



**DAWSON CITY
KORBO APARTMENTS
RESTORATION OPTIONS
and
PLAN OF RESTORATION**

July 2011



ACCESS
CONSULTING GROUP

A MEMBER OF ALEXCO RESOURCE GROUP

EXECUTIVE SUMMARY

Yukon Housing Corporation (Yukon Housing) retained Access Consulting Group (ACG) to provide emergency spill response, conduct phase I and II environmental site assessments and complete a Plan of Restoration for the cleanup of a home heating fuel leak that was discovered in Dawson City, Yukon Territory, on October 1, 2010, at the Yukon Housing's Korbo Apartment Building, 954 – 6th Avenue. A 2,000-gallon (7,600 litres) above ground storage tank supplied fuel to an inside oil burner by an underground fuel line which is buried adjacent to the south side of the building. The spill resulted from a crack in the elbow of the underground fuel line as it entered the apartment building. Indications are the leak was occurring for an extended period of time.

ACG calculated that approximately 5,000 m³ of soil has been contaminated on the Korbo lot (954 – 6th avenue) and the adjacent property to the south (also owned by Yukon Housing). Emergency spill response was provided by ACG on October 06, 2010. The estimated volume of diesel fuel spilled was 22,000 litres. A sump connecting to an underground weeping tile system installed along the base of the building was able to contain a large volume of the fuel. To date, a total of 23,643 litres of fuel and/or waste water has been successfully recovered from the site.

The Plan of Restoration will be completed over the next two years in a two phase process and provides for two courses of action depending on whether the Korbo Apartment Building is retained or demolished. Additional spill investigation and contaminant delineation must be undertaken and some immediate remedial action should be taken regardless of the decision to retain or remove the building.

If the building is retained, Phase I will involve the excavation and transportation to a Land Treatment Facility of approximately 800 m³ of contaminated soil located around the perimeter of the building. In addition, *in-situ* remedial measures (an aggressive soil vapour extraction system) will be installed to treat the contaminated soil beneath the Korbo Apartment Building and a neighboring building, House # 8571, also owned by Yukon Housing. Phase II will be carried out in 2012 and will include the excavation or in-situ remediation of the remaining contaminated soil (approximately 2,500 m³) and groundwater treatment, if required.

If the Korbo Apartment is to be removed Phase I will consist of the removal of the building. Phase II will involve the complete excavation and transportation to a Land Treatment

Facility (LTF) of the contaminated soils. The second building will need to be temporarily moved to allow for soil removal beneath the building. An option here for the second building is to install an *in-situ* treatment system.

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1.0 INTRODUCTION

Yukon Housing retained Access Consulting Group (ACG) to provide Emergency Spill Response, conduct Phase I and II environmental site assessments and complete a Plan of Restoration for the cleanup of a home heating fuel spill in Dawson City, Yukon Territory. The spill occurred at the Yukon Housing Korbo Apartment building, 954 – 6th Ave. in Dawson City. The fuel spill was first reported to Yukon Housing on October 01, 2010, by the local fueling company. Emergency spill response was provided by ACG on October 6, 2010, in response to the accidental release of an estimated 22,000 litres of diesel fuel from a faulty underground fuel supply line. The valve was immediately shut off on the tank.

A sump connecting to an underground weeping tile system that had been installed along the base of the building was able to contain a large volume of the fuel. Yukon Housing personnel were instructed to continue to remove free product (petroleum hydrocarbons that separate from water and float to the liquid surface) from this sump as necessary.

ACG visited the site in early October 2010 to undertake an underground investigation of the spill using an excavator and initial test pitting. A trench was excavated by a contractor under the supervision of ACG personnel along the underground fuel line, and a crack in the elbow was discovered. The underground fuel supply line is connected to a 2,000-gallon (7600 litre) above ground storage tank (AST) which is buried adjacent to the south side of the building terminating at the inside oil burner. In mid October ACG personnel returned to supervise the drilling of boreholes and installation of groundwater wells. In early November ACG personnel returned to supervise a second borehole investigation and to sample the groundwater wells. In June 2011 ACG personnel returned again to sample the groundwater wells. Please refer to the Report titled: *Emergency Spill Response and Phase I and II Environmental Site Assessments, Korbo Apartment Building, Dawson City, Yukon* for a more complete description of the work that Access Consulting has undertaken to date in response to this spill and the results of this sampling.

ACG has calculated that, as of December 2010 approximately 5,000 m³ of soil have been contaminated on the property. This report also outlines the remediation strategy selected for this site, and why those options were selected.



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**FIGURE 1
PROJECT LOCATION**



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DECEMBER 2010

VERIFIED BY KN



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- ★ Line Break Location
- ⊕ Monitoring Well
- ⊕ Bore Hole
- ⊙ Culvert
- ⊙ Power Pole
- ⊠ Storm Drain
- Water/Sewer Connection
- Fire Hydrant
- Sewer Manhole
- ⊕ Water Manhole
- * Tree
- Korbo Apartments
- Test Pit
- - - Building / Structure
- ▭ Land Parcel

Projection : UTM Zone 7N
Datum: NAD 83

Land parcel data obtained from Natural Resource Canada, Oct. 2010

FIGURE 2 - SITE OVERVIEW

DECEMBER 2010



DRAWN BY MD CHECKED BY KN



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KORBO APARTMENTS DAWSON CITY

- ★ Line Break Location
- ⊕ Monitoring Well
- ⊕ Bore Hole
- ⊙ Culvert
- ⦿ Power Pole
- Water/Sewer Connection
- Storm Drain
- Fire Hydrant
- Sewer Manhole
- ⊕ Water Manhole
- * Trees
- Korbo Apartments
- Other Buildings
- Test Pit
- Land Parcel



Projection : UTM Zone 7N
 Datum: NAD 83
 Land parcel data obtained from Natural Resource Canada, Oct. 2010

FIGURE 3 - SITE PLAN

DECEMBER 2010



DRAWN BY MD CHECKED BY JN

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2.0 REMEDIATION TARGET

Remediation of the spill is required under the Environment Act as described in the Duty to Mitigate letter (Appendix C).

2.1 Regulatory Criteria Applicable to the Site

The goal of the remediation work is to bring the property within the applicable regulatory guidelines. In this case it requires bringing the level of contamination to below the maximum allowable under the Yukon Contaminated Sites Regulations (CSR) for residential use. All sampling within the property boundary has been compared to the CSR “*Schedule 1 - Generic Numerical Soil Standards*” and “*Schedule 2 – Matrix Numerical*” Soil Standards under the residential land use listing.

2.2 Housing Shortage

Currently the property does not meet the CSR guidelines for residential use. Yukon Housing has noted that, as there is a significant housing shortage in Dawson City, ensuring that the property is ready for residential use as soon as possible is of the highest importance.

3.0 REMEDIATION PLAN

3.1 Further Sampling and Delineation

The next stage of work to further the remediation of the property is to improve the understanding of the extent and movement of the contamination. This requires improving the understanding of the movement of the contamination through the soils and the groundwater and any changes to the levels of contamination of both. To further understand the contamination of the soils another soil sampling event is required using boreholes and/or excavation of test pits. Additionally a third groundwater sampling event and air monitoring is needed. ACG recommends that these 3 programs be undertaken in August 2011.

3.2 Reclamation Options

Soil Remediation Options Considered:

ACG considered seven soil remedial options for the Korbo Apartment site:

- Option A: Excavation of accessible contaminated soil with offsite (ex-situ) biological/volatilization remediation in a Land Treatment Facility (LTF) and the installation of onsite (*in-situ*) aggressive soil vapour extraction systems if required
- Option B: Electro-coagulation - soil excavation and washing using electricity
- Option C: Thermal soil remediation – excavation soils and separating volatile and semi-volatile organic contaminants from soil using heat
- Option D: *In-situ* physical treatment - multi-phase extraction
- Option E: *In-situ* biological remediation enhanced bioremediation, and;
- Option F: *In-situ* biological remediation - monitoring natural attenuation.
- Option G: Excavation of down-gradient interception trench to capture contamination before it migrates off site in conjunction with one of the other options or with natural attenuation

Remedial Groundwater Options if Required:

ACG considered six groundwater remedial options for the Korbo Apartment site:

- Option A: Biological treatment - pump and transport system, with *ex-situ* biological remediation in a LTF
- Option B: *Ex-situ* physical treatment - pump and treat system, using an oil and water separator
- Option C: *In-situ* physical and chemical treatment – electro-coagulation, treating groundwater with electricity
- Option D: *In-situ* biological treatment - bioventing, enhancing natural attenuation;
- Option E: *In-situ* physical treatment - air sparging, blowing air directly into the ground water, and;
- Option F: *In-situ* biological remediation, monitoring natural attenuation.

4.0 RECOMMENDED RESTORATION METHODS

The following proposed remediation plan focuses on short-term objectives for minimizing the risk to human health, including the risks for residents and workers, and potential ecological receptors such as the Yukon River and local drinking water wells. Remedial options were assessed based on the capacity of the technology to treat the contaminants with regard to site specific factors, site specific constraints, clean-up time, cost effectiveness, and proven technology in the north.

4.1 Soil Remediation

The recommendation for soil remediation is *Option A: Excavation of accessible contaminated soil with offsite (ex-situ) biological remediation in a LTF and the installation of onsite (in-situ) aggressive soil vapour extraction systems if required.* This option was selected as the preferred strategy because excavation is an efficient and cost effective option with a high rate of success.

All of the excavated soil can likely be remediated at a lower cost at a nearby LTF owned and operated by Environment Yukon, Site Assessment and Remediation Division. The LTF is located approximately 11 km north of Dawson City on the Top of the World Highway. The soil can be remediated in approximately five years based on a bi-annual turning program with no added nutrients or sooner with more frequent turning. If the LTF does not have the capacity to hold all of the soil an additional treatment cell could be constructed by Yukon Housing to expand the capacity of the LTF.

4.2 Groundwater Remediation

For groundwater remediation *Option A: Biological treatment - pump and transport system, with ex-situ biological remediation in a LTF* and *Option F: In-situ biological remediation, monitoring natural attenuation* are recommended.

4.3 Korbo Apartment Scenarios

There is the possibility that the Korbo Apartment building could be removed from the site, prior to or during the remediation process. Thus there are two scenarios for remediation: if the building remains or if the building is demolished. The removal of the Korbo Apartment building from the site would significantly reduce the cost of soil remediation.

5.0 PLAN OF RESTORATION

Based on the results of the work recommended for August 2011 (see section 3.1) one or both of two intermediate remediation measures may need to be undertaken to prevent the spread of contamination. The first of these two measures is the excavation of an interceptor trench at the leading edge of the contamination on 6th avenue to prevent or minimize the movement of hydrocarbon contamination in the soils from the property and possibly to allow for the collection of groundwater for treatment. Soils excavated could be sent immediately to the existing LTF mentioned previously, following the Relocation Permit issued in October 2010 (Appendix A). The second measure is the installation of a well or wells at the western edge of the property

along 6th avenue to allow for collection of groundwater for treatment, following the conditions of the Special Waste Permit issued in October 2010 (Appendix B). While none of the soil sampling to date has shown there is soil contaminated in exceedance of the Special Waste guidelines without a more detailed underground investigation it is impossible to confirm that there will be no special waste soil. If there is special waste this soil will require special consideration and treatment, possibly shipping the soil to a LTF permitted to treat Special Waste. The volumes of contaminated soils described in this report are estimates only and only with excavation will true volumes be known, as such volume estimates presented here could increase or decrease. Appendix E shows cost estimates for each of the two scenarios.

5.1 Scenario 1: If the Korbo Apartment is Retained

The following plan of restoration was developed based on the selected remedial options above and will be completed in a two phase process over the next two years. Figure 4 details the estimated area of excavation during Phases I and II.

Phase I and II remedial scenarios presented below are based on a decision to leave the Korbo Apartment Building in its place. Phase I will consist of excavating 800 m³ of the most highly contaminated soil and the installation of an *in-situ* treatment system for the remaining 1700 m³. Phase II involves removal of the remaining 3300 m³ of soil in the following year.

Phase I

Phase I of the remediation strategy will include acquiring Yukon Environment's approval for the plan of restoration proposed for the cleanup of the site. Following the approval, the plan will be submitted to the Yukon Environmental and Socio-economic Assessment Board (YESAB) to be assessed. Applicable permits will then be obtained to implement the remediation strategy.

ACG has calculated that approximately 5,000 m³ of soil have been contaminated. During Phase I, the area of direct impact, the sump and weeping tile system which contains the most highly contaminated soil located around the perimeter of the Korbo Apartment Building, will be excavated (see Figure 4, Phase I Excavation Details). The removal of this most highly

contaminated soil will remove the bulk of the source material for the spread of contamination. Approximately 800 m³ of contaminated soil will be excavated and transported to the LTF.

The open excavation around the building will provide the necessary access to implement an *in-situ* remedial system designed to treat the contaminated soil located beneath the Korbo Apartment Building. This will be an aggressive soil vapour extraction system (SVE system) designed by the engineering firm CH2M Hill Canada Limited (CH2M Hill). The SVE system will remove hydrocarbon contaminants sorbed to soil in the unsaturated zone (soils above the water table). Horizontal wells will be drilled beneath the building and, using an industrial sized fan, hydrocarbon contaminants will be extracted from the soil. The open excavation will ensure that the system is set up to target areas that are most contaminated. There are an estimated 1,500m³ of contaminated soil beneath the Korbo Apartment Building that will be remediated by the SVE system. A more detailed design of the SVE system engineered by CH2M Hill is attached in Appendix D.

In addition, a small excavation will be advanced near the neighboring building, House # 8571, also owned by Yukon Housing. The excavation, approximately 20m³, will provide the necessary access to also install a SVE system required to treat the contaminated soil beneath the house. A horizontal well will be drilled beneath the house and will be hooked up to the industrial sized fan located at the Korbo Apartment Building. The 20m³ of contaminated soil excavated will also be transported to the LTF. This second SVE system will also be designed by the engineering firm CH2M Hill.

There are approximately 170m³ of contaminated soil beneath House # 8571 that will be remediated by the SVE system. Once the SVE system has been installed beneath the two buildings, both short and long term monitoring programs will be designed, consisting of indoor/outdoor air quality monitoring as well as soil and groundwater sampling, to assess the progress of natural attenuation. The monitoring program will be ongoing at the site until it has been fully remediated and a letter of comfort is issued by Yukon Environment.

If contaminated groundwater is encountered during the excavations, an onsite vacuum truck will be used as a pump and transport system to remove the groundwater entering the excavation

pits or a mechanical pump will be used to remove the water and temporarily store it in containers on site until it can be tested and removed. The contaminated groundwater collected will be batched in tanks at the LTF to accommodate water sampling. Depending on the results of the samples, the groundwater will either be sprayed onto the contaminated soil at the LTF or, if it does not meet applicable criteria, be given time to biodegrade and subjected to re-sampling at a future date. The site is located on an old stream bed and, if necessary, groundwater diversion measures, such as installing sheet piling upslope in a semi-circle formation or installation of wells to lower the groundwater table during excavation may be required.

Any free product encountered during the excavations will be skimmed off, stored in steel drums and removed from site under the current special waste permit (Appendix B). Once the source of the groundwater contamination (impacted soil) has been removed, biodegradation will be enhanced on the site. Oxygen may also be added to the backfill soil and/or groundwater to increase biodegradation. This would be accomplished under the direction of the engineering firm CH2M Hill. As previously mentioned, a monitoring program will be designed to monitor the natural attenuation of the contaminated groundwater.

The excavations will be backfilled with clean soil and, depending on site conditions during excavations; a poly liner may be installed to reduce recontamination of the clean backfilled soil.

Due to the large amount of soil, and numerous water samples that will require high propriety shipping, a mobile laboratory may be considered as an alternative option if it proves to be more cost effective.

Phase II

Phase II will be carried out in a manner similar to Phase I, by either excavating the remaining accessible contaminated soil and continuing with the *in-situ* remedial measures (see Figure 4).

Approximately 2000 m³ of soil will be treated by in-situ remedial measures (SVE system) and the remaining 2500m³ of accessible soils will be excavated and shipped to an LTF.

