

**APPENDIX B:**  
**Pre-Demolition Hazardous Building**  
**Materials Assessment**  
**January 2016**

**Bunk House Compound**

**Lot 20, 102A & Lot 102B Wind Flower Avenue**

**Lot 21, 104 Wind Flower Avenue**



January 2016

IBI GROUP ARCHITECTS ENGINEERS

# PRE-DEMOLITION HAZARDOUS BUILDING MATERIALS ASSESSMENT

## Bunk House Compound, Waterton, Alberta

REPORT

**Submitted to:**

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## **Executive Summary**

### **INTRODUCTION**

At the request of IBI Group Architects Engineers (IBI), Golder Associates Ltd. (Golder) conducted a hazardous building materials assessment at the Bunkhouse Compound (the Site) in Waterton, Alberta.

The assessment was conducted on October 13, 2015, by Caleb Fricker, Occupational Hygiene Technologist, under the direction of Nadine Reid, Occupational Hygienist.

### **SCOPE OF WORK**

The assessment was performed with the objective of compiling an inventory of hazardous building materials prior to the proposed demolition of the Site. The assessment included asbestos-containing materials (ACM), lead-containing paint, polychlorinated biphenyls (PCB) in fluorescent light ballasts, mercury in thermostats, mercury vapour in fluorescent light tubes, ozone-depleting substances (ODS) in items such as air conditioning units and refrigerators, radioactive materials in smoke detectors and miscellaneous building maintenance chemicals.

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **Asbestos-Containing Materials**

Based on site observations and the analytical results, asbestos was confirmed in the following materials at the time of the assessment:

- Beige Mosaic Sheet Flooring – Entrance of Unit 16; and
- Drywall Joint Compound – All Units, All Drywall

As this assessment was semi-destructive in nature, the potential exists for other building materials not sampled to contain asbestos. Materials in the buildings that may contain asbestos that could not be sampled due to the semi-destructive nature include but are not limited to drain pipes, gaskets within flanges and boilers, asbestos cement insulators within electrical equipment and within mechanical equipment.

Prior to any demolition or renovation activities, ACM that may be impacted must be removed. The work should be completed by workers certified by Alberta OHS. Throughout the abatement activities, appropriate air monitoring and inspections should be conducted by qualified personnel to document that contamination is contained and ACM are removed and disposed of appropriately. It is recommended that a proper scope of work and asbestos removal specifications be written to scope the complete and proper removal of the identified ACM.

If suspected ACM not previously assessed are uncovered during renovation or demolition activities, work should stop immediately and sampling of the material should be conducted to confirm the presence of asbestos.



### Lead-Containing Paint

Based on site observations and the analytical results, lead above the Surface Coatings Materials Regulations, 90 µg/g was identified in the following paints:

- Brown Paint on Wood Siding/Trim – Exterior (poor condition);
- Off-White Paint on Drywall/Wood Trim – All Units (good condition); and
- Beige Paint on Wood Doors/Cabinets – All Units (good condition).

Lead-containing surfaces with any amounts of lead that will be impacted through maintenance, renovation, or demolition activities in a manner likely to cause some level of airborne lead-containing dust or fumes, (i.e., welding, torch cutting, grinding, sanding or sandblasting) should be controlled through the development and implementation of an Exposure Control Plan. The exposure control plan should include safe work procedures to address the lead exposure hazard during the maintenance, renovation, or demolition activities. The safe work procedures should include procedures to minimize dust during construction and demolition, procedures for proper containment, collection, clean-up and disposal of debris to prevent contamination in other areas, the use of proper cleaning tools, selection and use of proper personal protective equipment, and other applicable procedures.

Lead-containing paint in poor condition should be abated prior to demolition. The lead containing paint that is flaking or loose (poor condition) should be abated following methods and requirements outlined in the Alberta OHS *Lead at the Work Site Bulletin*. The lead-containing paint waste should be analyzed for lead leachability by toxicity characteristic leaching procedure (TCLP) prior to transportation and disposal. The transportation and disposal of lead-containing waste materials must be conducted in accordance with the requirements of AEP and the Federal Transportation of Dangerous Goods Act and Regulations, current to the date of the work. The AEP Waste Control Regulation prescribes the disposal pathways for lead-containing waste.

### Polychlorinated Biphenyls

Approximately 16 fluorescent light fixtures with the older T12 style tubes suspected to contain PCB ballasts were observed throughout the Site at the time of the assessment. Prior to disposal, these ballasts should be inspected further to determine the presence of any PCBs.

Prior to decommissioning, renovation or demolition, PCB-containing ballasts must be properly removed and disposed of. Disposal of the ballasts must be conducted in accordance with federal and provincial regulations. As they are removed, PCB-containing ballasts must be placed in labelled drums located in a secure area. Once full, the drums must be manifested and transported to an approved destruction and disposal facility in accordance with regulations specified by Alberta Environmental Protection.

Non-liquid PCBs were found to be below the PCB Management Regulation criteria of 50 mg/kg for PCB-containing solids. As such, Golder did not identify PCB-containing paints during this assessment.



## HAZARDOUS BUILDING MATERIALS ASSESSMENT BUNKHOUSE COMPOUND, WATERTON, AB

### Other Hazardous Building Materials

Approximately 16 fluorescent light tubes suspected of containing mercury vapour were observed throughout the Site at the time of the assessment. No thermostats suspected of containing mercury capsules were observed throughout the Site at the time of the assessment.

Mercury vapour in light tubes poses no risk to workers or occupants provided the light bulbs remain intact and undisturbed. The bulbs should be removed from the building prior to decommissioning, renovations or maintenance activities and be kept separate from all other waste to prevent damage to the light bulbs. Light bulbs containing mercury vapour should be recycled as per the Alberta Fluorescent Lamp Stewardship Initiative. Alternatively, the mercury-containing fluorescent light may be disposed of in accordance with regulations specified by AEP.

Approximately 16 refrigerators suspected of containing ozone-depleting substances were observed throughout the Site at the time of the assessment. Equipment suspected of containing ODS is to be recycled or disposed of in accordance with the federal Ozone Depleting Substances and Halocarbons Regulation (Section 181/2000). Equipment containing suspect ODS that is to remain in place must be managed in accordance with the provincial and federal regulations. If the units require maintenance or are to be decommissioned, the refrigerants in the identified units must be drained, recycled or destroyed by a competent individual with the appropriate trade qualifications. Servicing should be performed in accordance with Environment Canada, *Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems* and manufactures specifications.

Approximately 27 smoke detectors suspected of containing radioactive components were observed throughout the Site at the time of the assessment. Smoke detectors that contain radioactive materials must be sent for recycling upon decommissioning. Removal and disposal must be conducted in accordance with the Nuclear Safety and Control Act, Nuclear Substances and Radiation Device Regulation SOR/2000-207.



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### 1.0 INTRODUCTION

At the request of IBI Group Architects Engineers (IBI), Golder Associates Ltd. (Golder) conducted a hazardous building materials assessment at the Bunkhouse Compound (the Site) in Waterton, Alberta.

The assessment was conducted on October 13, 2015, by Caleb Fricker, Occupational Hygiene Technologist, under the direction of Nadine Reid, Occupational Hygienist.

### 2.0 SCOPE OF WORK

The assessment was performed with the objective of compiling an inventory of hazardous building materials prior to the proposed demolition of the Site. The assessment included asbestos-containing materials (ACM), lead-containing paint, polychlorinated biphenyls (PCB) in fluorescent light ballasts, mercury in thermostats, mercury vapour in fluorescent light tubes, ozone-depleting substances (ODS) in items such as air conditioning units and refrigerators, radioactive materials in smoke detectors and miscellaneous building maintenance chemicals.

### 3.0 REGULATORY REQUIREMENTS AND GUIDELINES

Parks Canada employees are federally regulated. Most other parties conducting work for Parks Canada are governed by provincial regulations.

#### 3.1 Federal Regulations

In federal jurisdictions, hazardous building materials are regulated by Human Resources and Skills Development Canada (HRSDC) under the Canada Labour Code, Part II. Specifically, Part X, Hazardous Substances, provides the direction for the control of exposure to potentially toxic substances in the workplace. Under this regulation, employers are required to:

- maintain a record of all hazardous materials;
- undertake a hazard investigation by a competent person;
- ensure materials are properly stored and handled;
- post warning signs;
- inform and educate employees regarding hazards; and
- control exposure through substitution, engineering or protective equipment.

In Canada, environmental matters generally fall under the Government of Canada's Canadian Environmental Protection Act, 1999, S.C. 1999 c. 33 (as amended up to 2003) and applicable regulations and guidelines.

Other specific applicable federal regulations are detailed below.



### 3.1.1 Lead-Containing Paint

Lead was used as a pigment and drying agent in alkyd oil-based paint. The Liquid Coating Materials Regulations were enacted under the Hazardous Products Act in 1976 to restrict the lead content of paints and other liquid coatings on furniture, household products, children's products, industrial surfaces and exterior and interior surfaces to 0.5% by weight. The Canadian Paint and Coatings Association (CPCA), the national trade association for Canada's paint manufacturers, recommended that the Canadian paint industry voluntarily stop using any lead compounds in consumer paints by the end of 1990. Over the years, the amount of lead in paint has continued to decrease, due to the co-operative efforts of government and industry.

The previous regulations have since been amended under the Surface Coating Materials Regulations, SOR/2005-109, which states that the "concentration of total lead present in a surface coating material must not be more than 90 micrograms per gram ( $\mu\text{g/g}$ ) dry weight of lead" (0.009%).

### 3.1.2 Polychlorinated Biphenyls

PCBs are used as a dielectric fluid in electrical equipment such as transformers. The use of capacitors in fluorescent lamp ballasts was common up to 1980. The Federal Chlorobiphenyls Regulation, SOR/91-152 prohibits the use of PCBs in this electrical equipment installed after July 1, 1980. The Federal Chlorobiphenyls Regulation, SOR/92-507, also outlines the handling, storage, and disposal of PCBs and PCB-containing equipment.

The government of Canada passed a regulation set to protect and enhance the environment. As such, the regulations are enforceable by law. The regulation places the onus on the owner; employer and employee to ensure no adverse effects are experienced in the environment.

In accordance with PCB Regulations (SOR/2008-273), PCB-containing equipment is defined as any equipment, machinery or similar manufactured items, including paints, capacitors, and an electrical transformer that contains a PCB liquid or solid of more than 50 milligrams per kilogram ( $\text{mg/kg}$ ) of the liquid or solid. This definition includes paint which may contain PCBs. Following removal of all paints, the barrelled PCB-containing paint must be appropriately labelled, manifested, and transported to an approved destruction and disposal facility in accordance with regulations.

Prior to disposal, all ballasts should be compared to the criteria found in the Environment Canada Report EPS 2/CC/2 (revised) August 1991, *Identification of Lamp Ballasts Containing PCBs* to assess their likelihood of containing PCBs.

### 3.1.3 Ozone-Depleting Substances

In 1994, the federal government filed the Ozone-Depleting Substances Regulations to amend controls on production and consumption of chlorofluorocarbons (CFC), halons, tetrachloride and methyl-chloroform. The Federal Halocarbon Regulations, effective July 1, 1999, was filed to ensure uniformity with respect to the release, recovery and recycling of ODS and their halocarbon alternatives in refrigeration and air conditioning.

Canadian Environmental Protection Act (1999), Ozone-Depleting Substances Regulations, 1998, controls the import, manufacture, use, sale, and export of ODS. The regulation also requires that permits be obtained to import or export used, recovered, recycled, and reclaimed ODS.





### 3.2 Provincial Regulations

The provincial regulations, codes and guidelines relevant to hazardous building materials are legislated by Alberta Occupational Health and Safety (OHS), a branch of the Department of Safe, Fair and Healthy Workplaces under the Ministry of Jobs, Skills, Training and Labour. They include the Alberta Occupational Health and Safety (OHS) Code (2009) and the Alberta Asbestos Abatement Manual (October 2012). Provincial regulations that are applicable to the disposal of hazardous building materials are the Alberta Environmental Protection and Enhancement Act and Waste Control Regulation.

#### 3.2.1 Alberta Occupational Health and Safety Code

The Alberta Occupational Health and Safety Code is law which was passed to protect the health and safety of workers on the job. As such, the Code and the sections under the Code are enforceable by law. The Code places the onus on both the employer and the employee to ensure a safe working environment.

Part 4, Chemical Hazards, Biological Hazards and Harmful Substances, represents minimum requirements and specifies, among many other things, the general requirements for working with and around harmful substances. Control of worker exposure to airborne contaminants is detailed and the occupational exposure limits are specified in Schedule 1 of the Regulation.

Part 4 and Schedule 1, Table 2 in the Alberta Occupational Health and Safety Code outlines the general requirements to be followed when working with asbestos. It also defines occupational exposure limits (OEL) for a variety of airborne contaminants. The OEL for a particular contaminant represents conditions to which it is believed that nearly all workers may be exposed, day after day, without suffering from adverse health effects. Due to individual susceptibility, a small percentage of workers may experience discomfort at concentrations below the applicable OEL. An 8-hour OEL refers to the average concentration of a substance over an 8-hour period.

Sections 28 through 38 in Part 4 of the Alberta Occupational Health and Safety Code outline the requirements related to asbestos in facilities. Sections 31 to 35 specifically outline the limitations on the use of asbestos in buildings. The requirements of Sections 31 through 35 are summarized below:

- if asbestos fibres may be released in a building all necessary steps to correct this unsafe condition must be taken;
- asbestos products that have the potential for releasing fibres may not be installed;
- all materials containing crocidolite are banned from use;
- spray-applied asbestos products are banned from use;
- asbestos products, in general, must not be in a form or location where they could release airborne fibres and allow them to enter a ventilation system;
- buildings to be demolished are to have all materials with the potential of releasing asbestos fibres removed; and
- all materials with the potential of releasing asbestos fibres that may be impacted by a renovation must be either encapsulated, enclosed or removed.



## HAZARDOUS BUILDING MATERIALS ASSESSMENT BUNKHOUSE COMPOUND, WATERTON, AB

Historically, materials containing less than 1% asbestos have not been considered “asbestos-containing materials” for the purposes of the OHS legislation. However, in recent years, it has become apparent that some materials, such as vermiculite, can release significant amounts of asbestos fibres, even when they contain low levels (less than 1%) of asbestos. In addition, since the requirements in Part 4 of the OHS Code are based on the ability of a material to release asbestos fibres when disturbed, this interpretation was not consistent with the legislation. As a result, the Asbestos Abatement Manual was revised to remove the definition of an asbestos-containing material as one that contains more than 1% by weight asbestos. However, this has now raised questions as to when an employer must comply with the asbestos requirements in the OHS Code.

The employer must comply with the asbestos requirements when:

- the individual material in question contains more than 1% asbestos (by weight);
- the material contains less than 1% asbestos, but it is known that a “restricted area” is likely to occur when it is disturbed (e.g., vermiculite); or
- the material contains less than 1% asbestos and there is a reasonable chance that asbestos fibres may be released when the material is disturbed, either due to the condition of the material or the work procedures that will be used (e.g., removal of friable stipple material, dry removal of drywall where the drywall mud contains low levels of asbestos).

Materials identified as containing less than 1% asbestos, such as drywall joint compounds and stipple coatings, may not have been uniformly mixed when they were applied and could contain asbestos in concentrations greater than 1% in sections. When dealing with large quantities of such materials, employers should take non-homogeneous mixtures into consideration for Asbestos Management Plans and abatement activities.

### 3.2.2 Alberta Asbestos Abatement Manual

The *Alberta Asbestos Abatement Manual* (October 2012) is a guide published by Alberta OHS. This manual is used for determining compliance with the Occupational Health and Safety Code in the Province of Alberta. It covers basic information on asbestos, its health hazards, requirements for an employer to develop a code of practice regarding the storage, handling and disposal of substances listed in Schedule 1 of the Alberta OHS Code, requirements for worker protection, safe work practices, and the basic principles to follow for the safe abatement of ACM.

### 3.2.3 Alberta Environmental Protection and Enhancement Act

The Environmental Protection and Enhancement Act is law which was passed to protect and enhance the environment. As such, the Act and the regulations under the Act are enforceable by law. The Act places the onus on the owner, employer and employee to ensure no adverse effects are experienced in the environment.

The key waste regulation under the Environmental Protection and Enhancement Act (AEPEA) relating to hazardous building materials is the Waste Control Regulation (WCR), and Alberta’s hazardous waste and hazardous recyclables management programs. The WCR provides guidance for the proper handling, storage, transportation, treatment, recycling and disposal of hazardous wastes in the province. The regulation also outlines the materials and criteria to be used to characterize waste as hazardous.



Although asbestos is not considered to be a hazardous waste, Alberta Environment and Parks (AEP) (previously Alberta Environment and Sustainable Resource Development) has published guidelines for the disposal of asbestos waste. Within the guidelines, criteria have been established for the handling, transportation and disposal of asbestos waste. Also within the guidelines, the types of landfills that can accept asbestos waste are outlined. The requirements for the disposal of asbestos waste in Alberta are re-defined in the document entitled *Guide for Disposal of Asbestos Waste* published by AEP in August, 1989.

### 3.2.4 Other Guidelines

Presently there are no regulations in Alberta specifically addressing lead levels in paint. Alberta OHS published a Bulletin, *Lead at the Work Site*, in November of 2013<sup>1</sup> which considers paints containing more than 90 parts per million (ppm) (90 µg/g) lead to be lead-containing under Canadian Federal Law (Surface Coating Materials Regulation SOR/2005-109, made under the Canada Consumer Product Safety Act [S.C. 2010, c. 21]).

Lead-containing paint is a potential concern both as a source of direct exposure (inhalation or ingestion of dust or paint chips) and as a contributor to lead in interior dust and exterior soil. A risk assessment of potential occupational exposure to lead must consider not only the presence of lead (any amount) but also the activity or impact of activity on the paints containing lead. The Alberta OHS Lead at the Work Site bulletin references recommended abatement methods as outlined in the Ontario Ministry of Labour guideline, *Lead on Construction Projects*<sup>2</sup>. The guideline addresses this issue by establishing three tiers of trigger tasks where employees conducting these activities are assumed to potentially exceed the exposure limits and must be protected accordingly. There are also requirements under the EPEA to prevent the release of lead and mercury into the environment.

### 3.2.5 Transportation of Hazardous Waste

The transportation of hazardous wastes is governed under the Transportation of Dangerous Goods Act and Regulations which outline the requirements for storage, handling, and transportation of such waste.

## 4.0 METHODOLOGY

The assessment methodology was generally consistent with standards outlined by Alberta OHS and the Canada Labour Code.

Detailed notes were taken with each sample including the type of material and sample location. A digital photograph was taken of each sampling location.

### 4.1 Asbestos-Containing Materials

Assessment of the potential ACM in the Site included the evaluation of the building systems. The systems reviewed included, but not limited to:

- Mechanical: Building mechanical systems such as the heating, ventilating and air conditioning (HVAC) systems were inspected for the presence of ACM.

<sup>1</sup> *Lead at the Work Site*, CH071 – Chemical Hazards.

<sup>2</sup> *Health and Safety Guideline – Lead on Construction Projects*. Ontario Ministry of Labour. September 2004, <http://www.labour.gov.on.ca/english/hs/guidelines/lead/index.html>



## HAZARDOUS BUILDING MATERIALS ASSESSMENT BUNKHOUSE COMPOUND, WATERTON, AB

- **Structural:** The method of construction was determined, including interior room areas, mezzanines and roofing support systems. Fireproofing, fire-stop and other materials installed as a part of the structure were reviewed.
- **Architectural:** The presence of ACM was assessed in building materials and finishes such as floor and ceiling tiles, texture coats, asbestos sheet materials, wall joint compound, condensation control applications, spray-applied acoustical materials, and spray-applied insulation on areas of the structure.

The quantity of samples collected was in general accordance with the guidelines in the *Alberta Asbestos Abatement Manual* (October 2012) and was adjusted based on the amount of a particular homogenous material present. A homogenous material is defined as a material that is uniform in color and texture and includes the materials throughout its full extent, even if its occurrence is not contiguous or physically connected. Where analysis of a sample confirmed that a bulk material sample was asbestos-containing, then the entire homogenous material from which the sample was collected was considered an asbestos-containing material.

The *Alberta Asbestos Abatement Manual* (October 2012), recommends a specific number of samples to be collected from suspect ACM depending on the amount present on-site. As part of this project, certain building materials were observed to be installed in limited quantities throughout the buildings, making the collection of multiple samples from these materials impractical.

Materials suspected of containing asbestos were sampled and submitted for analysis to EMSL Canada Inc., a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory. The asbestos samples were analyzed for asbestos type and percentage content using polarized light microscopy and dispersion staining techniques in accordance with EPA methodologies (EPA 600/R-93/116).

### 4.2 Lead-Containing Paint

Visual identification and systematic sampling of suspected lead-containing materials was completed as part of the survey. Testing was conducted by collecting bulk samples by scraping a small section of paint to obtain approximately 1 gram (g) of suspect paint. The bulk samples were submitted under chain of custody to Paracel Laboratories Inc, and were analyzed for lead percentage content using Inductively Cooled Plasma – Optical Emission Spectroscopy (ICP-OES). For the purpose of this report, paints analyzed with lead content greater than the Surface Coatings Materials Regulations, SOR/2010-224 criteria of 0.009% by weight (90 ppm or 90 µg/g) are considered to be lead-containing.

### 4.3 Polychlorinated Biphenyls

Fluorescent light fixtures were inspected to determine if they have the older style T-12 tubes. If the T-12 tubes were observed, the light fixture was assumed to have PCB-containing ballasts. The high-efficiency light fixtures with the newer T-10, T-8, and T-5 style tubes were assumed to have non-PCB containing ballasts. When T-12 tubes were observed without impact to the light fixture, information was collected and compared to the criteria found in the Environment Canada Report EPS 2/CC/2 (revised) August 1991, *Identification of Lamp Ballasts Containing PCBs* to assess their likelihood of containing PCBs.



## HAZARDOUS BUILDING MATERIALS ASSESSMENT BUNKHOUSE COMPOUND, WATERTON, AB

Golder conducted limited sampling for non-liquid PCBs in select paint materials. Sampling was limited to select exterior paints. Sample collection consisted of obtaining a small volume of suspect paint, placing it in an individual sample bag. Samples were submitted to AGAT Laboratories for analysis. Samples were analyzed by gas chromatography in accordance with AGAT Laboratories methodology with reference to the Environmental Protection Agency's method SW-846 8082.

Transformer fluids were not assessed as part of this project.

### 4.4 Other Hazardous Building Materials

The buildings were visually assessed for the presence of mercury in thermostats, mercury vapour in fluorescent light tubes, ozone-depleting substances (ODS) in items or systems such as air conditioning units and refrigerators, radioactive materials in smoke detectors and miscellaneous building maintenance chemicals.

## 5.0 GENERAL OBSERVATIONS

The bunkhouse compound consisted of three separate buildings, each comprised of individual pre-fabricated modules previously manufactured for the Montreal Expo in 1967. One building had 8 units while the other two buildings had 4 units each for a total of 18 units. The modules were constructed with wood framing, wood siding and a built-up membrane roof constructed after 2008. The modules were placed on poured concrete footings and stacked on top of each other into a 2 storey bunkhouse. The modules were insulated with fibreglass in the wall and ceiling cavities. Interior finishes in the bunkhouses consisted of vinyl floor tile, sheet flooring, carpet and drywall walls and ceilings. The three bunkhouse buildings were heated by electric baseboard heaters in each unit. Golder did not observe cinderblock walls or attic spaces throughout the three bunkhouse buildings. Below the three bunkhouse buildings was a partially excavated crawlspace with a dirt floor and concrete walls. The crawlspace ceiling in the 8 unit bunkhouse building consisted of drywall, while the crawlspace ceilings in the other two 4 unit bunkhouse buildings consisted of plywood.

