



March 8, 2019

Reference No. 11178792-02

Ms. Krista Rebello, P.Eng.
Project Manager, Impacted Sites
Pollution Prevention Division
Department of Municipal Affairs and Environment
100 Prince Phillip Drive
4th Floor Confederation Building West Block
P.O. Box 8700
St. John's NL A1B 4J6

Dear Ms. Rebello:

**Re: Liability Estimate Based on Findings from Supplemental Phase II Environmental Site Assessment (ESA), Hazardous Building Materials Survey (HBMS) and Human Health and Ecological Risk Assessment (HHERA) - Revised
Marystown Shipyard, Marystown, Newfoundland and Labrador**

1. Introduction

GHD was retained by the Newfoundland and Labrador Department of Municipal Affairs and Environment (NLDMAE) to carry out a Supplemental Phase II Environmental Site Assessment (ESA), a Human Health and Ecological Risk Assessment (HHERA) program, and Hazardous Building Materials Survey (HBMS) at the inactive Marystown Shipyard (Site) located on the west side of Mortier Bay in the Town of Marystown, Newfoundland and Labrador (NL). The purpose of this investigation was to re-evaluate the environmental Site conditions through the collection of additional building material samples, soil, sediment, and groundwater data to develop a liability estimate for the Site.

Field work associated with the Supplemental Phase II ESA and HBMS program involved the following:

- The advancement of 41 boreholes, of which 12 were completed as monitor wells, using a geotechnical drill rig.
- Sampling of soil from the 41 boreholes and submission of select samples for metals and/or petroleum hydrocarbon analyses.
- A Site survey completed by Gary Templeton Surveys Ltd, included the collection of GPS coordinates and ground elevations of the new borehole/monitor well locations, existing monitor wells, existing recovery wells and selected Site features.
- Collection of 15 sediment samples in the area of the wharf structures referred to as the water lot and three reference sediment samples collected outside the Marystown Shipyard property boundary in Mortier Bay.
- Gauging for the presence of free-phase product and sampling of groundwater from each monitoring well (new and pre-existing).



- An HBMS program involving the collection of 26 paint samples for lead content, as well as the collection and analyses of 30 building materials samples for the presence of Asbestos-Containing Materials (ACMs).

Following a review of the sediment sample analytical results, a waterlot sampling program was implemented in December 2018 to supplement the preliminary findings of the Supplemental Phase II ESA and HHERA, which indicated there could be a potential risk to human health or ecological receptors from consumption of fish and/or shellfish caught from the waterlot. The supplemental marine sampling program involved the following:

- Additional discussion with local residents to document if fish and/shellfish are consumed from the area of the water lot.
- Collection of 8 sediment samples from the waterlot and reference site submitted for benthic invertebrate community characterization to further assess the potential for chemicals of potential concern (COPCs) to impact benthic invertebrate communities.
- Collection of 4 step out samples (including field duplicates) approximately 15-20 metres outside the Marystown Shipyard waterlot property boundary in Mortier Bay.
- Collection of 8 surface water samples (including field duplicate) from the waterlot and reference site for analysis of petroleum hydrocarbons, metals, PCBs and general chemistry to further assess the potential for groundwater impacts to discharge to surface water which may affect aquatic life.
- Collection of 35 invertebrate tissue samples collected from the site (and/or reference area) with selected samples submitted for analysis of COPCs to aid in the risk review evaluation.
- Submission of 4 sediment samples for particle size analyses and submission of 5 sediment samples for leachate analyses.

2. Supplemental Phase II ESA and HHERA

2.1 Findings for Soil, Groundwater, and Sediment

Based on the Supplemental Phase II ESA analytical program completed by GHD in 2018, the following results were noted at the Site:

Uplands

- Four of the 76 soil samples analyzed for petroleum hydrocarbons on the uplands portion of the Site exceeded Atlantic Risk-Based Corrective Action (RBCA) Tier I Risk-Based Screening Levels (RBSLs) for a commercial site with coarse-grained soil and non-potable groundwater.
- Two of the 32 soil samples collected from the on the uplands portion of the Site reported Chromium concentrations exceeding the CCME Soil Quality Guidelines (SQGs) for commercial land use.



