0.01	< 0.1	0.01	n/c	n/c	< 0.01	< 0.01	0.01	n/c	0
Fluorene	0.06	0.07	0.02	n/c	0.5	< 0.02	< 0.02	0.02	n/c	0	1.3	1.3	0.2	0	n/c	< 0.02	< 0.02	0.02	n/c	0
Heavy Extractable Petroleum Hydrocarbons (BC Guidelines)	41	43	20	n/c	0.1	201	235	20	16	n/c	617	666	20	8	n/c	28	42	20	n/c	0.7
Indeno(1,2,3-c,d)pyrene	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0
Index of Additive Cancer Risk (IACR)	< 0.6	< 0.6	0.6	n/c	0	0.6	0.6	0.6	n/c	0	< 0.6	< 0.6	0.6	n/c	0	< 0.6	< 0.6	0.6	n/c	0
Light Extractable Petroleum Hydrocarbons (BC Guidelines)	38	43	20	n/c	0.25	134	163	20	20	n/c	3800	3980	20	5	n/c	< 20	< 20	20	n/c	0
Naphthalene	0.035	0.036	0.005	3	n/c	< 0.005	< 0.005	0.005	n/c	0	6.50	4.24	0.05	42	n/c	< 0.005	< 0.005	0.005	n/c	0
Phenanthrene	0.16	0.18	0.02	12	n/c	0.03	0.03	0.02	n/c	0	2.4	2.2	0.02	9	n/c	0.04	0.02	0.02	n/c	1
Pyrene	0.02	0.02	0.01	n/c	0	0.02	0.03	0.01	n/c	1	0.09	0.2	0.01	n/c	n/c	< 0.01	< 0.01	0.01	n/c	0
Quinoline	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Volatile Hydrocarbon Fraction	14	16	10	n/c	0.2	< 10	< 10	10	n/c	0	130	56	10	**80**	n/c	< 10	< 10	10	n/c	0
corrected	14	15	10	n/c	0.1	< 10	< 10	10	n/c	0	128	54	10	**81**	n/c	< 10	< 10	10	n/c	0

Notes:
Results are expressed in micrograms per kilogram (mg/kg), unless otherwise indicated.
m - meter
SO - soil
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
Reported Detection Limit (RDL) indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
Relative Percent Difference (RPD) is calculated when the mean value is greater than five times the method reporting limit; Golder's internal QA/QC target is less than 50%.
Difference Factor (DF) is calculated when the mean value is less than five times the method reporting limit; Golder's internal QA/QC target is less than 2.
n/c = not calculated
N/A = not applicable
BOLD font indicates the parameter analysed exceeds Golder's internal QA/QC targets.

Table E-1
Results of Soil Quality Control Analyses AEC 1b- Polycyclic Aromatic Hydrocarbons
K19 - Trutch Former Townsite
Alaska Highway, BC

Sample Location	EX17-02-B08	EX17-02-B08				EX17-01-W32F	EX17-01-W32F				EX17-01-W36B	EX17-01-W36B			
Sample Name	04291-11-4.0m	04291-12-4.0m	**RDL**	**RPD (%)**	**DF**	04285-02-5.5m	04285-03-5.5m	**RDL**	**RPD (%)**	**DF**	04287-11-1.5m	04287-12-1.5m	**RDL**	**RPD (%)**	**DF**
Sample Collection Date	5/11/2017	5/11/2017				2/11/2017	2/11/2017				2/11/2017	2/11/2017			
Sample Matrix	SO	SO				SO	SO				SO	SO			
Sample Depth	4 - 4 m	4 - 4 m				5.5 - 5.5 m	5.5 - 5.5 m				1.5 - 1.5 m	1.5 - 1.5 m			
Polycyclic Aromatic Hydrocarbons (PAHs)															
1-Methylnaphthalene	< 0.005	< 0.005	0.005	n/c	0	0.029	0.035	0.005	19	n/c	1.55	1.59	0.05	3	n/c
2-methylnaphthalene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	0.047	0.005	**162**	n/c	< 0.005	< 0.005	0.005	n/c	0
Acenaphthene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
Acenaphthylene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
Anthracene	< 0.004	< 0.004	0.004	n/c	0	< 0.004	< 0.004	0.004	n/c	0	< 0.004	< 0.004	0.004	n/c	0
Benzo(a)anthracene	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0
Benzo(a)pyrene	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0
Benzo(a)pyrene Total Potency Equivalence (TPE)	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(b)fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo[j]fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(b,j) fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(g,h,i)perylene	0.08	0.10	0.05	n/c	0.4	0.10	0.11	0.05	n/c	0.2	< 0.05	< 0.05	0.05	n/c	0
Benzo(k)fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Chrysene	0.05	0.06	0.05	n/c	0.2	0.08	0.09	0.05	n/c	0.2	< 0.05	< 0.05	0.05	n/c	0
Dibenzo(a,h)anthracene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
EPH (C10-C19)	73	86	20	n/c	0.65	253	286	20	12	n/c	1150	1140	20	1	n/c
EPH (C19-C32)	62	71	20	n/c	0.45	385	435	20	12	n/c	44	43	20	n/c	0.05
Fluoranthene	0.02	0.02	0.01	n/c	0	0.02	0.02	0.01	n/c	0	< 0.01	< 0.01	0.01	n/c	0
Fluorene	< 0.02	< 0.02	0.02	n/c	0	< 0.02	0.02	0.02	n/c	0	0.14	0.13	0.02	7	n/c
Heavy Extractable Petroleum Hydrocarbons (BC Guidelines)	62	71	20	n/c	0.45	385	435	20	12	n/c	44	43	20	n/c	0.05
Indeno(1,2,3-c,d)pyrene	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0
Index of Additive Cancer Risk (IACR)	0.6	0.6	0.6	n/c	0	0.6	0.6	0.6	n/c	0	< 0.6	< 0.6	0.6	n/c	0
Light Extractable Petroleum Hydrocarbons (BC Guidelines)	73	86	20	n/c	0.65	253	286	20	12	n/c	1150	1140	20	1	n/c
Naphthalene	< 0.005	< 0.005	0.005	n/c	0	0.007	0.010	0.005	n/c	0.6	0.229	0.238	0.005	4	n/c
Phenanthrene	0.06	0.07	0.02	n/c	0.5	0.17	0.18	0.02	6	n/c	0.16	0.14	0.02	13	n/c
Pyrene	0.03	0.04	0.01	n/c	1	0.04	0.03	0.01	n/c	1	< 0.01	< 0.01	0.01	n/c	0
Quinoline	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Volatile Hydrocarbon Fraction	< 10	< 10	10	n/c	0	< 10	< 10	10	n/c	0	19	28	10	n/c	0.9
corrected	< 10	< 10	10	n/c	0	< 10	< 10	10	n/c	0	19	28	10	n/c	0.9