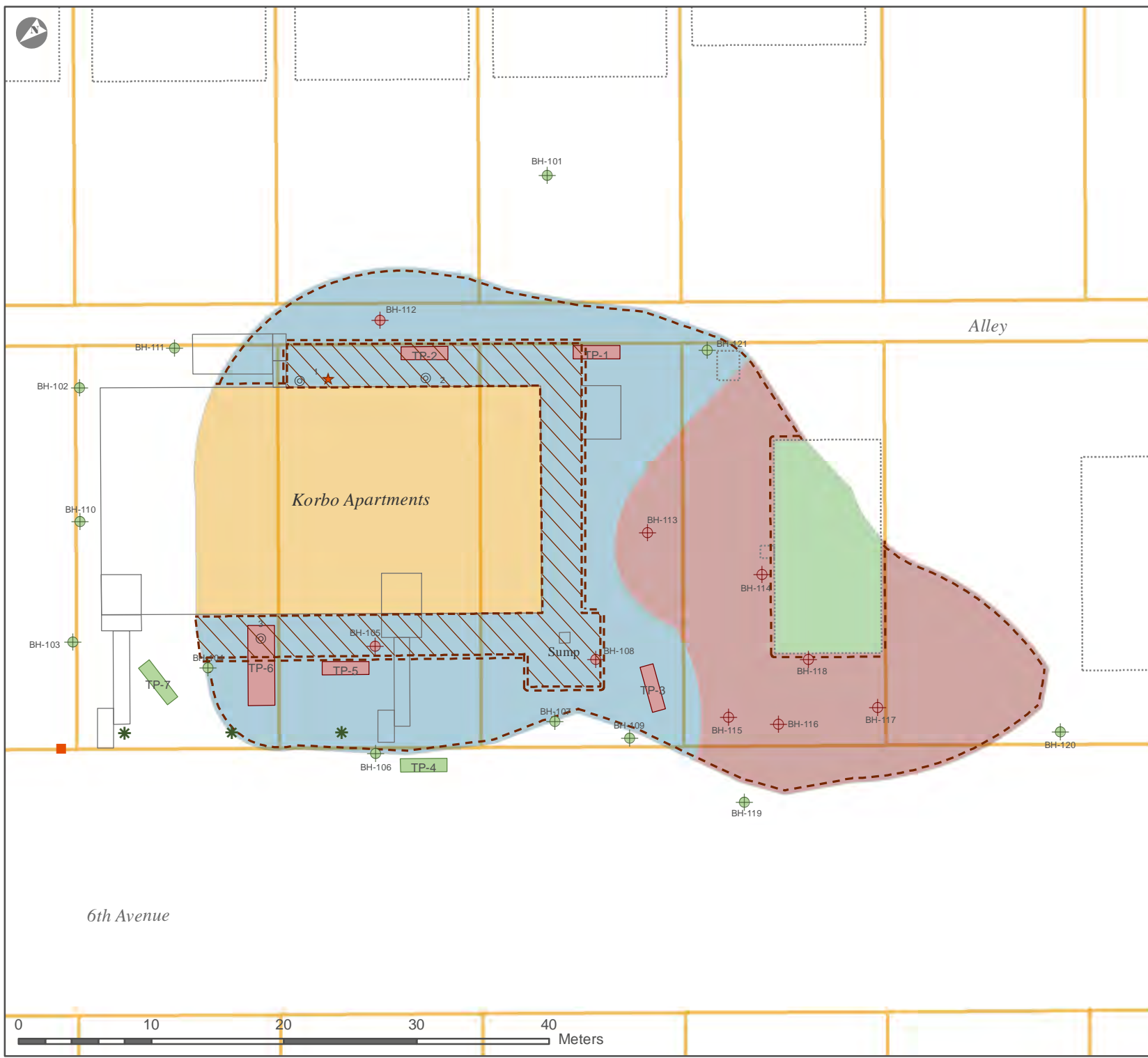
As previously mentioned in Phase I, a pump and transport system using an onsite vacuum truck will be used to treat contaminated groundwater if encountered. Water collected from the open

excavation will be batched and, if contaminated, sprayed onto the LTF to be remediated or be given time to biodegrade and subjected to re-sampling at a future date. As an alternate option, sheet piling may be used to divert the water from entering the excavation. Any free product encountered during the excavation will be skimmed off, stored and removed from site under the current special waste permit (Appendix B).

Depending on the depth of groundwater in relation to the soil contamination, an air sparging unit may be used to treat the soil and groundwater in the saturated zone. This system would be engineered by CH2M Hill, and would be installed under the Korbo Apartment Building and House # 8571 as necessary. Air sparging injects air into the contaminated groundwater to drive volatile and semivolatile contaminants into the unsaturated zone through volatilization. Information from groundwater monitoring events and the Phase I excavation will be interpreted to determine if the air sparging unit is feasible.

Phase I will also require additional monitoring wells be advanced to ensure the contamination plume is not mobile, provide water sampling access, and demonstrate that the overall quality at the site is improving.

YUKON HOUSING CORPORATION
KORBO APARTMENTS
DAWSON CITY



- Soil Test Results**
- ⊕ BoreHole, Not Contaminated
 - ⊕ BoreHole, Contaminated
 - TestPits, No Contamination
 - TestPits, Contaminated
- 109 sq. meters at a depth of 1.5 metres
 444 sq. meters at a depth of 3.5 metres
 482 sq. meters at a depth of 1.5 metres
 745 sq. meters at a depth of 3.5 metres
- Other Features**
- ★ Line Break Location
 - ⊙ Culvert
 - Storm Drain
 - Fire Hydrant
 - ✱ Tree
 - Korbo Apartments
 - Building / Structure
 - Land Parcel
- Excavation Details**
- Phase 1 Excavation (231 square meters)
 - Phase2 Excavation (995 square meters)

Projection : UTM Zone 7N
 Datum: NAD 83
 Land parcel data obtained from Natural Resource Canada, Oct. 2010

FIGURE 4
REMEDIATION PHASES -
IF THE KORBO APARTMENT
IS RETAINED



DRAWN BY MD JULY 2011 CHECKED BY PI

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5.2 Scenario 2: If the Korbo Apartment is Removed

The following plan of restoration was developed based on the selected remedial options above and will be completed in a two phase process over the next two years. Phase I will consist of removing the building in 2011. Phase II will involve removal of all the contaminated soil in the following year. Figure 4 details the estimated area of excavation to be excavated in Phase II.

Phase I

Phase I will involve the demolition of the Korbo Apartment Building. This work will be organized and undertaken by Yukon Housing or a contractor and will begin in 2011.

Phase II

Phase II of the remediation strategy will include acquiring Yukon Environment's approval for the plan of restoration proposed for the cleanup of the site. Following the approval, the plan will be submitted to the Yukon Environmental and Socio-economic Assessment Board (YESAB) to be assessed. Applicable permits will then be obtained to implement the remediation strategy.

ACG has calculated that approximately 5,000 m³ of soil have been contaminated. Upon the demolition and removal of the Korbo Apartment Building and relocation of building #8571 all of the contaminated soils on the property will be excavated (see Figure 5) and shipped to the LTF.

Previous described actions will be followed if contaminated groundwater is encountered during the excavations and if any free product is encountered.

The excavations will be backfilled with clean soil and, depending on site conditions during excavations a poly liner may be installed to reduce recontamination of the clean backfilled soil. Phase II will also require additional monitoring wells be advanced to ensure the contamination plume is not mobile, provide water sampling access, and demonstrate that the overall quality at the site is improving.

YUKON HOUSING CORPORATION
KORBO APARTMENTS
DAWSON CITY



- Soil Test Results**
- BoreHole, Not Contaminated
 - BoreHole, Contaminated
 - TestPits, No Contamination
 - TestPits, Contaminated
 - 109 sq. meters at a depth of 1.5 metres
 - 444 sq. meters at a depth of 3.5 metres
 - 482 sq. meters at a depth of 1.5 metres
 - 745 sq. meters at a depth of 3.5 metres
- Other Features**
- Line Break Location
 - Culvert
 - Storm Drain
 - Fire Hydrant
 - Tree
 - Korbo Apartments
 - Building / Structure
 - Land Parcel
- Excavation Details**
- Phase2 Excavation (1780 square meters)

Projection : UTM Zone 7N
 Datum: NAD 83
 Land parcel data obtained from Natural Resource Canada, Oct. 2010

FIGURE 5
REMEDIATION PHASES -
IF THE KORBO APARTMENT
IS REMOVED



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5.3 Remediation Methodology

All sampling and tests will be carried out as per the Yukon CSR Part 3 Restoration of Contaminated Sites and Part 5 Land Treatment Facilities, specifically:

- Protocol No. 2: *Analysis of Samples taken in relation to the Contaminated Sites Regulations*
- Protocol No. 3: *Soil Sampling Procedures at Contaminated Sites*
- Protocol No. 5: *Petroleum Hydrocarbon Analytical Methods and Standards*
- Protocol No. 6: *Application of Water Quality Standard*
- Protocol No. 7: *Groundwater Monitoring Well Installation and Sampling*
- Protocol No. 8: *Monitored Natural Attenuation*
- Protocol No. 11: *Sampling Procedures for Land Treatment Facilities*

5.4 Remediation Schedule

Due to the risks associated with the site, including the location of the contaminants in a residential area as well as the potential for groundwater issues, the remediation of the Yukon Housing property will occur as soon as feasibly possible. The following is an outline of the tentative proposed remediation schedule:

If the Korbo Apartment is retained:

Item	Date
Obtain approved Remediation Strategy from Environment	July/August 2011
Soil and Groundwater sampling to determine delineation and migration	August 2011
Immediate Remediation Actions (if required)	Sept 2011
YESAA project proposal application submission	August 2011
YESAB decision document	December 2011
Obtaining Applicable Permits and contractor selection	Jan/Mar 2012
Start of field work for Phase I	August 2011
End of Phase I excavation	Sept/Oct. 2011
Site air, soil and groundwater sampling and monitoring	ongoing
LTF maintenance	ongoing (3 to 5 yrs)
Phase I Interim reporting	April 2012
Start of field work for Phase II	June 2012
End of field work for Phase II	Sept./Oct. 2012
Phase II Reporting	April 2013

If the Korbo Apartment is Removed:

Item	Date
Obtain approved Remediation Strategy from Environment	July/Aug 2011
Soil and Groundwater sampling to determine delineation and migration	August 2011
Immediate Remediation Actions (if required)	Sept 2011
YESAA project proposal application submission	August 2011
Phase 1: Building Demolition	Aug-Oct 2011
YESAB decision document	December 2011
Obtaining Applicable Permits and contractor selection	Jan/Mar 2012
Site air, soil and groundwater sampling and monitoring	ongoing
LTF maintenance	ongoing (3 to 5 yrs)
Phase I Interim reporting	January 2012
Start of field work for Phase II	June 2012
End of field work for Phase II	Sept/Oct. 2012
Phase II Reporting	Jan 2013

Any significant changes in the schedule may delay the project and increase the cost of remediation. As groundwater flow increases in the spring/summer, the associated costs to control and remediate the additional volume will likely increase.

6.0 SUMMARY AND CONCLUSIONS

Yukon Housing Corporation retained ACG to provide Emergency Spill Response, conduct a Phase I and II Environmental Site Assessments and complete a Plan of Restoration for the cleanup of a home heating fuel spill in Dawson City, YT. Initial emergency spill response was provided by ACG on October 06, 2010, in response to approximately 22,000 litres of diesel fuel released from the faulty fuel supply line. A relocation permit, as well as a special waste permit, were obtained to collect, store, transport and dispose of waste fuel oil and/or contaminated water from the site. To date, a total of 23,643 litres of fuel and or waste water have been successfully recovered from the site.

A total of seven test pits and 21 boreholes were advanced on the property to assess and delineate the area of impact present on the site. Eight monitoring wells, six water manholes, three sewer manholes, and one storm drain were assessed for groundwater contamination.

ACG has calculated that approximately 5,000 m³ of soil have been contaminated. The Plan of Restoration will be completed in two phases. Final decision on the Plan of Restoration depends on the status of the Korbo Apartment Building. Regardless of the decision of whether or not to demolish the Korbo Apartment building two immediate investigative measures are recommended: undertaking an additional groundwater sampling program, air monitoring and undertaking an additional soil sampling program.

Should the Korbo Apartment building be retained in Phase I, approximately 800 m³ of contaminated soil located around the perimeter of the Korbo Apartment Building will be excavated and transported to a nearby LTF. In addition, *in-situ* remedial measures (an aggressive SVE system) will be implemented to treat the contaminated soil beneath the Korbo Apartment Building and a neighboring building, House # 8571, also owned by Yukon Housing. Additional monitoring wells will be installed to ensure the contamination plume is not mobile, as well as to demonstrate that the overall quality at the site is improving. Phase II will be carried out similarly to Phase I, which includes *in-situ* remediation (SVE system) or excavating the remaining contaminated soil(approximately 2,500 m³). Remediation measures are to begin in August/Sept. 2011. Site monitoring will be ongoing, consisting of indoor/outdoor air quality

monitoring, and soil and groundwater sampling, until samples no longer exceed CSR guidelines and a notification that the remediation is complete issued by Yukon Environment. A final report will be prepared outlining remedial activities and monitoring completed on site.

Yukon Housing is investigating their options to demolish, relocate or leave the Korbo Apartment Building in place. If the building is demolished or moved, the entire contaminated area will be excavated in two phases. Phase I will consist of removing the building. Phase II will involve removal of approximately 5000 m³ of contaminated soil.

The Plan of Restoration is based on soil volume estimates derived from limited investigations. These volumes could change significantly depending on the results of additional sampling and site conditions during remediation work. Depending on the timing of deliverables, as well as field observations during investigation and remediation work, the remediation strategy may be altered in order to adapt to changing circumstances. ACG will contact Yukon Environment for approval prior to any significant changes to the Plan of Restoration.

7.0 LIMITATIONS

This report was prepared for the exclusive use of Yukon Housing Corporation, and is based on data and information collected in October and November, 2010 and June 2011. Access Consulting Group has followed standard professional procedures in providing Emergency Spill Response and Site Assessments in preparing the contents of this report. The material in the report reflects Access Consulting Group's best judgment in light of the information available at the time of the preparation of this report. Any use that a third party makes of this report, or any reliance on decisions to be made based on it, is the responsibility of the third parties. Access Consulting Group accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. Access Consulting Group believes that the contents of this report are substantively correct.

The information and data contained in this report, including without limitation the results of any sampling and analyses conducted by Access Consulting Group, are based solely on the conditions observed at the time of the excavation and have been developed or obtained through the exercise of Access Consulting Group's professional judgment and are set to the best of Access Consulting Group's knowledge, information, and belief. Although every effort has been made to confirm that all such information and data is factual, complete and accurate, Access Consulting Group offers no guarantees or warranties, either expressed or implied, with respect to such information or data.


Access Consulting Group shall not by the act of issuing this report be deemed to have represented that any sampling and analyses conducted by it have been exhaustive or will identify all contaminants or contamination of the site, and persons relying on the results thereof do so at their own risk.

Should you have any questions regarding this report, or if you require further information, please contact the undersigned at Access Consulting Group in Whitehorse, Yukon, at (867) 668-6463.

Prepared by:


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Janelle Langlais B.Sc.

Environmental Scientist



**DAWSON CITY
KORBO APARTMENTS
RESTORATION OPTIONS
and
PLAN OF RESTORATION**



**APPENDIX A
RELOCATION PERMIT**



SPECIAL WASTE RELOCATION PERMIT

Issued for the Relocation of Contaminated Material Pursuant to the Environment Act, Section 13(1) of the Contaminated Sites Regulation, and the Special Waste Regulations

Permittee: Yukon Housing Corporation

Mailing Address: Box 2703 (Y-1), Whitehorse, YT Y1A 2C6

Phone/Fax: (867) 667-3439 / (867) 667-3664

Email: darrin.fredrickson@gov.yk.ca

Removal Location: 954 – 6th Avenue (Lots 4, 5, 6 Block LD), Dawson City, Yukon

Receiving Location: Arctic Backhoe Land Treatment Facility at McLean Lake

In accordance with your application, Yukon Housing Corporation, represented by yourself, is hereby permitted to relocate water contaminated with petroleum hydrocarbons in excess of special waste criteria, hereinafter referred to as contaminated material, from the removal location to the receiving location, both as specified above, subject to the following conditions:

PART 1. GENERAL

1. The permittee shall comply with applicable requirements in all federal, territorial and municipal legislation.
2. All personnel (employees, contractors or volunteers) involved in the relocation of the contaminated material shall be knowledgeable of the conditions and requirements specified in this permit. A copy of this permit shall be available to all personnel when relocating the contaminated material.
3. The permittee shall allow an environmental protection officer, at any reasonable time, to enter any place or premise under the permittee's ownership or occupation, other than a private dwelling, and inspect any activity which is subject to this permit.
4. The permittee shall provide notice in writing to the Environmental Programs Branch (the Branch) prior to any significant change of circumstances regarding the relocation of the contaminated material, including without limitation:
 - a. a change in the receiving location; or
 - b. the relocation of material contaminated with substances other than those authorized by this permit.

DEPARTMENT OF ENVIRONMENT
 ENVIRONMENTAL PROGRAMS
 Whitehorse, Yukon
 Certified true copy of original
 OCT 15 2010
 Date:..... Initials: *AS*.....

PART 2. RELOCATION OF CONTAMINATED MATERIAL

1. This permit is valid only for the relocation of contaminated material from the removal location to the receiving location, as noted above, in a number of batches to be shipped from the date of issuance of this permit to October 31, 2011.
2. The estimated total volume of contaminated water to be relocated is **20 m³**, equivalent to 20,000L.
3. The permittee shall confirm to the Branch the actual volume of contaminated material relocated, no later than **November 30, 2011**.
4. The permittee shall ensure that all contaminated material is transported and transferred in such a manner as to prevent its release into the environment.
5. The maximum volume of contaminated material that may be relocated under this permit without undertaking an environmental screening pursuant to the *Yukon Environmental and Socio-economic Assessment Act* is 2,999m³.