## 6.0 RESULTS AND DISCUSSION

### 6.1 Asbestos-Containing Materials

A total of 41 samples of suspect ACM were collected from the Site outlined above and submitted for analysis. The laboratory analyzed 52 different layers of material. Asbestos was identified in seven of the samples collected at the time of the assessment. The samples identified as asbestos containing are summarized in Tables 1: Asbestos Analysis Summary. Complete asbestos analysis results are provided in Appendix A. Select photographs of identified ACM are provided in Appendix B. Laboratory reports are provided in Appendix C.

**Table 1: Asbestos Analysis Summary**

Sample Number	Type of Material Sampled	Sample Location	Asbestos Detected
A-12	Drywall Joint Compound (Crawlspace Ceiling)	Unit 13	3% Chrysotile
A-18	Drywall Joint Compound (Ceiling)	Unit 16	2% Chrysotile
A-20	Beige Mosaic Sheet Flooring	Unit 16	25% Chrysotile
A-29	Drywall Joint Compound (Ceiling)	Unit 26	2% Chrysotile
A-31	Drywall Joint Compound (Wall)	Unit 20	2% Chrysotile
A-32	Drywall Joint Compound (Ceiling)	Unit 20	2% Chrysotile
A-39	Drywall Joint Compound (Ceiling)	Unit 21	2% Chrysotile



### 6.2 Lead-Containing Paint

Four bulk samples of paint suspected to be lead-containing were collected by Golder and submitted for analysis. All four of the samples collected were identified as lead-containing paint and are outlined below in Table 2: Lead-Containing Paints. Select photographs of identified lead-containing paints are provided in Appendix B. Laboratory reports are provided in Appendix C.

**Table 2: Lead-Containing Paints**

Sample Number	Substrate/Sample Location	Colour	Lead Concentration (µg/g)
L-01	Wood Siding/Trim – Exterior	Brown	354
L-02	Drywall/Wood Trim - Unit 13	Off-White	587
L-03	Wood Doors/Cabinets - Unit 13	Beige	1,190
L-04	Drywall/Wood Trim - Unit 26	Off-White	731

**Note:**

(1) Based on Surface Coatings Materials Regulations, SOR/2010-224 classification of 90 µg/g.

### 6.3 Polychlorinated Biphenyls

Approximately 16 fluorescent light fixtures with the older T12 style tubes suspected to contain PCB ballasts were observed throughout the Site at the time of the assessment.

One sample of paint was collected and submitted for PCB analysis. PCB was not identified in the sample analyzed. The result is summarized in Table 3: PCB Analysis Result. The laboratory report is provided in Appendix C.

**Table 3: PCB Analysis Result**

Sample Number	Locations/Substrate	Colour	PCB Concentration (mg/kg)	PCB-Based Paint <sup>(1)</sup> (Yes/No)
P-01	Exterior, Wood Siding / Trim	Brown	<0.05	No

**Note:**

(1) based on Government of Canada Regulation (SOR//2008-273), <50 mg/kg.

### 6.4 Other Hazardous Building Materials

Approximately 59 other hazardous building materials were observed throughout the Site at the time of the assessment. The items are summarized in Table 4: Other Hazardous Building Materials.

**Table 4: Other Hazardous Building Materials**

Item	Quantity
Mercury Vapour in Fluorescent Light Tubes	16
Items Containing Suspect ODS	16 Refrigerators (R-12)
Smoke Detectors with Radioactive Components	27

Miscellaneous chemicals or biohazards were not identified in the Site at the time of the assessment.





## **7.0 CONCLUSIONS AND RECOMMENDATIONS**

### **7.1 Asbestos-Containing Materials**

Based on site observations and the analytical results, asbestos was confirmed in the following materials at the time of the assessment:

- Beige Mosaic Sheet Flooring – Entrance of Unit 16; and
- Drywall Joint Compound – All Units, All Drywall

As this assessment was semi-destructive in nature, the potential exists for other building materials not sampled to contain asbestos. Materials in the buildings that may contain asbestos that could not be sampled due to the semi-destructive nature include but are not limited to drain pipes, gaskets within flanges and boilers, asbestos cement insulators within electrical equipment and within mechanical equipment.

Prior to any demolition or renovation activities, ACM that may be impacted must be removed. The work should be completed by workers certified by Alberta OHS. Throughout the abatement activities, appropriate air monitoring and inspections should be conducted by qualified personnel to document that contamination is contained and ACM are removed and disposed of appropriately. It is recommended that a proper scope of work and asbestos removal specifications be written to scope the complete and proper removal of the identified ACM.

If suspected ACM not previously assessed are uncovered during renovation or demolition activities, work should stop immediately and sampling of the material should be conducted to confirm the presence of asbestos.

### **7.2 Lead-Containing Paint**

Based on site observations and the analytical results, lead above the Surface Coatings Materials Regulations, 90 µg/g was identified in the following paints:

- Brown Paint on Wood Siding/Trim – Exterior (poor condition);
- Off-White Paint on Drywall/Wood Trim – All Units (good condition); and
- Beige Paint on Wood Doors/Cabinets – All Units (good condition).

Lead-containing surfaces with any amounts of lead that will be impacted through maintenance, renovation, or demolition activities in a manner likely to cause some level of airborne lead-containing dust or fumes, (i.e., welding, torch cutting, grinding, sanding or sandblasting) should be controlled through the development and implementation of an Exposure Control Plan. The exposure control plan should include safe work procedures to address the lead exposure hazard during the maintenance, renovation, or demolition activities. The safe work procedures should include procedures to minimize dust during construction and demolition, procedures for proper containment, collection, clean-up and disposal of debris to prevent contamination in other areas, the use of proper cleaning tools, selection and use of proper personal protective equipment, and other applicable procedures.



Lead-containing paint in poor condition should be abated prior to demolition. The lead containing paint that is flaking or loose (poor condition) should be abated following methods and requirements outlined in the Alberta OHS *Lead at the Work Site Bulletin*. The lead-containing paint waste should be analyzed for lead leachability by toxicity characteristic leaching procedure (TCLP) prior to transportation and disposal. The transportation and disposal of lead-containing waste materials must be conducted in accordance with the requirements of AEP and the Federal Transportation of Dangerous Goods Act and Regulations, current to the date of the work. The AEP Waste Control Regulation prescribes the disposal pathways for lead-containing waste.

### 7.3 Polychlorinated Biphenyls

Approximately 16 fluorescent light fixtures with the older T12 style tubes suspected to contain PCB ballasts were observed throughout the Site at the time of the assessment. Prior to disposal, these ballasts should be inspected further to determine the presence of any PCBs.

Prior to decommissioning, renovation or demolition, PCB-containing ballasts must be properly removed and disposed of. Disposal of the ballasts must be conducted in accordance with federal and provincial regulations. As they are removed, PCB-containing ballasts must be placed in labelled drums located in a secure area. Once full, the drums must be manifested and transported to an approved destruction and disposal facility in accordance with regulations specified by Alberta Environmental Protection.

Non-liquid PCBs were found to be below the PCB Management Regulation criteria of 50 mg/kg for PCB-containing solids. As such, Golder did not identify PCB-containing paints during this assessment.

### 7.4 Other Hazardous Building Materials

Approximately 16 fluorescent light tubes suspected of containing mercury vapour were observed throughout the Site at the time of the assessment. No thermostats suspected of containing mercury capsules were observed throughout the Site at the time of the assessment.

Mercury vapour in light tubes poses no risk to workers or occupants provided the light bulbs remain intact and undisturbed. The bulbs should be removed from the building prior to decommissioning, renovations or maintenance activities and be kept separate from all other waste to prevent damage to the light bulbs. Light bulbs containing mercury vapour should be recycled as per the Alberta Fluorescent Lamp Stewardship Initiative. Alternatively, the mercury-containing fluorescent light may be disposed of in accordance with regulations specified by AEP.

Approximately 16 refrigerators suspected of containing ozone-depleting substances were observed throughout the Site at the time of the assessment. Equipment suspected of containing ODS is to be recycled or disposed of in accordance with the federal Ozone Depleting Substances and Halocarbons Regulation (Section 181/2000). Equipment containing suspect ODS that is to remain in place must be managed in accordance with the provincial and federal regulations. If the units require maintenance or are to be decommissioned, the refrigerants in the identified units must be drained, recycled or destroyed by a competent individual with the appropriate trade qualifications. Servicing should be performed in accordance with Environment Canada, *Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems* and manufactures specifications.





## HAZARDOUS BUILDING MATERIALS ASSESSMENT BUNKHOUSE COMPOUND, WATERTON, AB

Approximately 27 smoke detectors suspected of containing radioactive components were observed throughout the Site at the time of the assessment. Smoke detectors that contain radioactive materials must be sent for recycling upon decommissioning. Removal and disposal must be conducted in accordance with the Nuclear Safety and Control Act, Nuclear Substances and Radiation Device Regulation SOR/2000-207.

Miscellaneous chemicals and biohazards were not identified in buildings at the time of the assessment.

### 8.0 STATEMENT OF LIMITATIONS

The conclusions and recommendations contained in this assessment report are based upon professional opinions with regard to the subject matter. These opinions are in accordance with currently accepted environmental assessment standards and practices applicable to these locations and are subject to the following inherent limitations:

The data and findings presented in this report are valid as of the dates of the investigations. The passage of time, manifestation of latent conditions or occurrence of future events may warrant further exploration at the properties, analysis of the data, and re-evaluation of the findings, observations, and conclusions expressed in this report.

The data reported and the findings, observations and conclusions expressed in this report are limited by the Scope of Work. The Scope of Work was defined as requested by the client, the time and budgetary constraints imposed by the client, and availability of access to the properties.

Because of the limitations stated above, the findings, observations and conclusions expressed by Golder Associates Ltd. in this report are not, and should not be, considered an opinion concerning compliance of any past or present owner or operator of the site with any federal, provincial or local laws or regulations.

No warranty or guarantee, whether expressed or implied, is made with respect to the data or the reported findings, observations, and conclusions, which are based solely upon site conditions in existence at the time of investigation.

Golder Associates Ltd.'s assessment reports present professional opinions and findings of a scientific and technical nature. While attempts were made to relate the data and findings to applicable environmental laws and regulations, the report shall not be construed to offer legal opinion or representations as to the requirements of, nor compliance with, environmental laws, rules, regulations or policies of federal, provincial, or local governmental agencies. Any use of the assessment report constitutes acceptance of the limits of Golder Associates Ltd.'s liability. Golder Associates Ltd.'s liability extends only to its client and not to other parties who may obtain this assessment report. Issues raised by the report should be reviewed by appropriate legal counsel.

The accuracy or authenticity of third party survey data provided to Golder by the Client that was included in this report was not verified by Golder.



## HAZARDOUS BUILDING MATERIALS ASSESSMENT BUNKHOUSE COMPOUND, WATERTON, AB

### 9.0 CLOSURE

If you have any questions or require additional information please feel free to contact the undersigned at (403) 299-5600. Thank you for the opportunity to be of service.

#### GOLDER ASSOCIATES LTD.

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# **APPENDIX A**

## **Sample Analysis Results**



## HAZARDOUS BUILDING MATERIALS ASSESSMENT, BUNKHOUSE COMPOUND, WATERTON, AB

Table – Asbestos Analysis Results, Bunkhouse Compound

Sample Number	Type of Material Sampled	Sample Location	Asbestos Detected No/Yes: Type
A-01	Black Paper Beneath Wood Siding	Exterior	No
A-02	Black Paper Beneath Wood Siding	Exterior	No
A-03	Black Paper Beneath Wood Siding	Exterior	No
A-04	Black Paper Beneath Wood Siding	Exterior	No
A-05	Black Paper Beneath Wood Siding	Exterior	No
A-06	Built-Up Roofing Material	Exterior Electrical Room	No
A-07	Grey Caulking on Metal Flashing	Exterior Electrical Room	No
A-08	Drywall Joint Compound (Wall)	Unit 13	No
A-09	Drywall Joint Compound (Ceiling)	Unit 13	No
A-10A	Green Streaked Sheet Floor	Unit 13	No
A-10B	Green Streaked Sheet Floor (Mastic)	Unit 13	No
A-11A	Grey Mosaic Sheet Floor	Unit 13	No
A-11B	Grey Mosaic Sheet Floor (Mastic)	Unit 13	No
<b>A-12</b>	<b>Drywall Joint Compound (Crawlspace Ceiling)</b>	<b>Unit 13</b>	<b>Yes: Chrysotile 3%</b>
A-13	Drywall Joint Compound (Wall)	Unit 15	No
A-14	Drywall Joint Compound (Ceiling)	Unit 15	No
A-15	Green Streaked Sheet Floor	Unit 15	No
A-16A	Pink Squares Sheet Floor	Unit 15	No
A-16B	Pink Squares Sheet Floor (Mastic)	Unit 15	No
A-17	Drywall Joint Compound (Wall)	Unit 16	No
<b>A-18</b>	<b>Drywall Joint Compound (Ceiling)</b>	<b>Unit 16</b>	<b>Yes: Chrysotile 2%</b>
A-19A	Green Streaked Sheet Floor	Unit 16	No
A-19B	Green Streaked Sheet Floor (Mastic)	Unit 16	No
<b>A-20</b>	<b>Beige Mosaic Sheet Floor</b>	<b>Unit 16</b>	<b>Yes: Chrysotile 25%</b>
A-21	Drywall Joint Compound (Wall)	Unit 17	No
A-22	Drywall Joint Compound (Ceiling)	Unit 17	No
A-23	Grey Squares Sheet Floor	Unit 17	No
A-24	Back Tar Paper in Ceiling Space	Unit 17	No
A-25	Black Tar Paper in Ceiling Space	Unit 17	No
A-26	Black Tar Paper in Ceiling Space	Unit 17	No
A-27A	Green Streaked Sheet Floor	Unit 26	No
A-27B	Green Streaked Sheet Floor (Mastic)	Unit 26	No
A-28	Drywall Joint Compound (Wall)	Unit 26	No
<b>A-29</b>	<b>Drywall Joint Compound (Ceiling)</b>	<b>Unit 26</b>	<b>Yes: Chrysotile 2%</b>
A-30A	Grey Mosaic Sheet Floor	Unit 20	No
A-30B	Grey Mosaic Sheet Floor (Mastic)	Unit 20	No
A-31	Drywall Joint Compound (Wall)	Unit 20	<b>Yes: Chrysotile 2%</b>
<b>A-32</b>	<b>Drywall Joint Compound (Ceiling)</b>	<b>Unit 20</b>	<b>Yes: Chrysotile 2%</b>
A-33A	Green Streaked Sheet Floor	Unit 20	No



## HAZARDOUS BUILDING MATERIALS ASSESSMENT, BUNKHOUSE COMPOUND, WATERTON, AB

Table – Asbestos Analysis Results, Bunkhouse Compound (continued)

Sample Number	Type of Material Sampled	Sample Location	Asbestos Detected No/Yes: Type
A-33B	Green Streaked Sheet Floor (Mastic)	Unit 30	No
A-34A	Grey Mosaic Sheet Floor	Unit 20	No
A-34B	Grey Mosaic Sheet Floor (Mastic)	Unit 20	No
A-35	Grey Speckled Sheet Floor	Unit 21	No
A-36	Grey Speckled Sheet Floor	Unit 21	No
A-37A	Grey Speckled Sheet Floor	Unit 21	No
A-37B	Grey Speckled Sheet Floor (Mastic)	Unit 21	No
A-38	Drywall Joint Compound (Wall)	Unit 21	No
<b>A-39</b>	<b>Drywall Joint Compound (Ceiling)</b>	<b>Unit 21</b>	<b>Yes: Chrysotile 2%</b>
A-40A	Green Streaked Sheet Floor	Unit 21	No
A-40B	Green Streaked Sheet Floor (Mastic)	Unit 21	No
A-41A	Green Streaked Sheet Floor	Unit 24	No
A-41B	Green Streaked Sheet Floor (Mastic)	Unit 24	No

Table – Lead Paint Analysis Results, Bunkhouse Compound

Sample Number	Substrate/Sample Location	Colour	Lead Concentration (µg/g)	Lead-Containing Paint <sup>(1)</sup> (Yes/No)
L-01	Wood Siding/Trim / Exterior Bunkhouse	Brown	354	Yes
L-02	Drywall/Wood Trim / Unit 13 Bunkhouse	Off-White	587	Yes
L-03	Wood Doors / Cabinets - Unit 13 Bunkhouse	Beige	1,190	Yes
L-04	Drywall/Wood Trim / Unit 26 Bunkhouse	Off-White	731	Yes



# **APPENDIX B**

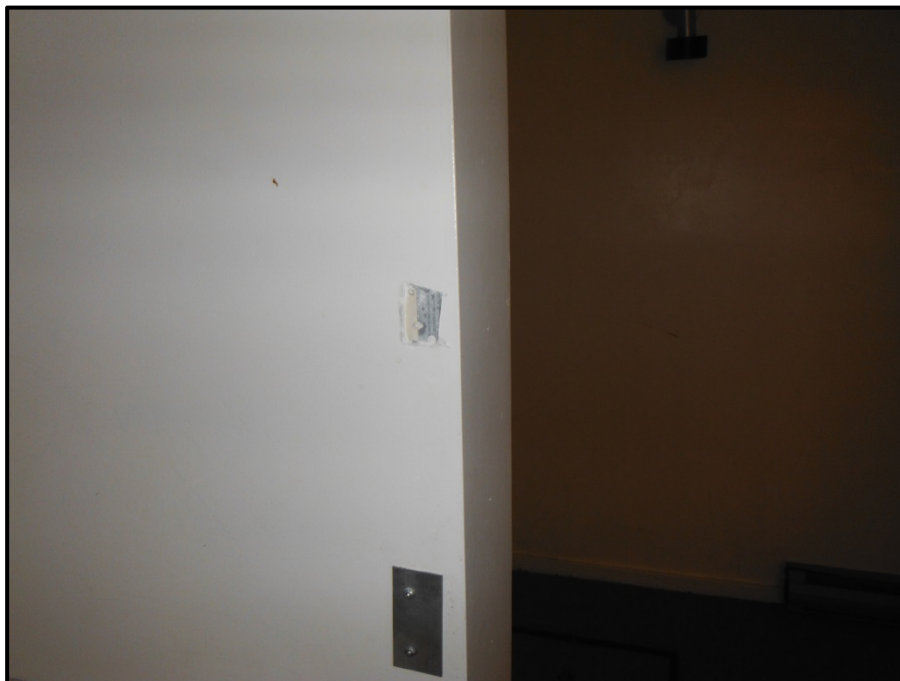
## **Photographs**



## HAZARDOUS BUILDING MATERIALS ASSESSMENT BUNKHOUSE COMPOUND, WATERTON, AB



**Photograph 1: Section of the Bunkhouse Compound**



**Photograph 2: Asbestos-Containing Drywall Joint Compound, Bunkhouse Compound**





## HAZARDOUS BUILDING MATERIALS ASSESSMENT BUNKHOUSE COMPOUND, WATERTON, AB



**Photograph 3: Asbestos-Containing Beige Mosaic Sheet Floor, Unit 16**



**Photograph 4: Lead-Containing Brown Paint on Wood Siding/Trim – Exterior, Bunkhouse Compound**





## HAZARDOUS BUILDING MATERIALS ASSESSMENT BUNKHOUSE COMPOUND, WATERTON, AB



**Photograph 5: Lead-Containing Off-White Paint on Drywall/Wood Trim – Interior, Bunkhouse Compound**



**Photograph 6: Lead-Containing Beige Paint on Wood Doors/Cabinets – Interior, Bunkhouse**



# **APPENDIX C**

## **Laboratory Reports**

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Analysis Date: 10/27/2015  
Collected: 10/13/2015

Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
A-01 651503629-0001	Exterior- Bunk House - Black Paper Beneath Wood Siding	Brown Fibrous Homogeneous	90% Cellulose	10% Non-fibrous (other)	None Detected
A-02 651503629-0002	Exterior- Bunk House - Black Paper Beneath Wood Siding	Brown Fibrous Homogeneous	90% Cellulose	10% Non-fibrous (other)	None Detected
A-03 651503629-0003	Exterior- Bunk House - Black Paper Beneath Wood Siding	Brown Fibrous Homogeneous	90% Cellulose	10% Non-fibrous (other)	None Detected
A-04 651503629-0004	Exterior- Bunk House - Black Paper Beneath Wood Siding	Brown Fibrous Homogeneous	90% Cellulose	10% Non-fibrous (other)	None Detected
A-05 651503629-0005	Exterior- Bunk House - Black Paper Beneath Wood Siding	Brown Fibrous Homogeneous	90% Cellulose	10% Non-fibrous (other)	None Detected
A-06 651503629-0006	Exterior Electrical Room- Bunk House - Built-Up Roofing Material	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-07 651503629-0007	Exterior Electrical Room- Bunk House - Grey Caulking on Metal Flashing	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected

Analyst(s)

Brett Olsen (229)

Kate Fee (79)

Jefferson Salvador, Laboratory Manager  
or other approved signatory

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Samples analyzed by EMSL Canada Inc. Calgary, AB NVLAP Lab Code 500100

Initial report from 10/27/2015 13:09:12

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos	
			% Fibrous	% Non-Fibrous	% Type	
A-08 651503629-0008	Unit 13- Bunk House - Drywall Joint Compound (Wall)	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected	
A-09 651503629-0009	Unit 13- Bunk House - Drywall Joint Compound (Ceiling)	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected	
A-10-Flooring 651503629-0010	Unit 13- Bunk House - Green Streaked Sheet Floor	Green/Beige Fibrous Homogeneous	20% Cellulose	80% Non-fibrous (other)	None Detected	
A-10-Mastic 651503629-0010A	Unit 13- Bunk House - Green Streaked Sheet Floor	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected	
A-11-Flooring 651503629-0011	Unit 13- Bunk House - Grey Mosaic Sheet Floor	Gray/Beige Fibrous Homogeneous	25% Cellulose 3% Glass	72% Non-fibrous (other)	None Detected	
A-11-Mastic 651503629-0011A	Unit 13- Bunk House - Grey Mosaic Sheet Floor	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected	
A-12 651503629-0012	Unit 13- Bunk House - Drywall Joint Compound (Ceiling of Crawlspace)	Beige Fibrous Homogeneous		97% Non-fibrous (other)	3% Chrysotile	

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or other approved signatory

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Samples analyzed by EMSL Canada Inc. Calgary, AB NVLAP Lab Code 500100

Initial report from 10/27/2015 13:09:12

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 Analysis Date: 10/27/2015  
 Collected: 10/13/2015

Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
A-13 651503629-0013	Unit 15- Bunk House - Drywall Joint Compound (Wall)	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-14 651503629-0014	Unit 15- Bunk House - Drywall Joint Compound (Ceiling)	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-15 651503629-0015	Unit 15- Bunk House - Green Streaked Sheet Floor	Green Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-16-Flooring 651503629-0016	Unit 15- Bunk House - Pink Squares Sheet Floor	Brown/Beige Fibrous Homogeneous	25% Cellulose 3% Glass	72% Non-fibrous (other)	None Detected
A-16-Mastic 651503629-0016A	Unit 15- Bunk House - Pink Squares Sheet Floor	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-17 651503629-0017	Unit 16- Bunk House - Drywall Joint Compound (Wall)	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-18 651503629-0018	Unit 16- Bunk House - Drywall Joint Compound (Ceiling)	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	2% Chrysotile