Notes:
Results are expressed in micrograms per kilogram (mg/kg), unless otherwise indicated.
m - meter
SO - soil
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
Reported Detection Limit (RDL) indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
Relative Percent Difference (RPD) is calculated when the mean value is greater than five times the method reporting limit; Golder's internal QA/QC target is less than 50%.
Difference Factor (DF) is calculated when the mean value is less than five times the method reporting limit; Golder's internal QA/QC target is less than 2.
n/c = not calculated
N/A = not applicable
BOLD font indicates the parameter analysed exceeds Golder's internal QA/QC targets.

Table E-2
Results of Soil Quality Control Analyses AEC 1B - Volatile Organic Compounds
K19 - Trutch Former Townsite
Alaska Highway, BC

Sample Location	EX17-01-W6B	EX17-01-W6B				EX17-01-B3	EX17-01-B3				EX17-01-W12A	EX17-01-W12A				EX17-01-W15B	EX17-01-W15B			
Sample Name	04256-12-3.5m	04257-01-3.5m				04259-10-5.5m	04259-11-5.5m				04262-03-2.5m	04262-04-2.5m				04262-11-3.5m	04262-12-3.5m			
Sample Collection Date	9/30/2017	9/30/2017	**RDL**	**RPD (%)**	**DF**	4/10/2017	4/10/2017	**RDL**	**RPD (%)**	**DF**	5/10/2017	5/10/2017	**RDL**	**RPD (%)**	**DF**	5/10/2017	5/10/2017	**RDL**	**RPD (%)**	**DF**
Sample Matrix	SO	SO				SO	SO				SO	SO				SO	SO			
Sample Depth	3.5 - 3.5 m	3.5 - 3.5 m				5.5 - 5.5 m	5.5 - 5.5 m				2.5 - 2.5 m	2.5 - 2.5 m				3.5 - 3.5 m	3.5 - 3.5 m			
Volatile Organic Componds (VOCs)																				
Benzene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	0.036	0.005	**151**	n/c	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
Dichloromethane (DCM) (Methylene Chloride)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	< 0.01	< 0.01	0.01	n/c	0	< 0.01	< 0.01	0.01	n/c	0	< 0.01	< 0.01	0.01	n/c	0	< 0.01	< 0.01	0.01	n/c	0
m,p-Xylenes	< 0.02	< 0.02	0.02	n/c	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	< 0.02	< 0.02	0.02	n/c	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	-	-	-	-	-	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Toluene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Xylenes, Total	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0

Notes:
Results are expressed in micrograms per kilogram (mg/kg), unless otherwise indicated.
m - meter
SO - soil
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
Reported Detection Limit (RDL) indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
Relative Percent Difference (RPD) is calculated when the mean value is greater than five times the method reporting limit; Golder's internal QA/QC target is less than 50%.
Difference Factor (DF) is calculated when the mean value is less than five times the method reporting limit; Golder's internal QA/QC target is less than 2.
n/c = not calculated
N/A = not applicable
BOLD font indicates the parameter analysed exceeds Golder's internal QA/QC targets.

Table E-2
Results of Soil Quality Control Analyses AEC 1B - Volatile Organic Compounds
K19 - Trutch Former Townsite
Alaska Highway, BC

Sample Location	EX17-01-B9	EX17-01-B9				EX17-01-B11	EX17-01-B11				EX17-01-W16F	EX17-01-W16F				EX17-01-B22	EX17-01-B22			
Sample Name	04265-03-5.0m	04265-04-5.0m				04265-06-5.0m	04265-07-5.0m				04266-07-4.0m	04266-08-4.0m				04268-03-4.0m	04268-04-4.0m			
Sample Collection Date	10/13/2017	10/13/2017	**RDL**	**RPD (%)**	**DF**	10/13/2017	10/13/2017	**RDL**	**RPD (%)**	**DF**	10/15/2017	10/15/2017	**RDL**	**RPD (%)**	**DF**	10/16/2017	10/16/2017	**RDL**	**RPD (%)**	**DF**
Sample Matrix	SO	SO				SO	SO				SO	SO				SO	SO			
Sample Depth	5 - 5 m	5 - 5 m				5 - 5 m	5 - 5 m				4 - 4 m	4 - 4 m				4 - 4 m	4 - 4 m			
Volatile Organic Compounds (VOCs)																				
Benzene	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0
Dichloromethane (DCM) (Methylene Chloride)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
m,p-Xylenes	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Methyl tert-Butyl Ether	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0
o-Xylene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Styrene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Toluene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Xylenes, Total	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0