- Two of the 16 groundwater samples collected from the monitor wells and/or recovery wells on the uplands portion of the Site exceeded the Tier I RBSLs for a commercial non-potable site.
- Two of the 16 groundwater samples also reported F2 carbon fractions exceeding the applicable Tier I Ecological Screening Levels (ESLs) for Plant and Soil Invertebrates Direct Contact with Shallow Groundwater and three of the 16 groundwater samples reported modified TPH (mTPH) concentrations exceeding the Tier I ESLs for the Protection of Freshwater and Marine Aquatic Life, adjusted for a distance of 10 and 20 metres to the closest aquatic receptor (Mortier Bay).
- Six groundwater samples, collected from the Assembly and Erection Building area, the drum storage area and the lower laydown area were submitted for metals analyses. As there are no provincial guidelines for metals in groundwater in NL, the groundwater results were screened using the FIGQG Tier 2 for Marine Life Exposure Pathway. All six samples reported exceedances of Arsenic, Copper, Selenium, and/or Zinc above the respective guideline.

Waterlot

- All 17 sediment samples (including the field duplicate samples) analyzed for petroleum hydrocarbons were within the applicable Atlantic RBCA Tier I Sediment ESLs.
- All 17 sediment samples exceeded the CCME ISQGs and/or PELs for one or more PAH parameters.
- All 17 sediment samples exceeded the CCME ISQGs and PELs for one or more metal parameters.
- The sediment samples reported detectable PCB concentrations above the CCME ISQGs for a marine receptor in all but five of the 17 (including the field duplicate samples) analyzed from the water lot. The CCME PELs were exceeded in three of the 17 sediment samples analyzed from the water lot.
- Concentrations of mTPH and metals in surface water samples collected from the waterlot were either not detectable or below applicable CCME water quality guidelines (WQGs).
- Leachate analyses for select sediment samples exceeding CCME CSQGs were below the NL Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD 26.1). Based on the leachate results, the waterlot sediment is not considered hazardous waste.

The data collected during the completion of the Supplemental Phase II ESA was used to support the completion of a HHERA to further evaluate potential risks to human and ecological receptors at the Shipyard and associated waterlot.

Based on the results of the HHERA, there are petroleum hydrocarbon concentrations present in the soil above the human health specific screening levels (HHSLs) for the protection of indoor air at locations near the on-Site commercial buildings that require further assessment.

There are groundwater samples collected at the Site that have arsenic and vanadium concentrations greater than the commercial direct contact / ingestion HHSLs located in the lower laydown area of the Shipyard. There are also groundwater samples that exceeded the mTPH direct contact / ingestion HHSLs



collected from monitor well MGSB-MW15, which is located on the south side of the general store building. As the on-Site groundwater is not being consumed, the only receptor with potential groundwater contact would be a construction worker.

The sediment located in the waterlot does not pose an unacceptable risk to the commercial worker receptors through direct contact pathway at the Site. The HHRA indicated the consumption of shellfish collected from the waterlot are unlikely to pose a risk to human health based on current usage of the waterlot. However, the HHRA indicated that consumption of shellfish harvested from the waterlot, specifically scallops, could pose a risk to toddlers if consumed on subsistence or heavy consumer basis (5 days/week, 26 weeks per year). The shellfish consumption pathway was assessed based on measured concentrations of COPCs (e.g. cadmium) in composite samples of soft tissue and not specific to edible portions of shellfish. Using whole body tissue concentrations likely overstates the potential for risk as COPCs such as cadmium are known to preferentially accumulate in the digestive gland of scallops with substantially less concentrations being present in the edible portions of the shellfish such as abductor muscles. As indicated in literature from the Department of Fisheries and Oceans (DFO), Research Branch (J.F. Uthe and C.L. Chou, 1986), cadmium concentrations in abductor muscles typically constitute less than 1% of the total cadmium concentrations in the soft tissue of scallops. For the purposes of the risk assessment, it has been conservatively assumed that the abductor muscle is 10% of the wholebody which would result in an exposure point contact (EPC) that is well below the site specific target levels (SSTLs) developed for both a toddler and adult receptor (subsistence, recreational/commercial consumption). It has also been noted that in the conditions of the DFO recreational/commercial licensing both commercial and recreational harvesters are instructed not to consume any portion, other than the abductor muscle ("meat"), from scallops that are harvested from the shoreline and adjacent waters surrounding the province of NL. As such, it is reasonable to assume that the concentration of cadmium in the edible portion of scallops (abductor muscle) collected from the Site is well below concentrations that are considered to pose a potential risk to human health.