Analyst(s)

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 or other approved signatory

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Samples analyzed by EMSL Canada Inc. Calgary, AB NVLAP Lab Code 500100

Initial report from 10/27/2015 13:09:12

**EMSL Canada Inc.**

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos	
			% Fibrous	% Non-Fibrous	% Type	
A-19-Flooring 651503629-0019	Unit 16- Bunk House - Green Streaked Sheet Floor	Green Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected	
A-19-Mastic 651503629-0019A	Unit 16- Bunk House - Green Streaked Sheet Floor	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected	
A-20 651503629-0020	Unit 16- Bunk House - Beige Mosaic Sheet Floor	Brown/Beige Fibrous Homogeneous	3% Cellulose	72% Non-fibrous (other)	25% Chrysotile	
A-21 651503629-0021	Unit 17- Bunk House - Drywall Joint Compound (Wall)	White Non-Fibrous Homogeneous		20% Perlite 80% Non-fibrous (other)	None Detected	
A-22 651503629-0022	Unit 17- Bunk House - Drywall Joint Compound (Ceiling)	White Non-Fibrous Homogeneous		20% Perlite 80% Non-fibrous (other)	None Detected	
A-23 651503629-0023	Unit 17- Bunk House - Grey Squares Sheet Floor	Beige Fibrous Homogeneous	25% Cellulose 2% Glass	73% Non-fibrous (other)	None Detected	
A-24 651503629-0024	Unit 17- Bunk House - Black Tar-Paper in Ceiling Space	Black Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (other)	None Detected	

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
A-25 651503629-0025	Unit 17- Bunk House - Black Tar-Paper in Ceiling Space	Black Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (other)	None Detected
A-26 651503629-0026	Unit 17- Bunk House - Black Tar-Paper in Ceiling Space	Black Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (other)	None Detected
A-27-Flooring 651503629-0027	Unit 26- Bunk House - Green Streaked Sheet Floor	Green Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-27-Mastic 651503629-0027A	Unit 26- Bunk House - Green Streaked Sheet Floor	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-28 651503629-0028	Unit 26- Bunk House - Drywall Joint Compound (Wall)	White Non-Fibrous Homogeneous		20% Perlite 80% Non-fibrous (other)	None Detected
A-29 651503629-0029	Unit 26- Bunk House - Drywall Joint Compound (Ceiling)	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	2% Chrysotile
A-30-Flooring 651503629-0030	Unit 20- Bunk House - Grey Mosaic Sheet Floor	Gray/White Fibrous Homogeneous	25% Cellulose 5% Synthetic	70% Non-fibrous (other)	None Detected

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Jefferson Salvador, Laboratory Manager  
 or other approved signatory

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Samples analyzed by EMSL Canada Inc. Calgary, AB NVLAP Lab Code 500100

Initial report from 10/27/2015 13:09:12



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CustomerID: 55EHPL50

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ProjectID:

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 Received: 10/20/15 1:27 PM  
 Analysis Date: 10/27/2015  
 Collected: 10/13/2015

Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
A-30-Mastic 651503629-0030A	Unit 20- Bunk House - Grey Mosaic Sheet Floor	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-31 651503629-0031	Unit 20- Bunk House - Drywall Joint Compound (Wall)	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	2% Chrysotile
A-32 651503629-0032	Unit 20- Bunk House - Drywall Joint Compound (Ceiling)	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	2% Chrysotile
A-33-Sheet Flooring 651503629-0033	Unit 20- Bunk House - Green Streaked Sheet Floor	Green Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-33-Mastic 651503629-0033A	Unit 20- Bunk House - Green Streaked Sheet Floor	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-34-Sheet Flooring 651503629-0034	Unit 20- Bunk House - Grey Mosaic Sheet Floor	Gray/Beige Fibrous Homogeneous	25% Cellulose 5% Synthetic	70% Non-fibrous (other)	None Detected
A-34-Mastic 651503629-0034A	Unit 20- Bunk House - Grey Mosaic Sheet Floor	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected

## Analyst(s)

Brett Olsen (229)

Kate Fee (79)

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 or other approved signatory

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 Analysis Date: 10/27/2015  
 Collected: 10/13/2015

Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
A-35 651503629-0035	Unit 21- Bunk House - Grey Speckled Sheet Floor	Gray Fibrous Homogeneous	25% Cellulose 2% Glass	73% Non-fibrous (other)	None Detected
A-36 651503629-0036	Unit 21- Bunk House - Grey Speckled Sheet Floor	Gray Fibrous Homogeneous	25% Cellulose 2% Glass	73% Non-fibrous (other)	None Detected
A-37-Flooring 651503629-0037	Unit 21- Bunk House - Grey Speckled Sheet Floor	Gray Fibrous Homogeneous	25% Cellulose 2% Glass	73% Non-fibrous (other)	None Detected
A-37-Mastic 651503629-0037A	Unit 21- Bunk House - Grey Speckled Sheet Floor	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-38 651503629-0038	Unit 21- Bunk House - Drywall Joint Compound (Wall)	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-39 651503629-0039	Unit 21- Bunk House - Drywall Joint Compound (Ceiling)	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	2% Chrysotile
A-40-Flooring 651503629-0040	Unit 21- Bunk House - Green Streaked Sheet Floor	Green Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected

## Analyst(s)

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Phone: (403) 299-5600  
 Fax: (403) 299-5606  
 Received: 10/20/15 1:27 PM  
 Analysis Date: 10/27/2015  
 Collected: 10/13/2015

Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
A-40-Mastic 651503629-0040A	Unit 21- Bunk House - Green Streaked Sheet Floor	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	<b>None Detected</b>
A-41-Flooring 651503629-0041	Unit 24- Bunk House - Green Streaked Sheet Floor	Green Non-Fibrous Homogeneous		100% Non-fibrous (other)	<b>None Detected</b>
A-41-Mastic 651503629-0041A	Unit 24- Bunk House - Green Streaked Sheet Floor	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	<b>None Detected</b>
A-42-Flooring 651503629-0042	Mailbox Room- Post Office - Grey Speckled Sheet Floor	Gray Fibrous Homogeneous	25% Cellulose	75% Non-fibrous (other)	<b>None Detected</b>
A-42-Mastic 651503629-0042A	Mailbox Room- Post Office - Grey Speckled Sheet Floor	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	<b>None Detected</b>
A-43 651503629-0043	Mailbox Room- Post Office - Drywall Joint Compound (Wall)	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	<b>2% Chrysotile</b>
A-44 651503629-0044	Back Room- Post Office - Drywall Joint Compound (Wall)	White Non-Fibrous Homogeneous		20% Perlite 80% Non-fibrous (other)	<b>None Detected</b>

Analyst(s)

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Samples analyzed by EMSL Canada Inc. Calgary, AB NVLAP Lab Code 500100

Initial report from 10/27/2015 13:09:12

## Sample Results

Lead				Matrix: Paint
				Sample Date: 13-Oct-15
Paracel ID	Client ID	Units	MDL	Result
1543152-01	L-01 - Brown - Wood Siding/Trim - Exterior Bunk House	ug/g	20	354
1543152-02	L-02 - Off-White - Drywall/Wood Trim - Unit 13 Bunk House	ug/g	20	587
1543152-03	L-03 - Beige (orange) - Wood Doors/Cabinets - Unit 13 Bunk House	ug/g	20	1190
1543152-04	L-04 - Off-White - Drywall/Wood Trim - Unit 26 Bunk House	ug/g	20	731
1543152-05	L-05 - Light-Grey - Drywall - Post Office	ug/g	20	365
1543152-06	L-06 - Black - Wood Trim - Exterior Post Office/Residence	ug/g	20	<20
1543152-07	L-07 - White - Wood Trim - Exterior Post Office/Residence	ug/g	20	67
1543152-08	L-08 - Beige - Drywall - Residence Side (Post Office)	ug/g	20	<20
1543152-09	L-09 - White - Drywall - Residence Side (Post Office)	ug/g	20	336
1543152-10	L-10 - Grey - Concrete Floor - Residence Side (Post Office)	ug/g	20	2020
1543152-11	L-11 - Beige - Drywall/Wood Walls - Lot 42	ug/g	20	<20
1543152-12	L-12 - White - Wood Trim/ Ceiling Tile - Lot 42	ug/g	20	46
1543152-13	L-13 - Grey - Concrete Floor - Lot 42	ug/g	20	1610
1543152-14	L-14 - Beige - Wood Trim / Stucco - Exterior Lot 42	ug/g	20	52400
1543152-15	L-15 - Red - Wood Trim - Exterior Lot 42	ug/g	20	1460
1543152-16	L-16 - Beige - Drywall - Lot 41	ug/g	20	<20
1543152-17	L-17 - White - Wood Trim - Interior Lot 41	ug/g	20	2020
1543152-18	L-18 - Grey - Plywood Floor - Interior Lot 41	ug/g	20	629
1543152-19	L-19 - Beige - Wood Siding - Exterior Lot 41	ug/g	20	13200
1543152-20	L-20 - Dark Brown - Wood Fencing/Trim - Exterior Lot 41	ug/g	20	979
1543152-21	L-21 - Light Brown - Wood Deck / Siding - Lot 41	ug/g	20	26
1543152-22	L-22 - Beige - Drywall - Lot 21	ug/g	20	346
1543152-23	L-23 - White - Wood Trim - Interior - Lot 21	ug/g	20	27100
1543152-24	L-24 - White - Wood Trim - Exterior - Lot 21	ug/g	20	9590
1543152-25	L-25 - Grey - Concrete Floor - Interior Lot 21	ug/g	20	2260
1543152-26	L-26 - White - Wood Trim - Exterior Lot 21	ug/g	20	1280
1543152-27	L-27 - Grey - Wood Deck - Exterior Lot 21	ug/g	20	1950
1543152-28	L-28 - Grey - Concrete Base of Wall - Exterior Lot 21	ug/g	20	<20
1543152-29	L-29 - Beige - Wood Panelling - Interior Main Floor - Lot 3/4	ug/g	20	419
1543152-30	L-30 - White - Wood Panelling - Interior Basement - Lot 3/4	ug/g	20	63
1543152-31	L-31 - Grey - Concrete Floor - Interior Lot 3/4	ug/g	20	196

## Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Matrix Blank</b>									
Lead	ND	20	ug/g						
<b>Matrix Duplicate</b>									
Lead	283	20	ug/g	354			22.2	30	



## Certificate of Analysis

AGAT WORK ORDER: 15C034028

PROJECT: 15-34393/1000

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CALGARY, ALBERTA  
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CLIENT NAME: GOLDER ASSOCIATES LTD.

ATTENTION TO: Bessie Abella

SAMPLING SITE:

SAMPLED BY:

### Polychlorinated Biphenyls Analysis

DATE RECEIVED: 2015-10-23

DATE REPORTED: 2015-10-26

				P-01 - Brown Wood	P-07 - White Wood Trim-Ext	P-14 - Beige Wood Trim/Stucco-Ext	P-15 - Red Wood Trim-Ext	P-19 - Beige Wood Siding-Ext	P-20 - Dark Brown Wood Fencing/Trim	P-21 - Light Brown Wood Deck/Siding	P-24 - White Wood Trim-Ext
SAMPLE DESCRIPTION:				Siding/Trim-Ext	Wood Trim-Ext	Trim/Stucco-Ext	Wood Trim-Ext	Siding-Ext	Fencing/Trim	Deck/Siding	Wood Trim-Ext
SAMPLE TYPE:				Paint	Paint	Paint	Paint	Paint	Paint	Paint	Paint
DATE SAMPLED:				10/13/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015
Parameter	Unit	G / S	RDL	7116202	7116271	7116272	7116273	7116274	7116275	7116276	7116277
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits									
Decachlorobiphenyl	%	50-150		110	105	105	110	145	105	115	110
				P-26 - White Wood Trim-Ext	P-27 - Grey Wood Deck-Ext	P-28 - Grey Concrete Base					
SAMPLE DESCRIPTION:				Wood Trim-Ext	Wood Deck-Ext	Concrete Base					
SAMPLE TYPE:				Paint	Paint	Paint					
DATE SAMPLED:				10/16/2015	10/16/2015	10/16/2015					
Parameter	Unit	G / S	RDL	7116278	7116279	7116280					
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05					
Aroclor 1254	mg/kg		0.05	<0.05	<0.05	<0.05					
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05					
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	<0.05	<0.05					
Surrogate	Unit	Acceptable Limits									
Decachlorobiphenyl	%	50-150		110	105	80					

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

Certified By:



**AGAT** Laboratories

## Certificate of Analysis

AGAT WORK ORDER: 15C034981

PROJECT: 15-34393/1000

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<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD.

SAMPLING SITE:

ATTENTION TO: Bessie Abella

SAMPLED BY:

### Polychlorinated Biphenyls Analysis

DATE RECEIVED: 2015-10-26

DATE REPORTED: 2015-10-27

P-06-Black-				
SAMPLE DESCRIPTION: Wood Trim-Ext				
SAMPLE TYPE: Paint				
DATE SAMPLED: 10/14/2015				
Parameter	Unit	G / S	RDL	7129531
Aroclor 1242	mg/kg		0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05
Aroclor 1260	mg/kg		0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05
Surrogate	Unit	Acceptable Limits		
Decachlorobiphenyl	%	50-150	87	

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

Certified By:

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

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January 2016

IBI GROUP ARCHITECTS ENGINEERS

# PRE-DEMOLITION HAZARDOUS BUILDING MATERIALS ASSESSMENT

Lot 20, 102A & 102B Wind Flower Avenue,  
Waterton, Alberta

REPORT

**Submitted to:**

Ms. Leanne Soligo  
IBI Group Architects Engineers  
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Calgary, AB  
T2N 1X7  
Email: [LSoligo@IBIGroup.com](mailto:LSoligo@IBIGroup.com)

**Report Number:** 15-34393.1000

**Distribution:**

1 e-copy - IBI Group Architects Engineers  
1 copy - Golder Associates Ltd.





## Executive Summary

### INTRODUCTION

At the request of IBI Group Architects Engineers (IBI), Golder Associates Ltd. (Golder) conducted a hazardous building materials assessment at 102A and 102B Windflower Avenue (Lot 20) in Waterton, Alberta.

The assessment was conducted on October 13 to 14, 2015, by Caleb Fricker, Occupational Hygiene Technologist, under the direction of Nadine Reid, Occupational Hygienist.

### SCOPE OF WORK

The assessment was performed with the objective of compiling an inventory of hazardous building materials prior to the proposed demolition of the building. The assessment included asbestos-containing materials (ACM), lead-containing paint, polychlorinated biphenyls (PCB) in fluorescent light ballasts, mercury in thermostats, mercury vapour in fluorescent light tubes, ozone-depleting substances (ODS) in items such as air conditioning units and refrigerators, radioactive materials in smoke detectors and miscellaneous building maintenance chemicals.

### CONCLUSIONS AND RECOMMENDATIONS

#### Asbestos-Containing Materials

Based on site observations and the analytical results, asbestos was confirmed in the following materials at the time of the assessment:

Asbestos-Containing Material	Locations
Drywall Joint Compound	All Drywall – Entire Building
Vinyl Floor Tile Beneath Sheet Flooring	Back Room – Post Office
Exterior Grey Window Putty	One Window – Residence
Asphalt Roofing Shingles	Roof of Shed
Vinyl Floor Tile Beneath Carpet	Living Room – Residence
Mosaic Sheet Flooring Beneath Carpet	Bedrooms – Residence
9"x9" Vinyl Floor Tile	Basement – Residence
White Insulation Board	Floor Vents – Residence

As this assessment was semi-destructive in nature, the potential exists for other building materials not sampled to contain asbestos. Materials in the building that may contain asbestos that could not be sampled due to the semi-destructive nature include but are not limited to drain pipes, gaskets within flanges and boilers, asbestos cement insulators within electrical equipment and within mechanical equipment.

Prior to any demolition or renovation activities, ACM that may be impacted must be removed. The work should be completed by workers certified by Alberta OHS. Throughout the abatement activities, appropriate air monitoring and inspections should be conducted by qualified personnel to document that contamination is contained and ACM are removed and disposed of appropriately. It is recommended that a proper scope of work and asbestos removal specifications be written to scope the complete and proper removal of the identified ACM.





If suspected ACM not previously assessed are uncovered during renovation or demolition activities, work should stop immediately and sampling of the material should be conducted to confirm the presence of asbestos.

### Lead-Containing Paint

Based on site observations and the analytical results, lead above the Surface Coatings Materials Regulations, 90 µg/g was identified in the following paints:

- Light Grey Paint on Drywall – Post Office (good condition);
- White Paint on Drywall – Residence, Basement, South Wall (poor condition); and
- Grey Paint on Concrete Floor – Residence Side (good condition).

Lead-containing surfaces with any amounts of lead that will be impacted through maintenance, renovation, or demolition activities in a manner likely to cause some level of airborne lead-containing dust or fumes, (i.e., welding, torch cutting, grinding, sanding or sandblasting) should be controlled through the development and implementation of an Exposure Control Plan. The exposure control plan should include safe work procedures to address the lead exposure hazard during the maintenance, renovation, or demolition activities. The safe work procedures should include procedures to minimize dust during construction and demolition, procedures for proper containment, collection, clean-up and disposal of debris to prevent contamination in other areas, the use of proper cleaning tools, selection and use of proper personal protective equipment, and other applicable procedures.

Lead-containing paint in poor condition should be abated prior to demolition. The lead containing paint that is flaking or loose (poor condition) should be abated following methods and requirements outlined in the Alberta OHS *Lead at the Work Site Bulletin*. The lead-containing paint waste should be analyzed for lead leachability by toxicity characteristic leaching procedure (TCLP) prior to transportation and disposal. The transportation and disposal of lead-containing waste materials must be conducted in accordance with the requirements of AEP and the Federal Transportation of Dangerous Goods Act and Regulations, current to the date of the work. The AEP Waste Control Regulation prescribes the disposal pathways for lead-containing waste.

### Polychlorinated Biphenyls

Fluorescent light fixtures with the older T12 style tubes suspected to contain PCB ballasts were not identified in the building at the time of the assessment.

### Other Hazardous Building Materials

Approximately 36 fluorescent light tubes suspected of containing mercury vapour were observed throughout the building at the time of the assessment. One thermostat suspected of containing mercury capsules was observed throughout the building at the time of the assessment.

Mercury vapour in light tubes and mercury in thermostats pose no risk to workers or occupants provided the light bulbs and capsules remain intact and undisturbed. The bulbs and capsules should be removed from the building prior to decommissioning, renovations or maintenance activities and be kept separate from all other waste to prevent damage to the light bulbs and capsules. Light bulbs containing mercury vapour should be recycled as per the Alberta Fluorescent Lamp Stewardship Initiative. Alternatively, the mercury-containing fluorescent light bulbs and capsules may be disposed of in accordance with regulations specified by AEP.



## HAZARDOUS BUILDING MATERIALS ASSESSMENT, LOT 20, WATERTON, AB

Approximately two refrigerators, one deep freezer, one air conditioning unit and one mini-fridge suspected of containing ozone-depleting substances were observed throughout the building at the time of the assessment. Equipment suspected of containing ODS is to be recycled or disposed of in accordance with the federal Ozone Depleting Substances and Halocarbons Regulation (Section 181/2000). Equipment containing suspect ODS that is to remain in place must be managed in accordance with the provincial and federal regulations. If the units require maintenance or are to be decommissioned, the refrigerants in the identified units must be drained, recycled or destroyed by a competent individual with the appropriate trade qualifications. Servicing should be performed in accordance with Environment Canada, *Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems* and manufactures specifications.

Approximately two smoke detectors suspected of containing radioactive components were observed throughout the building at the time of the assessment. Smoke detectors that contain radioactive materials must be sent for recycling upon decommissioning. Removal and disposal must be conducted in accordance with the Nuclear Safety and Control Act, Nuclear Substances and Radiation Device Regulation SOR/2000-207.

Lead packing was observed in the cast iron bell and spigot joints throughout the building at the time of the assessment. Removal, disposal or recycling of lead in bell and spigot joints must be conducted in accordance with federal and provincial regulations.

Miscellaneous chemicals and biohazards were not identified in the buildings at the time of the assessment.



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### 1.0 INTRODUCTION

At the request of IBI Group Architects Engineers (IBI), Golder Associates Ltd. (Golder) conducted a hazardous building materials assessment at 102A and 102B Windflower Avenue (Lot 20) in Waterton, Alberta.

The assessment was conducted on October 13 to 14, 2015, by Caleb Fricker, Occupational Hygiene Technologist, under the direction of Nadine Reid, Occupational Hygienist.

### 2.0 SCOPE OF WORK

The assessment was performed with the objective of compiling an inventory of hazardous building materials prior to the proposed demolition of the building. The assessment included asbestos-containing materials (ACM), lead-containing paint, polychlorinated biphenyls (PCB) in fluorescent light ballasts, mercury in thermostats, mercury vapour in fluorescent light tubes, ozone-depleting substances (ODS) in items such as air conditioning units and refrigerators, radioactive materials in smoke detectors and miscellaneous building maintenance chemicals.

### 3.0 REGULATORY REQUIREMENTS AND GUIDELINES

Parks Canada employees are federally regulated. Most other parties conducting work for Parks Canada are governed by provincial regulations.

#### 3.1 Federal Regulations

In federal jurisdictions, hazardous building materials are regulated by Human Resources and Skills Development Canada (HRSDC) under the Canada Labour Code, Part II. Specifically, Part X, Hazardous Substances, provides the direction for the control of exposure to potentially toxic substances in the workplace. Under this regulation, employers are required to:

- maintain a record of all hazardous materials;
- undertake a hazard investigation by a competent person;
- ensure materials are properly stored and handled;
- post warning signs;
- inform and educate employees regarding hazards; and
- control exposure through substitution, engineering or protective equipment.

In Canada, environmental matters generally fall under the Government of Canada's Canadian Environmental Protection Act, 1999, S.C. 1999 c. 33 (as amended up to 2003) and applicable regulations and guidelines.

Other specific applicable federal regulations are detailed below.

#### 3.1.1 Lead-Containing Paint

Lead was used as a pigment and drying agent in alkyd oil-based paint. The Liquid Coating Materials Regulations were enacted under the Hazardous Products Act in 1976 to restrict the lead content of paints and other liquid coatings on furniture, household products, children's products, industrial surfaces and exterior and interior surfaces to 0.5% by weight. The Canadian Paint and Coatings Association (CPCA), the national trade



association for Canada's paint manufacturers, recommended that the Canadian paint industry voluntarily stop using any lead compounds in consumer paints by the end of 1990. Over the years, the amount of lead in paint has continued to decrease, due to the co-operative efforts of government and industry.

The previous regulations have since been amended under the Surface Coating Materials Regulations, SOR/2005-109, which states that the "concentration of total lead present in a surface coating material must not be more than 90 micrograms per gram ( $\mu\text{g/g}$ ) dry weight of lead" (0.009%).

### 3.1.2 Polychlorinated Biphenyls

PCBs are used as a dielectric fluid in electrical equipment such as transformers. The use of capacitors in fluorescent lamp ballasts was common up to 1980. The Federal Chlorobiphenyls Regulation, SOR/91-152 prohibits the use of PCBs in this electrical equipment installed after July 1, 1980. The Federal Chlorobiphenyls Regulation, SOR/92-507, also outlines the handling, storage, and disposal of PCBs and PCB-containing equipment.