Notes:
Results are expressed in micrograms per kilogram (mg/kg), unless otherwise indicated.
m - meter
SO - soil
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
Reported Detection Limit (RDL) indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
Relative Percent Difference (RPD) is calculated when the mean value is greater than five times the method reporting limit; Golder's internal QA/QC target is less than 50%.
Difference Factor (DF) is calculated when the mean value is less than five times the method reporting limit; Golder's internal QA/QC target is less than 2.
n/c = not calculated
N/A = not applicable
BOLD font indicates the parameter analysed exceeds Golder's internal QA/QC targets.

Table E-2
Results of Soil Quality Control Analyses AEC 1B - Volatile Organic Compounds
K19 - Trutch Former Townsite
Alaska Highway, BC

Sample Location	EX17-01-W20B	EX17-01-W20B				EX17-01-W28C	EX17-01-W28C				EX17-01-B25	EX17-01-B25				EX17-01-W21D	EX17-01-W21D			
Sample Name	04269-05-3.5m	04269-06-3.5m				04272-09-2.0m	04272-10-2.0m				04270-09-4.0m	04270-10-4.0m				04275-07-3.5m	04275-08-3.5m			
Sample Collection Date	10/17/2017	10/17/2017	**RDL**	**RPD (%)**	**DF**	10/21/2017	10/21/2017	**RDL**	**RPD (%)**	**DF**	10/19/2017	10/19/2017	**RDL**	**RPD (%)**	**DF**	10/24/2017	10/24/2017	**RDL**	**RPD (%)**	**DF**
Sample Matrix	SO	SO				SO	SO				SO	SO				SO	SO			
Sample Depth	3.5 - 3.5 m	3.5 - 3.5 m				2 - 2 m	2 - 2 m				4 - 4 m	4 - 4 m				3.5 - 3.5 m	3.5 - 3.5 m			
Volatile Organic Componds (VOCs)																				
Benzene	0.62	0.76	0.02	20	n/c	0.68	0.68	0.02	0	n/c	< 0.02	< 0.02	0.02	n/c	0	1.20	1.15	0.02	4	n/c
Dichloromethane (DCM) (Methylene Chloride)	< 0.05	< 0.05	0.05	n/c	0	< 0.05	-	0.05	n/c	n/c	-	-	-	-	-	< 0.05	< 0.05	0.05	n/c	0
Ethylbenzene	3.64	5.76	0.05	45	n/c	0.90	0.90	0.05	0	n/c	< 0.05	< 0.05	0.05	n/c	0	2.51	1.84	0.05	31	n/c
m,p-Xylenes	4.16	6.18	0.05	39	n/c	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	3.74	2.04	0.05	**59**	n/c
Methyl tert-Butyl Ether	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0
o-Xylene	0.41	0.51	0.05	22	n/c	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	0.09	0.08	0.05	n/c	0.2
Styrene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Toluene	0.59	0.87	0.05	38	n/c	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	0.21	0.19	0.05	n/c	0.4
Xylenes, Total	4.6	6.7	0.1	37	n/c	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	3.8	2.1	0.1	**58**	n/c

Notes:
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Difference Factor (DF) is calculated when the mean value is less than five times the method reporting limit; Golder's internal QA/QC target is less than 2.
n/c = not calculated
N/A = not applicable
BOLD font indicates the parameter analysed exceeds Golder's internal QA/QC targets.

Table E-2
Results of Soil Quality Control Analyses AEC 1B - Volatile Organic Compounds
K19 - Trutch Former Townsite
Alaska Highway, BC

Sample Location	EX17-01-W7D	EX17-01-W7D				EX17-01-B32	EX17-01-B32				EX17-01-W29E	EX17-01-W29E				EX17-01-W39B	EX17-01-W39B			
Sample Name	04258-04-3.5m	04258-05-3.5m				04276-07-6.0m	04276-08-6.0m				04277-11-4.5m	04277-12-4.5m				04289-07-1.5m	04289-08-1.5m			
Sample Collection Date	4/10/2017	4/10/2017	**RDL**	**RPD (%)**	**DF**	10/28/2017	10/28/2017	**RDL**	**RPD (%)**	**DF**	10/31/2017	10/31/2017	**RDL**	**RPD (%)**	**DF**	3/11/2017	3/11/2017	**RDL**	**RPD (%)**	**DF**
Sample Matrix	SO	SO				SO	SO				SO	SO				SO	SO			
Sample Depth	3.5 - 3.5 m	3.5 - 3.5 m				6 - 6 m	6 - 6 m				4.5 - 4.5 m	4.5 - 4.5 m				1.5 - 1.5 m	1.5 - 1.5 m			
Volatile Organic Componds (VOCs)																				
Benzene	0.488	-	0.005	n/c	n/c	0.03	0.03	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	0.03	0.03	0.02	n/c	0
Dichloromethane (DCM) (Methylene Chloride)	< 0.01	< 0.01	0.01	n/c	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	0.28	-	0.01	n/c	n/c	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	1.06	0.93	0.05	13	n/c
m,p-Xylenes	-	-	-	-	-	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	0.38	0.29	0.05	27	n/c
Methyl tert-Butyl Ether	-	-	-	-	-	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0
o-Xylene	-	-	-	-	-	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Styrene	< 0.05	-	0.05	n/c	n/c	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Toluene	0.13	-	0.05	n/c	n/c	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Xylenes, Total	0.7	-	0.05	n/c	n/c	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	0.4	0.3	0.1	n/c	1

Notes:
Results are expressed in micrograms per kilogram (mg/kg), unless otherwise indicated.
m - meter
SO - soil
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
Reported Detection Limit (RDL) indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
Relative Percent Difference (RPD) is calculated when the mean value is greater than five times the method reporting limit; Golder's internal QA/QC target is less than 50%.
Difference Factor (DF) is calculated when the mean value is less than five times the method reporting limit; Golder's internal QA/QC target is less than 2.
n/c = not calculated
N/A = not applicable
BOLD font indicates the parameter analysed exceeds Golder's internal QA/QC targets.