Based on the results of the ERA, the concentrations of COPCs in sediment of the waterlot are not considered to pose an unacceptable risk to benthic invertebrates, fish, or aquatic wildlife through the direct contact and consumption exposure pathways.

Metals and mTPH were detected in groundwater samples at concentrations that could be a potential concern to aquatic life. Concentrations of mTPH and metals in surface water samples collected from the waterlot were either not detectable or below applicable CCME WQGs. The exceptions would be boron, chromium and copper, which reported elevated concentrations in surface water samples collected from the waterlot, but the concentration of these parameters were also elevated in the reference samples collected approximately 1,000 and 1,200 metres to the east. The concentration of selenium also marginally exceeded CCME WQG in one waterlot sample collected, but the remainder of the samples were below laboratory detection limits.

2.2 Recommendations for Soil, Groundwater, and Sediment

Based on the analytical program completed in 2018, the concentrations of petroleum hydrocarbons and/or metals in the soil and groundwater at the upland portion of the Site are consistent with the concentrations of petroleum hydrocarbons and metals noted during the previous assessment programs completed in 1998/1999. The petroleum hydrocarbon and/or metals issues identified during the 2018 Supplemental



ESA would require a Remedial Action Plan (RAP) or could be managed in place as part of a Risk Management/Mitigation plan that includes groundwater monitoring, soil vapour and/or indoor air sampling.

Similar to the uplands property, concentrations of metals, PAHs, and PCBs in the sediment from the waterlot area of the Site are consistent with the analytical results from the previous sediment sampling program completed by JWEL in 1998/1999. In addition, interviews from local residents confirmed that a scallop bed is present in the Mortier Bay harbour and fisherman collect scallops from the harbour and around the shipyard wharf for subsequent human consumption. The Supplemental Phase III ESA and HHERA report provided the following recommendations:

Uplands

- Conduct a groundwater monitoring program for seasonal variation including free product gauging in all of the on Site monitor wells and recovery wells for analyses of petroleum hydrocarbons and metals (including mercury). A minimum of two monitoring events should be completed in the Spring and Summer months to assess seasonal variation and provide the analytical data to determine if a risk management plan is required.
- Due to the locations of the commercial buildings on the Site, it is recommended that the soil exceedance areas be further assessed through the installation and seasonal sampling of soil vapour probes. A minimum of two monitoring events should be completed in the Summer and Winter months to assess seasonal variation and provide the analytical data to determine if a risk management plan is required.
- Although the maximum groundwater concentration (447 mg/L in MGSB-MW15, near the Carpenters & Joiners Building) does not exceed the indoor air inhalation HHSL, the groundwater at the Site is shallower than that assumed in the derivation of the HHSLs and therefore the HHSL may not be applicable, which may warrant further assessment. Although no free product was measured in groundwater during the field work, the groundwater concentration measured in MGSB-MW15 is indicative of the possible presence of free product in the area. Therefore it is recommended that consideration be given to further assessing the soil vapour to indoor air pathway in this area through the installation and seasonal sampling of soil vapour probes. Due to the monitor well's proximity to the existing building and the absence of elevated soil concentrations in the adjacent boreholes, sub slab probes beneath the building may be preferred. As recommended above, a minimum of two groundwater events (to determine the presence/absence of free product) and a minimum of two soil vapour events would be required to assess seasonal variation. If free phase product is detected, additional assessment would be required that includes installation of monitor wells for delineation purposes.
- It is recommended that a Risk Management Plan including Best Management Practices and a Site specific health and safety plan be developed to address possible contact with groundwater impacts should sub surface work be required in the lower laydown area and the south side of the general store building, which specifically address arsenic, vanadium, and modified TPH. It is noted that no soil samples collected contained metals or petroleum hydrocarbons above the applicable HHSLs for direct contact; therefore, the sub-surface soil at the Site does not present a risk to construction workers.