The government of Canada passed a regulation set to protect and enhance the environment. As such, the regulations are enforceable by law. The regulation places the onus on the owner; employer and employee to ensure no adverse effects are experienced in the environment.

In accordance with PCB Regulations (SOR/2008-273), PCB-containing equipment is defined as any equipment, machinery or similar manufactured items, including paints, capacitors, and an electrical transformer that contains a PCB liquid or solid of more than 50 milligrams per kilogram ( $\text{mg/kg}$ ) of the liquid or solid. This definition includes paint which may contain PCBs. Following removal of all paints, the barrelled PCB-containing paint must be appropriately labelled, manifested, and transported to an approved destruction and disposal facility in accordance with regulations.

Prior to disposal, all ballasts should be compared to the criteria found in the Environment Canada Report EPS 2/CC/2 (revised) August 1991, *Identification of Lamp Ballasts Containing PCBs* to assess their likelihood of containing PCBs.

### 3.1.3 Ozone-Depleting Substances

In 1994, the federal government filed the Ozone-Depleting Substances Regulations to amend controls on production and consumption of chlorofluorocarbons (CFC), halons, tetrachloride and methyl-chloroform. The Federal Halocarbon Regulations, effective July 1, 1999, was filed to ensure uniformity with respect to the release, recovery and recycling of ODS and their halocarbon alternatives in refrigeration and air conditioning.

Canadian Environmental Protection Act (1999), Ozone-Depleting Substances Regulations, 1998, controls the import, manufacture, use, sale, and export of ODS. The regulation also requires that permits be obtained to import or export used, recovered, recycled, and reclaimed ODS.



### 3.2 Provincial Regulations

The provincial regulations, codes and guidelines relevant to hazardous building materials are legislated by Alberta Occupational Health and Safety (OHS), a branch of the Department of Safe, Fair and Healthy Workplaces under the Ministry of Jobs, Skills, Training and Labour. They include the Alberta Occupational Health and Safety (OHS) Code (2009) and the Alberta Asbestos Abatement Manual (October 2012). Provincial regulations that are applicable to the disposal of hazardous building materials are the Alberta Environmental Protection and Enhancement Act and Waste Control Regulation.

#### 3.2.1 Alberta Occupational Health and Safety Code

The Alberta Occupational Health and Safety Code is law which was passed to protect the health and safety of workers on the job. As such, the Code and the sections under the Code are enforceable by law. The Code places the onus on both the employer and the employee to ensure a safe working environment.

Part 4, Chemical Hazards, Biological Hazards and Harmful Substances, represents minimum requirements and specifies, among many other things, the general requirements for working with and around harmful substances. Control of worker exposure to airborne contaminants is detailed and the occupational exposure limits are specified in Schedule 1 of the Regulation.

Part 4 and Schedule 1, Table 2 in the Alberta Occupational Health and Safety Code outlines the general requirements to be followed when working with asbestos. It also defines occupational exposure limits (OEL) for a variety of airborne contaminants. The OEL for a particular contaminant represents conditions to which it is believed that nearly all workers may be exposed, day after day, without suffering from adverse health effects. Due to individual susceptibility, a small percentage of workers may experience discomfort at concentrations below the applicable OEL. An 8-hour OEL refers to the average concentration of a substance over an 8-hour period.

Sections 28 through 38 in Part 4 of the Alberta Occupational Health and Safety Code outline the requirements related to asbestos in facilities. Sections 31 to 35 specifically outline the limitations on the use of asbestos in buildings. The requirements of Sections 31 through 35 are summarized below:

- if asbestos fibres may be released in a building all necessary steps to correct this unsafe condition must be taken;
- asbestos products that have the potential for releasing fibres may not be installed;
- all materials containing crocidolite are banned from use;
- spray-applied asbestos products are banned from use;
- asbestos products, in general, must not be in a form or location where they could release airborne fibres and allow them to enter a ventilation system;
- buildings to be demolished are to have all materials with the potential of releasing asbestos fibres removed; and
- all materials with the potential of releasing asbestos fibres that may be impacted by a renovation must be either encapsulated, enclosed or removed.



Historically, materials containing less than 1% asbestos have not been considered “asbestos-containing materials” for the purposes of the OHS legislation. However, in recent years, it has become apparent that some materials, such as vermiculite, can release significant amounts of asbestos fibres, even when they contain low levels (less than 1%) of asbestos. In addition, since the requirements in Part 4 of the OHS Code are based on the ability of a material to release asbestos fibres when disturbed, this interpretation was not consistent with the legislation. As a result, the Asbestos Abatement Manual was revised to remove the definition of an asbestos-containing material as one that contains more than 1% by weight asbestos. However, this has now raised questions as to when an employer must comply with the asbestos requirements in the OHS Code.

The employer must comply with the asbestos requirements when:

- the individual material in question contains more than 1% asbestos (by weight);
- the material contains less than 1% asbestos, but it is known that a “restricted area” is likely to occur when it is disturbed (e.g., vermiculite); or
- the material contains less than 1% asbestos and there is a reasonable chance that asbestos fibres may be released when the material is disturbed, either due to the condition of the material or the work procedures that will be used (e.g., removal of friable stipple material, dry removal of drywall where the drywall mud contains low levels of asbestos).

Materials identified as containing less than 1% asbestos, such as drywall joint compounds and stipple coatings, may not have been uniformly mixed when they were applied and could contain asbestos in concentrations greater than 1% in sections. When dealing with large quantities of such materials, employers should take non-homogeneous mixtures into consideration for Asbestos Management Plans and abatement activities.

### 3.2.2 Alberta Asbestos Abatement Manual

The *Alberta Asbestos Abatement Manual* (October 2012) is a guide published by Alberta OHS. This manual is used for determining compliance with the Occupational Health and Safety Code in the Province of Alberta. It covers basic information on asbestos, its health hazards, requirements for an employer to develop a code of practice regarding the storage, handling and disposal of substances listed in Schedule 1 of the Alberta OHS Code, requirements for worker protection, safe work practices, and the basic principles to follow for the safe abatement of ACM.

### 3.2.3 Alberta Environmental Protection and Enhancement Act

The Environmental Protection and Enhancement Act is law which was passed to protect and enhance the environment. As such, the Act and the regulations under the Act are enforceable by law. The Act places the onus on the owner, employer and employee to ensure no adverse effects are experienced in the environment.

The key waste regulation under the Environmental Protection and Enhancement Act (AEPEA) relating to hazardous building materials is the Waste Control Regulation (WCR), and Alberta’s hazardous waste and hazardous recyclables management programs. The WCR provides guidance for the proper handling, storage, transportation, treatment, recycling and disposal of hazardous wastes in the province. The regulation also outlines the materials and criteria to be used to characterize waste as hazardous.





Although asbestos is not considered to be a hazardous waste, Alberta Environment and Parks (AEP) (previously Alberta Environment and Sustainable Resource Development) has published guidelines for the disposal of asbestos waste. Within the guidelines, criteria have been established for the handling, transportation and disposal of asbestos waste. Also within the guidelines, the types of landfills that can accept asbestos waste are outlined. The requirements for the disposal of asbestos waste in Alberta are re-defined in the document entitled *Guide for Disposal of Asbestos Waste* published by AEP in August, 1989.

### 3.2.4 Other Guidelines

Presently there are no regulations in Alberta specifically addressing lead levels in paint. Alberta OHS published a Bulletin, *Lead at the Work Site*, in November of 2013<sup>1</sup> which considers paints containing more than 90 parts per million (ppm) (90 µg/g) lead to be lead-containing under Canadian Federal Law (Surface Coating Materials Regulation SOR/2005-109, made under the Canada Consumer Product Safety Act [S.C. 2010, c. 21]).

Lead-containing paint is a potential concern both as a source of direct exposure (inhalation or ingestion of dust or paint chips) and as a contributor to lead in interior dust and exterior soil. A risk assessment of potential occupational exposure to lead must consider not only the presence of lead (any amount) but also the activity or impact of activity on the paints containing lead. The Alberta OHS Lead at the Work Site bulletin references recommended abatement methods as outlined in the Ontario Ministry of Labour guideline, *Lead on Construction Projects*<sup>2</sup>. The guideline addresses this issue by establishing three tiers of trigger tasks where employees conducting these activities are assumed to potentially exceed the exposure limits and must be protected accordingly. There are also requirements under the EPEA to prevent the release of lead and mercury into the environment.

### 3.2.5 Transportation of Hazardous Waste

The transportation of hazardous wastes is governed under the Transportation of Dangerous Goods Act and Regulations which outline the requirements for storage, handling, and transportation of such waste.

## 4.0 METHODOLOGY

The assessment methodology was generally consistent with standards outlined by Alberta OHS and the Canada Labour Code.

Detailed notes were taken with each sample including the type of material and sample location. A digital photograph was taken of each sampling location.

### 4.1 Asbestos-Containing Materials

Assessments of the potential ACM in the buildings included the evaluation of the building systems. The systems reviewed included, but not limited to:

- Mechanical: Building mechanical systems such as the heating, ventilating and air conditioning (HVAC) systems were inspected for the presence of ACM.

<sup>1</sup> *Lead at the Work Site*, CH071 – Chemical Hazards.

<sup>2</sup> *Health and Safety Guideline – Lead on Construction Projects*. Ontario Ministry of Labour. September 2004, <http://www.labour.gov.on.ca/english/hs/guidelines/lead/index.html>



- **Structural:** The method of construction was determined, including interior room areas, mezzanines and roofing support systems. Fireproofing, fire-stop and other materials installed as a part of the structure were reviewed.
- **Architectural:** The presence of ACM was assessed in building materials and finishes such as floor and ceiling tiles, texture coats, asbestos sheet materials, wall joint compound, condensation control applications, spray-applied acoustical materials, and spray-applied insulation on areas of the structure.

The quantity of samples collected was in general accordance with the guidelines in the *Alberta Asbestos Abatement Manual* (October 2012) and was adjusted based on the amount of a particular homogenous material present. A homogenous material is defined as a material that is uniform in color and texture and includes the materials throughout its full extent, even if its occurrence is not contiguous or physically connected. Where analysis of a sample confirmed that a bulk material sample was asbestos-containing, then the entire homogenous material from which the sample was collected was considered an asbestos-containing material.

The *Alberta Asbestos Abatement Manual* (October 2012), recommends a specific number of samples to be collected from suspect ACM depending on the amount present on-site. As part of this project, certain building materials were observed to be installed in limited quantities throughout the buildings, making the collection of multiple samples from these materials impractical.

Materials suspected of containing asbestos were sampled and submitted for analysis to EMSL Canada Inc., a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory. The asbestos samples were analyzed for asbestos type and percentage content using polarized light microscopy and dispersion staining techniques in accordance with EPA methodologies (EPA 600/R-93/116).

### 4.2 Lead-Containing Paint

Visual identification and systematic sampling of suspected lead-containing materials was completed as part of the survey. Testing was conducted by collecting bulk samples by scraping a small section of paint to obtain approximately 1 gram (g) of suspect paint. The bulk samples were submitted under chain of custody to Paracel Laboratories Inc, and were analyzed for lead percentage content using Inductively Cooled Plasma – Optical Emission Spectroscopy (ICP-OES). For the purpose of this report, paints analyzed with lead content greater than the Surface Coatings Materials Regulations, SOR/2010-224 criteria of 0.009% by weight (90 ppm or 90 µg/g) are considered to be lead-containing.

### 4.3 Polychlorinated Biphenyls

Fluorescent light fixtures were inspected to determine if they have the older style T-12 tubes. If the T-12 tubes were observed, the light fixture was assumed to have PCB-containing ballasts. The high-efficiency light fixtures with the newer T-10, T-8, and T-5 style tubes were assumed to have non-PCB containing ballasts. When T-12 tubes were observed without impact to the light fixture, information was collected and compared to the criteria found in the Environment Canada Report EPS 2/CC/2 (revised) August 1991, *Identification of Lamp Ballasts Containing PCBs* to assess their likelihood of containing PCBs.



Golder conducted limited sampling for non-liquid PCBs in select paint materials. Sampling was limited to select exterior paints. Sample collection consisted of obtaining a small volume of suspect paint, placing it in an individual sample bag. Samples were submitted to AGAT Laboratories for analysis. Samples were analyzed by gas chromatography in accordance with AGAT Laboratories methodology with reference to the Environmental Protection Agency's method SW-846 8082.

Transformer fluids were not assessed as part of this project.

#### 4.4 Other Hazardous Building Materials

The building was visually assessed for the presence of mercury in thermostats, mercury vapour in fluorescent light tubes, ozone-depleting substances (ODS) in items or systems such as air conditioning units and refrigerators, radioactive materials in smoke detectors and miscellaneous building maintenance chemicals.

### 5.0 GENERAL OBSERVATIONS

The building located on Lot 20 is a single storey building containing a residence and a post office constructed circa 1949. No renovations were reported; however, the building was observed to have had undergone several renovations in the past. The building was constructed with wood framing, stucco siding, a flat built-up roof on concrete footings and foundation. The building was insulated with fibreglass in the wall and ceiling cavities. Interior finishes in the building consisted of vinyl floor tile, sheet flooring, carpet floor, drywall walls and ceilings, 1' x 1' ceiling tiles and stipple coat ceilings. Both sides of the building were heated with separate natural gas-fired furnaces through forced-air heating vents. The HVAC system assessed on the post office side of the building was not insulated. The HVAC system assessed on the residence side of the building was insulated around the floor vents with white insulation board. The post office side of the building had a partially excavated crawlspace consisting of a dirt ground floor, concrete walls, and wood floor boards as the ceiling. The residence side of the building had a basement with a concrete foundation. Based on the structural differences, Golder assumed the residence side of the building was built at a separate time prior to the post office side. One small shed was located on the south side of the property consisting of wood framing, wood siding and asphalt shingles.

### 6.0 RESULTS AND DISCUSSION

#### 6.1 Asbestos-Containing Materials

A total of 57 samples of suspect ACM were collected from the building and submitted for analysis. The laboratory analyzed 82 different layers of material. Asbestos was identified in 21 of the samples collected at the time of the assessment. The samples identified as asbestos containing are summarized in Tables 1: Asbestos Analysis Summary. Complete asbestos analysis results are provided in Appendix A. Select photographs of identified ACM are provided in Appendix B. Laboratory reports are provided in Appendix C.



## HAZARDOUS BUILDING MATERIALS ASSESSMENT, LOT 20, WATERTON, AB

**Table 1: Asbestos Analysis Summary**

Sample Number	Type of Material Sampled	Sample Location	Asbestos Detected
A-43	Drywall Joint Compound (Wall)	Post Office – Mailbox Room	2% Chrysotile
A-55A	Vinyl Floor Tile Beneath Sheet Flooring	Post Office – Back Room	5% Chrysotile
A-59A	Vinyl Floor Tile Beneath Sheet Flooring	Post Office – Back Room	5% Chrysotile
A-60A	Vinyl Floor Tile Beneath Sheet Flooring	Post Office – Back Room	5% Chrysotile
A-71	Grey Putty	Residence, Exterior Windows	10% Chrysotile
A-73	Asphalt Shingles	Residence, Shed Roof	2% Chrysotile
A-75A	Vinyl Floor Tile Beneath Carpet	Residence, Living Room	2% Chrysotile
A-76A	Vinyl Floor Tile Beneath Carpet	Residence, Living Room	2% Chrysotile
A-77A	Vinyl Floor Tile Beneath Carpet	Residence, Living Room	2% Chrysotile
A-83	Mosaic Sheet Flooring Beneath Carpet	Residence, East Bedroom	25% Chrysotile
A-84	Mosaic Sheet Flooring Beneath Carpet	Residence, East Bedroom	25% Chrysotile
A-85A	Mosaic Sheet Flooring Beneath Carpet	Residence, South Bedroom	25% Chrysotile
A-86	Drywall Joint Compound (Wall)	Residence, Entrance	<1% Chrysotile
A-87	Drywall Joint Compound (Wall)	Residence, Basement Stairs	<1% Chrysotile
A-88	Drywall Joint Compound (Wall)	Residence, Basement	<1% Chrysotile
A-89	Drywall Joint Compound (Ceiling)	Residence, Living Room	2% Chrysotile
A-90	Drywall Joint Compound (Ceiling)	Residence, Living Room	2% Chrysotile
A-94A	9"x9" Vinyl Floor Tile	Residence, Basement	15% Chrysotile
A-95A	9"x9" Vinyl Floor Tile	Residence, Basement	15% Chrysotile
A-96	9"x9" Vinyl Floor Tile	Residence, Basement	15% Chrysotile
A-97	White Insulation Board	Residence, Basement	60% Chrysotile

## 6.2 Lead-Containing Paint

A total of six bulk samples of paint suspected to be lead-containing were collected by Golder and submitted for analysis. Three of the samples collected were identified as lead-containing paint and are outlined below in Table 2: Lead-Containing Paints. Complete lead paint analysis results are provided in Appendix A. Select photographs of identified lead-containing paints are provided in Appendix B. Laboratory reports are provided in Appendix C.

**Table 2: Lead-Containing Paints**

Sample Number	Substrate/Sample Location	Colour	Lead Concentration (µg/g)
L-05	Drywall - Post Office	Light Grey	365
L-09	Drywall - Residence Side	White	336
L-10	Concrete Floor - Residence Side	Grey	2,020

**Note:**

(1) Based on Surface Coatings Materials Regulations, SOR/2010-224 classification of 90 µg/g.



### 6.3 Polychlorinated Biphenyls

Fluorescent light fixtures with the older T12 style tubes suspected to contain PCB ballasts were not identified in the building at the time of the assessment.

Two samples of paint were collected and submitted for PCB analysis. PCB's were not identified in any of the samples analyzed. The results are summarized in Table 3: PCB Analysis Results. The laboratory report is provided in Appendix C.

**Table 3: PCB Analysis Results**

Sample Number	Locations/Substrate	Colour	PCB Concentration (mg/kg)	PCB-Based Paint <sup>(1)</sup> (Yes/No)
P-06	Exterior, Wood Trim / Deck	Black	<0.05	No
P-07	Exterior, Wood Trim / Deck	White	<0.05	No

**Note:**

(1) based on Government of Canada Regulation (SOR/2008-273), <50 mg/kg

### 6.4 Other Hazardous Building Materials

Approximately 44 other hazardous building materials were observed throughout the building at the time of the assessment. The items are summarized in Table 4: Other Hazardous Building Materials.

**Table 4: Other Hazardous Building Materials**

Item	Quantity
Mercury Capsules in Thermostats	1
Mercury Vapour in Fluorescent Light Tubes	36
Items Containing Suspect ODS	2 Refrigerators (no label) 1 Mini Refrigerator(no label) 1 Air Conditioning Unit (no label) 1 Freezer (no label)
Smoke Detectors with Radioactive Components	2

Lead packing was observed in the cast iron bell and spigot joints throughout the building on Lot 20 at the time of the assessment.

Miscellaneous chemicals or biohazards were not identified in the buildings at the time of the assessment.



## **7.0 CONCLUSIONS AND RECOMMENDATIONS**

### **7.1 Asbestos-Containing Materials**

Based on site observations and the analytical results, asbestos was confirmed in the following materials at the time of the assessment:

<b>Asbestos-Containing Material</b>	<b>Locations</b>
Drywall Joint Compound	All Drywall – Entire Building
Vinyl Floor Tile Beneath Sheet Flooring	Back Room – Post Office
Exterior Grey Window Putty	One Window – Residence
Asphalt Roofing Shingles	Roof of Shed
Vinyl Floor Tile Beneath Carpet	Living Room – Residence
Mosaic Sheet Flooring Beneath Carpet	Bedrooms – Residence
9"x9" Vinyl Floor Tile	Basement – Residence
White Insulation Board	Floor Vents – Residence

As this assessment was semi-destructive in nature, the potential exists for other building materials not sampled to contain asbestos. Materials in the building that may contain asbestos that could not be sampled due to the semi-destructive nature include but are not limited to drain pipes, gaskets within flanges and boilers, asbestos cement insulators within electrical equipment and within mechanical equipment.

Prior to any demolition or renovation activities, ACM that may be impacted must be removed. The work should be completed by workers certified by Alberta OHS. Throughout the abatement activities, appropriate air monitoring and inspections should be conducted by qualified personnel to document that contamination is contained and ACM are removed and disposed of appropriately. It is recommended that a proper scope of work and asbestos removal specifications be written to scope the complete and proper removal of the identified ACM.

If suspected ACM not previously assessed are uncovered during renovation or demolition activities, work should stop immediately and sampling of the material should be conducted to confirm the presence of asbestos.

### **7.2 Lead-Containing Paint**

Based on site observations and the analytical results, lead above the Surface Coatings Materials Regulations, 90 µg/g was identified in the following paints:

- Light Grey Paint on Drywall – Post Office (good condition);
- White Paint on Drywall – Residence, Basement, South Wall (poor condition); and
- Grey Paint on Concrete Floor – Residence Side (good condition).





Lead-containing surfaces with any amounts of lead that will be impacted through maintenance, renovation, or demolition activities in a manner likely to cause some level of airborne lead-containing dust or fumes, (i.e., welding, torch cutting, grinding, sanding or sandblasting) should be controlled through the development and implementation of an Exposure Control Plan. The exposure control plan should include safe work procedures to address the lead exposure hazard during the maintenance, renovation, or demolition activities. The safe work procedures should include procedures to minimize dust during construction and demolition, procedures for proper containment, collection, clean-up and disposal of debris to prevent contamination in other areas, the use of proper cleaning tools, selection and use of proper personal protective equipment, and other applicable procedures.

Lead-containing paint in poor condition should be abated prior to demolition. The lead containing paint that is flaking or loose (poor condition) should be abated following methods and requirements outlined in the Alberta OHS *Lead at the Work Site Bulletin*. The lead-containing paint waste should be analyzed for lead leachability by toxicity characteristic leaching procedure (TCLP) prior to transportation and disposal. The transportation and disposal of lead-containing waste materials must be conducted in accordance with the requirements of AEP and the Federal Transportation of Dangerous Goods Act and Regulations, current to the date of the work. The AEP Waste Control Regulation prescribes the disposal pathways for lead-containing waste.

### 7.3 Polychlorinated Biphenyls

Fluorescent light fixtures with the older T12 style tubes suspected to contain PCB ballasts were not identified in the building at the time of the assessment.

### 7.4 Other Hazardous Building Materials

Approximately 36 fluorescent light tubes suspected of containing mercury vapour were observed throughout the building at the time of the assessment. One thermostat suspected of containing mercury capsules was observed throughout the building at the time of the assessment.

Mercury vapour in light tubes and mercury in thermostats pose no risk to workers or occupants provided the light bulbs and capsules remain intact and undisturbed. The bulbs and capsules should be removed from the building prior to decommissioning, renovations or maintenance activities and be kept separate from all other waste to prevent damage to the light bulbs and capsules. Light bulbs containing mercury vapour should be recycled as per the Alberta Fluorescent Lamp Stewardship Initiative. Alternatively, the mercury-containing fluorescent light bulbs and capsules may be disposed of in accordance with regulations specified by AEP.

Approximately two refrigerators, one deep freezer, one air conditioning unit and one mini-fridge suspected of containing ozone-depleting substances were observed throughout the building at the time of the assessment. Equipment suspected of containing ODS is to be recycled or disposed of in accordance with the federal Ozone Depleting Substances and Halocarbons Regulation (Section 181/2000). Equipment containing suspect ODS that is to remain in place must be managed in accordance with the provincial and federal regulations. If the units require maintenance or are to be decommissioned, the refrigerants in the identified units must be drained, recycled or destroyed by a competent individual with the appropriate trade qualifications. Servicing should be performed in accordance with Environment Canada, *Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems* and manufactures specifications.