Table E-2
Results of Soil Quality Control Analyses AEC 1B - Volatile Organic Compounds
K19 - Trutch Former Townsite
Alaska Highway, BC

Sample Location	EX17-02-W2A	EX17-02-W2A				EX17-02-B08	EX17-02-B08				EX17-01-W32F	EX17-01-W32F				EX17-01-W36B	EX17-01-W36B			
Sample Name	04290-08-1.75m	04290-09-1.75m				04291-11-4.0m	04291-12-4.0m				04285-02-5.5m	04285-03-5.5m				04287-11-1.5m	04287-12-1.5m			
Sample Collection Date	4/11/2017	4/11/2017	**RDL**	**RPD (%)**	**DF**	5/11/2017	5/11/2017	**RDL**	**RPD (%)**	**DF**	2/11/2017	2/11/2017	**RDL**	**RPD (%)**	**DF**	2/11/2017	2/11/2017	**RDL**	**RPD (%)**	**DF**
Sample Matrix	SO	SO				SO	SO				SO	SO				SO	SO			
Sample Depth	1.75 - 1.75 m	1.75 - 1.75 m				4 - 4 m	4 - 4 m				5.5 - 5.5 m	5.5 - 5.5 m				1.5 - 1.5 m	1.5 - 1.5 m			
Volatile Organic Compounds (VOCs)																				
Benzene	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0
Dichloromethane (DCM) (Methylene Chloride)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
m,p-Xylenes	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Methyl tert-Butyl Ether	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0
o-Xylene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Styrene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Toluene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Xylenes, Total	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0

Notes:
Results are expressed in micrograms per kilogram (mg/kg), unless otherwise indicated.
m - meter
SO - soil
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
Reported Detection Limit (RDL) indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
Relative Percent Difference (RPD) is calculated when the mean value is greater than five times the method reporting limit; Golder's internal QA/QC target is less than 50%.
Difference Factor (DF) is calculated when the mean value is less than five times the method reporting limit; Golder's internal QA/QC target is less than 2.
n/c = not calculated
N/A = not applicable
BOLD font indicates the parameter analysed exceeds Golder's internal QA/QC targets.

Table E-3
Results of Soil Quality Control Analyses AEC 1C - Polycyclic Aromatic Hydrocarbons
K19 - Trutch Former Townsite
Alaska Highway, BC