PART 3. TRANSPORT AND TRANSFER OF SPECIAL WASTE

1. A waste manifest shall be completed to document each shipment of contaminated material considered to be special waste, and copies of the waste manifest shall be distributed in the manner described thereon.
2. The permit number **YG45-023** shall be used as the Provincial Identification Number on waste manifests used for the transport of the contaminated material.
3. The permittee shall ensure that the contaminated material is transported, in accordance with applicable transport laws, to a facility permitted in the Yukon or another jurisdiction to receive the contaminated material. For greater certainty, the permittee shall ensure that the contaminated material is transported by a transporter permitted to transport this type of special waste in the Yukon.
4. The permittee shall ensure that all vehicles carrying any contaminated material considered to be special waste are secured to prevent access by unauthorized persons.

PART 4. SAMPLING AND ANALYSIS

1. The permittee shall ensure that all contaminated material covered by this permit is sampled at a rate of one sample per 5 m³ and analyzed in accordance with all protocols pursuant to the *Contaminated Sites Regulation* that pertain to contaminant analysis.
2. The permittee shall ensure that the results of all analyses required under this Part are submitted to the Branch no later than **November 30, 2011**.

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Date: **OCT 15 2010** Initials: **ES**....

3. The permittee shall ensure that all information submitted to satisfy the requirements of this permit is accompanied by a documentation tracking form provided by the Branch, and submitted as instructed on that form.

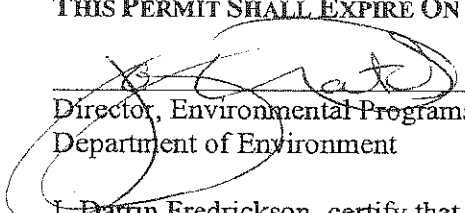
PART 5. INSPECTIONS & RECORD KEEPING

1. The permittee shall keep records of all analysis results (including raw analytical data), including those from in-situ, ex-situ, and confirmatory sampling, as applicable, for a minimum of 3 years and make them available upon request for inspection by an environmental protection officer.

PART 6. SPILLS

1. The permittee shall contact either an environmental protection officer, or the 24-hour Yukon Spill Report Centre (867-667-7244) as soon as possible under the circumstances in the event of a release, spill, unauthorized emission, discharge, or escape of any contaminated material.
2. The permittee shall ensure that appropriate clean-up equipment (such as sorbent, shovel, broom, bucket, gloves, boots, etc.) is in a readily available location at all locations where contaminated material is handled or stored and in all vehicles transporting contaminated material.
3. The permittee shall ensure that emergency spill procedures are posted at all locations where contaminated material is handled or stored and carried in all vehicles transporting contaminated material, and that all personnel (employees, contractors or volunteers) are familiar with those procedures.

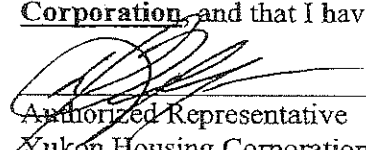
THIS PERMIT SHALL EXPIRE ON DECEMBER 31, 2011.



Director, Environmental Programs Branch
Department of Environment

Oct 15/10
Date

I, Darin Fredrickson, certify that I am the authorized representative of Yukon Housing Corporation, and that I have read and understood the terms and conditions of this permit.



Authorized Representative
Yukon Housing Corporation

Oct 15/10
Date

DEPARTMENT OF ENVIRONMENT
ENVIRONMENTAL PROGRAMS
Whitehorse, Yukon
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Date: OCT. 15. 2010 Initials: DF....



**DAWSON CITY
KORBO APARTMENTS
RESTORATION OPTIONS
and
PLAN OF RESTORATION**



**APPENDIX B
SPECIAL WASTE PERMIT**



Environment

Box 2703, Whitehorse, Yukon Y1A 2C6

October 18, 2010

Darrin Fredrickson
Yukon Housing Corporation
Box 2703 (Y-1)
Whitehorse, YT
Y1A 2C6

Dear Mr. Fredrickson:

Re: Special Waste Permit #41-245

Enclosed please find a certified copy of your special waste permit. Please ensure that a copy of this permit is kept on, and that all relevant staff are familiar with its conditions. Also, please note that if any operational details change, respecting the handling of special wastes, you are required to apply for an amendment to your permit.

Should you have any questions, please call me at (867) 667-8848.

Sincerely,

A handwritten signature in black ink that reads "B. Peters".

Bethany Peters
Environmental Protection Analyst
Environmental Programs Branch

Encl.



Permit No: 41-245

SPECIAL WASTE PERMIT

Issued for the generation and storage of special wastes pursuant to the Environment Act and the Special Waste Regulations

Permittee: Yukon Housing Corporation

Mailing Address: Box 2703 (Y-1), Whitehorse, YT, Y1A 2C6

Site Location: 954 – 6th Avenue, Dawson City, Yukon
Lots 4, 5, 6 Block LD

Phone/Fax: (867) 667-3439 / (867) 667-3664

Authorized Representative: Darrin Fredrickson

Email: darrin.fredrickson@gov.yk.ca

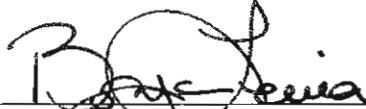
Effective Date: Date of Director's Signature

Expiry Date: December 31, 2012

Scope of Authorization: In accordance with your application, you are authorized to generate or store the following:

➤ **waste diesel fuel (mixed with water),**
hereinafter referred to as "listed special wastes", as set out in the terms and conditions of this permit.

Dated this 18 day of October, 2010


A/ Director, Environmental Programs Branch
Environment Yukon

DEPARTMENT OF ENVIRONMENT
ENVIRONMENTAL PROGRAMS
Whitehorse, Yukon
Certified true copy of original

Date: OCT 18/2010 Initials: B.P.

1.0 DEFINITIONS

1. In this permit,

“Act” means the *Environment Act*, R.S.Y. 2002, c. 76;

“associated personnel” means all employees, contractors and volunteers involved in the permitted activities;

“Branch” means the Environmental Programs Branch, Environment Yukon;

“facility” means the special waste management facility located at the site;

“head office” means the office of the permittee located in Yukon;

“listed special waste” means waste diesel fuel;

“Regulations” means the *Air Emissions Regulations*, O.I.C. 1998/207, the *Solid Waste Regulations*, O.I.C. 2000/11, the *Storage Tank Regulations*, O.I.C. 1996/194, and the *Special Waste Regulations*, O.I.C. 1995/047;

“vehicle” has the same meaning as in the *Motor Vehicles Act*, R.S.Y. 2002, c. 153; and

“waste manifest” means the shipping document required to be completed by the permittee as set out in this permit in the form approved by an environmental protection analyst.

2. Any term not defined in this permit that is defined in the Act or the Regulations has the same meaning as in the Act or the Regulations.

2.0 GENERAL

1. This permit is restricted to special wastes generated by the permittee.

2. The permittee shall ensure that all associated personnel:

- a) have access to a copy of this permit;
- b) are knowledgeable of the terms and conditions of this permit; and
- c) receive the appropriate training for the purposes of carrying out the requirements of this permit.

3. The permittee shall provide notice in writing to an environmental protection analyst from the Branch prior to any significant change of circumstances at the site, including without limitation:

- a) closure of the facility;
- b) a change of ownership of the facility;
- c) generating or handling special wastes other than those authorized by this permit; or
- d) a change in the mailing address, site location or phone number of the permittee.

4. Where conflicts exist between this permit, the permit application or any plans, this permit shall prevail.

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ENVIRONMENTAL PROGRAMS
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Date: oct 18/2010 Initials: BP

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3.0 TRANSPORT AND TRANSFER

Date: OCT 18, 2019..... Initials: BP.....

1. The permittee shall not transport or transfer special wastes other than within the site.
2. The permittee shall ensure that all listed special wastes are transported and transferred in such a manner as to prevent their release into the environment.
3. The permittee shall ensure that special wastes are transported to a permitted special waste management facility in the Yukon or another jurisdiction by a carrier permitted in the Yukon to receive and transport the special wastes.
4. The permittee shall complete a waste manifest documenting each shipment of special wastes from the site. The permittee shall distribute copies of the waste manifest in the manner described thereon.
5. The permit number **YG41-245** shall be used as the Provincial Identification Number on waste manifests used for the transport of the listed special wastes.
6. The permittee shall ensure that all vehicles operated by the permittee and carrying any special wastes are secured to prevent access by unauthorized persons.

4.0 STORAGE AND HANDLING

1. The permittee shall not handle special wastes other than listed special wastes.
2. The permittee shall not discard, destroy, treat, process, incinerate, or recycle special wastes, except for mixing or dilution authorized by an environmental protection officer pursuant to section 3(i) below.
3. The permittee shall:
 - a) cover or store out of inclement weather all drums and other portable containers containing special wastes;
 - b) store all drums and other portable containers containing special wastes off the ground;
 - c) immediately remove all special wastes stored in leaking containers or transfer them to intact containers;
 - d) store special wastes in a manner that will prevent incompatible substances from reacting adversely with each other;
 - e) ensure that all containers used for the storage of special waste are clearly marked to identify what special waste the container is intended to hold;
 - f) ensure that containers used for the storage of special waste are made of materials that will not adversely react with the special waste;
 - g) not allow any residue at the bottom of a container used for the storage of special wastes to be released to the environment. Such residue shall be collected by the permittee, separated from other waste and treated as a special waste until proven by testing to not be special waste;
 - h) not mix waste oil from piston engine aircraft with other waste oil;

- i) only mix or dilute a special waste with any other material where such mixing or dilution is authorized by an environmental protection officer from the Branch as an acceptable treatment/disposal option for the special waste;
 - j) keep all containers used to store special waste closed at all times during storage and not open, handle or store the container in a manner which may cause it to leak or rupture; and
 - k) have every closed container that
 - (i) has a capacity of more than 230 litres;
 - (ii) is designed to be installed in a fixed location; and
 - (iii) will contain special waste
 - a) certified by a testing agency recognized by the Standards Council of Canada prior to putting special waste in the container.
4. The permittee shall not store special waste in storage tanks unless specifically authorized by this permit.

5.0 STORAGE TANK REQUIREMENTS

1. All storage tanks to be used for the storage of the listed special wastes shall be certified by a testing agency recognized by the Standards Council of Canada (SCC).
2. No special wastes may be stored in an underground storage tank, therefore all unknown or uncharacterized wastes must either be:
 - a) analyzed and determined not to be special waste prior to allowing them to enter an underground storage tank; or
 - b) stored in aboveground storage tank(s).
3. The permittee shall ensure that different types of special wastes are not stored simultaneously in the same storage tank.
4. The permittee shall establish a special waste transfer area around each aboveground storage tank that has a concrete curb or earthen dike to contain any spills or leaks.
5. The permittee shall ensure that all aboveground storage tanks to be used for storage of listed special wastes provide for space to allow for manual and visual inspections for leaks.
6. The permittee shall ensure that all materials on pipes, pumps, seals, containers and any other equipment that comes in contact with a listed special waste is compatible with that special waste.
7. The permittee shall ensure that all aboveground storage tanks to be used for storage of listed special wastes with a capacity of more than 4,000 litres have an impervious secondary containment system.

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ENVIRONMENTAL PROGRAMS
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Date: OCT 18 2019 Initials: BF

8. Where an impervious containment system is required, it must provide for a permeability to water of less than 1×10^{-6} cm per second under a hydraulic head of 3 meters, and it must be sized to hold the larger of:
 - a) 110% of the largest volume of a listed special waste in any given container or tank; or
 - b) 25% of the total volume of listed special wastes in storage.
9. Where an impervious containment system is not required, the permittee shall ensure that a spill containment device is installed to the inlets of all aboveground storage tanks to prevent the release of any listed special wastes.
10. The permittee shall ensure that for aboveground storage tanks to be used for storage of listed special wastes with a capacity of more than 4,000 litres:
 - a) overflow protection is provided by means of:
 - i. fixed piping to an empty adjacent tank with a capacity equal to or greater than 20% of the protected tank; or
 - ii. a high level alarm set at 90% of the full liquid level of the tank; or
 - iii. an automatic feed cutoff system set at 95% of the full liquid level of the tank; and
 - b) all transfer lines, hoses, and pipes are equipped with automatic shutoff or closure on failure valves which close off the flow of listed special wastes in the event of a sudden accidental escape unless a method of containment is provided to prevent the release of listed special wastes.

6.0 SPILLS

1. The permittee shall contact either an environmental protection officer, or the 24-hour Yukon Spill Report Centre (**867-667-7244**) as soon as possible under the circumstances in the event of a release, spill, unauthorized emission, discharge, or escape of any of the listed special wastes.
2. The permittee shall ensure that appropriate clean-up equipment (such as sorbent, shovel, broom, bucket, gloves, boots, etc.) is in a readily available location at all locations where the listed special wastes are handled or stored.
3. The permittee shall ensure that emergency spill procedures are posted at all locations where the listed special wastes are handled or stored, and that all personnel (employees, contractors or volunteers) are familiar with those procedures.

7.0 INSPECTIONS AND RECORD KEEPING

1. The permittee shall ensure that storage tanks and storage containers are inspected:
 - a) weekly in terms of visual inspection for leaks of listed special wastes;
 - b) monthly in terms of volume of listed special wastes;
 - c) annually in terms of tank/container quality, piping, and auxiliary equipment; and
 - d) upon request from an environmental protection officer.

2. The permittee shall keep records of:
 - a) the name and site location of each person or company that delivers listed special wastes to the facility or from whom listed special wastes are picked up for collection at the facility;
 - b) the types of listed special wastes collected at the facility, their estimated volumes, and their storage location(s) at the facility;
 - c) results of any required analyses of waste oil feedstock samples;
 - d) inspections performed in accordance with subsection 1 above, and the results of those inspections;
 - e) the name of any company that transports listed special wastes from the facility;
 - f) the location to which the listed special wastes are transported; and
 - g) a copy of any waste manifest used to transport listed special wastes to, from, or by the facility.
3. The permittee shall keep all records required by this permit for a minimum of three years and make them available for inspection by an environmental protection officer upon request. Records shall be kept in a format acceptable to the Branch.
4. If an inspection reveals that the permittee is in any way not in compliance with this permit or approved plans (if applicable), the permittee shall repair the damage or take other actions as required to bring the facility into compliance.

I, Darrin Fredrickson [print name clearly], certify that I am an authorized representative of Yukon Housing Corporation, and that I have read and understood the terms and conditions of this permit.



Darrin Fredrickson, Authorized Representative
Yukon Housing Corporation

Oct 18/10
Date

DEPARTMENT OF ENVIRONMENT
ENVIRONMENTAL PROGRAMS
Whitehorse, Yukon
Certified true copy of original

Date: OCT 18/2010 Initials: BP



**DAWSON CITY
KORBO APARTMENTS
RESTORATION OPTIONS
and
PLAN OF RESTORATION**



**APPENDIX C
DETAILED IN-SITU REMEDIAL MEASURES**



October 28th, 2010

Darrin Fredrickson
Yukon Housing Corporation
Housing Operations (Y-1)
Box 2703, Whitehorse, Yukon
Y1A 2C6

File# 10-86

Re: Duty to Mitigate-954-6th Avenue Dawson City, Yukon (Korbo Apartments)

Dear Mr. Fredrickson,

Thank you for the meeting that was held on October 1st, 2010 between the Yukon Housing Corporation, Access Mining Consultants Ltd. (AMCL) and the Environmental Programs Branch (EPB) to discuss the release of home heating fuel that occurred at the captioned property resulting from a faulty fuel supply line.

This letter is to advise you of your responsibilities under the Yukon *Environment Act*.

Section 135 of the Yukon *Environment Act* states:

If a spill occurs, the person who owns or has possession, charge, or control of the spilled substance at the time of the spill shall, when they have knowledge of the spill,

a) take all reasonable measures

(i) to confine, repair and remedy the effects of the spill; and

(ii) to remove the substance spilled in such a manner as to reduce or mitigate any danger to human life, health, and the natural environment; and

b) restore or rehabilitate the natural environment to a condition reasonably equivalent to the condition that existed immediately before the spill occurred.

In order to fulfill your responsibilities under the Yukon *Environment Act*, the EPB requires the following steps to be taken:

- I. Complete a full site assessment as outlined in section 9 of the Yukon *Contaminated Sites Regulation* conducting all necessary tests, surveys and sampling in order to fully describe and delineate the vertical and horizontal extent of contaminated soil and groundwater within the area(s) affected by your spill.

- II. Obtain all necessary permits including a relocation permit from the EPB prior to any off site relocation, handling and/or storage of contaminated material from the captioned property. Information regarding necessary permits can be obtained by contacting Beth Peters at 667-8848.

The findings of the site assessment along with information confirming that all areas of the natural environment affected by your spill are restored to a condition reasonably equivalent to the condition that existed immediately before your spill occurred, shall be submitted to the EPB no later than **December 17th, 2010**.

The information submitted shall include the results of sampling and analysis conducted in accordance with the Department of Environment's Protocol 3, *Sampling Procedures for Soil Samples Taken in Relation to the Contaminated Sites Regulation*, and Protocol 5, *Petroleum Hydrocarbon Analytical Methods and Standards* and a diagram(s) depicting the locations within the excavation from which the samples were taken and the vertical and horizontal extent of the contamination.

Information concerning the Yukon *Environment Act*, *Contaminated Sites Regulation*, associated protocols and other relevant legislation can be found at the following website:

<http://environmentyukon.gov.yk.ca/monitoringenvironment/regulations.php>

Please be advised that the EPB is in receipt of a remedial strategy submitted by AMCL on October 8th, 2010 and concurs with all aspects of this remedial strategy.