Approximately two smoke detectors suspected of containing radioactive components were observed throughout the building at the time of the assessment. Smoke detectors that contain radioactive materials must be sent for recycling upon decommissioning. Removal and disposal must be conducted in accordance with the Nuclear Safety and Control Act, Nuclear Substances and Radiation Device Regulation SOR/2000-207.

Lead packing was observed in the cast iron bell and spigot joints throughout the building on Lot 20 at the time of the assessment. Removal, disposal or recycling of lead in bell and spigot joints must be conducted in accordance with federal and provincial regulations.

Miscellaneous chemicals and biohazards were not identified in the buildings at the time of the assessment.

## 8.0 STATEMENT OF LIMITATIONS

The conclusions and recommendations contained in this assessment report are based upon professional opinions with regard to the subject matter. These opinions are in accordance with currently accepted environmental assessment standards and practices applicable to these locations and are subject to the following inherent limitations:

The data and findings presented in this report are valid as of the dates of the investigations. The passage of time, manifestation of latent conditions or occurrence of future events may warrant further exploration at the properties, analysis of the data, and re-evaluation of the findings, observations, and conclusions expressed in this report.

The data reported and the findings, observations and conclusions expressed in this report are limited by the Scope of Work. The Scope of Work was defined as requested by the client, the time and budgetary constraints imposed by the client, and availability of access to the properties.

Because of the limitations stated above, the findings, observations and conclusions expressed by Golder Associates Ltd. in this report are not, and should not be, considered an opinion concerning compliance of any past or present owner or operator of the site with any federal, provincial or local laws or regulations.

No warranty or guarantee, whether expressed or implied, is made with respect to the data or the reported findings, observations, and conclusions, which are based solely upon site conditions in existence at the time of investigation.

Golder Associates Ltd.'s assessment reports present professional opinions and findings of a scientific and technical nature. While attempts were made to relate the data and findings to applicable environmental laws and regulations, the report shall not be construed to offer legal opinion or representations as to the requirements of, nor compliance with, environmental laws, rules, regulations or policies of federal, provincial, or local governmental agencies. Any use of the assessment report constitutes acceptance of the limits of Golder Associates Ltd.'s liability. Golder Associates Ltd.'s liability extends only to its client and not to other parties who may obtain this assessment report. Issues raised by the report should be reviewed by appropriate legal counsel.

The accuracy or authenticity of third party survey data provided to Golder by the Client that was included in this report was not verified by Golder.



## **9.0 CLOSURE**

If you have any questions or require additional information please feel free to contact the undersigned at (403) 299-5600. Thank you for the opportunity to be of service.

### **GOLDER ASSOCIATES LTD.**

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# **APPENDIX A**

## **Sample Analysis Results**



## HAZARDOUS BUILDING MATERIALS ASSESSMENT LOT 20, WATERTON, AB

**Table – Asbestos Analysis Results, Lot 20**

Sample Number	Type of Material Sampled	Sample Location	Asbestos Detected No/Yes: Type
A-42A	Grey Speckled Sheet Floor	Post Office – Mailbox Room	No
A-42B	Grey Speckled Sheet Floor (Mastic)	Post Office – Mailbox Room	No
<b>A-43</b>	<b>Drywall Joint Compound (Wall)</b>	<b>Post Office – Mailbox Room</b>	<b>Yes: Chrysotile 2%</b>
A-44	Drywall Joint Compound (Wall)	Post Office – Back Room	No
A-45	Drywall Joint Compound (Column)	Post Office – Back Room	No
A-46A	Grey Speckled Sheet Floor	Post Office – Mailbox Room	No
A-46B	Grey Speckled Sheet Floor (Mastic)	Post Office – Mailbox Room	No
A-47A	Grey Speckled Sheet Floor	Post Office – Mailbox Room	No
A-47B	Grey Speckled Sheet Floor (Mastic)	Post Office – Mailbox Room	No
A-48	Secondary Sheet Floor	Post Office – Mailbox Room	No
A-49A	Secondary Sheet Floor	Post Office – Mailbox Room	No
A-49B	Secondary Sheet Floor (Mastic)	Post Office – Mailbox Room	No
A-50A	Secondary Sheet Floor	Post Office – Mailbox Room	No
A-50B	Secondary Sheet Floor (Mastic)	Post Office – Mailbox Room	No
A-51	Secondary Sheet Floor	Post Office - Back Room	No
A-52	Ceiling Texture Coat	Post Office – Back Room	No
A-53	Ceiling Texture Coat	Post Office Back Room	No
A-54A	Sheet Floor Beneath Carpet	Post Office – Back Room	No
A-54B	Sheet Floor Beneath Carpet (Mastic)	Post Office – Back Room	No
<b>A-55A</b>	<b>Vinyl Floor Tile Beneath Sheet Floor</b>	<b>Post Office – Back Room</b>	<b>Yes: Chrysotile 5%</b>
A-55B	Vinyl Floor Tile Beneath Sheet Floor (Mastic)	Post Office – Back Room	No
A-56A	Sheet Floor (Burlap Backed) Beneath Vinyl Floor Tile	Post Office – Back Room	No
A-56A	Sheet Floor (Burlap Backed) Beneath Vinyl Floor Tile (Mastic)	Post Office – Back Room	No
A-57A	Sheet Floor Beneath Carpet	Post Office – Back Room	No
A-57B	Sheet Floor Beneath Carpet (Mastic)	Post Office – Back Room	No
A-58A	Sheet Floor Beneath Carpet	Post Office – Back Room	No
A-58B	Sheet Floor Beneath Carpet (Mastic)	Post Office – Back Room	No
<b>A-59A</b>	<b>Vinyl Floor Tile Beneath Sheet Floor</b>	<b>Post Office – Back Room</b>	<b>Yes: Chrysotile 5%</b>
A-59B	Vinyl Floor Tile Beneath Sheet Floor (Mastic)	Post Office – Back Room	No
<b>A-60A</b>	<b>Vinyl Floor Tile Beneath Sheet Floor</b>	<b>Post Office – Back Room</b>	<b>Yes: Chrysotile 5%</b>
A-60B	Vinyl Floor Tile Beneath Sheet Floor (Mastic)	Post Office – Back Room	No
A-61A	Sheet Floor (Burlap Backed) Beneath Vinyl Floor Tile	Post Office – Back Room	No
A-61B	Sheet Floor (Burlap Backed) Beneath Vinyl Floor Tile (Mastic)	Post Office – Back Room	No
A-62A	Sheet Floor (Burlap Backed) Beneath Vinyl Floor Tile	Post Office – Back Room	No



## HAZARDOUS BUILDING MATERIALS ASSESSMENT LOT 20, WATERTON, AB

**Table – Asbestos Analysis Results, Lot 20 (continued)**

Sample Number	Type of Material Sampled	Sample Location	Asbestos Detected No/Yes: Type
A-62B	Sheet Floor (Burlap Backed) Beneath Vinyl Floor Tile (Mastic)	Post Office – Back Room	No
A-63	Cement Wall Material Around Furnace Exhaust Stack	Post Office - Crawlspace	No
A-64A	Stucco 1 – Exterior Walls	Post Office - Residence	No
A-64B	Stucco 2 – Exterior Walls	Post Office – Residence	No
A-65A	Stucco 1 – Exterior Walls	Post Office – Residence	No
A-65B	Stucco 2 – Exterior Walls	Post Office – Residence	No
A-66A	Stucco 1 – Exterior Walls	Post Office – Residence	No
A-66B	Stucco 2 – Exterior Walls	Post Office – Residence	No
A-67A	Stucco 1 – Exterior Walls	Post Office – Residence	No
A-67B	Stucco 2 – Exterior Walls	Post Office – Residence	No
A-68A	Stucco 1 – Exterior Walls	Post Office - Residence	No
A-68B	Stucco 2 – Exterior Walls	Post Office – Residence	No
A-69	Beige Wall Mastic on Perimeter Base of Wall	Post Office – Residence (Exterior)	No
A-70	Beige Caulking	Post Office – Residence (Exterior Windows)	No
<b>A-71</b>	<b>Grey Putty</b>	<b>Post Office – Residence (Exterior Windows)</b>	<b>Yes: Chrysotile 10%</b>
A-72	Grey Caulking on Roof Penetration	Post Office – Residence (Roof)	No
<b>A-73</b>	<b>Asphalt Shingles</b>	<b>Post Office – Residence (Shed Roof)</b>	<b>Yes: Chrysotile 2%</b>
A-74	Built-Up Roofing Material	Post Office – Residence (Exterior Roof)	No
<b>A-75A</b>	<b>Vinyl Floor Tile Beneath Carpet</b>	<b>Post Office – Residence (Living Room)</b>	<b>Yes: Chrysotile 2%</b>
A-75B	Vinyl Floor Tile Beneath Carpet (Mastic)	Post Office – Residence (Living Room)	No
<b>A-76A</b>	<b>Vinyl Floor Tile Beneath Carpet</b>	<b>Post Office – Residence (Living Room)</b>	<b>Yes: Chrysotile 2%</b>
A-76B	Vinyl Floor Tile Beneath Carpet (Mastic)	Post Office – Residence (Living Room)	No
<b>A-77A</b>	<b>Vinyl Floor Tile Beneath Carpet</b>	<b>Post Office – Residence (Living Room)</b>	<b>Yes: Chrysotile 2%</b>
A-77B	Vinyl Floor Tile Beneath Carpet (Mastic)	Post Office – Residence (Living Room)	No
A-78	Grey Squares Sheet Floor	Post Office – Residence (Kitchen)	No
A-79	Grey Squares Sheet Floor	Post Office – Residence (Kitchen)	No
A-80	Grey Squares Sheet Floor	Post Office – Residence (Kitchen)	No
A-81	Secondary Sheet Floor	Post Office – Residence (Kitchen)	No
A-82	Floor Levelling Compound	Post Office – Residence (Kitchen)	No
<b>A-83</b>	<b>Mosaic Sheet Floor Beneath Carpet</b>	<b>Post Office – Residence (East Bedroom)</b>	<b>Yes: Chrysotile 25%</b>



## HAZARDOUS BUILDING MATERIALS ASSESSMENT LOT 20, WATERTON, AB

**Table – Asbestos Analysis Results, Lot 20 (continued)**

Sample Number	Type of Material Sampled	Sample Location	Asbestos Detected No/Yes: Type
A-84	Mosaic Sheet Floor Beneath Carpet	Post Office – Residence (East Bedroom)	Yes: Chrysotile 25%
A-85A	Mosaic Sheet Floor Beneath Carpet	Post Office – Residence (South Bedroom)	Yes: Chrysotile 25%
A-85B	Mosaic Sheet Floor Beneath Carpet (Mastic)	Post Office – Residence (South Bedroom)	No
A-86	Drywall Joint Compound (Wall)	Post Office – Residence (Entrance)	Yes: Chrysotile <1%
A-87	Drywall Joint Compound (Wall)	Post Office – Residence (Basement Stairs)	Yes: Chrysotile <1%
A-88	Drywall Joint Compound (Wall)	Post Office – Residence (Basement)	Yes: Chrysotile <1%
A-89	Drywall Joint Compound (Ceiling)	Post Office – Residence (Living Room)	Yes: Chrysotile 2%
A-90	Drywall Joint Compound (Ceiling)	Post Office – Residence (Living Room)	Yes: Chrysotile 2%
A-91	Ceiling Stipple Coat	Post Office – Residence (East Bedroom)	No
A-92	Ceiling Stipple Coat	Post Office – Residence (South Bedroom)	No
A-93	Ceiling Stipple Coat	Post Office – Residence (Basement)	No
A-94A	9"x9" Vinyl Floor Tile	Post Office – Residence (Basement)	Yes: Chrysotile 15%
A-94B	9"x9" Vinyl Floor Tile (Mastic)	Post Office – Residence (Basement)	No
A-95A	9"x9" Vinyl Floor Tile	Post Office – Residence (Basement)	Yes: Chrysotile 15%
A-95B	9"x9" Vinyl Floor Tile (Mastic)	Post Office – Residence (Basement)	No
A-96	9"x9" Vinyl Floor Tile	Post Office – Residence (Basement)	Yes: Chrysotile 15%
A-97	White Insulation Board	Post Office – Residence (Basement)	Yes: Chrysotile 50%
A-98	Red Sheet Floor	Post Office – Residence (Basement)	No

**Table – Lead Paint Analysis Results, Lot 20**

Sample Number	Substrate/Sample Location	Colour	Lead Concentration (µg/g)	Lead-Containing Paint <sup>(1)</sup> (Yes/No)
L-05	Drywall / Lot 20 (Post Office)	Light Grey	365	Yes
L-06	Wood Trim / Exterior Lot 20 (Residence)	Black	<20	No
L-07	Wood Trim / Exterior Lot 20 (Residence)	White	67	No
L-08	Drywall / Lot 20 (Residence)	Beige	<20	No
L-09	Drywall / Lot 20 (Residence)	White	336	Yes
L-10	Concrete Floor / Lot 20 (Residence)	Grey	2,020	Yes



# **APPENDIX B**

## **Photographs**





## HAZARDOUS BUILDING MATERIALS ASSESSMENT, LOT 20, WATERTON, AB



**Photograph 1: Lot 20**



**Photograph 2: Asbestos-Containing Drywall Joint Compound, Lot 20**



**Photograph 3: Asbestos-Containing Vinyl Flooring Tile Beneath Sheet Flooring / Carpet, Lot 20 – Post Office**



**Photograph 4: Asbestos-Containing Grey Window Putty, Exterior, Lot 20 – Exterior of Residence**

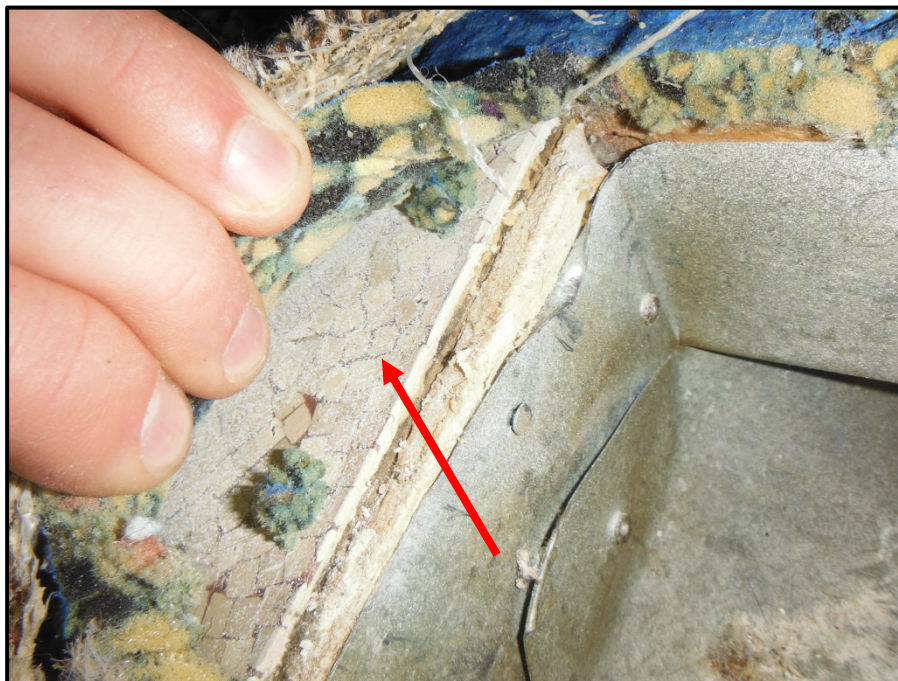




**Photograph 5: Asbestos-Containing Asphalt Roofing Shingles, Shed, Lot 20 – Exterior of Residence**



**Photograph 6: Asbestos-Containing Vinyl Floor Tile Beneath Carpet, Lot 20 – Residence**



**Photograph 7: Asbestos-Containing Mosaic Sheet Flooring Beneath Carpet, Lot 20 – Residence**



**Photograph 8: Asbestos-Containing 9" x 9" Vinyl Floor Tile, Basement, Lot 20 – Residence**





**Photograph 9: Asbestos-Containing White Insulation Board around Floor Vents, Lot 20 – Residence**



**Photograph 10: Lead-Containing Light Grey Paint on Drywall – Interior, Lot 20 – Post Office**



**Photograph 11: Lead-Containing White Paint on Drywall – Interior, Lot 20 – Residence**



**Photograph 12: Lead-Containing Grey Paint on Concrete Floor – Interior, Lot 20 – Residence**



# **APPENDIX C**

## **Laboratory Reports**



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 Analysis Date: 10/27/2015  
 Collected: 10/13/2015

Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
A-40-Mastic 651503629-0040A	Unit 21- Bunk House - Green Streaked Sheet Floor	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-41-Flooring 651503629-0041	Unit 24- Bunk House - Green Streaked Sheet Floor	Green Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-41-Mastic 651503629-0041A	Unit 24- Bunk House - Green Streaked Sheet Floor	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-42-Flooring 651503629-0042	Mailbox Room- Post Office - Grey Speckled Sheet Floor	Gray Fibrous Homogeneous	25% Cellulose	75% Non-fibrous (other)	None Detected
A-42-Mastic 651503629-0042A	Mailbox Room- Post Office - Grey Speckled Sheet Floor	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-43 651503629-0043	Mailbox Room- Post Office - Drywall Joint Compound (Wall)	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	2% Chrysotile
A-44 651503629-0044	Back Room- Post Office - Drywall Joint Compound (Wall)	White Non-Fibrous Homogeneous		20% Perlite 80% Non-fibrous (other)	None Detected

Analyst(s)

Brett Olsen (229)

Kate Fee (79)

Jefferson Salvador, Laboratory Manager  
 or other approved signatory

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Samples analyzed by EMSL Canada Inc. Calgary, AB NVLAP Lab Code 500100

Initial report from 10/27/2015 13:09:12

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>	
			%	Fibrous	%	Type
A-45 651503629-0045	Back Room- Post Office - Drywall Joint Compound (Column)	Beige Non-Fibrous Homogeneous			100% Non-fibrous (other)	None Detected
A-46-Flooring 651503629-0046	Mailbox Room- Post Office - Grey Speckled Sheet Floor	Gray Fibrous Homogeneous	25%	Cellulose	75% Non-fibrous (other)	None Detected
A-46-Mastic 651503629-0046A	Mailbox Room- Post Office - Grey Speckled Sheet Floor	Brown Non-Fibrous Homogeneous			100% Non-fibrous (other)	None Detected
A-47-Flooring 651503629-0047	Mailbox Room- Post Office - Grey Speckled Sheet Floor	Gray Fibrous Homogeneous	25%	Cellulose	75% Non-fibrous (other)	None Detected
A-47-Mastic 651503629-0047A	Mailbox Room- Post Office - Grey Speckled Sheet Floor	Brown Non-Fibrous Homogeneous			100% Non-fibrous (other)	None Detected
A-48 651503629-0048	Mailbox Room- Post Office - Secondary Sheet Floor	Various/Beige Fibrous Homogeneous	25%	Cellulose	75% Non-fibrous (other)	None Detected
A-49-Flooring 651503629-0049	Mailbox Room- Post Office - Secondary Sheet Floor	Various/Beige Fibrous Homogeneous	25%	Cellulose	75% Non-fibrous (other)	None Detected

Analyst(s)

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos	
			% Fibrous	% Non-Fibrous	% Type	
A-49-Mastic 651503629-0049A	Mailbox Room- Post Office - Secondary Sheet Floor	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)		None Detected
A-50-Flooring 651503629-0050	Mailbox Room- Post Office - Secondary Sheet Floor	Various/Beige Fibrous Homogeneous	25% Cellulose	75% Non-fibrous (other)		None Detected
A-50-Mastic 651503629-0050A	Mailbox Room- Post Office - Secondary Sheet Floor	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)		None Detected
A-51 651503629-0051	Back Room- Post Office - Ceiling Texture Coat	White Non-Fibrous Homogeneous		20% Perlite 80% Non-fibrous (other)		None Detected
A-52 651503629-0052	Back Room- Post Office - Ceiling Texture Coat	White Non-Fibrous Homogeneous		20% Perlite 80% Non-fibrous (other)		None Detected
A-53 651503629-0053	Back Room- Post Office - Ceiling Texture Coat	White Non-Fibrous Homogeneous		20% Perlite 80% Non-fibrous (other)		None Detected
A-54-Flooring 651503629-0054	Back Room- Post Office - Sheet Floor Beneath Carpet	Yellow/Beige Fibrous Homogeneous	25% Cellulose	75% Non-fibrous (other)		None Detected

## Analyst(s)

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Kate Fee (79)

Jefferson Salvador, Laboratory Manager  
 or other approved signatory

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Initial report from 10/27/2015 13:09:12

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos	
			% Fibrous	% Non-Fibrous	% Type	
A-54-Mastic 651503629-0054A	Back Room- Post Office - Sheet Floor Beneath Carpet	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)		None Detected
A-55-Floor Tile 651503629-0055	Back Room- Post Office - Vinyl Floor Tile Beneath Sheet Floor	Brown Non-Fibrous Homogeneous		95% Non-fibrous (other)		5% Chrysotile
A-55-Mastic 651503629-0055A	Back Room- Post Office - Vinyl Floor Tile Beneath Sheet Floor	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)		None Detected
A-56-Flooring 651503629-0056	Back Room- Post Office - Sheet Floor (Burlap Backed) Beneath Vinyl Floor Tile	Brown Fibrous Homogeneous	15% Cellulose	85% Non-fibrous (other)		None Detected
A-56-Mastic 651503629-0056A	Back Room- Post Office - Sheet Floor (Burlap Backed) Beneath Vinyl Floor Tile	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)		None Detected
A-57-Flooring 651503629-0057	Back Room- Post Office - Sheet Floor Beneath Carpet	White/Yellow Fibrous Homogeneous	25% Cellulose	75% Non-fibrous (other)		None Detected
A-57-Mastic 651503629-0057A	Back Room- Post Office - Sheet Floor Beneath Carpet	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)		None Detected

## Analyst(s)

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
A-58-Flooring 651503629-0058	Back Room- Post Office - Sheet Floor Beneath Carpet	White/Yellow Fibrous Homogeneous	25% Cellulose	75% Non-fibrous (other)	None Detected
A-58-Mastic 651503629-0058A	Back Room- Post Office - Sheet Floor Beneath Carpet	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-59-Floor Tile 651503629-0059	Back Room- Post Office - Vinyl Floor Tile Beneath Sheet Floor	Brown Non-Fibrous Homogeneous		95% Non-fibrous (other)	5% Chrysotile
A-59-Mastic 651503629-0059A	Back Room- Post Office - Vinyl Floor Tile Beneath Sheet Floor	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-60-Floor Tile 651503629-0060	Back Room- Post Office - Vinyl Floor Tile Beneath Sheet Floor	Brown Non-Fibrous Homogeneous		95% Non-fibrous (other)	5% Chrysotile
A-60-Mastic 651503629-0060A	Back Room- Post Office - Vinyl Floor Tile Beneath Sheet Floor	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-61-Flooring 651503629-0061	Back Room- Post Office - Sheet Floor (Burlap Backed) Beneath Vinyl Floor Tile	Brown Fibrous Homogeneous	15% Cellulose	85% Non-fibrous (other)	None Detected

Analyst(s)

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Initial report from 10/27/2015 13:09:12