Sample Location	EX17-01-W39B	EX17-01-W39B				EX17-02-W2A	EX17-02-W2A				EX17-02-B08	EX17-02-B08				EX17-02-B16	EX17-02-B16			
Sample Name	04289-07-1.5m	04289-08-1.5m				04290-08-1.75m	04290-09-1.75m				04291-11-4.0m	04291-12-4.0m				04293-10-4.0m	04293-11-4.0m			
Sample Collection Date	3/11/2017	3/11/2017	**RDL**	**RPD (%)**	**DF**	4/11/2017	4/11/2017	**RDL**	**RPD (%)**	**DF**	5/11/2017	5/11/2017	**RDL**	**RPD (%)**	**DF**	9/11/2017	9/11/2017	**RDL**	**RPD (%)**	**DF**
Sample Matrix	SO	SO				SO	SO				SO	SO				SO	SO			
Sample Depth	1.5 - 1.5 m	1.5 - 1.5 m				1.75 - 1.75 m	1.75 - 1.75 m				4 - 4 m	4 - 4 m				4 - 4 m	4 - 4 m			
Polycyclic Aromatic Hydrocarbons (PAHs)																				
1-Methylnaphthalene	12.1	10.0	0.5	19	n/c	0.009	0.008	0.005	n/c	0.2	< 0.005	< 0.005	0.005	n/c	0	0.184	0.177	0.005	4	n/c
2-methylnaphthalene	11.7	6.20	0.5	n/c	n/c	0.011	0.012	0.005	n/c	0.2	< 0.005	< 0.005	0.005	n/c	0	0.327	0.316	0.005	3	n/c
Acenaphthene	< 0.05	< 0.05	0.05	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
Acenaphthylene	< 0.05	< 0.05	0.05	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
Anthracene	< 0.04	< 0.04	0.04	n/c	0	< 0.004	< 0.004	0.004	n/c	0	< 0.004	< 0.004	0.004	n/c	0	< 0.004	< 0.004	0.004	n/c	0
Benzo(a)anthracene	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0
Benzo(a)pyrene	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0	< 0.03	< 0.03	0.03	n/c	0
Benzo(a)pyrene Total Potency Equivalence (TPE)	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(b)fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo[j]fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(b,j) fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Benzo(g,h,i)perylene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	0.08	0.10	0.05	n/c	0.4	0.09	0.09	0.05	n/c	0
Benzo(k)fluoranthene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Chrysene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	0.05	0.06	0.05	n/c	0.2	0.07	0.07	0.05	n/c	0
Dibenzo(a,h)anthracene	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0
EPH (C10-C19)	3810	3980	20	4	n/c	< 20	< 20	20	n/c	0	73	86	20	n/c	0.65	131	148	20	12	n/c
EPH (C19-C32)	617	666	20	8	n/c	28	42	20	n/c	0.7	62	71	20	n/c	0.45	70	80	20	n/c	0.5
Fluoranthene	< 0.01	< 0.1	0.01	n/c	n/c	< 0.01	< 0.01	0.01	n/c	0	0.02	0.02	0.01	n/c	0	0.02	0.02	0.01	n/c	0
Fluorene	1.3	1.3	0.2	0	n/c	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	0.09	0.07	0.02	n/c	1
Heavy Extractable Petroleum Hydrocarbons (BC Guidelines)	617	666	20	8	n/c	28	42	20	n/c	0.7	62	71	20	n/c	0.45	70	80	20	n/c	0.5
Indeno(1,2,3-c,d)pyrene	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0
Index of Additive Cancer Risk (IACR)	< 0.6	< 0.6	0.6	n/c	0	< 0.6	< 0.6	0.6	n/c	0	0.6	0.6	0.6	n/c	0	< 0.6	< 0.6	0.6	n/c	0
Light Extractable Petroleum Hydrocarbons (BC Guidelines)	3800	3980	20	5	n/c	< 20	< 20	20	n/c	0	73	86	20	n/c	0.65	130	147	20	12	n/c
Naphthalene	6.50	4.24	0.05	42	n/c	< 0.005	< 0.005	0.005	n/c	0	< 0.005	< 0.005	0.005	n/c	0	0.077	0.084	0.005	9	n/c
Phenanthrene	2.4	2.2	0.2	9	n/c	0.04	0.02	0.02	n/c	1	0.06	0.07	0.02	n/c	0.5	0.28	0.25	0.02	11	n/c
Pyrene	0.09	0.2	0.01	n/c	n/c	< 0.01	< 0.01	0.01	n/c	0	0.03	0.04	0.01	n/c	1	0.04	0.04	0.01	n/c	0
Quinoline	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Volatile Hydrocarbon Fraction	130	56	10	**80**	n/c	< 10	< 10	10	n/c	0	< 10	< 10	10	n/c	0	< 10	17	10	n/c	0.7
corrected	128	54	10	**81**	n/c	< 10	< 10	10	n/c	0	< 10	< 10	10	n/c	0	< 10	16	10	n/c	0.6

Notes:
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QA/QC = quality assurance/quality control
Reported Detection Limit (RDL) indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
Relative Percent Difference (RPD) is calculated when the mean value is greater than five times the method reporting limit; Golder's internal QA/QC target is less than 50%.
Difference Factor (DF) is calculated when the mean value is less than five times the method reporting limit; Golder's internal QA/QC target is less than 2.
n/c = not calculated
N/A = not applicable
BOLD font indicates the parameter analysed exceeds Golder's internal QA/QC targets.

Table E-4
Results of Soil Quality Control Analyses AEC 1C - Volatile Organic Compounds
K19 - Trutch Former Townsite
Alaska Highway, BC

Sample Location	EX17-01-W39B	EX17-01-W39B				EX17-02-W2A	EX17-02-W2A				EX17-02-B08	EX17-02-B08				EX17-02-B16	EX17-02-B16			
Sample Name	04289-07-1.5m	04289-08-1.5m				04290-08-1.75m	04290-09-1.75m				04291-11-4.0m	04291-12-4.0m				04293-10-4.0m	04293-11-4.0m			
Sample Collection Date	3/11/2017	3/11/2017	**RDL**	**RPD (%)**	**DF**	4/11/2017	4/11/2017	**RDL**	**RPD (%)**	**DF**	5/11/2017	5/11/2017	**RDL**	**RPD (%)**	**DF**	9/11/2017	9/11/2017	**RDL**	**RPD (%)**	**DF**
Sample Matrix	SO	SO				SO	SO				SO	SO				SO	SO			
Sample Depth	1.5 - 1.5 m	1.5 - 1.5 m				1.75 - 1.75 m	1.75 - 1.75 m				4 - 4 m	4 - 4 m				4 - 4 m	4 - 4 m			
Volatile Organic Componds (VOCs)																				
Benzene	0.03	0.03	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	< 0.02	0.02	n/c	0	< 0.02	0.02	0.02	n/c	0
Ethylbenzene	1.06	0.93	0.05	13	n/c	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	0.05	0.11	0.05	n/c	1.2
m,p-Xylenes	0.38	0.29	0.05	27	n/c	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	0.18	0.29	0.05	**47**	n/c
Methyl tert-Butyl Ether	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0
o-Xylene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	0.05	0.05	n/c	0
Styrene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Toluene	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0	< 0.05	< 0.05	0.05	n/c	0
Xylenes, Total	0.4	0.3	0.1	n/c	1	< 0.1	< 0.1	0.1	n/c	0	< 0.1	< 0.1	0.1	n/c	0	0.2	0.3	0.1	n/c	1

Notes:
Results are expressed in micrograms per kilogram (mg/kg), unless otherwise indicated.
m - meter
SO - soil
FDA = field duplicate available
FD = field duplicate
QA/QC = quality assurance/quality control
Reported Detection Limit (RDL) indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
Relative Percent Difference (RPD) is calculated when the mean value is greater than five times the method reporting limit; Golder's internal QA/QC target is less than 50%.
Difference Factor (DF) is calculated when the mean value is less than five times the method reporting limit; Golder's internal QA/QC target is less than 2.
n/c = not calculated
N/A = not applicable
BOLD font indicates the parameter analysed exceeds Golder's internal QA/QC targets.