Please call me at 667-5636 if you have any further questions or concerns regarding this matter.

Sincerely,



Jules Farkas
Environmental Protection Officer
Yukon Department of Environment

C. Bryan Levia-Manager, Monitoring & inspections (V-8)



**DAWSON CITY
KORBO APARTMENTS
RESTORATION OPTIONS
and
PLAN OF RESTORATION**



**APPENDIX D
DETAILED IN-SITU REMEDIAL MEASURES**

Korbo Apartments Remediation – Opinion of Project Cost

TO: Kurt Neunherz, Access Consulting Group

COPIES: Karl Reimer, CH2M HILL
Tom Palaia, CH2M HILL
Liz Van Warmerdam, CH2M HILL

FROM: Brooks Gummow

DATE: March 31, 2011

PROJECT NUMBER: 420095

Introduction

Access Consulting Group (ACG) retained CH2M HILL Canada Limited (CH2M HILL) to develop a scope of work and opinion of cost to provide technical services as part of the overall site remediation for the Korbo Apartments remediation project located in Dawson City, Yukon (subject property).

The purpose of this memorandum is to provide disbursement cost details for ACG to acquire and operate a mechanical treatment system. Please note that this opinion of cost is not representative of any fees for technical oversight services as proposed to be provided by CH2M HILL through the course of the project. Additional costs incurred by CH2M HILL, to include any or all of the contingency items as discussed below, will be billed on a time and material basis and have not been included in the March 18, 2011, draft proposal or in this memo.

It is understood that ACG will be assuming the responsibility for all construction costs and associated disbursements related to the completion of this work (construction of the *in-situ* system, laboratory services, well installation, etc.).

Some examples of these costs and the reasoning behind this cost opinion include:

- Treatment system equipment supply, delivery, and commissioning
- Contingencies for additional treatment system equipment
- Additional borehole drilling and monitoring well installation associated with the supplemental site assessment program
- Laboratory analyses of soil and groundwater samples collected during the remedial program

The cost to complete the tasks as noted above and the costs to complete the task as requested by ACG are summarized in the table below.

Task ID	Task Description	Cost/Contingency
A1	Supply/install of turnkey soil vapour extraction (SVE)/air sparge (AS) system	\$105,000/\$128,000
A2	Supply/install stand-alone SVE/AS system in retrofitted outbuilding	\$49,500/\$134,500
B*	Treatment system design and procurement	\$37,500/\$10,000
C	SVE/AS well installation and process piping infrastructure	\$122,000/\$10,000
D*	SVE/AS well installation supervision	\$25,000/NA
E*	Treatment system installation supervision	\$17,000/\$5,000
F*	Preliminary low flow groundwater sampling supervision	\$10,500/NA
G	Initial soil and groundwater analyses for MNA program	\$24,100/NA
H	Subsequent groundwater analyses for MNA program	\$49,250/NA
I*	Treatment system and MNA data review and reporting	\$22,500/NA

Notes: * Cost for task item previously provided in draft proposal.

The following sections provide the detail and background information supporting the development of the costs and potential contingencies included in this memo, and not included in the preceding draft proposal document. A table including established and contingency costs submitted on March 18, 2011, is attached to this memo for further reference in Appendix A.

Rationale and Consideration of Task Item Costs

Task A1 – Cost opinion for supply/installation of a pre-designed, pre-packaged SVE/AS System

In typical scenarios requiring the semi-permanent application of mechanical remediation technology, purpose built systems are pre-designed and containerized for shipment, placement, connection, and operation at a contaminated site. To this end, CH2M HILL contacted several equipment suppliers and requested cost and technical specifications for equipment that would perform the required functions, based on the extent of the general and environmental site assessment information provided by ACG.

The contingency amount for this task item is reflective of the following items:

- a) The potential requirement to procure and install a thermal catalytic oxidizer so as to treat SVE exhaust, should nuisance odours not be effectively mitigated by direct discharge to atmosphere or passive treatment methods (that is, granular activated carbon).
- b) The potential requirement to remobilize to the site to supervise the installation of the AS blower and associated process connections should this remedial step be warranted.

A proposal prepared by one of the remediation equipment suppliers, SCG Industries Limited (SCG), is attached in Appendix B for reference purposes. SCG has addressed the limitation of the existing power supply available at the subject property, and as such, will

allow the safe and efficient operation of the unit without the need for the installation of a high voltage power supply at the subject property.

Task A2 – Cost opinion for stand-alone SVE/AS blower option

At the request of ACG, costs to procure and install component remediation equipment within an existing site outbuilding have been assessed. To that end, preliminary discussions were undertaken with a regional equipment supplier, Oak Environmental Inc. (Oak) regarding the procurement costs for the required equipment. It is noted that the electrical design and installation tasks associated with the safe connection and effective operation of this equipment has not been provided by CH2M HILL. Furthermore, the actual costs to provide the remedial equipment on an as-is basis is difficult to quantify without the assistance of the property owner (Yukon Housing) or a qualified subcontractor who would ultimately be responsible for the proper installation and servicing of the equipment.

Contingency has been included for the following:

- a) The potential need to procure and install a thermal catalytic oxidizer in order to treat SVE exhaust should nuisance odours not be effectively mitigated by direct discharge to atmosphere or passive treatment methods (that is, granular activated carbon).
- b) The potential need to remobilize to the site to supervise the installation of the AS blower and associated process connections should this remedial step be warranted.

Task B – Treatment system design and procurement

Task B of the project includes various subtasks required to formalize the design and determine the technical logistics of providing SVE/AS equipment at the site, the associated well infrastructure, process connections, and operational monitoring program.

Contingency has been included for the following:

- a) The requirement to complete additional design subtasks to allow for the suitable installation and safe operation of the equipment at the site, which may include the guidance and instruction of Yukon Housing staff to make the existing structure fit to house and operate the equipment as specified. A cost for the building retrofit subtask has been included in the attached cost table. Additional electrical control and protection infrastructure may also be required. These tasks need to be completed by qualified personnel on-site and coordinated by a professional engineer (internally through CH2M HILL or as a subcontractor). The cost to complete the electrical design/installation has not been provided in the cost table provided (Appendix A).

Task C – SVE/AS well installation, process piping infrastructure and supplemental site assessment drilling

A qualified drilling contractor has been identified by CH2M HILL to complete the horizontal SVE and vertical AS wells as part of the overall remedial program at the site. The contractor, Geotech Drilling (Geotech) was contacted and a cost quote was prepared (the costs of which were included in the March 18 proposal). A figure detailing the preliminary conceptual design of this task is attached for further reference. The cost opinion prepared by Geotech is provided in Appendix C.

Appendix C is based on the following assumptions:

- a) Three horizontal SVE wells will be installed at the site (two beneath the apartment building and one beneath the single family residence).
- b) Twelve vertical AS wells will be installed surrounding the southern end of the apartment building.
- c) Geotech will supply all of the process piping required to connect the SVE and AS wells to the treatment system equipment.
- d) A minimum of 10 boreholes will be advanced at selected locations throughout the property and completed with monitoring wells. This task is required to further delineate the extent of contaminants and further support the development of the MNA program.

Contingency has been included for the following:

- a) The requirement to install an additional SVE well beneath the apartment building. This activity may be warranted should further review of site geology data indicate that an insufficient Radius of Influence (ROI) would be developed with only two wells operating at this location.

Tasks G and H – Soil and groundwater analytical disbursements

Supplemental site assessment data (that is, soil and groundwater analytical results) are required to substantiate the MNA program as previously proposed. A cost quotation was requested from Maxxam Analytics Inc. (Maxxam) on the basis of the following task-specific assumptions:

- a) The primary phase (Year 1) of the assessment will involve the collection of both soil and groundwater samples. Samples would be collected during the installation of the AS wells and supplemental site assessment boreholes advanced at the subject property.
- b) The subsequent 2 groundwater sampling events in Year 1 will involve the collection of groundwater samples (further supporting the MNA program).
- c) In the second phase (Year 2) of the site remediation activities, costs have been provided to account for 3 groundwater sampling events.

For the purposes of this memorandum, it is understood that ACG will assume the responsibility to process this disbursement directly. The quote prepared was based on our estimate of the number of samples that would be collected and the parameters required for both the supplemental site assessment and MNA programs. A copy of this quotation is attached in Appendix D for further reference.

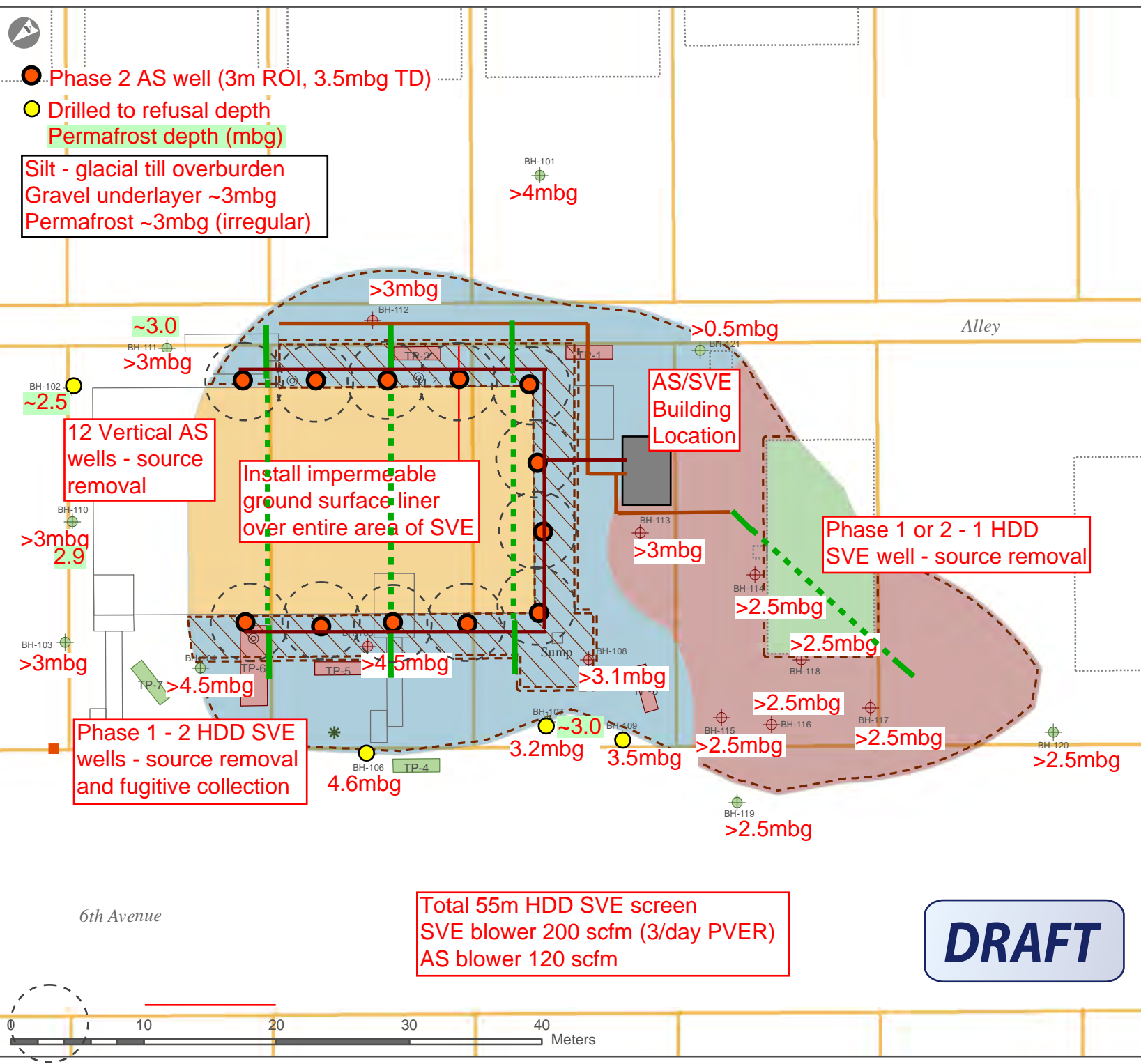
Assumptions in Opinion of Cost Development

The costs provided herein were not derived on a competitive basis and are for estimation purposes only. The opinion of cost has been provided for the development of a project budget by ACG only. Cost opinion is reflective of a +30%, -15% range only.

No costs have been included as a result of weather-related delays and pricing assumes no work is performed on-site from late spring to early summer.

This cost estimate has been prepared from the information available at the time of the estimate for guidance in project evaluation and implementation. The final costs of the project will depend on actual labour and material costs, competitive market conditions, implementation schedule, and other variable factors. As a result, the final project costs will vary from the estimates presented herein. Because of this, project feasibility and funding needs must be carefully reviewed prior to making specific financial decisions to help ensure proper project evaluation and adequate funding.

We trust that the information as attached and provided above meets your needs at the current time. Should you require any additional information, please do not hesitate to contact us.



APPENDIX A

COMBINED PROJECT TASK TABLE

Table 1. Korbo Apartments Remediation - Project Cost Table

Task	Cost Item	Unit Cost	Year 1	Year 2	CH2M Costs	ACG Costs	Total Line Item Cost	Contingency	comments
Cost Opinion for a Pre-Designed, Pre-Packaged System									
A1	SVE System Only - no AS blower or oxidizer	\$ 3,000	\$ 36,000	\$ 36,000	~	\$ 72,000	\$ 72,000		
	revised set-up cost - no AS blower or oxidizer	\$ 8,000	\$ 8,000	~	~	\$ 8,000	\$ 8,000		
	contingency for AS blower rental (monthly)	\$ 500	~	\$ 6,000	~	~	\$ 6,000	\$ 6,000	
	contingency for oxidizer	\$ 4,250	\$ 51,000	\$ 51,000	~	~	\$ 102,000	\$ 102,000	
	contingency for oxidizer shipping & setup	\$ 15,000	\$ 15,000	~	~	~	\$ 15,000	\$ 15,000	
	Freight - inbound in Year 1, outbound in Year 2	\$ 10,000	\$ 10,000	\$ 10,000	~	\$ 20,000	\$ 20,000		
	Contingency for AS blower installation supervision by CH2M (Year 2)	\$ 5,000	~	\$ 5,000	~	~	\$ 5,000	\$ 5,000	
	Air Phase Carbon - to address potential nuisance odours	\$ 5,000	\$ 5,000	~	~	\$ 5,000	\$ 5,000		assumes 3 change-outs - by treatment system provider
Sub-total for task			\$ 59,000	\$ 46,000		\$ 105,000		\$ 128,000	actual cost of task is Year 1 + Year 2 only (no contingencies carried)
Cost Opinion for a Stand-alone SVE & AS Blower Option (utilizing existing shed)									
A2	Building removal, replacement and retrofit (Yukon Housing)	\$ 7,500	\$ 7,500	~	~	\$ 7,500	\$ 7,500		assumed costs for YH staff to complete - electrical design/install cost excluded
	SVE Blower Purchase - Oak Environmental	\$ 12,500	\$ 12,500	~	~	\$ 12,500	\$ 12,500		as per information provided to ACG by Oak Environmental
	SVE freight	\$ 2,250	\$ 2,250	~	~	\$ 2,250	\$ 2,250		as per information provided to ACG by Oak Environmental
	SVE setup (Yukon Housing or others)	\$ 5,000	\$ 5,000	~	~	\$ 5,000	\$ 5,000		
	contingency for oxidizer	\$ 4,250	\$ 51,000	\$ 51,000	~	~	\$ 102,000	\$ 102,000	
	contingency for oxidizer shipping & setup	\$ 15,000	\$ 15,000	~	~	~	\$ 15,000	\$ 15,000	
	AS Blower Purchase	\$ 12,500	~	\$ 12,500	~	\$ 12,500	\$ 12,500	\$ 12,500	as per information provided to ACG by Oak Environmental
	AS freight	\$ 2,250	~	\$ 2,250	~	\$ 2,250	\$ 2,250	\$ 2,250	as per information provided to ACG by Oak Environmental
	AS setup (Yukon Housing or others)	\$ 2,500	~	\$ 2,500	~	\$ 2,500	\$ 2,500	\$ 2,500	
	Contingency for AS blower installation supervision by CH2M (Year 2)	\$ 5,000	~	\$ 5,000	~	~	\$ 5,000	\$ 5,000	
Air Phase Carbon - to address potential nuisance odours	\$ 5,000	\$ 5,000	~	~	\$ 5,000	\$ 5,000		assumes 3 change-outs - by filter media supplier	
Sub-total for task			\$ 32,250	\$ 17,250		\$ 49,500		\$ 134,500	
B	CH2 System Design and Procurement	300 hrs @ \$125/hr	\$ 37,500	~	\$ 37,500		\$ 37,500		
	contingency for additional design/engineering for A2 option	80 hrs @ \$125/hr	\$ 10,000				\$ 10,000	\$ 10,000	
C	SVE/AS Well Install (GEOtech) - disbursement assumed by ACG	\$ 92,500	\$ 92,500	~	~	\$ 92,500	\$ 92,500		as per details in proposal document
	contingency for additional horizontal well beneath apt bldg	\$ 10,000	\$ 10,000	~	~	\$ 10,000	\$ 10,000	\$ 10,000	based on further site geology data study
	pipng, fittings and instrumentation for SVE/AS well connections	\$ 5,000	\$ 5,000	~	~	\$ 5,000	\$ 5,000		PVC pipe by GeoTech - fittings and installation by others
	delineation BH/MWs (10) by GeoTech	\$ 14,500	\$ 14,500	~	~	\$ 14,500	\$ 14,500		vapour monitoring equipment by ACG
D	SVE/AS Well Install Supervision (BAG/KDR)	160 hrs @ \$125/hr	\$ 20,000.00	~	\$ 20,000.00	~	\$ 20,000		as per details in proposal document
	travel to site (KDR)	\$ 2,000	\$ 2,000.00	~	\$ 2,000.00	~	\$ 2,000		
	vehicle, accommodation & per diem	12 days @ \$250/day	\$ 3,000.00	~	\$ 3,000.00	~	\$ 3,000		
E	CH2 System Install Supervision (BAG)	110 hrs @ \$125/hr	\$ 13,750	~	\$ 13,750		\$ 13,750		as per details in proposal document
	travel to site (BAG)	\$ 2,000	\$ 2,000	~	\$ 2,000		\$ 2,000		
	vehicle, accommodation & per diem	5 days @ \$250/day	\$ 1,250	~	\$ 1,250		\$ 1,250		
F	Preliminary Low-flow GW Sampling (KDR & BAG)	60 hrs @ \$125/hr	\$ 7,500.00	~	\$ 7,500.00	~	\$ 7,500		as per details in proposal document
	monitoring supplies and sampling equipment for LF pgm	\$ 1,500	\$ 1,500.00	~	\$ 1,500	~	\$ 3,000.00	\$ 3,000	
G	Soil and GW Analytical Disbursement (Maxxam)		\$ 24,100.00	~	~	\$ 24,100.00	\$ 24,100		full MNA suite - 100% of GW, 50% of soils
H	Post Install GW Analytical Disbursement (Maxxam)	\$9,850/event	\$ 19,700.00	\$ 29,550.00	~	\$ 49,250.00	\$ 49,250		
I	Site Monitoring Data Analyses and Reporting	7.5 hrs/mo @ \$125/hr	\$ 11,250.00	\$ 11,250.00	\$ 22,500.00	~	\$ 22,500		as per details in proposal document
Sub-total for tasks			\$ 255,550	\$ 42,300	\$ 109,500	\$ 188,350	\$ 297,850		