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 Collected: 10/13/2015

Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
A-61-Mastic 651503629-0061A	Back Room- Post Office - Sheet Floor (Burlap Backed) Beneath Vinyl Floor Tile	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-62-Flooring 651503629-0062	Back Room- Post Office - Sheet Floor (Burlap Backed) Beneath Vinyl Floor Tile	Brown Fibrous Homogeneous	15% Cellulose	85% Non-fibrous (other)	None Detected
A-62-Mastic 651503629-0062A	Back Room- Post Office - Sheet Floor (Burlap Backed) Beneath Vinyl Floor Tile	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-63 651503629-0063	Crawlspace- Post Office - Cement Wall Material Around Furnace Exhaust Stack	Gray/Black/Orange Non-Fibrous Homogeneous		10% Quartz 90% Non-fibrous (other)	None Detected
A-64-Stucco 1 651503629-0064	Post Office/ Residence - Stucco- Exterior Walls	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-64-Stucco 2 651503629-0064A	Post Office/ Residence - Stucco- Exterior Walls	Gray Non-Fibrous Homogeneous		10% Quartz 90% Non-fibrous (other)	None Detected

Analyst(s)

Brett Olsen (229)

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Initial report from 10/27/2015 13:09:12

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## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
A-65-Stucco 1 651503629-0065	Post Office/ Residence - Stucco- Exterior Walls	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-65-Stucco 2 651503629-0065A	Post Office/ Residence - Stucco- Exterior Walls	Gray Non-Fibrous Homogeneous		10% Quartz 90% Non-fibrous (other)	None Detected
A-66-Stucco 1 651503629-0066	Post Office/ Residence - Stucco- Exterior Walls	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-66-Stucco 2 651503629-0066A	Post Office/ Residence - Stucco- Exterior Walls	Gray Non-Fibrous Homogeneous		10% Quartz 90% Non-fibrous (other)	None Detected
A-67-Stucco 1 651503629-0067	Post Office/ Residence - Stucco- Exterior Walls	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-67-Stucco 2 651503629-0067A	Post Office/ Residence - Stucco- Exterior Walls	Gray Non-Fibrous Homogeneous		10% Quartz 90% Non-fibrous (other)	None Detected
A-68-Stucco 1 651503629-0068	Post Office/ Residence - Stucco- Exterior Walls	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
A-68-Stucco 2 651503629-0068A	Post Office/ Residence - Stucco- Exterior Walls	Gray Non-Fibrous Homogeneous		10% Quartz 90% Non-fibrous (other)	None Detected
A-69 651503629-0069	Exterior- Post Office/ Residence - Beige Wall Mastic on Perimeter Base of Wall	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-70 651503629-0070	Post Office/ Residence - Beige Caulking- Exterior Windows	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-71 651503629-0071	Post Office/ Residence - Grey Putty- Exterior Windows	Gray Non-Fibrous Homogeneous		90% Non-fibrous (other)	10% Chrysotile
A-72 651503629-0072	Roof- Post Office/ Residence - Grey Caulking on Roof Penetration	Gray Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-73 651503629-0073	Roof- Shed- Post Office/ Residence - Asphalt Shingles	Black Fibrous Homogeneous	70% Cellulose	2% Quartz 26% Non-fibrous (other)	2% Chrysotile

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## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
A-74 651503629-0074	Exterior Roof- Post Office/ Residence - Built-Up Roofing Material	Brown/Black Fibrous Homogeneous	60% Cellulose	5% Quartz 35% Non-fibrous (other)	<b>None Detected</b>
A-75-Floor Tile 651503629-0075	Living Room- Residence Side of Post Office - Vinyl Floor Tile Beneath Carpet	Brown/White Non-Fibrous Homogeneous		98% Non-fibrous (other)	<b>2% Chrysotile</b>
A-75-Mastic 651503629-0075A	Living Room- Residence Side of Post Office - Vinyl Floor Tile Beneath Carpet	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	<b>None Detected</b>
A-76-Floor Tile 651503629-0076	Living Room- Residence Side of Post Office - Vinyl Floor Tile Beneath Carpet	Brown/White Non-Fibrous Homogeneous		98% Non-fibrous (other)	<b>2% Chrysotile</b>
A-76-Mastic 651503629-0076A	Living Room- Residence Side of Post Office - Vinyl Floor Tile Beneath Carpet	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	<b>None Detected</b>
A-77-Floor Tile 651503629-0077	Living Room- Residence Side of Post Office - Vinyl Floor Tile Beneath Carpet	Brown Non-Fibrous Homogeneous		98% Non-fibrous (other)	<b>2% Chrysotile</b>

Analyst(s)

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos	
			% Fibrous	% Non-Fibrous	% Type	
A-77-Mastic 651503629-0077A	Living Room- Residence Side of Post Office - Vinyl Floor Tile Beneath Carpet	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)		None Detected
A-78 651503629-0078	Kitchen- Residence Side of Post Office - Grey Squares Sheet Floor	Gray Fibrous Homogeneous	25% Cellulose 2% Glass	73% Non-fibrous (other)		None Detected
A-79-Flooring 651503629-0079	Kitchen- Residence Side of Post Office - Grey Squares Sheet Floor	Gray Fibrous Homogeneous	25% Cellulose 2% Glass	73% Non-fibrous (other)		None Detected
A-80 651503629-0080	Kitchen- Residence Side of Post Office - Grey Squares Sheet Floor	Gray Fibrous Homogeneous	25% Cellulose 2% Glass	73% Non-fibrous (other)		None Detected
A-81 651503629-0081	Kitchen- Residence Side of Post Office - Secondary Sheet Floor	Beige Fibrous Homogeneous	25% Cellulose 2% Glass	73% Non-fibrous (other)		None Detected
A-82 651503629-0082	Kitchen- Residence Side of Post Office - Floor Levelling Compound	Gray Fibrous Homogeneous	<1% Synthetic	3% Quartz 97% Non-fibrous (other)		None Detected

Analyst(s)

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## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
A-83 651503629-0083	East Bedroom- Residence Side of Post Office - Mosaic Sheet Floor Beneath Carpet	Brown/Beige Fibrous Homogeneous	3% Cellulose	72% Non-fibrous (other)	25% Chrysotile
A-84 651503629-0084	East Bedroom- Residence Side of Post Office - Mosaic Sheet Floor Beneath Carpet	Brown/Beige Fibrous Homogeneous	3% Cellulose	72% Non-fibrous (other)	25% Chrysotile
A-85-Flooring 651503629-0085	South Bedroom- Residence Side of Post Office - Mosaic Sheet Floor Beneath Carpet	Brown/Beige Fibrous Homogeneous	3% Cellulose	72% Non-fibrous (other)	25% Chrysotile
A-85-Mastic 651503629-0085A	South Bedroom- Residence Side of Post Office - Mosaic Sheet Floor Beneath Carpet	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-86 651503629-0086	Entrance- Residence Side of Post Office - Drywall Joint Compound (Wall)	Beige Fibrous Homogeneous	10% Cellulose	90% Non-fibrous (other)	<1% Chrysotile

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## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
A-87 651503629-0087	Basement Stairs- Residence Side of Post Office - Drywall Joint Compound (Wall)	Beige Fibrous Homogeneous	10% Cellulose	90% Non-fibrous (other)	<1% Chrysotile
A-88 651503629-0088	Basement- Residence Side of Post Office - Drywall Joint Compound (Wall)	Beige Fibrous Homogeneous	10% Cellulose	90% Non-fibrous (other)	<1% Chrysotile
A-89 651503629-0089	Living Room- Residence Side of Post Office - Drywall Joint Compound (Ceiling)	Beige Fibrous Homogeneous	10% Cellulose	88% Non-fibrous (other)	2% Chrysotile
A-90 651503629-0090	Living Room- Residence Side of Post Office - Drywall Joint Compound (Ceiling)	Beige Non-Fibrous Homogeneous	10% Cellulose	88% Non-fibrous (other)	2% Chrysotile
A-91 651503629-0091	East Bedroom- Residence Side of Post Office - Ceiling Stipple Coat	Beige Non-Fibrous Homogeneous		30% Perlite 70% Non-fibrous (other)	None Detected
A-92 651503629-0092	South Bedroom- Residence Side of Post Office - Ceiling Stipple Coat	Beige Non-Fibrous Homogeneous		30% Perlite 70% Non-fibrous (other)	None Detected

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## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
A-93 651503629-0093	Basement- Residence Side of Post Office - Ceiling Stipple Coat	White Non-Fibrous Homogeneous		30% Perlite 70% Non-fibrous (other)	<b>None Detected</b>
A-94-Floor Tile 651503629-0094	Basement- Residence Side of Post Office - 9"x9" Vinyl Floor Tile	Black Non-Fibrous Homogeneous		85% Non-fibrous (other)	<b>15% Chrysotile</b>
A-94-Mastic 651503629-0094A	Basement- Residence Side of Post Office - 9"x9" Vinyl Floor Tile	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	<b>None Detected</b>
A-95-Floor Tile 651503629-0095	Basement- Residence Side of Post Office - 9"x9" Vinyl Floor Tile	Black Non-Fibrous Homogeneous		85% Non-fibrous (other)	<b>15% Chrysotile</b>
A-95-Mastic 651503629-0095A	Basement- Residence Side of Post Office - 9"x9" Vinyl Floor Tile	Black Non-Fibrous Homogeneous		100% Non-fibrous (other)	<b>None Detected</b>
A-96 651503629-0096	Basement- Residence Side of Post Office - 9"x9" Vinyl Floor Tile	Black Non-Fibrous Homogeneous		85% Non-fibrous (other)	<b>15% Chrysotile</b>
A-97 651503629-0097	Basement- Residence Side of Post Office - White Insulation Board	White Fibrous Homogeneous	40% Cellulose	0% Non-fibrous (other)	<b>60% Chrysotile</b>

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## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
A-98 651503629-0098	Basement Stairs - Residence Side of Post Office - Red Sheet Floor	Red/Black Fibrous Homogeneous	20% Cellulose	80% Non-fibrous (other)	None Detected
A-99 651503629-0099	Lot 42 (105 Fountain Ave) - Stucco- Exterior Walls	Gray Non-Fibrous Homogeneous		10% Quartz 90% Non-fibrous (other)	None Detected
A-100 651503629-0100	Lot 42 (105 Fountain Ave) - Stucco- Exterior Walls	Gray Non-Fibrous Homogeneous		10% Quartz 90% Non-fibrous (other)	None Detected
A-101 651503629-0101	Lot 42 (105 Fountain Ave) - Stucco- Exterior Walls	Gray Non-Fibrous Homogeneous		10% Quartz 90% Non-fibrous (other)	None Detected
A-102 651503629-0102	Lot 42 (105 Fountain Ave) - Stucco- Exterior Walls	Gray Non-Fibrous Homogeneous		10% Quartz 90% Non-fibrous (other)	None Detected
A-103 651503629-0103	Lot 42 (105 Fountain Ave) - Stucco- Exterior Walls	Gray Non-Fibrous Homogeneous		10% Quartz 90% Non-fibrous (other)	None Detected
A-104 651503629-0104	Lot 42 (105 Fountain Ave) - Cement Parging- Perimeter Base of Exterior Walls	Gray Non-Fibrous Homogeneous		10% Quartz 90% Non-fibrous (other)	None Detected

Analyst(s)

Brett Olsen (229)

Kate Fee (79)

Jefferson Salvador, Laboratory Manager  
 or other approved signatory

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Samples received in good condition unless otherwise noted. Estimated accuracy, precision and uncertainty data available upon request. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Reporting limit is 1%

Samples analyzed by EMSL Canada Inc. Calgary, AB NVLAP Lab Code 500100

Initial report from 10/27/2015 13:09:12

## Sample Results

Lead				Matrix: Paint
				Sample Date: 13-Oct-15
Paracel ID	Client ID	Units	MDL	Result
1543152-01	L-01 - Brown - Wood Siding/Trim - Exterior Bunk House	ug/g	20	354
1543152-02	L-02 - Off-White - Drywall/Wood Trim - Unit 13 Bunk House	ug/g	20	587
1543152-03	L-03 - Beige (orange) - Wood Doors/Cabinets - Unit 13 Bunk House	ug/g	20	1190
1543152-04	L-04 - Off-White - Drywall/Wood Trim - Unit 26 Bunk House	ug/g	20	731
1543152-05	L-05 - Light-Grey - Drywall - Post Office	ug/g	20	365
1543152-06	L-06 - Black - Wood Trim - Exterior Post Office/Residence	ug/g	20	<20
1543152-07	L-07 - White - Wood Trim - Exterior Post Office/Residence	ug/g	20	67
1543152-08	L-08 - Beige - Drywall - Residence Side (Post Office)	ug/g	20	<20
1543152-09	L-09 - White - Drywall - Residence Side (Post Office)	ug/g	20	336
1543152-10	L-10 - Grey - Concrete Floor - Residence Side (Post Office)	ug/g	20	2020
1543152-11	L-11 - Beige - Drywall/Wood Walls - Lot 42	ug/g	20	<20
1543152-12	L-12 - White - Wood Trim/ Ceiling Tile - Lot 42	ug/g	20	46
1543152-13	L-13 - Grey - Concrete Floor - Lot 42	ug/g	20	1610
1543152-14	L-14 - Beige - Wood Trim / Stucco - Exterior Lot 42	ug/g	20	52400
1543152-15	L-15 - Red - Wood Trim - Exterior Lot 42	ug/g	20	1460
1543152-16	L-16 - Beige - Drywall - Lot 41	ug/g	20	<20
1543152-17	L-17 - White - Wood Trim - Interior Lot 41	ug/g	20	2020
1543152-18	L-18 - Grey - Plywood Floor - Interior Lot 41	ug/g	20	629
1543152-19	L-19 - Beige - Wood Siding - Exterior Lot 41	ug/g	20	13200
1543152-20	L-20 - Dark Brown - Wood Fencing/Trim - Exterior Lot 41	ug/g	20	979
1543152-21	L-21 - Light Brown - Wood Deck / Siding - Lot 41	ug/g	20	26
1543152-22	L-22 - Beige - Drywall - Lot 21	ug/g	20	346
1543152-23	L-23 - White - Wood Trim - Interior - Lot 21	ug/g	20	27100
1543152-24	L-24 - White - Wood Trim - Exterior - Lot 21	ug/g	20	9590
1543152-25	L-25 - Grey - Concrete Floor - Interior Lot 21	ug/g	20	2260
1543152-26	L-26 - White - Wood Trim - Exterior Lot 21	ug/g	20	1280
1543152-27	L-27 - Grey - Wood Deck - Exterior Lot 21	ug/g	20	1950
1543152-28	L-28 - Grey - Concrete Base of Wall - Exterior Lot 21	ug/g	20	<20
1543152-29	L-29 - Beige - Wood Panelling - Interior Main Floor - Lot 3/4	ug/g	20	419
1543152-30	L-30 - White - Wood Panelling - Interior Basement - Lot 3/4	ug/g	20	63
1543152-31	L-31 - Grey - Concrete Floor - Interior Lot 3/4	ug/g	20	196

## Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Matrix Blank</b>									
Lead	ND	20	ug/g						
<b>Matrix Duplicate</b>									
Lead	283	20	ug/g	354			22.2	30	



## Certificate of Analysis

AGAT WORK ORDER: 15C034028

PROJECT: 15-34393/1000

2910 12TH STREET NE  
CALGARY, ALBERTA  
CANADA T2E 7P7  
TEL (403)735-2005  
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<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD.

SAMPLING SITE:

ATTENTION TO: Bessie Abella

SAMPLED BY:

### Polychlorinated Biphenyls Analysis

DATE RECEIVED: 2015-10-23

DATE REPORTED: 2015-10-26

		P-01 - Brown		P-07 - White		P-14 - Beige		P-15 - Red		P-19 - Beige		P-20 - Dark		P-21 - Light		P-24 - White	
		Wood		Wood		Wood		Wood		Wood		Brown Wood		Brown Wood		Wood Trim-Ext	
SAMPLE DESCRIPTION:		Siding/Trim-Ext		Wood Trim-Ext		Trim/Stucco-Ext		Wood Trim-Ext		Siding-Ext		Fencing/Trim		Deck/Siding		Wood Trim-Ext	
SAMPLE TYPE:		Paint		Paint		Paint		Paint		Paint		Paint		Paint		Paint	
DATE SAMPLED:		10/13/2015		10/14/2015		10/15/2015		10/15/2015		10/16/2015		10/16/2015		10/16/2015		10/16/2015	
Parameter	Unit	G / S	RDL	G / S	RDL	G / S	RDL	G / S	RDL	G / S	RDL	G / S	RDL	G / S	RDL	G / S	RDL
Aroclor 1242	mg/kg		0.05		<0.05		<0.05		<0.05		<0.05		<0.05		<0.05		<0.05
Aroclor 1254	mg/kg		0.05		<0.05		<0.05		<0.05		<0.05		<0.05		<0.05		<0.05
Aroclor 1260	mg/kg		0.05		<0.05		<0.05		<0.05		<0.05		<0.05		<0.05		<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05		<0.05		<0.05		<0.05		<0.05		<0.05		<0.05		<0.05
Surrogate	Unit	Acceptable Limits															
Decachlorobiphenyl	%	50-150		110		105		105		110		145		105		115	
				P-26 - White		P-27 - Grey		P-28 - Grey									
SAMPLE DESCRIPTION:		Wood Trim-Ext		Wood Deck-Ext		Concrete Base											
SAMPLE TYPE:		Paint		Paint		Paint											
DATE SAMPLED:		10/16/2015		10/16/2015		10/16/2015											
Parameter	Unit	G / S	RDL	G / S	RDL	G / S	RDL										
Aroclor 1242	mg/kg		0.05		<0.05		<0.05										
Aroclor 1254	mg/kg		0.05		<0.05		<0.05										
Aroclor 1260	mg/kg		0.05		<0.05		<0.05										
Total Polychlorinated Biphenyls	mg/kg		0.05		<0.05		<0.05										
Surrogate	Unit	Acceptable Limits															
Decachlorobiphenyl	%	50-150		110		105		80									

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

Certified By:



**AGAT** Laboratories

## Certificate of Analysis

AGAT WORK ORDER: 15C034981

PROJECT: 15-34393/1000

2910 12TH STREET NE  
CALGARY, ALBERTA  
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TEL (403)735-2005  
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<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD.

SAMPLING SITE:

ATTENTION TO: Bessie Abella

SAMPLED BY:

### Polychlorinated Biphenyls Analysis

DATE RECEIVED: 2015-10-26

DATE REPORTED: 2015-10-27

P-06-Black-				
SAMPLE DESCRIPTION: Wood Trim-Ext				
SAMPLE TYPE: Paint				
DATE SAMPLED: 10/14/2015				
Parameter	Unit	G / S	RDL	7129531
Aroclor 1242	mg/kg		0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05
Aroclor 1260	mg/kg		0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05
Surrogate	Unit	Acceptable Limits		
Decachlorobiphenyl	%	50-150	87	

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

Certified By:

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

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January 2016

IBI GROUP ARCHITECTS ENGINEERS

# PRE-DEMOLITION HAZARDOUS BUILDING MATERIALS ASSESSMENT

Lot 21, 104 Wind Flower  
Avenue, Waterton, Alberta

REPORT

**Submitted to:**

Ms. Leanne Soligo  
IBI Group Architects Engineers  
400, 1167 Kensington Crescent NW  
Calgary, AB  
T2N 1X7  
Email: LSoligo@IBIGroup.com

**Report Number:** 15-34393.1000

**Distribution:**

1 e-copy - IBI Group Architects Engineers  
1 copy - Golder Associates Ltd.







# Executive Summary

## INTRODUCTION

At the request of IBI Group Architects Engineers (IBI), Golder Associates Ltd. (Golder) conducted a hazardous building materials assessment 104 Wind Flower Avenue (Lot 21) in Waterton, Alberta.

The assessment was conducted on October 16, 2015, by Caleb Fricker, Occupational Hygiene Technologist, under the direction of Nadine Reid, Occupational Hygienist.

## SCOPE OF WORK

The assessment was performed with the objective of compiling an inventory of hazardous building materials prior to the proposed demolition of the building on Lot 21. The assessment included asbestos-containing materials (ACM), lead-containing paint, polychlorinated biphenyls (PCB) in fluorescent light ballasts, mercury in thermostats, mercury vapour in fluorescent light tubes, ozone-depleting substances (ODS) in items such as air conditioning units and refrigerators, radioactive materials in smoke detectors and miscellaneous building maintenance chemicals.

## CONCLUSIONS AND RECOMMENDATIONS

### Asbestos-Containing Materials

Based on site observations and the analytical results, asbestos was confirmed in the following materials at the time of the assessment:

Asbestos-Containing Material	Locations
Brown Vinyl Floor Tile;	Bedrooms – Main Floor
Beige Patterned Sheet Flooring	Vestibule – Main Floor
Drywall Joint Compound	All Drywall – Main Floor
Grey Paper Duct Wrap	Basement
Grey Board Above Furnace	Basement
Ceiling Texture Coat (Mud	Kitchen – Main Floor

As this assessment was semi-destructive in nature, the potential exists for other building materials not sampled to contain asbestos. Materials in the building that may contain asbestos that could not be sampled due to the semi-destructive nature include but are not limited to drain pipes, gaskets within flanges and boilers, asbestos cement insulators within electrical equipment and within mechanical equipment.

Prior to any demolition or renovation activities, ACM that may be impacted must be removed. The work should be completed by workers certified by Alberta OHS. Throughout the abatement activities, appropriate air monitoring and inspections should be conducted by qualified personnel to document that contamination is contained and ACM are removed and disposed of appropriately. It is recommended that a proper scope of work and asbestos removal specifications be written to scope the complete and proper removal of the identified ACM.

If suspected ACM not previously assessed are uncovered during renovation or demolition activities, work should stop immediately and sampling of the material should be conducted to confirm the presence of asbestos.



### Lead-Containing Paint

Based on site observations and the analytical results, lead above the Surface Coatings Materials Regulations, 90 µg/g was identified in the following paints:

- Beige Paint on Drywall – Interior (good condition);
- White Paint on Wood Trim – Interior (good condition);
- White Paint on Wood Trim – Exterior (good condition);
- Grey Paint on Concrete Floor – Basement (good condition);
- White Paint on Wood Deck – Exterior (poor condition);
- Grey Paint on Wood Deck – Exterior (poor condition).

Lead-containing surfaces with any amounts of lead that will be impacted through maintenance, renovation, or demolition activities in a manner likely to cause some level of airborne lead-containing dust or fumes, (i.e., welding, torch cutting, grinding, sanding or sandblasting) should be controlled through the development and implementation of an Exposure Control Plan. The exposure control plan should include safe work procedures to address the lead exposure hazard during the maintenance, renovation, or demolition activities. The safe work procedures should include procedures to minimize dust during construction and demolition, procedures for proper containment, collection, clean-up and disposal of debris to prevent contamination in other areas, the use of proper cleaning tools, selection and use of proper personal protective equipment, and other applicable procedures.

Lead-containing paint in poor condition should be abated prior to demolition. The lead containing paint that is flaking or loose (poor condition) should be abated following methods and requirements outlined in the Alberta OHS *Lead at the Work Site Bulletin*. The lead-containing paint waste should be analyzed for lead leachability by toxicity characteristic leaching procedure (TCLP) prior to transportation and disposal. The transportation and disposal of lead-containing waste materials must be conducted in accordance with the requirements of AEP and the Federal Transportation of Dangerous Goods Act and Regulations, current to the date of the work. The AEP Waste Control Regulation prescribes the disposal pathways for lead-containing waste.