APPENDIX F

Geotechnical Recommendations

06 October 2017
File 2003-002-00

Tervita
893 Van Isle Way
Langford, British Columbia
V9B 5R8

ATTENTION: Mr. Tristan Gething

Dear Mr. Gething

SUBJECT: Sloping and Shoring Excavation Plan;
And Backfill Recommendations
Trutch Remediation Project
TRUTCH, British Columbia

1.0 Introduction

1.1 Background

HMR Engineering Inc. (HMR) was requested by Tervita to provide a slope and shoring plan for their excavations at the Trutch Remediation Project. This report will provide recommendations on safe working slopes and provide a general backfill plan for the imported clay-till and sand material from "Adsette Pit" near Prophet River, British Columbia.

1.2 Objectives

The objectives of this letter are to:

- Provide recommendations on safe working slopes within the excavation;
- To provide general guidelines when it comes to backfilling and compacting of imported clay-till; pit run sand; and overburden material free of contamination (material excavated from the hole) and to;
- Provide details on restoration of existing across road that crosses AEC 1 b (Trutch, British Columbia).

2.0 Geotechnical Recommendations

The clay (till like) soils found on-site represent adequate strata that will stand at near vertical slopes unless exposure to natural elements such as snow or rain are

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Fort Nelson, B.C.
V0C1R0, Box 1505

present. Changes in moisture contents will cause a loss of soil suction and shallow slumping will occur in these types of soils.

Surcharge Stockpiles or Large Equipment

Large surcharge loads can be caused from on-site stockpiles of excavated material or from large pieces of construction equipment. The following recommendations will need to be adhered to:

- Ensure that all stockpiles are placed back from the top of the excavation by twice the depth of the excavation. For instance, if the excavation is 6 m deep the stockpile set back distance should be 12 m; and
- Large construction equipment should follow the same rule as stock pile set back distances except for excavation equipment, such as backhoes and tracked excavators.

3.0 Safe Working Slopes

Safe Working Slope Angles

All slope angles should be excavated as follows:

- Excavate all slopes to safe working slope angles as stipulated by WorkSafe BC, see Appendix B.
- Ensure any weeping sand or granular lenses are drained and pumped. Sloughing in these areas may occur and slopes may need to be cut back at shallower angles.
- Loose material must be removed from the excavation side slopes to prevent falling lumps from striking workers below;
- The excavation side slopes should be monitored for drying and cracking and assessed daily prior to site entry:
- Signs of surface cracking or tension cracks should be assessed daily prior to site entry; and
- While workers are in this excavation, monitor the excavation side slopes for any signs of falling slope debris, tension cracks or water infiltration. For worker safety, brief shut-downs to reassess the side slopes may be required as work in the excavation continues.

Given the size of the excavations a 1:1 slope will be adequate for slope stability. No mechanical shoring or slot cutting is anticipated; however as mentioned above monitoring slopes for any falling slope debris, tension cracking and water infiltration is required as work continues in an excavation. Appended to this report are photographs of an excavation at that show how the excavations are being sloped.

4.0 General Backfill Guidelines

There is no specification for backfill in the drawings/tender for the Trutch Project; Other than it is referenced in Section 3.7 “Backfill Types and Compaction; 3.7.1. Use only Imported Backfill, or Owner Suppled Backfill in accordance with the Contract and which has been recommended by a Qualified Professional, and been previously accepted as a Submittal.”

That being said: Imported Clay-Till and Pit Run Sand from the “Adsette Pit” near Prophet River is appropriate to use as backfill from base of excavation to surface either clay-till/sand or both in which order is up to the discretion of Tervita.

Overburden material that has been excavated from the site that is free of contamination is appropriate to use as backfill and should help relieve some congestion at the work site.

Recommendations are as follows:

- Place backfill material in uniform layers not exceeding 300 mm compacted as referenced in Section 3.8.4. of the Trutch Tender/Drawings;
- Do not use material which is frozen or contains ice, snow or debris to greatest extent possible; and,
- Machine compact all fill materials unless otherwise according to drawings. (As mentioned above “Using excavator Tracking to compact material will be suitable.
- For areas that include structures or driveways; and across roads such as the above mentioned “AEC 1b across road.” The imported granular material from “Adsette Pit” will be suitable and should be used at least 600 mm below surface and brought to grade in no less than 200 mm lifts (loose thickness) compacted to approximately 150 mm per lift using a 1000lb plate tamper unit or equivalent.

5.0 Across Road Restoration

Tervita will replace the across road that crosses AEC 1b, using imported granular material from “Adsette Pit” to a least 600 mm below grade as follows.

- Lay imported granular material from “Adsette Pit” in no less than 200 mm lifts (loose thickness) compacted to an approximate thickness of 150 mm per lift.
- A 1000lb plate tamper unit will be sufficient for compacting the imported granular material from “Adsette Pit.

There are no specifications for compaction on this project regarding replacement of the above-mention crossroad. However, if the afore mentioned steps are followed it

should be more than adequate.

6.0 Closure

This report was prepared by HMR Engineering Inc. for the use of Tervita and its authorised agents for the backfill of and sloping of excavation(s) located at the Trutch Remediation Project at Trutch, British Columbia. The contents herein reflect HMR Engineering Inc.'s best judgment available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. HMR Engineering Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This report has been prepared in accordance with generally accepted engineering practice common to the local area. No other warranty, expressed or implied is made.