Total Cost Summary		Year 1 Total Cost	Year 2 Total Cost	CH2M Costs	ACG Costs	Grand Total	Contingency (WC)
With Task A1 Option	\$	314,550	\$ 88,300	\$ 109,500	\$ 293,350	\$ 402,850	\$ 138,000
With Task A2 Option	\$	287,800	\$ 59,550	\$ 109,500	\$ 237,850	\$ 347,350	\$ 154,500
Difference (A1-A2)	\$	26,750	\$ 28,750	\$ -	\$ 55,500	\$ 55,500	\$ (16,500)

APPENDIX B

SCG INDUSTRIES EQUIPMENT QUOTE

SCG Industries Ltd



EQUIPMENT PROPOSAL

Presented to

CH2M HILL, INC.

Dawson City, Yukon

Submitted March 1st, 2011
Document number: P10,863

Equipment description:

Site 1:

Air Sparge blower	Type	Rotary Lobe
	Model	Sutorbilt 4H
	Power	240 volt, Single Phase, 10 hp, VFD controlled
	Capacity	120Scfm @ 10 psi
	Features	Inlet filter
		Throttle and dilution valve
		Temperature switch / indicator
	Pressure indicator	
	Pressure relief valve	

Air sparge manifold	Material of construction	Carbon steel
	Capacity	12, one inch outlet lines
	Features	1" Brass gate valve for each line
		flow meter for each line
		Pressure gauge for each line

VES blower	Type	Rotary Lobe
	Model	Sutorbilt 3L
	Power	240 volt, Single phase, 3 hp
	Capacity	200 scfm @ 50"H2O
	Features	Inline filter / silencer
		Throttle, check, and dilution valve
		Vacuum relief valve
		Vacuum indicator
		Averaging pitot tube flow meter for total air flow
	Air sample ports pre and post blower	
	Discharge silencer	

Air water separator	Material of construction	Carbon steel
	Capacity	200 scfm
		H/H level switch, discharge pump control floats

SVE manifold	Material of construction	Carbon steel
	Capacity	3 two inch inlet lines
	Features	2" Brass gate valve for each line
		flow meter port for each line
		sample port for each line
		Vacuum gauge for each line

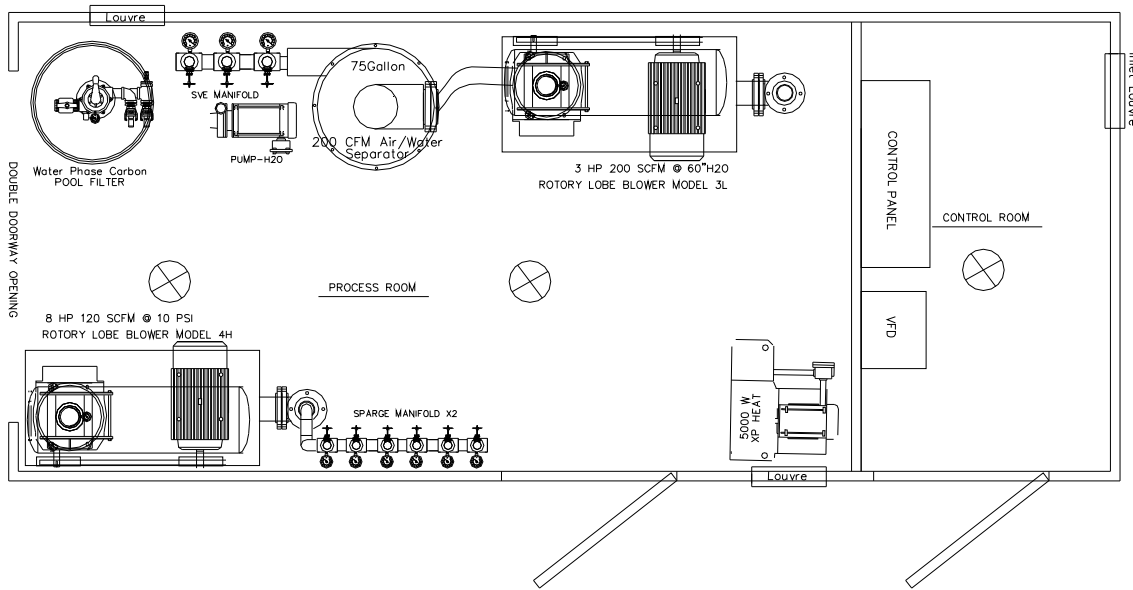
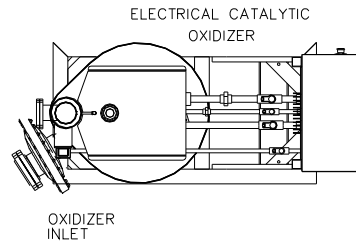
Equipment enclosure	Type	2 Room Reconditioned Sea Container c/w Painted satin coat interior
	Dimension	20' X 8' X 8'6"
	Process Rm.Classification	As per NEC, class 1 div 2 - complies w local building code
	Features	Heated and insulated, ventilation and lighting
	Elect. Rm Classification	General Purpose

Electrical / control panel	Voltage	120 volt , Single phase
	Disconnect	240 volt 200 amp lockable main disconnect
	Classification	As per NEC, geneal purpose, Nema 4 electrical enclosure
	Certification	Control panel CSA approved
	Features	Magnetic motor starters / VFD
		Telemetry capable
	PLC controller	

Options:

Electric oxidizer	Type	Falmouth Electric Catalytic Oxidizer
	Model	Falco 300
	Capacity	300 scfm

Enclosure Layout:



Pricing:

Installation:

Technician (including travel and training time)	100	\$95.00	\$9,500.00
Supervisor	0	\$130.00	\$0.00
Travel	1	\$2,000.00	\$2,000.00
Disbursement supervisor	0	\$200.00	\$0.00
Disbursements (3 men)	8	\$200.00	\$1,600.00
		Subtotal:	13,100.00

Equipment

Sparge SVE system	1	\$75,000.00	\$75,000.00
Electric Oxidizer	1	\$82,800.00	\$82,800.00
Shipping estimate	1	\$10,000.00	\$10,000.00
		Subtotal:	\$167,800.00

Monthly rental option (12 month minimum)

Sparge SVE system	12	\$3,500.00	\$42,000.00
Electric Oxidizer	12	\$4,200.00	\$50,400.00
Shipping estimate	1	\$10,000.00	\$10,000.00
		Subtotal:	\$102,400.00

Note: 60% of rental can be used towards purchase at anytime during the rental period.

Should you require more information do not hesitate to contact me.

Regards,

SCG INDUSTRIES LIMITED

Michael C Campbell
President

APPENDIX C

GEOTECH DRILLING COST ESTIMATE



Cost Estimate

Bill to: **Ch2M Hill Canada Ltd.**

Date: Mar 19,2011

Care of: Ch2M Hill Canada Ltd.
255 Consumer Road
Toronto, Ontario M2J 5B6

Revised No./Date: _____

Project Manager: John Cameron

Cost Estimate No.: _____

ATTN: Karl Reimer, MSc., P.Eng., QPESA

Unit No. (Drill Rig): Fraste Mito

Tel: 1 416 499 0090 ext 73601

Location: Dawson City

Email: karl.reimer@ch2m.com

Province: YT

Scope: Drill 3 - 6" horizontal B/Hs under an existing structure 15m deep. Drill and install 12 - 4" sparge wells vertically to a depth of 3.5m around property. Drill and install 10 - 2inch M/Ws to a depth of 3.5m completed with road boxes.

Itm	Qty	Unit	Description	Price	Extended
1	120	hrs	Auger/Odex drilling	305.00	36,600.00
2	58	hrs	Overtime (after 8 hours, weekends, stats/two man crew)	65.00	3,770.00
3	1	L/S	Mobilization	28570.00	28,570.00
4		hrs	Crew travel	149.00	-
5	12	shift	Support vehicle(truck mount)	249.00	2,988.00
6	13	shift	Crew subsistence (two man crew)	378.00	4,914.00
7	12	shift	2 Air compressor (300/200)	850.00	10,200.00
8	12	shift	Grout pump	199.00	2,388.00
9	6	hrs	Safety meeting	149.00	894.00
10		hrs	Rig standby	225.00	-
11	330	ft	6" Odex bit wear consumption	12.75	4,207.50
12	120	ft	4" Odex bit wear consumption	5.75	690.00
13					-
14	35	10ft	4" Bell couple sched 40 PVC	67.30	2,355.50
15	14	10ft	4.96 PVC for installation in horizontal wells	154.60	2,164.40
16	28	10 ft	4" solid PVC	102.35	2,865.80
17	15	10 ft	4" slotted PVC	138.45	2,076.75
18	5	10 ft	Solid 1", 1.5" or 2" p.v.c. well casing	36.87	184.35
19	10	10 ft	Slotted 1", 1.5" or 2" p.v.c. well casing	49.45	494.50
20	10	ea	1", 1.5" or 2" slip caps	3.45	34.50
21	10	ea	J-plugs	28.69	286.90
22	10	ea	Flush mount casing protectors	97.75	977.50
23	10	bags	Fast set pre-mix concrete	17.25	172.50
24		bags	Portland cement	23.75	-
25	45	bags	Sand	15.52	698.40
26	38	bags	Bentonite chips	28.55	1,084.90
27	18	bags	Premix grout	34.44	619.92
28					-
29					-

Terms & Conditions: E. & O.E. Cost Estimate valid for 60 days. Underground / Overhead utilities are the sole responsibility of the client. Lost, broken or unrecoverable tooling will be charged at cost plus 15%. Cancellation fees & restocking charges may apply if less than 48 hours notice. Invoice Payment terms: Upon Receipt. 2% interest charges will apply on past due accounts.. Invoice considered accepted and approved 15 days after receipt unless written notification is received.

Overtime is applicable after 8 hours, weekends, and statutory holidays

Subtotal \$ 109,237.42

H.S.T.

G.S.T. \$ 7,646.62

TOTAL DUE \$ 116,884.04

British Columbia

5052 Hartway Drive • Prince George • British Columbia • Canada • V2K 5B7

Tel: (250)962-9041 • Fax: (250)962-9046 • Web: geotechdrilling.com

Promotion Code: _____

Thank You for Your Business!

APPENDIX D

MAXXAM ANALYTICS QUOTE



Client: **CH2M HILL**
 Address: **Suite 300**
255 Consumers Road
Toronto, ON M2J 5B6
 Phone: **416-499-0090 (x73622)**
 Fax: **416-499-9772**
 Contact: **Brooks Gummow**
 E-Mail: brooks.gummow@ch2m.com

PROJECT QUOTATION

Quotation:

Maxxam Reference: B11-044.1-FC

Effective Date: March 24, 2011

Valid Until: August 31, 2011

Dawson City, YT

Parameter	Method	Quantity	Price Per Sample	Extended Price	Notes
GROUNDWATER					
BTEX/VH/VPW	GCMS/HS, Calculation	25	\$55.00	\$1,375.00	BC/YT equivalent to F1
LEPH/HEPH (includes PAHs and EPHs)	GCMS/GCFID, Calculation	25	\$155.00	\$3,875.00	BC/YT equivalent to F2-F4
Nitrate	Colourimetry, Calculation	25	\$11.50	\$287.50	
Sulphate	Colourimetry	25	\$11.50	\$287.50	
Ferrous Iron	Colourimetry	25	\$55.00	\$1,375.00	
Methane	GCPID	25	\$75.00	\$1,875.00	
Alkalinity	Titration	25	\$11.50	\$287.50	
Dissolved Organic Carbon (DOC)	Colourimetry	25	\$17.00	\$425.00	
Subtotal				\$9,787.50	
SOIL					
BTEX/VH/VPW	GCMS/HS, Calculation	52	\$55.00	\$2,860.00	BC/YT equivalent to F1
LEPH/HEPH (includes PAHs and EPHs)	GCMS/GCFID, Calculation	52	\$155.00	\$8,060.00	BC/YT equivalent to F2-F4
Leachable Nitrate	Colourimetry, Calculation	26	\$15.00	\$390.00	
Leachable Sulphate	Colourimetry	26	\$15.00	\$390.00	
Ferrous Iron (Leachable)	Colourimetry	26	\$70.00	\$1,820.00	
Total Organic Carbon (TOC)	Leco (Combustion)	26	\$26.00	\$676.00	
Subtotal				\$14,196.00	
TOTAL				\$23,983.50	Taxes & disposal extra

ADDITIONAL FEES		Soil	Water
Environmental Disposal Fee	Charged on a per sample basis	\$2.00	\$2.00
Hold Fee at 4 degrees C	Samples submitted with no test request	\$5.00	\$5.00
Archive Data Retrieval	\$50 per hour	-	-
Electronic Data Deliverables	In MS Excel spreadsheet or client-specific form	n/c	n/c
PROJECT SPECIFIC TURN-AROUND-TIME (TAT)			
* TAT surcharges have been included in the unit rates quoted above.			

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BLANKET DISCOUNT

- * Any analysis not specifically listed in this agreement will be discounted 20% off the prices listed in the current British Columbia & Yukon Price and Service Guide, or by other agreement.
- * For large sampling programs related to a specific project, please contact your account manager for a specific project quotation.

METHOD PERFORMANCE, DETECTION LIMITS AND ENVIRONMENTAL GUIDELINES

- * Unless stated otherwise, a review of the scope of work (per ISO 17025) indicates that Maxxam standard target analytes and reporting limits will meet client requirements. Prices are quoted on this basis. Sample matrix interferences may result in changes to the detection limits. Additional fees may apply to meet more stringent requirements.
- * Methods used in British Columbia are in accordance to the BC Environmental Laboratory Manual (2003).
- * Please contact your Project Manager for standard parameter lists and reporting limits.
- * Dilutions due to matrix interferences may raise detection limits above criteria.
- * It is the client's responsibility to inform the laboratory of any detection limit requirements at the time of submission.

QUALITY ASSURANCE

- * Maxxam has a national quality assurance program supported by dedicated, trained, full-time Quality Assurance staff.
- * Maxxam is broadly accredited by the Canadian Association for Laboratory Accreditation (CALA). Details at www.cala.ca.
- * Reports will include quality control results where appropriate (e.g. analyte spikes, method blanks, duplicates, and uncertainty).
- * Analysis of additional quality control samples at a rate of 1 every 10 sample is available on an as-needed, as-requested basis at no extra charge.

TURN-AROUND-TIME (TAT)

- * All TAT quoted is in business days
- * TAT, on samples received past 3:00 pm or on Saturday or Sunday, begins the next business day.
- * For weekend or holiday work, additional charges may apply. Please contact your Project Manager.