### Polychlorinated Biphenyls

Approximately three fluorescent light fixtures with the older T12 style tubes suspected to contain PCB ballasts were observed throughout the building at the time of the assessment. Prior to disposal, these ballasts should be inspected further to determine the presence of any PCBs.

Prior to decommissioning, renovation or demolition, PCB-containing ballasts must be properly removed and disposed of. Disposal of the ballasts must be conducted in accordance with federal and provincial regulations. As they are removed, PCB-containing ballasts must be placed in labelled drums located in a secure area. Once full, the drums must be manifested and transported to an approved destruction and disposal facility in accordance with regulations specified by Alberta Environmental Protection.

Non-liquid PCBs were found to be below the PCB Management Regulation criteria of 50 mg/kg for PCB-containing solids. As such, Golder did not identify PCB-containing paints during this assessment.



### Other Hazardous Building Materials

Approximately four fluorescent light tubes suspected of containing mercury vapour were observed throughout the building at the time of the assessment. One thermostat suspected of containing mercury capsules was observed throughout the building at the time of the assessment.

Mercury vapour in light tubes and mercury in thermostats pose no risk to workers or occupants provided the light bulbs and capsules remain intact and undisturbed. The bulbs and capsules should be removed from the building prior to decommissioning, renovations or maintenance activities and be kept separate from all other waste to prevent damage to the light bulbs and capsules. Light bulbs containing mercury vapour should be recycled as per the Alberta Fluorescent Lamp Stewardship Initiative. Alternatively, the mercury-containing fluorescent light bulbs and capsules may be disposed of in accordance with regulations specified by AEP.

One refrigerator suspected of containing ozone-depleting substances was observed in the building at the time of the assessment. Equipment suspected of containing ODS is to be recycled or disposed of in accordance with the federal Ozone Depleting Substances and Halocarbons Regulation (Section 181/2000). Equipment containing suspect ODS that is to remain in place must be managed in accordance with the provincial and federal regulations. If the units require maintenance or are to be decommissioned, the refrigerants in the identified units must be drained, recycled or destroyed by a competent individual with the appropriate trade qualifications. Servicing should be performed in accordance with Environment Canada, *Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems* and manufactures specifications.

Two smoke detectors suspected of containing radioactive components were observed throughout the building at the time of the assessment. Smoke detectors that contain radioactive materials must be sent for recycling upon decommissioning. Removal and disposal must be conducted in accordance with the Nuclear Safety and Control Act, Nuclear Substances and Radiation Device Regulation SOR/2000-207.

Lead packing was observed in the cast iron bell and spigot joints throughout the residence of Lot 21 at the time of the assessment. Removal, disposal or recycling of lead in bell and spigot joints must be conducted in accordance with federal and provincial regulations.

Miscellaneous chemicals and biohazards were not identified in the buildings at the time of the assessment.



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### 1.0 INTRODUCTION

At the request of IBI Group Architects Engineers (IBI), Golder Associates Ltd. (Golder) conducted a hazardous building materials assessment at 104 Wind Flower Avenue (Lot 21) in Waterton, Alberta.

The assessment was conducted on October 16, 2015, by Caleb Fricker, Occupational Hygiene Technologist, under the direction of Nadine Reid, Occupational Hygienist.

### 2.0 SCOPE OF WORK

The assessment was performed with the objective of compiling an inventory of hazardous building materials prior to the proposed demolition of the building on Lot 21. The assessment included asbestos-containing materials (ACM), lead-containing paint, polychlorinated biphenyls (PCB) in fluorescent light ballasts, mercury in thermostats, mercury vapour in fluorescent light tubes, ozone-depleting substances (ODS) in items such as air conditioning units and refrigerators, radioactive materials in smoke detectors and miscellaneous building maintenance chemicals.

### 3.0 REGULATORY REQUIREMENTS AND GUIDELINES

Parks Canada employees are federally regulated. Most other parties conducting work for Parks Canada are governed by provincial regulations.

#### 3.1 Federal Regulations

In federal jurisdictions, hazardous building materials are regulated by Human Resources and Skills Development Canada (HRSDC) under the Canada Labour Code, Part II. Specifically, Part X, Hazardous Substances, provides the direction for the control of exposure to potentially toxic substances in the workplace. Under this regulation, employers are required to:

- maintain a record of all hazardous materials;
- undertake a hazard investigation by a competent person;
- ensure materials are properly stored and handled;
- post warning signs;
- inform and educate employees regarding hazards; and
- control exposure through substitution, engineering or protective equipment.

In Canada, environmental matters generally fall under the Government of Canada's Canadian Environmental Protection Act, 1999, S.C. 1999 c. 33 (as amended up to 2003) and applicable regulations and guidelines.

Other specific applicable federal regulations are detailed below.



### 3.1.1 Lead-Containing Paint

Lead was used as a pigment and drying agent in alkyd oil-based paint. The Liquid Coating Materials Regulations were enacted under the Hazardous Products Act in 1976 to restrict the lead content of paints and other liquid coatings on furniture, household products, children's products, industrial surfaces and exterior and interior surfaces to 0.5% by weight. The Canadian Paint and Coatings Association (CPCA), the national trade association for Canada's paint manufacturers, recommended that the Canadian paint industry voluntarily stop using any lead compounds in consumer paints by the end of 1990. Over the years, the amount of lead in paint has continued to decrease, due to the co-operative efforts of government and industry.

The previous regulations have since been amended under the Surface Coating Materials Regulations, SOR/2005-109, which states that the "concentration of total lead present in a surface coating material must not be more than 90 micrograms per gram ( $\mu\text{g/g}$ ) dry weight of lead" (0.009%).

### 3.1.2 Polychlorinated Biphenyls

PCBs are used as a dielectric fluid in electrical equipment such as transformers. The use of capacitors in fluorescent lamp ballasts was common up to 1980. The Federal Chlorobiphenyls Regulation, SOR/91-152 prohibits the use of PCBs in this electrical equipment installed after July 1, 1980. The Federal Chlorobiphenyls Regulation, SOR/92-507, also outlines the handling, storage, and disposal of PCBs and PCB-containing equipment.

The government of Canada passed a regulation set to protect and enhance the environment. As such, the regulations are enforceable by law. The regulation places the onus on the owner; employer and employee to ensure no adverse effects are experienced in the environment.

In accordance with PCB Regulations (SOR/2008-273), PCB-containing equipment is defined as any equipment, machinery or similar manufactured items, including paints, capacitors, and an electrical transformer that contains a PCB liquid or solid of more than 50 milligrams per kilogram ( $\text{mg/kg}$ ) of the liquid or solid. This definition includes paint which may contain PCBs. Following removal of all paints, the barrelled PCB-containing paint must be appropriately labelled, manifested, and transported to an approved destruction and disposal facility in accordance with regulations.

Prior to disposal, all ballasts should be compared to the criteria found in the Environment Canada Report EPS 2/CC/2 (revised) August 1991, *Identification of Lamp Ballasts Containing PCBs* to assess their likelihood of containing PCBs.

### 3.1.3 Ozone-Depleting Substances

In 1994, the federal government filed the Ozone-Depleting Substances Regulations to amend controls on production and consumption of chlorofluorocarbons (CFC), halons, tetrachloride and methyl-chloroform. The Federal Halocarbon Regulations, effective July 1, 1999, was filed to ensure uniformity with respect to the release, recovery and recycling of ODS and their halocarbon alternatives in refrigeration and air conditioning.

Canadian Environmental Protection Act (1999), Ozone-Depleting Substances Regulations, 1998, controls the import, manufacture, use, sale, and export of ODS. The regulation also requires that permits be obtained to import or export used, recovered, recycled, and reclaimed ODS.





### 3.2 Provincial Regulations

The provincial regulations, codes and guidelines relevant to hazardous building materials are legislated by Alberta Occupational Health and Safety (OHS), a branch of the Department of Safe, Fair and Healthy Workplaces under the Ministry of Jobs, Skills, Training and Labour. They include the Alberta Occupational Health and Safety (OHS) Code (2009) and the Alberta Asbestos Abatement Manual (October 2012). Provincial regulations that are applicable to the disposal of hazardous building materials are the Alberta Environmental Protection and Enhancement Act and Waste Control Regulation.

#### 3.2.1 Alberta Occupational Health and Safety Code

The Alberta Occupational Health and Safety Code is law which was passed to protect the health and safety of workers on the job. As such, the Code and the sections under the Code are enforceable by law. The Code places the onus on both the employer and the employee to ensure a safe working environment.

Part 4, Chemical Hazards, Biological Hazards and Harmful Substances, represents minimum requirements and specifies, among many other things, the general requirements for working with and around harmful substances. Control of worker exposure to airborne contaminants is detailed and the occupational exposure limits are specified in Schedule 1 of the Regulation.

Part 4 and Schedule 1, Table 2 in the Alberta Occupational Health and Safety Code outlines the general requirements to be followed when working with asbestos. It also defines occupational exposure limits (OEL) for a variety of airborne contaminants. The OEL for a particular contaminant represents conditions to which it is believed that nearly all workers may be exposed, day after day, without suffering from adverse health effects. Due to individual susceptibility, a small percentage of workers may experience discomfort at concentrations below the applicable OEL. An 8-hour OEL refers to the average concentration of a substance over an 8-hour period.

Sections 28 through 38 in Part 4 of the Alberta Occupational Health and Safety Code outline the requirements related to asbestos in facilities. Sections 31 to 35 specifically outline the limitations on the use of asbestos in buildings. The requirements of Sections 31 through 35 are summarized below:

- if asbestos fibres may be released in a building all necessary steps to correct this unsafe condition must be taken;
- asbestos products that have the potential for releasing fibres may not be installed;
- all materials containing crocidolite are banned from use;
- spray-applied asbestos products are banned from use;
- asbestos products, in general, must not be in a form or location where they could release airborne fibres and allow them to enter a ventilation system;
- buildings to be demolished are to have all materials with the potential of releasing asbestos fibres removed; and
- all materials with the potential of releasing asbestos fibres that may be impacted by a renovation must be either encapsulated, enclosed or removed.



Historically, materials containing less than 1% asbestos have not been considered “asbestos-containing materials” for the purposes of the OHS legislation. However, in recent years, it has become apparent that some materials, such as vermiculite, can release significant amounts of asbestos fibres, even when they contain low levels (less than 1%) of asbestos. In addition, since the requirements in Part 4 of the OHS Code are based on the ability of a material to release asbestos fibres when disturbed, this interpretation was not consistent with the legislation. As a result, the Asbestos Abatement Manual was revised to remove the definition of an asbestos-containing material as one that contains more than 1% by weight asbestos. However, this has now raised questions as to when an employer must comply with the asbestos requirements in the OHS Code.

The employer must comply with the asbestos requirements when:

- the individual material in question contains more than 1% asbestos (by weight);
- the material contains less than 1% asbestos, but it is known that a “restricted area” is likely to occur when it is disturbed (e.g., vermiculite); or
- the material contains less than 1% asbestos and there is a reasonable chance that asbestos fibres may be released when the material is disturbed, either due to the condition of the material or the work procedures that will be used (e.g., removal of friable stipple material, dry removal of drywall where the drywall mud contains low levels of asbestos).

Materials identified as containing less than 1% asbestos, such as drywall joint compounds and stipple coatings, may not have been uniformly mixed when they were applied and could contain asbestos in concentrations greater than 1% in sections. When dealing with large quantities of such materials, employers should take non-homogeneous mixtures into consideration for Asbestos Management Plans and abatement activities.

### 3.2.2 Alberta Asbestos Abatement Manual

The *Alberta Asbestos Abatement Manual* (October 2012) is a guide published by Alberta OHS. This manual is used for determining compliance with the Occupational Health and Safety Code in the Province of Alberta. It covers basic information on asbestos, its health hazards, requirements for an employer to develop a code of practice regarding the storage, handling and disposal of substances listed in Schedule 1 of the Alberta OHS Code, requirements for worker protection, safe work practices, and the basic principles to follow for the safe abatement of ACM.

### 3.2.3 Alberta Environmental Protection and Enhancement Act

The Environmental Protection and Enhancement Act is law which was passed to protect and enhance the environment. As such, the Act and the regulations under the Act are enforceable by law. The Act places the onus on the owner, employer and employee to ensure no adverse effects are experienced in the environment.

The key waste regulation under the Environmental Protection and Enhancement Act (AEPEA) relating to hazardous building materials is the Waste Control Regulation (WCR), and Alberta’s hazardous waste and hazardous recyclables management programs. The WCR provides guidance for the proper handling, storage, transportation, treatment, recycling and disposal of hazardous wastes in the province. The regulation also outlines the materials and criteria to be used to characterize waste as hazardous.



Although asbestos is not considered to be a hazardous waste, Alberta Environment and Parks (AEP) (previously Alberta Environment and Sustainable Resource Development) has published guidelines for the disposal of asbestos waste. Within the guidelines, criteria have been established for the handling, transportation and disposal of asbestos waste. Also within the guidelines, the types of landfills that can accept asbestos waste are outlined. The requirements for the disposal of asbestos waste in Alberta are re-defined in the document entitled *Guide for Disposal of Asbestos Waste* published by AEP in August, 1989.

### 3.2.4 Other Guidelines

Presently there are no regulations in Alberta specifically addressing lead levels in paint. Alberta OHS published a Bulletin, *Lead at the Work Site*, in November of 2013<sup>1</sup> which considers paints containing more than 90 parts per million (ppm) (90 µg/g) lead to be lead-containing under Canadian Federal Law (Surface Coating Materials Regulation SOR/2005-109, made under the Canada Consumer Product Safety Act [S.C. 2010, c. 21]).

Lead-containing paint is a potential concern both as a source of direct exposure (inhalation or ingestion of dust or paint chips) and as a contributor to lead in interior dust and exterior soil. A risk assessment of potential occupational exposure to lead must consider not only the presence of lead (any amount) but also the activity or impact of activity on the paints containing lead. The Alberta OHS Lead at the Work Site bulletin references recommended abatement methods as outlined in the Ontario Ministry of Labour guideline, *Lead on Construction Projects*<sup>2</sup>. The guideline addresses this issue by establishing three tiers of trigger tasks where employees conducting these activities are assumed to potentially exceed the exposure limits and must be protected accordingly. There are also requirements under the EPEA to prevent the release of lead and mercury into the environment.

### 3.2.5 Transportation of Hazardous Waste

The transportation of hazardous wastes is governed under the Transportation of Dangerous Goods Act and Regulations which outline the requirements for storage, handling, and transportation of such waste.

## 4.0 METHODOLOGY

The assessment methodology was generally consistent with standards outlined by Alberta OHS and the Canada Labour Code.

Detailed notes were taken with each sample including the type of material and sample location. A digital photograph was taken of each sampling location.

### 4.1 Asbestos-Containing Materials

Assessment of the potential ACM in the building included the evaluation of the building systems. The systems reviewed included, but not limited to:

- Mechanical: Building mechanical systems such as the heating, ventilating and air conditioning (HVAC) systems were inspected for the presence of ACM.

<sup>1</sup> *Lead at the Work Site*, CH071 – Chemical Hazards.

<sup>2</sup> *Health and Safety Guideline – Lead on Construction Projects*. Ontario Ministry of Labour. September 2004, <http://www.labour.gov.on.ca/english/hs/guidelines/lead/index.html>



- **Structural:** The method of construction was determined, including interior room areas, mezzanines and roofing support systems. Fireproofing, fire-stop and other materials installed as a part of the structure were reviewed.
- **Architectural:** The presence of ACM was assessed in building materials and finishes such as floor and ceiling tiles, texture coats, asbestos sheet materials, wall joint compound, condensation control applications, spray-applied acoustical materials, and spray-applied insulation on areas of the structure.

The quantity of samples collected was in general accordance with the guidelines in the *Alberta Asbestos Abatement Manual* (October 2012) and was adjusted based on the amount of a particular homogenous material present. A homogenous material is defined as a material that is uniform in color and texture and includes the materials throughout its full extent, even if its occurrence is not contiguous or physically connected. Where analysis of a sample confirmed that a bulk material sample was asbestos-containing, then the entire homogenous material from which the sample was collected was considered an asbestos-containing material.

The *Alberta Asbestos Abatement Manual* (October 2012), recommends a specific number of samples to be collected from suspect ACM depending on the amount present on-site. As part of this project, certain building materials were observed to be installed in limited quantities throughout the buildings, making the collection of multiple samples from these materials impractical.

Materials suspected of containing asbestos were sampled and submitted for analysis to EMSL Canada Inc., a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory. The asbestos samples were analyzed for asbestos type and percentage content using polarized light microscopy and dispersion staining techniques in accordance with EPA methodologies (EPA 600/R-93/116).

### 4.2 Lead-Containing Paint

Visual identification and systematic sampling of suspected lead-containing materials was completed as part of the survey. Testing was conducted by collecting bulk samples by scraping a small section of paint to obtain approximately 1 gram (g) of suspect paint. The bulk samples were submitted under chain of custody to Paracel Laboratories Inc, and were analyzed for lead percentage content using Inductively Cooled Plasma – Optical Emission Spectroscopy (ICP-OES). For the purpose of this report, paints analyzed with lead content greater than the Surface Coatings Materials Regulations, SOR/2010-224 criteria of 0.009% by weight (90 ppm or 90 µg/g) are considered to be lead-containing.

### 4.3 Polychlorinated Biphenyls

Fluorescent light fixtures were inspected to determine if they have the older style T-12 tubes. If the T-12 tubes were observed, the light fixture was assumed to have PCB-containing ballasts. The high-efficiency light fixtures with the newer T-10, T-8, and T-5 style tubes were assumed to have non-PCB containing ballasts. When T-12 tubes were observed without impact to the light fixture, information was collected and compared to the criteria found in the Environment Canada Report EPS 2/CC/2 (revised) August 1991, *Identification of Lamp Ballasts Containing PCBs* to assess their likelihood of containing PCBs.



Golder conducted limited sampling for non-liquid PCBs in select paint materials. Sampling was limited to select exterior paints. Sample collection consisted of obtaining a small volume of suspect paint, placing it in an individual sample bag. Samples were submitted to AGAT Laboratories for analysis. Samples were analyzed by gas chromatography in accordance with AGAT Laboratories methodology with reference to the Environmental Protection Agency's method SW-846 8082.

Transformer fluids were not assessed as part of this project.

### 4.4 Other Hazardous Building Materials

The building was visually assessed for the presence of mercury in thermostats, mercury vapour in fluorescent light tubes, ozone-depleting substances (ODS) in items or systems such as air conditioning units and refrigerators, radioactive materials in smoke detectors and miscellaneous building maintenance chemicals.

## 5.0 GENERAL OBSERVATIONS

The residence located on Lot 21 is a single storey building constructed circa 1960. The building was constructed with wood framing, new siding, and a new asphalt shingled roof. Golder was informed that the siding and roof were new by a Parks Canada representative. The residence included a basement with a concrete foundation. The residence was insulated with fibreglass in the wall and ceiling cavities. Interior finishes in the residence consisted of vinyl floor tile, sheet flooring, carpet floor, stipple/texture coat ceilings and drywall walls and ceilings. The building was heated with a natural gas fired furnace in the basement through forced-air heating vents. The HVAC system was insulated around the forced-air heating vents with grey insulation board and grey insulation paper. A detached double car garage consisting of wood framing on a concrete foundation with new siding and new asphalt shingles was observed on the north side of the property. The interior finishes of the detached garage consisted of drywall walls and ceiling with some texture coat on the ceilings.

## 6.0 RESULTS AND DISCUSSION

### 6.1 Asbestos-Containing Materials

A total of 38 samples of suspect ACM were collected from the building and submitted for analysis. The laboratory analyzed 44 different layers of material. Asbestos was identified in 16 of the samples collected at the time of the assessment. The samples identified as asbestos containing are summarized in Tables 1: Asbestos Analysis Summary. Complete asbestos analysis results are provided in Appendix A. Select photographs of identified ACM are provided in Appendix B. Laboratory reports are provided in Appendix C.

**Table 1: Asbestos Analysis Summary**

Sample Number	Type of Material Sampled	Sample Location	Asbestos
A-188A	Brown Vinyl Floor Tile	Southwest Bedroom	5% Chrysotile
A-189A	Brown Vinyl Floor Tile	Southwest Bedroom	5% Chrysotile
A-190A	Brown Vinyl Floor Tile	Northwest Bedroom Closet	5% Chrysotile
A-197	Beige Patterned Sheet Flooring	Vestibule	25% Chrysotile
A-198	Beige Patterned Sheet Flooring	Vestibule	25% Chrysotile
A-199	Beige Patterned Sheet Flooring	Vestibule	25% Chrysotile
A-200	Drywall Joint Compound (Wall)	Stairs	2% Chrysotile
A-201	Drywall Joint Compound (Wall)	Northwest Bedroom Closet	2% Chrysotile
A-202	Drywall Joint Compound (Wall)	Southwest Bedroom Closet	2% Chrysotile



## HAZARDOUS BUILDING MATERIALS ASSESSMENT, LOT 21, WATERTON, AB

**Table 1: Asbestos Analysis Summary (continued)**

Sample Number	Type of Material Sampled	Sample Location	Asbestos
A-203	Drywall Joint Compound (Ceiling)	Washroom Closet	2% Chrysotile
A-204	Drywall Joint Compound (Ceiling)	West Bedroom Closet	2% Chrysotile
A-208	Grey Paper Duct Wrap	Basement	75% Chrysotile
A-209	Grey Board Above Furnace	Basement	75% Chrysotile
A-210B	Ceiling Texture Coat (Mud)	Kitchen	2% Chrysotile
A-211B	Ceiling Texture Coat (Mud)	Kitchen	2% Chrysotile
A-212B	Ceiling Texture Coat (Mud)	Kitchen	2% Chrysotile

## 6.2 Lead-Containing Paint

A total of seven bulk samples of paint suspected to be lead-containing were collected by Golder and submitted for analysis. Six of the samples collected were identified as lead-containing paint and are outlined below in Table 2: Lead-Containing Paints. Complete lead paint analysis results are provided in Appendix A. Select photographs of identified lead-containing paints are provided in Appendix B. Laboratory reports are provided in Appendix C.

**Table 2: Lead-Containing Paints**

Sample Number	Substrate/Sample Location	Colour	Lead Concentration (µg/g)
L-22	Drywall	Beige	346
L-23	Wood Trim - Interior	White	27,100
L-24	White - Wood Trim - Exterior	White	9,590
L-25	Concrete Floor - Interior	Grey	2,260
L-26	Wood Trim - Exterior	White	1,280
L-27	Wood Deck - Exterior	Grey	1,950

**Note:**

(1) Based on Surface Coatings Materials Regulations, SOR/2010-224 classification of 90 µg/g.

## 6.3 Polychlorinated Biphenyls

Approximately three fluorescent light fixtures with the older T12 style tubes suspected to contain PCB ballasts were observed throughout the building at the time of the assessment.

Three samples of paint were collected and submitted for PCB analysis. PCB's were not identified in any of the samples analyzed. The results are summarized in Table 3: PCB Analysis Results. The laboratory report is provided in Appendix C.

**Table 3: PCB Analysis Results**

Sample Number	Locations/Substrate	Colour	PCB Concentration (mg/kg)	PCB-Based Paint <sup>(1)</sup> (Yes/No)
P-26	Exterior, Wood Trim / Deck	White	<0.05	No
P-27	Exterior, Wood Deck	Grey	<0.05	No
P-28	Interior, Concrete Perimeter Base of Wall	Grey	<0.05	No

**Note:**

(1) based on Government of Canada Regulation (SOR//2008-273), <50 mg/kg.