- If a RAP is not completed to address the soil and groundwater impacts at the Site, impacts should be risk managed or a Phase III ESA is recommended to delineate the soil and/or groundwater impacts to meet minimal site assessment requirements. The Phase III ESA program would include delineation of petroleum hydrocarbon and chromium soil impacts south of MAEB-MW2, petroleum hydrocarbon soil impacts east and south of MSBL-MW6/BH5, petroleum hydrocarbons soil impacts west of MFPA-MW1, chromium soil impacts north of MFPA-BH3, petroleum hydrocarbon soil impacts north, south and east of MLLA-MW3, as well as petroleum hydrocarbon impacts in groundwater north of MGSB-MW15. The Phase III ESA can be combined with the groundwater and soil vapour monitoring programs discussed above.

Although outside the scope to develop an environmental liability for the Site, the following recommendations are carried forward from previous ESA programs reviewed as part of the data gap analyses:

- Any ASTs remaining on the Site and intended to be used, should be inspected to ensure they meet the requirements specified in the Newfoundland and Labrador Gasoline and Associated Products (GAP) and/or Heating Oil Storage Tank (HOST) Regulations for their intended usages.
- Although no major surface stains were noted in the areas assessed during the Supplemental Phase II ESA, any surface stains noted at the Site should be assessed or remediated as per provincial requirements.
- Any drums, containers or other vessels remaining at the Site should be collected and consolidated in designated Site areas and those no longer required should be disposed of at an approved facility.
- The scrap steel and debris, particularly in the lower laydown area and observed to be present in fill materials around the shoreline and ditching to the southwest of the lower laydown area, should be removed from the Site and disposed of at approved facilities.
- If existing buildings are to remain, an inspection of the existing septic sewer systems should be completed to ensure sewage discharges meet provincial regulations.
- Any ODS containing equipment or PCB containing light ballasts remaining at the Site should be disposed of in accordance with the applicable regulations.
- Although the underground fuel distribution lines on Site were documented to be drained, purged, capped and abandoned in place in 2000 and petroleum hydrocarbon impacts were not found along the pipelines in 2000, regulatory approval for abandonment in place would be required. This should be included in any future submissions for regulatory closure of the Site.

Waterlot

- No recommendations are required.



2.3 Upland Liability Estimate

For the purpose of providing a remediation liability estimate, GHD assumed that Excavation and Off-Site Disposal of the petroleum hydrocarbon and/or metals impacted soil at an approved landfill would be the preferred remedial option for the upland portion of the Site.

The estimated aerial extent of metal (chromium) impacted soil located on the Shipyard Property is 210 m² (i.e., 70 m² on the northern side of Assembly and Erection Building and 140 m² in the fuel pump area). The corresponding quantity of chromium impacted soil at the Site is approximately 420 tonnes (i.e., 140 tonnes on the northern side of the Assembly and Erection Building and 280 tonnes in the fuel pump area), assuming an average thickness of 1.0 metre.

In total, there is approximately 420 tonnes of metals impacted soil on the Shipyard Property. Given that the impacts are not delineated to the north and west of sample MFPA-BH3-2015, a contingency of 30% has been added to the liability estimate (which will also cover consultant fees and analytical cost).

The estimated aerial extent of petroleum hydrocarbon (mTPH) impacted soil located on the Shipyard Property is 2,000 m² (i.e., 225 m² on the northern side of Assembly and Erection Building, 225 m² on the north side of the Services Building and 1,550 m² in the fuel pump/lower laydown area). The corresponding quantity of mTPH impacted soil in the Site is 4,000 tonnes (i.e., 450 tonnes on the northern side of the Assembly and Erection Building, 450 tonnes on the northern side of the Services Building and 3,100 tonnes in the fuel pump/lower laydown area), assuming an average thickness of 1.0 metre.