Our conclusions and recommendations are based upon the information obtained from our brief site visit and visual observations. The reported visual observations and field tests indicate subsurface surface and groundwater conditions only at the specific locations and times investigated, only to the depth penetrated and only for the soil properties tested. The subsurface conditions may vary between the excavations and with time. The interpretation of subsurface conditions provided is a professional opinion of conditions and not a certification of the site conditions. The nature and extent of subsurface surface variation may not become evident until construction or further investigation. If variations or other latent conditions do become evident, HMR Engineering Inc. should be notified immediately so that we may assess the conditions and may re-evaluate our conclusions and recommendations. Although subsurface surface conditions have been explored, we have not conducted investigations, sampling, laboratory testing or evaluations of the site with respect to the presence of contaminated soil or groundwater.

This report contains the results of our investigations as well as certain recommendations arising out of such investigations. Our recommendations do not constitute a design, in whole or in part, of any of the elements of the proposed work. Incorporation of any or all of our recommendations into the design of any such element does not constitute us as designers or co-designers of such elements, nor does it mean that such design is appropriate in geotechnical terms. The designers of

such elements must consider the appropriateness of our recommendations in the light of all design criteria known to them, many of which may not be known to us. Our mandate has been to investigate and recommend which we have completed by means of this report. We have had no mandate to design, or review the design of any elements of the proposed work and accept no responsibility for such design or design review.

Written By:

Jeff Daniels, Field Technician
Branch Manager

Reviewed By:

Ian H. Harder, P.Eng.
Owner

Enclosures

Appendix A – Photos
Appendix B – WorkSafe BC Regulations

Appendix C – Sieve Analyses:

G0147 – Pit Run Sand "Adsette Pit":

HMR Engineering Inc

Appendix A
Photographs

Trutch Remediation Project
2017 Excavation Photographs
TRUTCH, British Columbia

Photograph No. 1 – Photograph taken by Tervita personnel on-site at Trutch, British Columbia showing Tangle Ridge Custom Crushing Ltd. Clearing overburden material and cleaning up slope debris. – Octover 1st, 2017.

Photograph No. 2 – Photograph 2 Showing nice clean sloping and wide open excavation. No signs of sloughing, groundwater or tension cracking. Fencing in place along roadway. October 1st, 2017.

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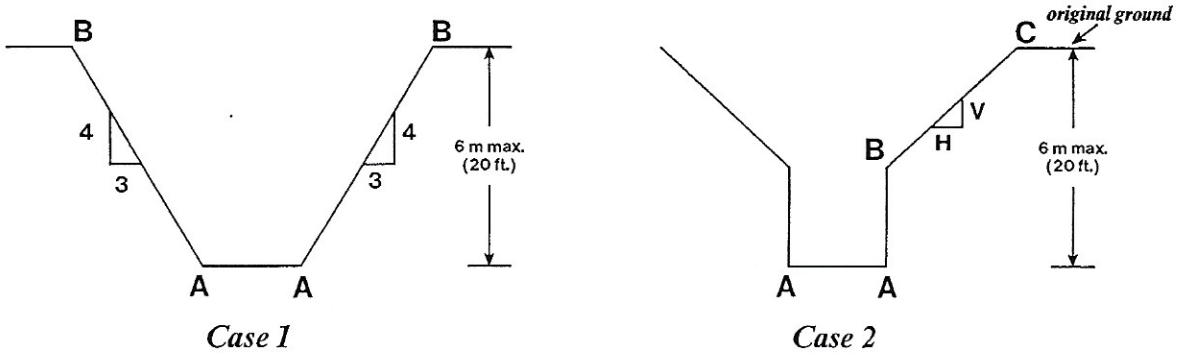
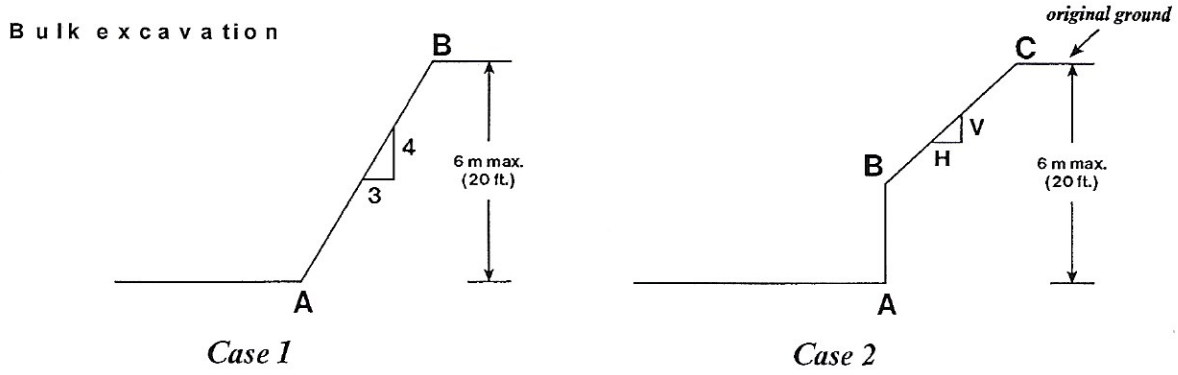
Appendix B
WorkSafe BC Regulations

Figure 20-1: Sloping in lieu of shoring

Trench excavation



Bulk excavation



Case 1 (trench or bulk excavation) - maximum slope of excavated face, shown as line AB, in hard and solid soil is 3 horizontal to 4 vertical.