Client: **CH2M HILL**
 Address: **Suite 300**
255 Consumers Road
Toronto, ON M2J 5B6
 Phone: **416-499-0090 (x73622)**
 Fax: **416-499-9772**
 Contact: **Brooks Gummow**
 E-Mail: brooks.gummow@ch2m.com

PROJECT QUOTATION

Quotation:

Maxxam Reference: B11-044.1-FC

Effective Date: March 24, 2011

Valid Until: August 31, 2011

SERVICE (valid for tests not already covered in the pricing section)	PREMIUM/ SURCHARGE
Same Day TAT (limited parameters)	200%
ASAP (fastest possible TAT)	100%
1 Day TAT (end of next business day)	100%
2 Day TAT	50%
3 Day TAT	0%
Standard 5-7 Day TAT	Regular Rate

Advance notice of all RUSH projects prior to arrival is requested. Please call your Project Manager to schedule.

- 1-day TAT is defined as those samples arriving prior to 3 pm and reported by the end of the next business day (6 pm).
- In the event of incomplete or conflicting submission information, TAT begins immediately once resolved.
- If rush service is required to meet hold times, surcharges will be charged even if standard TAT is requested.
- Surcharges are only charged for actual TAT received, not TAT requested.

CONTACTS

Contact Title	Contact Name	Telephone	Responsibilities
BRITISH COLUMBIA			
4606 Canada Way, Burnaby, BC V5G 1K5		604-734-7276	
Manager of Business Development & Account Manager	Fred Chen	604-612-2451	Business development and sales.
Project Manager	Jennifer Exter	604-639-2627	Main point of contact for reporting, shipping, invoicing.
Account Manager	Dave Wallace (Ontario)	416-455-5289	Technical account manager.
Customer Service Manager	Rob MacArthur	604-639-8431	Team manager for customer service.
General Manager	Rob Gilbert	604-639-8404	Operations and workload management.

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SHIPPING CHARGES

- Shipment of containers and sampling supplies by the most cost-effective means is included.
- Shipping to Maxxam's laboratory facilities is the responsibility of the client and not included in the cost.
- Please provide a minimum of 1 business day notice for bottle orders, particularly for large orders.
- Coolers and shipping containers remain the property of Maxxam Analytics.

QUOTE REFERENCE

- The quotation number must appear on the Chain of Custody upon sample submission
- If no quotation number is provided, standard pricing will be applied.

TERMS AND CONDITIONS

- Taxes are not included in the costs quoted above. Taxes will be added at time of billing.
- Please include our quotation number with all correspondence submitted.
- Payment terms are net 30 days.
- Quotation is valid only on an approved credit.

MAXXAM AUTHORIZATION

Fred Chen, B.Sc., P.Chem
 Manager of Business Development (British Columbia & Yukon)

March 24 ,2011

Date

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MAXXAM ANALYTICS - TERMS AND CONDITIONS 2011

STANDARD TERMS AND CONDITIONS

The following terms and conditions apply to the Services to be provided by Maxxam Analytics International Corporation ("Maxxam"). For the purposes of this document "Services" includes the services provided by Maxxam as described or reported on the preceding pages, and includes all related services and reporting thereon. In the event of a conflict between these and any other terms and conditions contained in any purchase order or other documentation relating to the Services not specifically agreed to in writing by Maxxam, these terms and conditions shall govern.

LIABILITY

Maxxam's sole responsibility is to perform its Services in accordance with commonly accepted professional standards using accepted, and where applicable, accredited testing methodologies and procedures, unless lesser standards or methods are prescribed by the client. Maxxam's liability in connection with the performance or non-performance of Services is to the Client only, and does not extend to the Client's or Maxxam's successors, assigns, associates, affiliates, officers, employees, directors, contractors, customers or to any other third party, and is limited to the actual cost of the specific analysis included in the Services. Maxxam has no liability whatsoever for indirect, consequential, exemplary, incidental, special or punitive damages including lost profits, even if Maxxam has been advised of the possibility of such damages. Except as aforesaid, Maxxam disclaims all warranties, express or implied, including without limitation any warranties of merchantability or fitness for a particular purpose. The client agrees to indemnify and hold Maxxam harmless from all claims, damages and losses including the cost of defence in connection with or arising out of performance of the Services, except only as aforesaid.

CONFIDENTIALITY PROMISE

All results and information obtained by Maxxam will be held in strict confidence unless (i) the Client directs otherwise in writing, (ii) any disclosed information is at the time of its disclosure or subsequently become generally available to the public without breach of any confidentiality agreement by Maxxam, or (iii) disclosure is compelled by law, in which event Maxxam will use commercially reasonable efforts to give Client prior written notice of any disclosure to be made, and at Client's expense, Maxxam shall cooperate fully with Client to obtain protective orders, confidential treatment or other such protective action as may be available to preserve the confidentiality of the information required to be disclosed.

INSURANCE

Proof of insurance is available upon request.

FEES

Published prices for analytical services may be subject to change without prior notification.

SAMPLE STORAGE

Maxxam will retain for a minimum of 30 days from receipt for no additional cost. Longer storage periods are available upon request, but additional charges may apply. Maxxam reserves the right to return unused portions of samples to the client, at the Client's expense.

SAMPLE DISPOSAL

Maxxam will safely dispose of any unused samples in accordance with local environmental regulations. A disposal fee may apply.

HAZARDOUS SAMPLES

Samples which are suspected to be hazardous, must be clearly marked as such prior to submission to the laboratory. These samples may be returned to the Client or disposed of by Maxxam at additional cost.

MINIMUM CHARGE

A minimum charge may be applied to analytical submissions to cover the cost of containers, shipping and project management expenses.

TERMS

Net 30 days, 1.5% service charge per month on overdue accounts. Purchase order, cheque or credit application may be required before work commences. Accounts overdue by 90 days or more may be referred to a collection agency. Maxxam reserves the right to withhold data or refuse samples on overdue accounts.

CREDIT APPLICATION

Maxxam requires a credit application to be completed to set up an account, and updated credit information provided on an annual or as requested basis. Based on the result of the credit application an appropriate credit limit will be established. Maxxam reserves the right to withhold data or refuse samples once this limit has been reached.

CHAIN OF CUSTODY

Chain of Custody forms ("COC") will be provided and must accompany samples to document the transfer of samples from the field to the laboratory. Complete instructions as to analysis and reporting requirements are to be included. A signed COC provides authorization from the Client to Maxxam to proceed with the testing under our standard terms and conditions. Failure to sign the COC may result in delays of turn around time or processing samples, or refusal to accept samples.

RETURN SHIPPING OF SAMPLES

Maxxam assumes no responsibility for samples or sampling supplies that are lost or delayed as a result of independent couriers.

SAMPLING SUPPLIES (SINGLE USE)

Sample bottles, preservatives, labels and COCs are available when requesting services. Contact your client service representative for minimum sample size requirements, sampling protocols and/or to place an order. Some sample containers are available only on a cost or rental fee basis, please refer to your client service representative for more details. A charge may apply for containers ordered, but not returned to Maxxam for testing.

RENTAL SAMPLING EQUIPMENT

Sampling supplies including summa canisters, compressed breathing air cylinders, air media, glassware and pumps are provided to the Client for a rental fee or as part of an analytical package. The Client assumes full responsibility for replacement costs in the event of loss or damage at Maxxam's sole discretion. Rental charges are charged regardless if samples are collected or not and are based on a set period of time. Late fees may apply for rental equipment returned beyond the quoted rental term.



CH2M HILL
255 Consumers Road
Toronto, Ontario M5J 5B6
Tel 416-499-9000
Fax 416-499-4687

March 18, 2011
Mr. Kurt Neunherz
Access Consulting Group
#3 Calcite Business Centre
151 Industrial Road
Whitehorse YT, Y1A 2V3

Subject: Proposal to provide Remedial Support at the Dawson City Korbo Apartments

Dear Mr. Neunherz:

CH2M HILL Canada Limited (CH2M HILL) is pleased to present this proposal to Access Consulting Group (ACG) for design, installation, and monitoring of a soil vapour extraction (SVE) and air sparging (AS) system for remediation of petroleum hydrocarbons at the Korbo Apartments in Dawson City, Yukon Territory (YT). This proposal describes the phased remedial approach and objectives, details our scope of work, provides a budget estimate for our tasks, statement of assumptions, and suggestions for value added options to the proposal.

1.0 Project Background

CH2M HILL understands that a release of home heating fuel occurred in early October 2010 at the Yukon Housing Corporation's Korbo Apartment complex, located at 954 - 6th Avenue, Dawson City Dawson City YT.

The heating fuel was stored in an approximately 8,000 litre (L) above ground storage tank that connects to the building by an underground fuel line located on the south side of the building. It was concluded that the release resulted from a crack in the elbow of the underground fuel line, located before the line enters the apartment building.

Following discovery of the fuel release, ACG was retained by Yukon Housing Corporation to provide the following services:

- Emergency Spill Response;
- Phase II Environmental Site Assessment (PII ESA); and
- Complete a Plan of Restoration (POR) for the cleanup of the spilled fuel.

Emergency spill response activities recovered approximately 23,600 L of a mixture of fuel and water.

The PII ESA activities included the advancement of soil borings, installation of monitoring wells and test pitting. ACG reported that the findings indicate that the onsite soils are generally medium- to coarse-grained and that the water table is located between 1.6m and

3m below grade (mbg). Groundwater flow is interpreted to be towards the north northwest and the Yukon River. Frozen groundwater conditions were encountered during the fall months. Permafrost was noted in several borings at a depth of approximately 2.5 to 3 mbg.

Based on preliminary site assessment activities, ACG has concluded that some of the released fuel migrated beneath two residential buildings onsite and that approximately 5,100 m³ of soil, some of that being beneath these buildings, are contaminated with fuel.

With technical support of CH2M HILL, the POR was completed by ACG and included the following activities:

- Excavating soils in accessible areas of the site and transport of these soils to a land treatment facility (LTF);
- Treatment of soils contaminated with fuel that remain in place using conventional mechanical aeration treatment technologies. Based on the available information, both ACG and CH2M HILL determined that the most effective treatment options to address residual impacts beneath the footprint of the site buildings is to employ a combination of soil vapour extraction (SVE) and air sparging (AS) technologies.
- Monitored natural attenuation (MNA) of residual soil and groundwater contamination around the excavation and zones of AS/SVE.
- A monitoring program to evaluate the efficacy of the treatment system.

Based on budget constraints, Yukon Housing has requested that the remediation be divided into two phases which are to be completed in 2011 and 2012.

1.1 Phase 1-2011 Activities

According to the POR, the following activities will be completed in 2011:

1. Excavation of accessible impacted soils immediately adjacent to the apartment building to an approximate depth of 3.5m, with offsite disposal for the purposes of biological remediation in an LTF;
2. Installation of onsite (in-situ) treatment infrastructure (i.e., the AS and SVE systems) to address impacts in areas of the site inaccessible to excavation equipment. This includes beneath the Korbo Apartment and the smaller building to the west of it;
3. Operation of the SVE portion of the treatment system;
4. Design and implementation of groundwater monitoring and sampling program to quantify the degree to which MNA is occurring in the groundwater.
5. System optimization to identify potential adjustments or modifications to the SVE system or operating approach that could improve remedial performance and efficiency; and
6. Reporting.

1.2 Phase 2-2012 Activities

According to the POR, the following activities will be completed in 2012:

1. Excavation of impacted soils soil in accessible areas beyond the extent of the Phase 1 excavation limits, with offsite disposal for the purposes of biological remediation in an LTF;
2. Operation of the SVE and AS of the treatment system; and
3. Groundwater monitoring and sampling for MNA.
4. System optimization to identify potential adjustments or modifications to the AS/SVE system or operating approach that could improve remedial performance and efficiency; and
5. Reporting .

2.0 CH2M HILL Project Responsibilities and Objectives

Through discussions with ACG, CH2M HILL understands that our role in implementing the POR is to:

1. Design, arrange for procuring the materials and observe the installation, commissioning and personnel training of the AS/SVE treatment system. Once commissioned and personnel are trained, the system will be operated and it's performance monitored by ACG. Performance monitoring data identified by CH2M HILL will be recorded. That data will be provided to CH2M HILL in a report format for review. Should modifications to the system be recommended, CH2M HILL will communicate recommendations to ACG to implement.

Summary of ACG's responsibilities:

- i. Administrate construction contract
 - ii. Provide personnel to be trained by CH2M HILL and operate/monitor the AS/SVE system following commissioning
 - iii. Provide operating/monitoring reports, including data, to CH2M HILL for review in report formatProvide operating/monitoring reports, including data, to CH2M HILL for review in report format
2. Develop a groundwater monitoring program to evaluate the effectiveness and performance of natural attenuation processes. CH2M HILL will undertake the first groundwater monitoring event with ACG and demonstrate appropriate sampling techniques: ACG will then conduct all future monitoring events. ACG will be responsible for field and laboratory analysis of samples and will provide all data collected to CH2M HILL in electronic format for evaluation. CH2M HILL will review the data and prepare a report on the effectiveness of natural attenuation processes at the site based on the first round of data. ACG will prepare all future reports, using the first as a template and, CH2M HILL will provide peer review and comments as necessary.

Summary of ACG's responsibilities:

- i. Provide personnel to be trained by CH2M HILL to collect groundwater samples during the first groundwater monitoring event

- ii. Collect groundwater samples for all subsequent monitoring events
- iii. Complete laboratory analysis based on analytical parameters suggested by CH2M HILL
- iv. Complete MNA reports based on CH2M HILL template

3.0 Proposed Scope of Work

In order to achieve the project objectives outlined in this proposal, the following tasks will be undertaken by CH2M HILL:

3.1 Design, Procure Materials for, Install and Commission Treatment System

There is reported to be approximately 1,700 m³ of contaminated soil beneath the buildings that cannot be excavated and treated at the LTF. Based on the POR, this contamination is to be addressed by treatment using a combination of SVE and AS. CH2M HILL is relying solely on the data generated by ACG's initial assessment of the property for use as a basis for the approach in this proposal. CH2M HILL has provided preliminary treatment system design plans based on the limited Phase II ESA data available. To increase the efficacy and efficiency of the SVE/AS system, CH2M HILL recommends a more comprehensive geological/hydrogeological study of the area be completed in advance of CH2M HILL designing the in situ treatment system. This is discussed in further detail under subsection entitled "Value-added Suggestions." For budgeting purposes and based on information obtained in ACG's January 2011 report entitled: "Emergency Spill Response, Site Assessments, and Plan of Restoration, CH2M HILL assumes that the following SVE and AS systems will be appropriate for remediation of the petroleum hydrocarbon contamination to 3.5 mbg at the site:

SVE System

- A total of four horizontal borings will be advanced (three beneath the apartment building and one beneath the single family residence) with each boring being 15 m in length and 1.5 mbg;
- A well will be installed in each horizontal boring and will be constructed of 100 mm (~4-inch) diameter (Ø) Schedule 40, poly-vinyl chloride (PVC) well screen material. Given the medium- to coarse-grained nature of the native soils, there will be no sand-packing around the screen;
- The SVE blower system will be sized to extract a total airflow rate 200 standard cubic feet per minut (scfm);
- 38 mm Ø Sch40 PVC field piping will convey air from each SVE well to a manifold on the SVE blower system influent
- Anticipated contaminants of concern in the vapour stream are toluene, ethylbenzene, and xylenes (TEX), and volatile petroleum hydrocarbons (C6-C10). At this conceptual stage, it is assumed that direct venting through the stack to the

atmosphere will be an appropriate approach to managing the collected vapours. No off-gas treatment system has been included in this proposal.

- An instrumentation and control system will be provided to automate the systems operation and provide automatic shutdown in case of excessive moisture collection or thermal overload.

AS System

- Twelve vertical AS wells will be installed around the perimeter of the apartment building, (with an assumed radius of influence (ROI) of 3m per well);
- The target depth of the sparging wells is approximately 3 mbg (to the top of the permafrost) and will consist of 50 mm Ø Sch40 PVC material with a 0.3-m, 20-slot screen packed with silica sand pack and grouted to surface.
- 25 mm Ø Sch40 PVC field piping will deliver air to each AS well from a manifold on the AS system effluent
- The target depth of the sparging wells is approximately 3 mbgs (0.5 m below the observed water table) and will consist of 100 mm diameter (Ø) PVC material with a 1-m, 20-slot screen packed with silica sand pack and grouted to surface.
- The AS blower will be sized to provide a total airflow rate of 120 scfm;
- An instrumentation and control system will be provided to automate its operation and provide automatic shutdown in case of SVE shut down or thermal overload. The SVE will collect vapours generated by the AS system. Therefore, AS will only be operated if the SVE system is operational.

CH2M HILL will provide construction quality control oversight and engineering services during construction. CH2M HILL will provide three days of startup support for pneumatic leak and functional performance testing. CH2M HILL will provide an Operation and Maintenance (O&M) Manual and 0.5-day training for staff on safe and proper operation of the SVE system. The O&M Manual will include procedures to follow for performance monitoring of the AS and SVE systems.

3.2 Develop a Groundwater Monitoring Program

A program of groundwater monitoring will be used to assess the performance of the AS/SVE treatment system, to modify the system to improve its contaminant mass removal efficiency, and to track the attenuation of contaminants surrounding the treatment zone. Using available information, CH2M HILL will develop a groundwater monitoring plan that will characterize background/baseline conditions, delineate the areal extent of the contaminated groundwater plume and assess natural attenuation processes. Given that the existing wells were installed at the site for other purposes, it is anticipated that additional monitoring wells will be needed to meet the data objective.