In total, there is approximately 4,000 tonnes of mTPH impacted soil on the Shipyard Site. Given that the mTPH impacts are not delineated to the west of sample MFPA-MW1-2018 (due to the presence of a rock cliff), to the east of MLLA-MW3-2018 (due to the presence of Mortier Bay), to the south of sample MAEB-MW2-2018 (due to the presence of the Assembly and Erection Building), and to the south of MSBL-BH5-2018 (due to the presence of the Services Building), a contingency of 30% has been added to the liability estimate (which also covers consultant fees and analytical costs). As the mTPH impacts are present at depths ranging from 1.8 to 3.6 metres below ground surface in the soil, there will be extra time required for non-impacted soil excavation and handling. This will include stockpiling and sampling of non-impacted soil for use as on-Site backfill where possible and the added excavation area due to the depth of the impacted soil to ensure the on-Site safety requirements with respect to boundary sloping are addressed.

The estimated cost to complete the above recommended remediation program is approximately **\$1,150,994 plus HST**. Additional details regarding this estimate are provided in the table below.



Description	Unit Cost	Amount	Units	Total
Project Kickoff/Prep/HASP/UG Clearances	\$1,000.00	1	LS	\$1,000.00
Procurement Plans and Specs	\$2,500.00	1	LS	\$2,500.00
Equipment Mob/Demob	\$1,500.00	1	LS	\$1,500.00
Excavation/transportation and backfill	\$125.00	4420	Tonnes	\$552,500.00
Metal Soil Disposal (assume leachable)	\$250.00	420	Tonnes	\$105,000.00
Petroleum Hydrocarbon Soil Disposal	\$42.00	4000	Tonnes	\$168,000.00
Personnel Mob/Demob	\$1,000.00	1	LS	\$1,000.00
Site Supervision	\$1,000.00	12	day	\$12,000.00
Field Expenses (accommodations, meals)	\$200.00	12	day	\$2,400.00
Car Rental and Gas	\$200.00	12	day	\$2,400.00
Water Management (i.e. Vac Truck, etc.)	\$20,000.00	1	LS	\$20,000.00
Laboratory Analysis (Soil) - BTEX/TPH incl 10% QA/QC	\$100.00	40	samples	\$4,000.00
Laboratory Analysis (Soil) - Metals incl 10% QA/QC	\$50.00	16	samples	\$800.00
Laboratory Analysis (GW) - BTEX/TPH incl 10% QA/QC	\$100.00	10	samples	\$1,000.00
Laboratory Analysis (GW) - Metals incl 10% QA/QC	\$45.00	4	samples	\$180.00
Project Management	\$300.00	12	days	\$3,600.00
Reporting and RoSC	\$7,500.00	1	LS	\$7,500.00
Contingency (30%)				\$265,614.00
Total Estimate				\$1,150,994.00

As indicated in the Supplemental Phase II ESA and HHERA, the petroleum hydrocarbon and metal impacts can be managed in place using a risk management/risk mitigation approach. This would include groundwater monitoring for seasonal variation (comprising of a minimum of two monitoring/gauging events completed in the Spring and Summer months) as well as the installation and sampling of soil vapour probes in the areas of high petroleum hydrocarbons to ensure the protection of commercial workers at the Site. As with the groundwater monitoring, a minimum of two soil vapour monitoring events should be completed in the Summer and Winter months to assess seasonal variation and ensure protection of human health through the indoor air pathway. Given the high mTPH concentrations (447 mg/L) exhibited in the groundwater sample collected from MGSB-MW15, GHD has also included estimated costs to complete a limited remedial program to excavate and remove highly impacted soil in the area of the former 4500 litre furnace oil underground storage tank (UST). It is estimated that approximately 100 tonnes of heavily impacted soil will need to be removed and transported off-Site for treatment and disposal. This approach provides a contingency should free-phase product be encountered during any of the seasonal monitoring/gauging programs.



The estimated cost to complete the risk management/risk mitigation approach is approximately **\$74,448 plus HST**. Additional details regarding this estimate are summarized in the table below.