Case 2 (trench or bulk excavation) - maximum height of vertical portion, shown as line AB is 1.2 metres (4 feet).

For Case 2 (trench or bulk excavation), the maximum permissible slope of the excavated face BC for the corresponding height of the lower vertical cut AB is as follows:

Height of line AB		Maximum slope of line BC (in hard and solid soil)
Centimetres	Feet	
up to 30	up to 1	1 horizontal (H) to 1 vertical (V)
30 to 60	1 to 2	3H to 2V
60 to 90	2 to 3	2H to 1V
90 to 120	3 to 4	3H to 1V

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Mechanical

Sieve Analysis

LAB REPORT: MECHANICAL SIEVE ANALYSIS

Sample No.	**G0147**	Date Sampled	**23-Sep-17**	By	**J.D.**	of	**HMR Engineering Inc.**	
Location	**Adsette Pit Near Profit River**			Sample Type	**Pail**		Natural Moisture	**2.6** %
Description	**Sand - Adsette**						Tech	**J.D.**

Specifications: **Master Municipal Construction Document, Platinum Edition (2009), Section 31 05 17, Table 2.4, Pit Run Sand.**

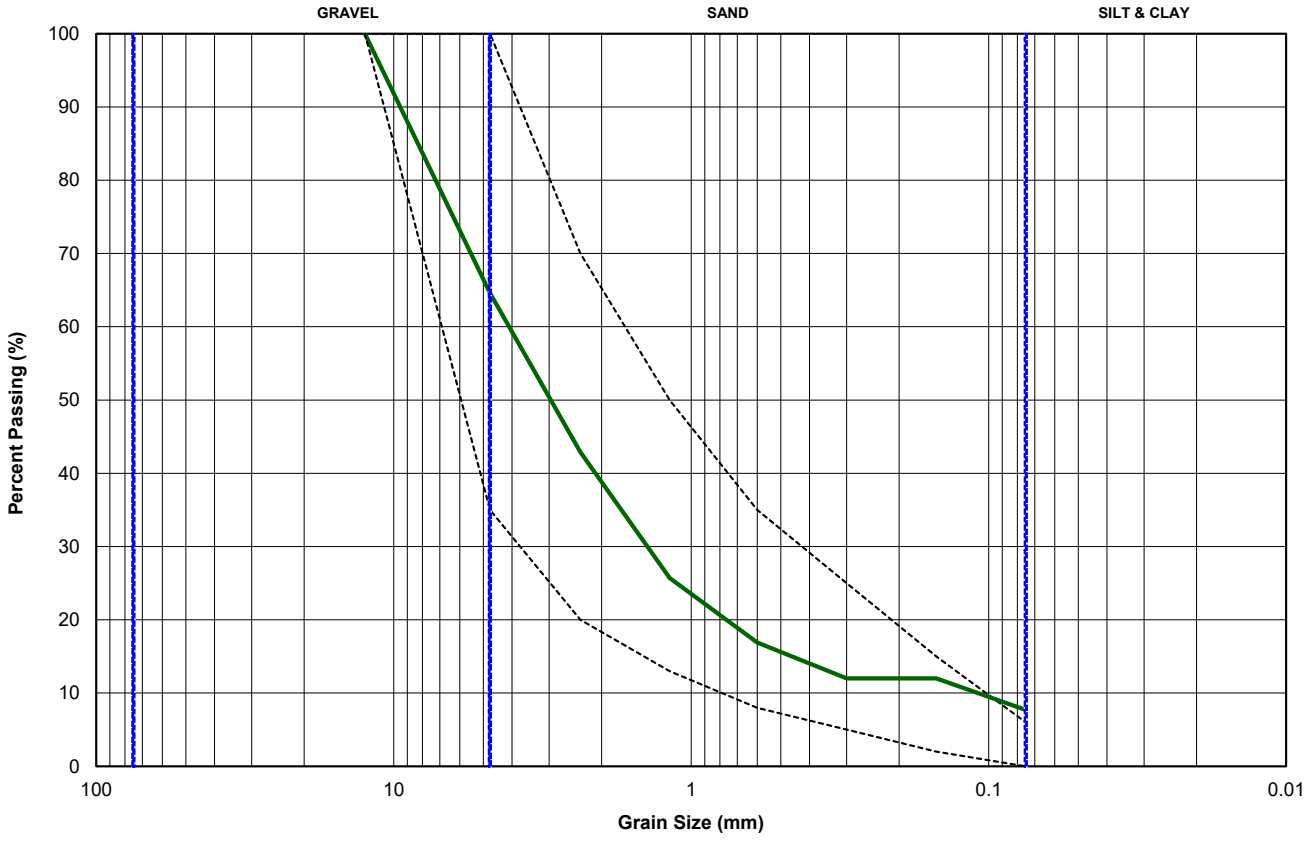
Comments: _____

Fracture	Method
N/A	**N/A**

Sieve Results

Sieve mm	12.5	4.75	2.36	1.18	0.600	0.300	0.150	0.075
% Passing	**100.0**	**64.6**	**42.9**	**25.7**	**16.9**	**12.0**	**12.0**	**7.7**
Specification	100	35-100	20-70	13-50	8-35	5-25	2-15	0-6

By Type Gravel = **35.4%** Sand = **56.9%** Silt & Clay = **7.7%**



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Client	**Tervita**	Date	**24-Sep-17**
Project	**2017 Material Testing**	File No.	**2003-002-00**
Location	**Fort Nelson, B.C.**	Sample No.	**G0147**

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