The groundwater monitoring plan will consist of two sampling events per year in recognition that water in these shallow wells will be frozen from early fall until late spring. The plan will define sampling protocols and parameters appropriate for the assessment of

the natural attenuation of petroleum hydrocarbon compounds in ambient conditions. CH2M HILL, in conjunction with ACG will conduct the initial groundwater monitoring event and CH2M HILL will prepare a technical memo documenting the results, assessing the analytical results and making recommendations for modifications (if any) for future monitoring events. It is understood that ACG will conduct all future monitoring and evaluation events, with CH2M HILL providing internal peer review services.

3.3 Report Preparation and Data Evaluation

CH2M HILL will provide review and recommendations for improvement of remediation during remediation O&M. It is assumed that ACG will prepare the draft reports and CH2M HILL will perform a peer review. The documents to be reviewed include 2011 and 2012 year-end activities reports that documents the results of the soil excavation work and the installation, commissioning details of the AS/SVE system, and natural attenuation evaluation. CH2M HILL will also review brief technical memos that will be drafted by ACG on a quarterly basis that summarize the performance monitoring results for the AS/SVE treatment system.

Remediation Systems Data Analysis

CH2M HILL will review performance data collected by ACG from the SVE and AS systems on a monthly basis. If the data indicates that the system is not performing as expected or that modifications to the system are recommended, then CH2M HILL will contact ACG with that information following data review. Otherwise, the system's performance assessment will be documented in a brief technical memorandum on a quarterly basis.

In addition, CH2M HILL will prepare an annual summary of the system's performance that can form part of ACG's annual performance report to the Yukon Government, with data being compared to the Yukon government's regulatory framework, stating the limitations of the data.

MNA Program

CH2M HILL will prepare the initial MNA assessment report and will then act as internal peer reviewer of subsequent reports to be prepared by ACG. As such, CH2M HILL has not budgeted any time to contribute to the annual performance report to the Yukon Government on this part of the overall program.

4.0 Estimate of Cost

The costs to implement the scope of work as listed above are summarized in the following table. All work will be conducted using CH2M HILL's Agreement For Subconsulting Services From CH2M HILL Canada Limited, Revised 10/05.(attached)

Cost Item	Year 1 Cost	Year 2 Cost	Total Cost
AS/SVE Treatment System Design and O&M Manual	\$35,000	NA	\$35,000
SVE & AS Well and Field Piping Installation Oversight	\$22,500	NA	\$22,500
AS/SVE Treatment System Installation Oversight, startup and Training	\$14,250	\$10,000	\$24,250
Groundwater Monitoirng Program Development	\$10,000		\$10,000
Initial MNA Sampling Program (Soil and Groundwater)	\$5,250	NA	\$5,250
Treatment System Performance and MNA Data Evaluation and Reporting	\$11,375	\$11,375	\$22,750
TOTAL	\$98,375	\$21,375	\$119,750

Please note that the above quoted amounts do not include applicable taxes or disbursement fees associated with invoice processing.

It is understood that ACG will be assuming the responsibility for of the subcontractor costs and associated disbursements related to the completion of this project (construction of the in situ system, laboratory services, well installation, etc). A separate cost opinion will be communicated to ACG with respect to additional project costs that have been estimated by CH2M on ACG's behalf. The costs will include the following items:

- Treatment system equipment supply, delivery and commissioning;
- Contingencies for additional treatment system equipment;
- Additional borehole drilling and monitoring well installation associated with the supplemental site assessment program; and
- Laboratory analyses of samples developed during the remedial program.

The accuracy of the cost opinion is classified as +50%/-30% and was prepared for guidance in project evaluation from the information available at the time. The final cost of the items included in the cost opinion will depend on final design, selected scope of work, actual labour and material costs, competitive market conditions, implementation schedule, and other variable factors outside the control of CH2M HILL. As a result, the actual costs may

vary from the estimate presented herein. Because of this, it is recommended that the project feasibility and funding needs be carefully reviewed prior to making specific decisions to help determine project viability.

5.0 Schedule

The following tentative schedule is provided for review (assuming that field work begins in April 2011):

Date	Deliverable/Action Item (Year 1 Phase Only)
May 2, 2011	CH2M HILL arrives onsite to oversee the installation of treatment system infrastructure (drilling activities for SVE wells, assuming 2 days per well)
May 10, 2011	CH2M HILL oversees the advance of the vertical AS wells (assuming 3 wells/day)
May 12-13, 2011	Treatment system components delivered and connected
May 14, 2011	CH2M HILL oversees commissioning of SVE system;
May 15, 2011	CH2M HILL conducts trouble shooting and system testing and initiates low flow groundwater sampling program
May 17, 2011	<ul style="list-style-type: none"> • CH2M HILL demobilizes from site • Daily treatment system monitoring program begins
Late May/ early June, 2011	<ul style="list-style-type: none"> • Soil and groundwater sampling results become available for review and comment regarding treatment system operations data is also provided for the previous two week period • Treatment system monitoring frequency changes to weekly events
Mid July, 2011	ACG attends the site to conduct a second groundwater sampling event
End of July, 2011	Analytical results of groundwater sampling and treatment system operations data for the previous month are provided for review and comment
End of August, 2011	Treatment systems operations data for the previous month are provided for review and comment
Mid September, 2011	ACG attends the site to conduct a third groundwater sampling event
End of September, 2011	Analytical results of groundwater sampling as well as treatment systems operation data for the previous month are provided for review and comment
End of November,	Assuming the system cannot remain operational throughout the late fall and winter months, CH2M HILL will evaluate the system operation and

2011	the groundwater and soil analytical results and provide comments to append to ACGs operations maintenance and monitoring report
End of March, 2012	Assuming the system remained operational throughout the late fall and winter months, CH2M HILL will evaluate the system operation and the groundwater and soil analytical results and provide comments that will be appended to ACGs operations maintenance and monitoring report

Based on the review of monitoring data obtained from the operation of the treatment system and the MNA program analytical data, recommendations will be provided to ACG regarding the necessity of operating the SVE system alone or begin the AS portion of the remedial program. The overall performance monitoring program for 2012-20013 (Year 2 phase) will follow a comparable schedule with respect to the frequency and timing of the monitoring events.

6.0 Assumptions

This scope of work and estimate of cost have been prepared using several key assumptions. These assumptions include:

1) The apartment building will be unoccupied for the duration of the remedial program.

Under the current conditions, electrical power required to operate the SVE and AS equipment will leave no additional capacity to support the occupation of the apartment building.

2) Electrical supply to the site will be limited to current availability.

As the site is located in a residential area, the power supply is expected to be limited to 120/208 V single phase current. The minimum amperage demand of the treatment system equipment will be 200 A at this rating. Minor modifications by the treatment system supplier to the remediation equipment will be required, resulting in increased system supply costs. It is also expected that costs to operate the system will be slightly higher using an electrical supply with a lower voltage rating.

3) The extent and impacts and overall contaminant distribution patterns are similar to those reported in ACG's site assessment and restoration plan report.

The proposed SVE and AS well installations have been designed using the above mentioned report as a reference guide. Should site conditions be found to be different than as previously stated, additional infrastructure installation costs may be incurred.

4) SVE and AS infrastructure can be installed within the same mobilization as the Phase 1 excavation activities.

In order to maximize the effectiveness and minimize the cost associated with the horizontal SVE well installations, the workplan assumes that the drilling equipment

will be able to operate from within the limits of the excavated area surrounding the apartment building prior to backfilling activities. Furthermore, it is assumed that the excavation equipment can be utilized to allow for the effective completion of the horizontal wells beneath both site building. The placement of the drilling equipment at the prescribed depth, will allow for minimal deviation in the overall elevation of the SVE well piping and will reduce the total length of boring

- 5) Utility services and sub-grade structures will be accurately identified by ACG and or Yukon Housing prior to the advancement of the SVE and AS well network and that these components will not limit the ability to install the well network as proposed.**

To ensure that no subsurface utilities or building structures are encountered during the well installation activities, the type, location and depth of all known subsurface utilities and foundation structures must be properly identified prior to the commencement of drilling activities. It is recommended that both public and private utility contractors be employed to determine the location of services terminating at the site buildings or passing through the site. Additionally, if plans or as-built drawings of the site buildings are available, they should be provided to CH2M HILL prior to well installation activities.

- 6) Mechanical remediation equipment will be acquired on a rental basis for a maximum period of two years.**

Based on the preferred remedial option, the expected construction project lifespan has been estimated at two years. The active remediation of the site and MNA program can and should continue until such a time that the site has been sufficiently remediated (anticipated to be more than 2 years). It is noted that the break-even point for treatment system rental, with respect to the purchase price is between 18 and 24 months. While the treatment system can be operated indefinitely, the effectiveness of the treatment system should be routinely evaluated from a cost-benefit perspective to ensure project value is maintained.

- 7) Soil vapour treatment (adsorptive media or catalytic oxidizer etc) will not be required.**

Based on discussions with ACG, it is understood that current legislative requirements do not mandate treatment of emissions from site remediation equipment. Typical applications of an SVE treatment system as proposed would include treatment options such as activated carbon adsorptive media or thermal catalytic oxidation. The cost to provide this equipment will be provided to ACG on a contingency level. This additional treatment system element could be added to the process stream in the future should it be deemed necessary. It is further understood that the SVE system must exhaust at elevation above nearby window openings such that the treatment system exhaust stack will be affixed to the outside of the apartment building and extended above the roofline of the building.

8) The SVE system will remove subsurface contamination, but is not designed to remediate indoor air quality.

CH2M HILL makes no claims that the SVE system will effectively remedy indoor air quality, if concerns are identified by ACG. If indoor air quality concerns are found, then additional characterization and remediation beyond that specified herein will be required.

7.0 Value-added Suggestions

The assumptions made to prepare this proposal carry some risk. The recommendations below are means by which those risks can be minimized. They are offered as options for further discussion, if warranted valuable by ACG. These costs have not been included in our cost estimate above.

1) Air injection could cause some permafrost melting .

Install thermistors to monitor permafrost and structural stability of the building (if built into permafrost).

Estimated cost = \$2,000

2) The current remedial approach is based on site characterization and no treatability or air permeability information.

To increase the efficacy and efficiency of the SVE/AS system, CH2M HILL recommends a more comprehensive geological/hydrogeological assessment to better focus the remedial efforts onsite. CH2M HILL recommends that any further assessment be completed in advance of CH2M HILL completing its design of the in situ treatment system.

Estimated cost = \$50,000

3) The current offgas treatment approach does not consider exposure of public to VOCs that are emitted.

Perform screening-level air dispersion modeling to design the exhaust stack height to comply with ambient air quality objectives at potential receptor locations.

Estimated cost = \$3,000

4) The SVE system is shallow and could result in ground surface short-circuiting.

Install a ground surface vapour barrier to mitigate short circuits. This could be added after installation of the system to improve performance of the system if necessary

Estimated cost = \$20,000

5) Affect of spring melt and Yukon River water level rise is unknown. This could result in submergence of the SVE wells if not properly cited.

Install water level transducers to log rise of water table and record water table fluctuation throughout the year. SVE will need to be installed above the high water

mark in order to ensure it remains useful throughout the year.
Estimated Cost = \$5,000

We trust that the material included in this proposal meets your requirements. It has been a pleasure to work with you on this exciting project. If you have any questions, please do not hesitate to contact Karl at: 416-499-9000 extension 73601

Sincerely,

CH2M HILL CANADA LIMITED

DRAFT

DRAFT

Karl Reimer, M.Sc., P.Eng, QPESA
Project Manager

Chris Coggans, M.Sc., P.Geo.
Vice-President

ACKNOWLEDGEMENT AND AUTHORIZATION

I/we have authority to bind Access Consulting Group and have reviewed the proposal presented herein including the scope of work, the price estimate, the terms and conditions, and hereby accept it and authorize CH2M HILL Canada Limited to proceed.

Signed: _____

Date: _____

PROVISIONS

ARTICLE 1. TERMS OF PAYMENT

1.1 Invoicing

CH2M HILL will submit monthly invoices to CONSULTANT. Such invoices will be consistent with the compensation terms of this AGREEMENT and will be prepared in a form and supported by documentation as CONSULTANT may reasonably require.

1.2 Invoice Payments

1.2.1 Following receipt of reimbursement from OWNER, payment will be made by CONSULTANT to CH2M HILL within 15 days for the approved invoice amount.

1.2.2 If receipt of reimbursement to CONSULTANT from OWNER is delayed for reasons unrelated to CH2M HILL, payment to CH2M HILL will be due from CONSULTANT within sixty (60) days of the date of CH2M HILL's invoice.

1.2.3 CH2M HILL reserves the right to suspend services under this AGREEMENT after giving seven (7) days' written notice to CONSULTANT if CONSULTANT fails to make payment in full to CH2M HILL, including interest as provided herein. CH2M HILL will have no liability to CONSULTANT because of such suspension of service.

1.2.4 In the event of a disputed or contested billing, only that portion so contested will be withheld from submittal to OWNER. CONSULTANT will exercise reasonableness in contesting any bill or portion thereof.

1.2.5 CONSULTANT will provide CH2M HILL with a copy of all billings sent to OWNER at time billings are sent.

1.3 Final Payment

Upon completion of the Scope of Services, CH2M HILL will notify CONSULTANT, in writing, that the Scope of Services is complete and that final payment is due. If the Scope of Services has been completed in accordance with this AGREEMENT, final payment will be made within 15 days of receipt of payment from OWNER or if any such payment is delayed, within 60 days from the date of CH2M HILL's final invoice.

1.4 Liens

CH2M HILL will promptly pay for all services, labour, material, and equipment used or employed in the Scope of Services, and will maintain all materials, equipment, structures, buildings, premises, and other subject matter hereof, free and clear of mechanic's or other liens.

1.5 Interest

1.5.1 Any interest received by CONSULTANT from the OWNER for late progress payments or holdbacks will be shared with CH2M HILL on a pro rata basis.

1.5.2 Interest at the rate of 1-1/2 percent per month, or the highest rate permitted by law if lesser, will be charged on all past-due amounts. Payments will first be credited to interest and then to principal.

ARTICLE 2. OBLIGATIONS OF CH2M HILL

2.1 Independent Contractor

CH2M HILL is an independent contractor and will maintain complete control of and responsibility for its employees, subcontractors, and agents. CH2M HILL will also be responsible for the means and methods for carrying out the Scope of Services and for the safety of its employees. Nothing contained in this AGREEMENT will create any contractual relationship between OWNER and CH2M HILL, nor any other party except CONSULTANT.

2.2 Lower Tier Subcontractors

Neither this AGREEMENT nor any lower tier subcontract will create any contractual relationship between any Lower Tier Subcontractor and CONSULTANT, nor any liability of CONSULTANT to any Lower Tier Subcontractor.

2.3 Performance

The standard of care applicable to CH2M HILL's services will be the degree of skill and diligence normally employed by others performing the same or similar services at the time the services are performed. CH2M HILL will reperform any services not meeting this standard without additional compensation.

2.4 Insurance

2.4.1 CH2M HILL will maintain throughout this AGREEMENT the following insurance and will, if requested, submit certificates verifying such to CONSULTANT:

- (a) Worker's compensation insurance and employer's liability insurance as required by the province where the work is performed.
- (b) Automobile and vehicle liability insurance covering claims for injuries to members of the public and/or damages to property of others arising from use of motor vehicles, including onsite and offsite operations, and owned, non-owned, or hired vehicles, with \$1,000,000 combined single limits.
- (c) Commercial general liability insurance covering claims for injuries to members of the public or damage to property of others arising out of any covered negligent act or omission of CH2M HILL or of any of its employees, agents, or subcontractors, with \$1,000,000 per occurrence and in the aggregate.
- (d) Professional liability insurance of \$1,000,000 per claim and in the aggregate.

2.4.2 All insurance certificates will state that the insurance carrier will give CONSULTANT thirty (30) days notice of any cancellation or material change of the policies.

2.5 Codes, Laws, and Regulations

CH2M HILL will comply with all applicable codes, laws, regulations, standards, and ordinances in force during the term of this AGREEMENT.

2.6 Permits, Licenses, and Fees

CH2M HILL will obtain and pay for all permits and licenses required by law that are directly associated with CH2M HILL's performance of the Scope of Services.

2.7 Publicity and Confidentiality

CH2M HILL will not disclose the nature of its Scope of Services on the PROJECT, or engage in any other publicity or public media disclosures with respect to this PROJECT without prior written consent of CONSULTANT and the OWNER.

2.8 Copies of Data

One legible copy of each of all laboratory, field, or other notes, log book pages, and technical data, computations, designs, and other instruments of service prepared under the terms of this AGREEMENT will be delivered by CH2M HILL to CONSULTANT, if requested, upon completion of the Scope of Services.

2.9 Access to Records

CH2M HILL will maintain accounting records, in accordance with generally accepted accounting principles and practices, to substantiate all invoiced amounts. Said records will be available for examination by CONSULTANT during CH2M HILL's normal business hours for a period of one (1) year after CH2M HILL's final invoice. CONSULTANT may only audit accounting records applicable to cost-reimbursable type compensation.