Description	Unit Cost	Amounts	Units	Total
Project Kickoff/Prep/HASP/UG Clearances	\$1,000.00	1	LS	\$1,000.00
Soil Vapour Installation - Personnel Mob/Demob	\$1,000.00	1	LS	\$1,000.00
Soil Vapour Installation - Field Expenses (accommodations, meals)	\$200.00	1	day	\$200.00
Soil Vapour Installation - Car Rental and Gas	\$200.00	1	day	\$200.00
Mob/Demob of Vacuum Truck Soil Vapour Installation	\$5,000.00	1	LS	\$5,000.00
Soil Vapour Material Costs	\$100.00	6	LS	\$600.00
Soil Vapour Installation - Site Supervision	\$1,000.00	1	day	\$1,000.00
Groundwater & Soil Vapour Monitoring - Personnel Mob/Demob	\$1,000.00	2	day	\$2,000.00
Groundwater & Soil Vapour Monitoring - Field Expenses (accommodations, meals, equipment)	\$400.00	6	day	\$2,400.00
Groundwater & Soil Vapour Monitoring - Car Rental and Gas	\$200.00	6	day	\$1,200.00
Groundwater & Soil Vapour Monitoring - Site Work	\$1,000.00	6	day	\$6,000.00
Laboratory Analysis (GW) - BTEX/TPH incl 10% QA/QC	\$100.00	32	samples	\$3,200.00
Laboratory Analysis (GW) - Metals incl 10% QA/QC	\$50.00	32	samples	\$1,600.00
Laboratory Analysis (SV) - BTEX/TPH incl 10% QA/QC	\$470.00	14	samples	\$6,580.00
Project Management	\$300.00	7	days	\$2,100.00
Reporting (1 report for 2 events)	\$6,500.00	1	LS	\$6,500.00
Limited RAP - Equipment Mob/Demob	\$1,500.00	1	LS	\$1,500.00
Limited RAP - Excavation/transportation and backfill	\$125.00	100	Tonnes	\$12,500.00
Limited RAP - Soil Disposal	\$42.00	100	Tonnes	\$4,200.00
Limited RAP - Personnel Mob/Demob	\$1,000.00	1	LS	\$1,000.00
Limited RAP - Site Supervision	\$1,000.00	2	day	\$2,000.00
Limited RAP - Field Expenses (accommodations, meals)	\$200.00	2	day	\$400.00
Limited RAP - Car Rental and Gas	\$200.00	2	day	\$400.00
Limited RAP - Water Management (i.e. Vac Truck, etc.)	\$4,500.00	1	LS	\$4,500.00
Limited RAP - Laboratory Analysis (Soil)	\$100.00	6	samples	\$600.00
Contingency (10%)				\$6,768.00
Total Estimate				\$74,448.00

2.4 Waterlot Liability Estimate

Based on the available tissue analytical results along with the benthic invertebrate community results, it is considered unlikely that concentrations of COPCs in sediment or biological tissue collected from the waterlot pose an unacceptable risk to ecological receptors that would warrant additional risk management or remedial action. Therefore, the sediment is not required to be excavated and/or transported off-Site for disposal.



If sediment is required to be excavated/removed to facilitate any future wharf upgrades, leachate analyses on the sediment has confirmed the dredged material is not classified as a toxic hazardous waste. As a result, the excavated dredged material meets the requirements outlined in the Guidance Document entitled “Protocol for the Management of Excavated Soils, Concrete Rubble and Dredged Materials (GD-PPD-045.2)” and can be disposed at an approved landfill facility, pending landfill approval.

In summary, given the sediment does not pose unacceptable risk to human health and the environment and the concentrations of COPCs meet the requirements to be disposed at an approved landfill facility, there is no environmental liability associated with the waterlot area of the Shipyard site.

3. Summary of Findings for Hazardous Building Materials Survey

During the 2018 HBMS completed at the inactive Marystown Shipyard, 30 potential ACM samples were collected with 4 that confirmed ACMs in vinyl floor tile and/or mastic from the Mill Building, Main Shed, Synchro Building, and Administration Building; 2 confirmed ACMs in pipe insulation from the Mill Building, and 1 confirmed ACM in the gasket around the door opening of the Despatch Oven in the Mill Building.

During the 2018 HBMS completed at the inactive Marystown Shipyard, 26 potential Lead-Based Paint samples were collected with 13 samples that reported concentrations above the 5,000 mg/kg for consideration of disposal potential. Some of these samples reported extremely high concentrations up to almost 100,000 mg/kg with exceedances reported in the old Murley Building, exterior electrical box enclosures, Mill Building, Main Shed, Synchro Building, and Maintenance Building.

A liability estimate based on the 2018 HBMS and historical sampling programs was provided under separate that includes more detail; however, the HBMS liability estimate is summarized below.

For the purpose of providing a remediation liability estimate, GHD have assumed the following:

- Two 4-person crews with one field supervisor will be available by a registered asbestos abatement contractor.
- Consultant will be required to supervise the progress of the work that includes the collection of baseline, perimeter, and personal air samples for RUSH analysis – baseline samples to be analyzed with standard turnaround times.
- Consultant to prepare tender documents for all recommended abatement work.
- Contingency of \$63,450 (about 20%)

The estimated cost to complete the recommended abatement program is approximately **\$375,000 plus HST**. Additional details regarding this estimate are summarized in the table below.



Location	Sub-Contractor		Consultant Management			
	ACMs	Lead Paint	Air Monitoring	Disbursements	Reporting	Project Management
Prepare Abatement Tender	\$0	\$0	\$0	\$500	\$7,000	\$0
Carpenter & Joiners Bldg.	\$5,000	\$25,000	\$5,000	\$5,000	\$5,000	\$2,250
Assembly & Erection Bldg.	\$5,000	\$75,000	\$7,500	\$10,000	\$5,000	\$5,125
Syncrolift Bldg.	\$5,000	\$10,000	\$2,500	\$5,000	\$3,000	\$1,275
Services Bldg.	\$0	\$5,000	\$1,000	\$2,500	\$2,500	\$550
Parts Bldg.	\$0	\$10,000	\$2,500	\$2,500	\$2,500	\$875
Administration Bldg.	\$5,000	\$5,000	\$1,000	\$2,500	\$2,500	\$800
Murley Bldg.	\$0	\$5,000	\$1,000	\$2,500	\$1,500	\$500
Docking Berths Area	\$0	\$25,000	\$1,000	\$5,000	\$2,500	\$1,675
Waste Disposal	\$5,000	\$5,000	\$0	\$0	\$0	\$0
Update AMP	\$0	\$0	\$0	\$0	\$10,000	\$0
Develop & Update LPMP	\$0	\$0	\$0	\$0	\$10,000	\$0
Sub-Totals	\$25,000	\$165,000	\$21,500	\$35,500	\$51,500	\$13,050
TOTAL	\$311,550					

Notes:

AMP: Asbestos Management Plan

LPMP: Lead Paint Management Plan

4. Closure

This information and liability estimate has been prepared for the sole benefit of the Newfoundland and Labrador Department of Municipal Affairs and Environment (NLDMAE). The report may not be used by any other person or entity without the express written consent of GHD Limited and NLDMAE. Any use that a third party makes of this report, or any reliance on decisions made based on it, is the responsibility of such third parties. GHD Limited accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

GHD Limited makes no representation or warranty with respect to this report other than the work was undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. Any information or facts provided by others and referred to or utilized in the preparation of this report was assumed by GHD Limited to be accurate. Conclusions presented in this report should not be construed as legal advice.

If any conditions become apparent that differ significantly from our understanding of conditions as presented in the Supplemental Phase III ESA report or as understood from the initial investigations



completed between 1997 and 2001, we request that we be notified immediately to reassess the conclusions provided herein.

Should you have any questions regarding the information presented herein, please do not hesitate to contact the undersigned.

Yours truly,

GHD

A handwritten signature in blue ink, appearing to read "Leslie Williams".

Leslie Williams, P.Eng.
Project Manager

A handwritten signature in blue ink, appearing to read "James O'Neill".

James O'Neill, P.Eng.
Senior Project Manager | Principal

A handwritten signature in blue ink, appearing to read "Brian Luffman".

Brian Luffman, P.Eng.
Project Manager