2.10 Suspension of Work

CH2M HILL will, upon written notice from CONSULTANT, suspend, delay, or interrupt all or a part of the Scope of Services. In such event, CH2M HILL will resume the Scope of Services upon written notice from CONSULTANT, and an appropriate extension of time and adjustment of compensation will be mutually agreed upon.

2.11 Schedule

The schedule and/or terms of completion for the performance of services under this AGREEMENT shall be as specified in the Scope of Services.

2.12 Subsurface Investigations

In soils, foundation, groundwater, and other subsurface investigations, the actual characteristics may vary significantly between successive test points and sample intervals and at locations other than where observations, exploration, and investigations have been made. Because of the inherent uncertainties in subsurface evaluations, changed or unanticipated underground conditions may occur that could affect total PROJECT cost and/or execution. These conditions and cost/execution effects are not the responsibility of CH2M HILL.

2.13 CH2M HILL's Personnel at Construction Site

2.13.1 The presence or duties of CH2M HILL's personnel at a construction site, whether as onsite representatives or otherwise, do not make CH2M HILL or its personnel in any way responsible for those duties that belong to the CONSULTANT, OWNER and/or construction contractors or other entities, and do not relieve the construction contractors or any other entity of their obligations, duties, and responsibilities, including, but not limited to, all construction methods, means, techniques, sequences, and procedures necessary for coordinating and completing all portions of the construction work in accordance with the contract documents and any health or safety precautions required by such construction work.

2.13.2 CH2M HILL and its personnel have no authority or duty to exercise any control over any construction contractor or other entity or their employees in connection with their work or any health or safety precautions and

have no duty for inspecting, noting, observing, correcting, or reporting on health or safety deficiencies of the construction contractor or other entity or any other persons at the site except CH2M HILL's own personnel.

2.13.3 The presence of CH2M HILL's personnel at a construction site is for the purpose of providing to CONSULTANT and OWNER a greater degree of confidence that the completed work will conform generally to the contract documents and that the integrity of the design concept as reflected in the contract documents has been implemented and preserved. CH2M HILL neither guarantees the performance of any construction contractors nor assumes responsibility for contractor's failure to perform their work in accordance with the contract documents, nor does CH2M HILL have any duty or obligation in relation to any of the foregoing.

2.14 Opinions of Cost, Financial Considerations, and Schedules

2.14.1 In providing opinions of cost, financial analyses, economic feasibility projections, and schedules for the PROJECT, CH2M HILL has no control over cost or price of labour and materials; unknown or latent conditions of existing equipment or structures that may affect operation or maintenance costs; competitive bidding procedures and market conditions; time or quality of performance by third parties; quality, type, management, or direction of operating personnel; and other economic and operational factors that may materially affect the ultimate PROJECT cost or schedule. Therefore, CH2M HILL makes no warranty that the actual PROJECT costs, financial aspects, economic feasibility, or schedules will not vary from CH2M HILL's opinions, analyses, projections, or estimates.

2.14.2 If CONSULTANT or OWNER wishes greater assurance as to any element of PROJECT cost, feasibility, or schedule, Consultant or OWNER as the case may be will employ an independent cost estimator, contractor, or other appropriate advisor. The party employing such estimator, contractor or advisor shall bear the cost thereof.

2.15 Construction Progress Payments

Recommendations by CH2M HILL to CONSULTANT for periodic construction progress payments to any construction contractor will be based on CH2M HILL's knowledge, information, and belief from selective sampling that the work has progressed to the point indicated in the Schedule. Such recommendations do not represent that continuous or detailed examinations have been made by CH2M HILL to ascertain that such construction contractor has completed the work in exact accordance with the Contract Documents; that the final work will be acceptable in all respects; that CH2M HILL has made an examination to ascertain how or for what purpose the construction contractor has used the moneys paid; that title to any of the work, materials, or equipment has passed to OWNER free and clear of liens, claims, security interests, or encumbrances; or that there are not other matters at issue between OWNER and the construction contractor that affect the amount that should be paid.

2.16 Record Drawings

Record drawings, if required, will be prepared, in part, on the basis of information compiled and furnished by others, and may not always represent the exact location, type of various components, or exact manner in which the PROJECT was finally constructed. CH2M HILL is not responsible for any errors or omissions in the information from others that is incorporated into the record drawings.

ARTICLE 3. OBLIGATIONS OF CONSULTANT

3.1 Timely Review

CONSULTANT will examine CH2M HILL's studies, reports, proposals, and other PROJECT-related documents and render decisions required by CH2M HILL in a timely manner.

3.2 Prompt Notice

CONSULTANT will give prompt written notice to CH2M HILL whenever CONSULTANT observes or becomes aware of any development that effects the scope or timing of the Scope of Services, or any defect in the work of CH2M HILL.

3.3 Furnished Data

CONSULTANT will provide CH2M HILL with all technical data in its possession, including, but not limited to, previous reports, maps, surveys, borings, and other information relating to CH2M HILL's Scope of Services on the PROJECT. CH2M HILL may reasonably rely upon the accuracy of the information provided by CONSULTANT.

3.4 Changes

3.4.1 CONSULTANT may make changes, revisions, additions, or deletions (collectively hereinafter called "changes") in the Scope of Services. CH2M HILL will not proceed with any changes unless notified to proceed in writing by CONSULTANT.

3.4.2 Any such change will provide for an equitable adjustment in time, compensation, or both under this paragraph.

3.5 Access to Facilities and Property

CONSULTANT will arrange access to OWNER's facilities as required for CH2M HILL's performance of its services and will arrange to have the OWNER provide labour and safety equipment as required by CH2M HILL for such access. CONSULTANT will also perform or arrange for the OWNER to perform, at no cost to CH2M HILL, such tests of equipment, machinery, pipelines, and other components of OWNER's facilities as may be required in connection with CH2M HILL's services. OWNER will be responsible for all acts of OWNER's personnel.

3.6 Advertisements, Permits, and Access

Unless otherwise agreed to in the Scope of Services, CONSULTANT will obtain, arrange, or pay for advertisements for bids; permits and licenses required by local, provincial, or federal authorities, except those identified in Article 2.6; and land, easements, rights-of-way, and access necessary for CH2M HILL's services or PROJECT construction.

3.7 Contractor Indemnification and Claims

CONSULTANT agrees to include in all construction contracts the provisions of Article 2.13, and provisions requiring contractor indemnification of OWNER and CONSULTANT for contractor's negligence.

3.8 OWNER's Insurance

During construction of the PROJECT, CONSULTANT will use its best efforts to ensure that:

- (a) OWNER will maintain property insurance on all pre-existing physical facilities associated in any way with the PROJECT.
- (b) OWNER will provide for a waiver of subrogation as to all OWNER-carried property damage insurance, during construction and thereafter, in favour of CONSULTANT, its officers, employees, agents and subcontractors and subconsultants.
- (c) OWNER will provide (or have any construction contractors provide) a Builders Risk All Risk insurance policy for the full replacement value of all PROJECT work including the value of all onsite OWNER-furnished equipment and/or materials associated with CONSULTANT's services. Such policy will include coverage for loss due to defects in materials and workmanship and errors in design, and will provide a waiver of subrogation as to CONSULTANT and such construction contractors (or OWNER), and their respective officers, employees, agents, affiliates, subconsultants, and subcontractors. CONSULTANT will provide CH2M HILL a copy of such policy.

3.9 Litigation Assistance

The Scope of Services does not include costs of CH2M HILL for required or requested assistance to support, prepare, document, bring, defend, or assist in litigation undertaken or defended by CONSULTANT or OWNER. All such services required or requested of CH2M HILL by CONSULTANT or OWNER, except for suits or claims between the parties to this AGREEMENT, will be reimbursed as mutually agreed, and payment for such services shall be in accordance with Article 1, unless and until there is a finding by a court or arbitrator that CH2M HILL's negligence caused CONSULTANT's or OWNER's damage.

ARTICLE 4. GENERAL LEGAL PROVISIONS

4.1 Assignments

This is a bilateral personal services AGREEMENT. This AGREEMENT shall be binding upon and enure to the benefit of the parties hereto, their respective successors and assigns. No party may assign its rights hereunder except as herein expressly provided.

4.2 Waivers

No waiver by either party of any default by the other party in the performance of any provisions of this AGREEMENT will operate as, or be construed as, a waiver of any future default.

4.3 Force Majeure

CH2M HILL will not be liable for delays in performing the Scope of Services, or for the direct or indirect cost resulting from such delays, that may result from acts of God, acts of governmental authorities, or any other cause beyond CH2M HILL's reasonable control. In such event, CH2M HILL's schedule and compensation shall be equitably adjusted.

4.4 Authorization To Proceed

Execution of this AGREEMENT by CONSULTANT will be authorization of CH2M HILL to proceed with the Scope of Services, unless otherwise provided for in this AGREEMENT.

4.5 No Third-Party Beneficiaries

This AGREEMENT gives no rights or benefits to anyone other than CH2M HILL and CONSULTANT and has no third-party beneficiaries.

4.6 Governing Law

The law of the province in which CH2M HILL's Services are performed shall govern the validity of this AGREEMENT, its interpretation and performance, and any other claims related to it.

4.7 Ownership for Work Product and Inventions

All of the work product of CH2M HILL in executing this PROJECT shall remain the property of CH2M HILL. OWNER shall receive a perpetual, royalty-free, non-transferable, non-exclusive license to use the deliverables for the purpose for which they were intended. Any inventions, patents, copyrights, computer programs, or other intellectual property developed during the course of, or as a result of, the PROJECT shall remain the property of CH2M HILL.

4.8 Severability and Survival

If any of the provisions contained in this AGREEMENT are held to be invalid, illegal, or unenforceable, the enforceability of the other remaining provisions shall not be impaired. Limitations of liability, indemnities, and other express representations shall survive termination of this AGREEMENT for any cause.

4.9 Termination

4.9.1 This AGREEMENT may be terminated by either party for convenience on thirty (30) days' written notice, or for cause if either party fails substantially to perform through no fault of the other and does not commence correction of such nonperformance within five (5) days of written notice and diligently completes the corrections thereafter.

4.9.2 On termination, CH2M HILL will be paid for all authorized work performed up to the termination date plus termination expenses, such as, but not limited to, reassignment of personnel, subcontract termination costs, and related closeout costs.

4.10 Consequential Damages

To the maximum extent permitted by law, CH2M HILL, its affiliated corporations, directors, officers, employees, or subcontractors shall not be liable for special, indirect, or consequential damages of OWNER or CONSULTANT, whether such damages arise out of breach of contract or warranty, tort including negligence, strict or statutory liability, or any other cause of action. In order to protect CH2M HILL against indirect liability or third-party proceedings, CONSULTANT will release and indemnify CH2M HILL for any such damages.

4.11 Reuse of PROJECT Documents

All reports, drawings, specifications, documents, and other deliverables of CH2M HILL, whether in hard copy or in electronic form, are instruments of service for this PROJECT, whether the PROJECT is completed or not. CONSULTANT agrees to indemnify CH2M HILL and its directors, officers, employees, subcontractors and affiliated corporations from all claims, damages, losses, and costs, including, but not limited to, litigation expenses and legal fees arising out of or related to the unauthorized reuse, change or alteration of these PROJECT documents.

4.12 Indemnification

4.12.1 CH2M HILL agrees to indemnify CONSULTANT and OWNER from any claims, loss, cost, or expense claimed by third parties for property damage and bodily injury, including death, to the proportionate extent caused by the negligence or willful misconduct of CH2M HILL, its employees, affiliated corporations, officers, and subcontractors in connection with the PROJECT.

CONSULTANT agrees to indemnify CH2M HILL from any loss, cost, or expense claimed by third parties for property damage and bodily injury, including death, to the proportionate extent caused by the negligence or willful misconduct of CONSULTANT, its employees, or agents in connection with the PROJECT.

4.13 Limitation of Liability

4.13.1 To the maximum extent permitted by law, CH2M HILL's liability for CONSULTANT's damages will not, in the aggregate, exceed \$100,000.

4.13.2 This article takes precedence over any conflicting article of this AGREEMENT or any document incorporated into it or referenced by it.

4.13.3 This limitation of liability will apply whether CH2M HILL's liability arises under breach of contract or warranty; tort, including negligence; strict liability; statutory liability; or any other cause of action and shall include CH2M HILL's directors, officers affiliated corporations, employees, and subcontractors.

4.14 Hazardous or Toxic Substances

4.14.1 If asbestos or hazardous or toxic substances in any form are encountered or suspected, CH2M HILL will stop its own work in the affected portions of the PROJECT to permit testing and evaluation.

4.14.2 If asbestos is suspected, CH2M HILL will, if requested, manage the asbestos remediation activities using a qualified subcontractor at an additional fee and contract terms to be negotiated.

4.14.3 If hazardous substances other than asbestos are suspected, CH2M HILL will, if requested, conduct tests to determine the extent of the problem and will perform the necessary studies and recommend the necessary remedial measures at an additional fee and contract terms to be negotiated.

4.15 Language

The parties hereto confirm that they have requested that this AGREEMENT as well as all documents relating thereto have been and shall be drawn up in English only. Les parties aux présentes confirment qu'elles ont exigé que cette convention de même que tous les documents s'y rattachant soient rédigés en anglais seulement.



**DAWSON CITY
KORBO APARTMENTS
RESTORATION OPTIONS
and
PLAN OF RESTORATION**



**APPENDIX E
COST ESTIMATES**

Korbo Apartment Spill Remediation Plan Cost Estimate

Phase I and II Remediation Plan - Scenario I: if buildings are retained

Phase I of Remediation Plan - Scenario I: if buildings are retained				
Includes: YESAA submission, Excavation of the contaminated soil immediately around the apartment building (approx 800 m ³), installation of				
	Hours/Units	Days	Rate	Cost
<u>Access Consulting YESAA/Reporting/Permitting/Project Management/remediation strategy</u>				
Access Consulting Senior Scientist	120		\$120/hr	\$14,400.00
Access Consulting Scientist	180		\$100/hr	\$18,000.00
<u>Field Work</u>	Based on approx 28 days			
Includes excavation of contaminated soil immediately around apartment building, install insitu remediation				
Access Consulting Senior Scientist (10 days)	120		\$120/hr	\$14,400.00
Access Consulting Scientist (28 days)	340		\$100/hr	\$34,000.00
Access Consulting Senior Scientist Project Support	40		\$120/hr	\$4,800.00
Truck			28 \$165/day	\$4,620.00
Accommodation			38 \$200/day	\$7,600.00
Equipment			25 \$100/day	\$2,500.00
Other				\$1,500.00
Lab		1 sample for each 50 m3 as per regs plus confirmatory samples and samples from drilling		\$15,000.00
Insitu Remediation Design				\$45,000.00
Insitu Remediation Installation				\$100,000.00
Other				\$40,000.00
Excavator	100		\$200/hr	\$20,000.00
Trucking	20m3 load	2hr round trip	90	\$150/hr
Backfill	pit run \$100/load	\$10/m	850	\$10/m3
GW monitoring well installation				\$30,000.00
GW monitoring and sampling				\$20,000.00
Reporting				\$7,500.00
Sub Total				\$401,320.00
15% Contingency				\$60,198.00
Phase I Total				\$461,518.00

Korbo Apartment Spill Remediation Plan Cost Estimate

Phase I and II Remediation Plan - Scenario II: if buildings are removed

Phase I of Remediation Plan - Scenario II: if buildings are removed				
	Hours	Days	Rate	Cost
<u>Access Consulting YESAA/Reporting/Permitting</u>				
Access Consulting Senior Scientist	60		\$120/hr	\$7,200.00
Access Consulting Scientist	130		\$100/hr	\$13,000.00
Building Demolition (to be undertaken by Yukon Housing, no cost estimate available)				
Subtotal				\$20,200.00
15% Contingency				\$3,030.00
Phase I total				\$23,230.00
Phase II of Remediation Plan - Scenario II: if buildings are removed				
Field Work	Based on approx 50 days			
Access Consulting Senior Scientist	350		\$120/hr	\$42,000.00
Access Consulting Scientist	600		\$100/hr	\$60,000.00
Truck		50	\$165/day	\$8,250.00
Accomodation and meals		80	\$200/day	\$16,000.00
Equipment		50	\$100/day	\$5,000.00
Other				\$1,000.00
Reporting				\$7,500.00
Lab	1 sample for each 50 m ³ as per regs plus confirmatory samples			\$30,000.00
Excavator	400		\$200/hr	\$80,000.00
Trucking	20m3 load	or 2hr round trip	500	\$150/hr \$75,000.00
LTF Construction	Based on Estimate from Site Assessment and Remediation Unit (SARU) May be \$100,000 less if the existing SARU LTF is used			\$160,000.00
Backfill	pit run \$100/load	\$10/m ³	5000	\$10/m ³ \$50,000.00
ongoing LTF operation	turn soil 4 times a year, sampling	5	yr	\$40,000/yr \$200,000.00
Subtotal				\$734,750.00
15% Contingency				\$110,212.50
Phase II total				\$844,962.50
Additional Costs				
installing monitoring wells				\$40,000.00
1 yr of monitoring, sampling and reporting				\$40,000.00
Subtotal				\$80,000.00
15% Contingency				\$12,000.00
Total Additional Costs				\$92,000.00
Total*				\$960,192.50

*Based on assumptions derived from most recent sampling results, may change with additional information and changes over time