### 6.4 Other Hazardous Building Materials

Approximately eight other hazardous building materials were observed throughout the building at the time of the assessment. The items are summarized in Table 4: Other Hazardous Building Materials.

**Table 4: Other Hazardous Building Materials**

Item	Quantity
Mercury Capsules in Thermostats	1
Mercury Vapour in Fluorescent Light Tubes	4
Items Containing Suspect ODS	1 Refrigerator (R-134a)
Smoke Detectors with Radioactive Components	2

Lead packing was observed in the cast iron bell and spigot joints throughout the residence of Lot 21 at the time of the assessment.

Miscellaneous chemicals or biohazards were not identified in the buildings at the time of the assessment.

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

### 7.1 Asbestos-Containing Materials

Based on site observations and the analytical results, asbestos was confirmed in the following materials at the time of the assessment:

Asbestos-Containing Material	Locations
Brown Vinyl Floor Tile	Bedrooms – Main Floor
Beige Patterned Sheet Flooring	Vestibule – Main Floor
Drywall Joint Compound	All Drywall – Main Floor
Grey Paper Duct Wrap	Basement
Grey Board Above Furnace	Basement
Ceiling Texture Coat (Mud)	Kitchen – Main Floor

As this assessment was semi-destructive in nature, the potential exists for other building materials not sampled to contain asbestos. Materials in the building that may contain asbestos that could not be sampled due to the semi-destructive nature include but are not limited to drain pipes, gaskets within flanges and boilers, asbestos cement insulators within electrical equipment and within mechanical equipment.

Prior to any demolition or renovation activities, ACM that may be impacted must be removed. The work should be completed by workers certified by Alberta OHS. Throughout the abatement activities, appropriate air monitoring and inspections should be conducted by qualified personnel to document that contamination is contained and ACM are removed and disposed of appropriately. It is recommended that a proper scope of work and asbestos removal specifications be written to scope the complete and proper removal of the identified ACM.

If suspected ACM not previously assessed are uncovered during renovation or demolition activities, work should stop immediately and sampling of the material should be conducted to confirm the presence of asbestos.



## **7.2 Lead-Containing Paint**

Based on site observations and the analytical results, lead above the Surface Coatings Materials Regulations, 90 µg/g was identified in the following paints:

- Beige Paint on Drywall – Interior (good condition);
- White Paint on Wood Trim – Interior (good condition);
- White Paint on Wood Trim – Exterior (good condition);
- Grey Paint on Concrete Floor – Basement (good condition);
- White Paint on Wood Deck – Exterior (poor condition);
- Grey Paint on Wood Deck – Exterior (poor condition).

Lead-containing surfaces with any amounts of lead that will be impacted through maintenance, renovation, or demolition activities in a manner likely to cause some level of airborne lead-containing dust or fumes, (i.e., welding, torch cutting, grinding, sanding or sandblasting) should be controlled through the development and implementation of an Exposure Control Plan. The exposure control plan should include safe work procedures to address the lead exposure hazard during the maintenance, renovation, or demolition activities. The safe work procedures should include procedures to minimize dust during construction and demolition, procedures for proper containment, collection, clean-up and disposal of debris to prevent contamination in other areas, the use of proper cleaning tools, selection and use of proper personal protective equipment, and other applicable procedures.

Lead-containing paint in poor condition should be abated prior to demolition. The lead containing paint that is flaking or loose (poor condition) should be abated following methods and requirements outlined in the Alberta OHS *Lead at the Work Site Bulletin*. The lead-containing paint waste should be analyzed for lead leachability by toxicity characteristic leaching procedure (TCLP) prior to transportation and disposal. The transportation and disposal of lead-containing waste materials must be conducted in accordance with the requirements of AEP and the Federal Transportation of Dangerous Goods Act and Regulations, current to the date of the work. The AEP Waste Control Regulation prescribes the disposal pathways for lead-containing waste.

## **7.3 Polychlorinated Biphenyls**

Approximately three fluorescent light fixtures with the older T12 style tubes suspected to contain PCB ballasts were observed throughout the building at the time of the assessment. Prior to disposal, these ballasts should be inspected further to determine the presence of any PCBs.

Prior to decommissioning, renovation or demolition, PCB-containing ballasts must be properly removed and disposed of. Disposal of the ballasts must be conducted in accordance with federal and provincial regulations. As they are removed, PCB-containing ballasts must be placed in labelled drums located in a secure area. Once full, the drums must be manifested and transported to an approved destruction and disposal facility in accordance with regulations specified by Alberta Environmental Protection.

Non-liquid PCBs were found to be below the PCB Management Regulation criteria of 50 mg/kg for PCB-containing solids. As such, Golder did not identify PCB-containing paints during this assessment.



## **7.4 Other Hazardous Building Materials**

Approximately four fluorescent light tubes suspected of containing mercury vapour were observed throughout the building at the time of the assessment. One thermostat suspected of containing mercury capsules was observed throughout the building at the time of the assessment.

Mercury vapour in light tubes and mercury in thermostats pose no risk to workers or occupants provided the light bulbs and capsules remain intact and undisturbed. The bulbs and capsules should be removed from the building prior to decommissioning, renovations or maintenance activities and be kept separate from all other waste to prevent damage to the light bulbs and capsules. Light bulbs containing mercury vapour should be recycled as per the Alberta Fluorescent Lamp Stewardship Initiative. Alternatively, the mercury-containing fluorescent light bulbs and capsules may be disposed of in accordance with regulations specified by AEP.

One refrigerator suspected of containing ozone-depleting substances was observed throughout the building at the time of the assessment. Equipment suspected of containing ODS is to be recycled or disposed of in accordance with the federal Ozone Depleting Substances and Halocarbons Regulation (Section 181/2000). Equipment containing suspect ODS that is to remain in place must be managed in accordance with the provincial and federal regulations. If the units require maintenance or are to be decommissioned, the refrigerants in the identified units must be drained, recycled or destroyed by a competent individual with the appropriate trade qualifications. Servicing should be performed in accordance with Environment Canada, *Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems* and manufactures specifications.

Two smoke detectors suspected of containing radioactive components were observed throughout the building at the time of the assessment. Smoke detectors that contain radioactive materials must be sent for recycling upon decommissioning. Removal and disposal must be conducted in accordance with the Nuclear Safety and Control Act, Nuclear Substances and Radiation Device Regulation SOR/2000-207.

Lead packing was observed in the cast iron bell and spigot joints throughout the residence of Lot 21 at the time of the assessment. Removal, disposal or recycling of lead in bell and spigot joints must be conducted in accordance with federal and provincial regulations.

Miscellaneous chemicals and biohazards were not identified in the buildings at the time of the assessment.



## **8.0 STATEMENT OF LIMITATIONS**

The conclusions and recommendations contained in this assessment report are based upon professional opinions with regard to the subject matter. These opinions are in accordance with currently accepted environmental assessment standards and practices applicable to these locations and are subject to the following inherent limitations:

The data and findings presented in this report are valid as of the dates of the investigations. The passage of time, manifestation of latent conditions or occurrence of future events may warrant further exploration at the properties, analysis of the data, and re-evaluation of the findings, observations, and conclusions expressed in this report.

The data reported and the findings, observations and conclusions expressed in this report are limited by the Scope of Work. The Scope of Work was defined as requested by the client, the time and budgetary constraints imposed by the client, and availability of access to the properties.

Because of the limitations stated above, the findings, observations and conclusions expressed by Golder Associates Ltd. in this report are not, and should not be, considered an opinion concerning compliance of any past or present owner or operator of the site with any federal, provincial or local laws or regulations.

No warranty or guarantee, whether expressed or implied, is made with respect to the data or the reported findings, observations, and conclusions, which are based solely upon site conditions in existence at the time of investigation.

Golder Associates Ltd.'s assessment reports present professional opinions and findings of a scientific and technical nature. While attempts were made to relate the data and findings to applicable environmental laws and regulations, the report shall not be construed to offer legal opinion or representations as to the requirements of, nor compliance with, environmental laws, rules, regulations or policies of federal, provincial, or local governmental agencies. Any use of the assessment report constitutes acceptance of the limits of Golder Associates Ltd.'s liability. Golder Associates Ltd.'s liability extends only to its client and not to other parties who may obtain this assessment report. Issues raised by the report should be reviewed by appropriate legal counsel.

The accuracy or authenticity of third party survey data provided to Golder by the Client that was included in this report was not verified by Golder.



## **9.0 CLOSURE**

If you have any questions or require additional information please feel free to contact the undersigned at (403) 299-5600. Thank you for the opportunity to be of service.

### **GOLDER ASSOCIATES LTD.**

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# **APPENDIX A**

## **Sample Analysis Results**





## HAZARDOUS BUILDING MATERIALS ASSESSMENT, LOT 21, WATERTON, AB

Table – Asbestos Analysis Results, Lot 21

Sample Number	Type of Material Sampled	Sample Location	Asbestos Detected No/Yes: Type
A-185	Black Flooring Underlay	Hallway	No
A-186	Black Flooring Underlay	Hallway	No
A-187	Black Flooring Underlay	Hallway	No
<b>A-188A</b>	<b>Brown Vinyl Floor Tile</b>	<b>Southwest Bedroom</b>	<b>Yes: Chrysotile 5%</b>
A-188B	Brown Vinyl Floor Tile (Mastic)	Southwest Bedroom	No
<b>A-189A</b>	<b>Brown Vinyl Floor Tile</b>	<b>Southwest Bedroom</b>	<b>Yes: Chrysotile 5%</b>
A-189B	Brown Vinyl Floor Tile (Mastic)	Southwest Bedroom	No
<b>A-190A</b>	<b>Brown Vinyl Floor Tile</b>	<b>Northwest Bedroom Closet</b>	<b>Yes: Chrysotile 5%</b>
A-190B	Brown Vinyl Floor Tile (Mastic)	Northwest Bedroom Closet	No
A-191	Beige Mosaic Sheet Floor	Washroom	No
A-192	Beige Mosaic Sheet Floor	Washroom	No
A-193	Beige Mosaic Sheet Floor	Washroom	No
A-194	Beige Speckled Sheet Floor	Kitchen/Stairs	No
A-195	Beige Speckled Sheet Floor	Kitchen/Stairs	No
A-196	Beige Speckled Sheet Floor	Kitchen/Stairs	No
<b>A-197</b>	<b>Beige Patterned Sheet Floor</b>	<b>Vestibule</b>	<b>Yes: Chrysotile 25%</b>
<b>A-198</b>	<b>Beige Patterned Sheet Floor</b>	<b>Vestibule</b>	<b>Yes: Chrysotile 25%</b>
<b>A-199</b>	<b>Beige Patterned Sheet Floor</b>	<b>Vestibule</b>	<b>Yes: Chrysotile 25%</b>
<b>A-200</b>	<b>Drywall Joint Compound (Wall)</b>	<b>Stairs</b>	<b>Yes: Chrysotile 2%</b>
<b>A-201</b>	<b>Drywall Joint Compound (Wall)</b>	<b>Northwest Bedroom Closet</b>	<b>Yes: Chrysotile 2%</b>
<b>A-202</b>	<b>Drywall Joint Compound (Wall)</b>	<b>Southwest Bedroom Closet</b>	<b>Yes: Chrysotile 2%</b>
<b>A-203</b>	<b>Drywall Joint Compound (Ceiling)</b>	<b>Washroom Closet</b>	<b>Yes: Chrysotile 2%</b>
<b>A-204</b>	<b>Drywall Joint Compound (Ceiling)</b>	<b>West Bedroom Closet</b>	<b>Yes: Chrysotile 2%</b>
A-205	Ceiling Stipple Coat	Living Room	No
A-206	Ceiling Stipple Coat	Hallway	No
A-207	Ceiling Stipple Coat	Southwest Bedroom	No
<b>A-208</b>	<b>Grey Paper Duct Wrap</b>	<b>Basement</b>	<b>Yes: Chrysotile 75%</b>
<b>A-209</b>	<b>Grey Board Above Furnace</b>	<b>Basement</b>	<b>Yes: Chrysotile 75%</b>
A-210A	Ceiling Texture Coat (Texture)	Kitchen	No
<b>A-210B</b>	<b>Ceiling Texture Coat (Mud)</b>	<b>Kitchen</b>	<b>Yes: Chrysotile 2%</b>
A-211A	Ceiling Texture Coat (Texture)	Kitchen	No
<b>A-211B</b>	<b>Ceiling Texture Coat (Mud)</b>	<b>Kitchen</b>	<b>Yes: Chrysotile 2%</b>
A-212A	Ceiling Texture Coat (Texture)	Kitchen	No
<b>A-212B</b>	<b>Ceiling Texture Coat (Mud)</b>	<b>Kitchen</b>	<b>Yes: Chrysotile 2%</b>
A-213	Brown Paper Around Fiberglass Batt Insulation	Attic	No
A-214	Brown Paper Around Fiberglass Batt Insulation	Attic	No
A-215	Brown Paper Around Fiberglass Batt Insulation	Attic	No



## HAZARDOUS BUILDING MATERIALS ASSESSMENT, LOT 21, WATERTON, AB

**Table – Asbestos Analysis Results, Lot 21 (continued)**

Sample Number	Type of Material Sampled	Sample Location	Asbestos Detected No/Yes: Type
A-216	Drywall Joint Compound (Wall)	Detached Garage	No
A-217	Drywall Joint Compound (Wall)	Detached Garage	No
A-218	Drywall Joint Compound (Wall)	Detached Garage	No
A-219	Ceiling Texture Coat	Detached Garage	No
A-220	Ceiling Texture Coat	Detached Garage	No
A-221	Ceiling Texture Coat	Detached Garage	No
A-222	Wall Board (10-Test)	Detached Garage	No

**Table – Lead Paint Analysis Results, Lot 21**

Sample Number	Substrate/Sample Location	Colour	Lead Concentration (µg/g)	Lead-Containing Paint <sup>(1)</sup> (Yes/No)
L-22	Drywall / Lot 21	Beige	346	Yes
L-23	Wood Trim / Interior - Lot 21	White	27,100	Yes
L-24	Wood Trim / Exterior - Lot 21	White	9,590	Yes
L-25	Concrete Floor / Interior Lot 21	Grey	2,260	Yes
L-26	Wood Trim / Exterior Lot 21	White	1,280	Yes
L-27	Wood Deck / Exterior Lot 21	Grey	1,950	Yes
L-28	Concrete Base of Wall / Exterior Lot 21	Grey	<20	No



# **APPENDIX B**

## **Photographs**



**Photograph 1: 104 Wind Flower Avenue, Lot 21**



**Photograph 2: Asbestos-Containing Brown Vinyl Floor Tile (Sub Floor), Lot 21**

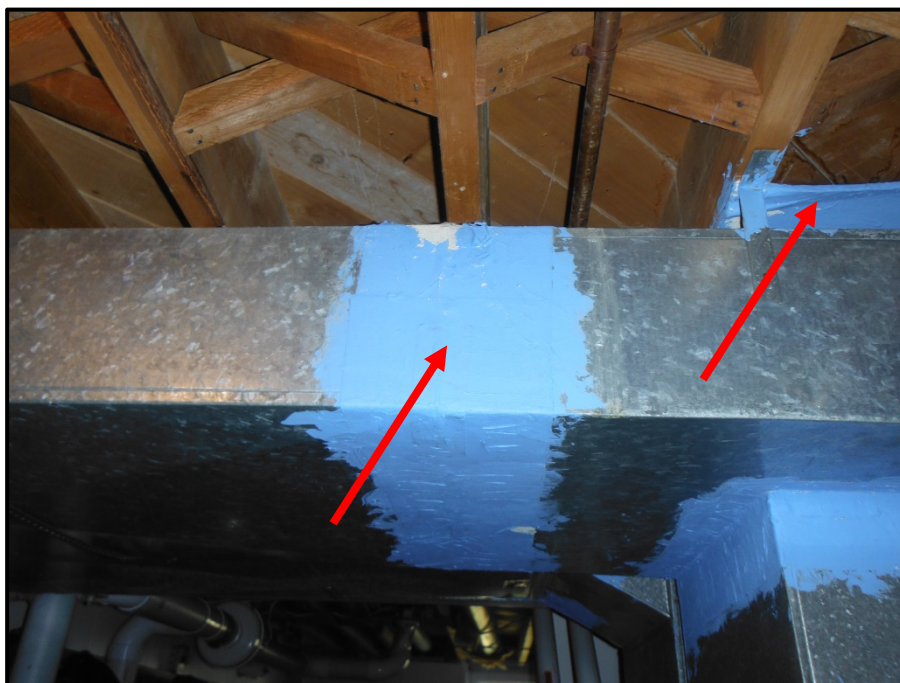




**Photograph 3: Asbestos-Containing Beige Patterned Sheet Flooring, Lot 21**



**Photograph 4: Asbestos-Containing Drywall Joint Compound, Lot 21**



**Photograph 5: Asbestos-Containing Grey Paper Duct Wrap and Grey Board above Furnace, Lot 21**



**Photograph 6: Asbestos-Containing Ceiling Texture Coat (Mud), Lot 21**





**Photograph 7: Lead-Containing Beige Paint on Drywall and Wood Trim – Interior, Lot 21**



**Photograph 8: Lead-Containing White and Grey Paint on Wood Deck – Interior, Lot 21**



**Photograph 9: Lead-Containing Grey Paint on Concrete Floor – Basement, Lot 21**



# **APPENDIX C**

## **Laboratory Reports**

**EMSL Canada Inc.**

413 Forge Road, SE, Calgary, AB T2H 0S9

Phone/Fax: 403-879-1149 / (403) 879-1152

<http://www.EMSL.com>[CalgaryLab@EMSL.com](mailto:CalgaryLab@EMSL.com)

EMSL Canada Or 651503629

CustomerID: 55EHPL50

CustomerPO: GA15-0465

ProjectID:

Attn: **Nadine Reid**  
**Golder Associates, Ltd.**  
**102, 2535 - 3 Avenue SE**  
**Calgary, AB T2A 7W5**

Phone: (403) 299-5600  
 Fax: (403) 299-5606  
 Received: 10/20/15 1:27 PM  
 Analysis Date: 10/27/2015  
 Collected: 10/13/2015

Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
A-182 651503629-0182	Garage Roof- Lot 41 (101 Windflower Ave) - Green Asphalt Shingles with Tar Layer	White/Black/Green Fibrous Homogeneous	50% Cellulose	50% Non-fibrous (other)	None Detected
A-183 651503629-0183	Garage Roof- Lot 41 (101 Windflower Ave) - Green Asphalt Shingles with Tar Layer	White/Black/Green Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-184 651503629-0184	Garage Roof- Lot 41 (101 Windflower Ave) - Green Asphalt Shingles with Tar Layer	White/Black/Green Fibrous Homogeneous	50% Cellulose	50% Non-fibrous (other)	None Detected
A-185 651503629-0185	Hallway- Lot 21- (104 Windflower Ave) - Black Flooring Underlay	Black Fibrous Homogeneous	20% Cellulose	80% Non-fibrous (other)	None Detected
A-186 651503629-0186	Hallway- Lot 21- (104 Windflower Ave) - Black Flooring Underlay	Black Fibrous Homogeneous	20% Cellulose	80% Non-fibrous (other)	None Detected
A-187 651503629-0187	Hallway- Lot 21- (104 Windflower Ave) - Black Flooring Underlay	Black Fibrous Homogeneous	20% Cellulose	80% Non-fibrous (other)	None Detected

Analyst(s)

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Kate Fee (79)

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Samples analyzed by EMSL Canada Inc. Calgary, AB NVLAP Lab Code 500100

Initial report from 10/27/2015 13:09:12

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Received: 10/20/15 1:27 PM  
Analysis Date: 10/27/2015  
Collected: 10/13/2015

Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
A-188-Flooring 651503629-0188	Southwest Bedroom- Lot 21 (104 Windflower Ave) - Brown Vinyl Floor Tile	Brown Non-Fibrous Homogeneous		95% Non-fibrous (other)	5% Chrysotile
A-188-Mastic 651503629-0188A	Southwest Bedroom- Lot 21 (104 Windflower Ave) - Brown Vinyl Floor Tile	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-189-Flooring 651503629-0189	Southwest Bedroom- Lot 21 (104 Windflower Ave) - Brown Vinyl Floor Tile	Brown Non-Fibrous Homogeneous		95% Non-fibrous (other)	5% Chrysotile
A-189-Mastic 651503629-0189A	Southwest Bedroom- Lot 21 (104 Windflower Ave) - Brown Vinyl Floor Tile	Brown Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-190-Flooring 651503629-0190	Northwest Bedroom Closet- Lot 21 (104 Windflower A - Brown Vinyl Floor Tile	Brown Non-Fibrous Homogeneous		95% Non-fibrous (other)	5% Chrysotile

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	%	<u>Non-Asbestos</u>		<u>Asbestos</u>
				Fibrous	Non-Fibrous	% Type
A-190-Mastic 651503629-0190A	Northwest Bedroom Closet-Lot 21 (104 Windflower A - Brown Vinyl Floor Tile	Brown Non-Fibrous Homogeneous			100% Non-fibrous (other)	None Detected
A-191 651503629-0191	Washroom- Lot 21 (104 Windflower Ave) - Beige Mosaic Sheet Floor	Beige Fibrous Homogeneous	15% 2% 5%	Cellulose Glass Synthetic	78% Non-fibrous (other)	None Detected
A-192 651503629-0192	Washroom- Lot 21 (104 Windflower Ave) - Beige Mosaic Sheet Floor	Beige Fibrous Homogeneous	15% 2% 5%	Cellulose Glass Synthetic	78% Non-fibrous (other)	None Detected
A-193 651503629-0193	Washroom- Lot 21 (104 Windflower Ave) - Beige Mosaic Sheet Floor	Beige Fibrous Homogeneous	15% 2% 5%	Cellulose Glass Synthetic	78% Non-fibrous (other)	None Detected
A-194 651503629-0194	Kitchen/ Stairs- Lot 21 (104 Windflower Ave) - Beige Speckled Sheet Floor	Beige Fibrous Homogeneous	20% 2%	Cellulose Glass	78% Non-fibrous (other)	None Detected

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
A-195 651503629-0195	Kitchen/ Stairs- Lot 21 (104 Windflower Ave) - Beige Speckled Sheet Floor	Beige Fibrous Homogeneous	85% Cellulose 3% Glass	12% Non-fibrous (other)	<b>None Detected</b>
Backing only; no tile in sample bag.					
A-196 651503629-0196	Kitchen/ Stairs- Lot 21 (104 Windflower Ave) - Beige Speckled Sheet Floor	Beige Fibrous Homogeneous	20% Cellulose 2% Glass	78% Non-fibrous (other)	<b>None Detected</b>
A-197 651503629-0197	Vestibule- Lot 21 (104 Windflower Ave) - Beige Patterned Sheet Floor	Brown/Beige Fibrous Homogeneous	2% Cellulose	73% Non-fibrous (other)	<b>25% Chrysotile</b>
A-198 651503629-0198	Vestibule- Lot 21 (104 Windflower Ave) - Beige Patterned Sheet Floor	Brown/Beige Fibrous Homogeneous	2% Cellulose	73% Non-fibrous (other)	<b>25% Chrysotile</b>
A-199 651503629-0199	Vestibule- Lot 21 (104 Windflower Ave) - Beige Patterned Sheet Floor	Brown/Beige Fibrous Homogeneous	2% Cellulose	73% Non-fibrous (other)	<b>25% Chrysotile</b>
A-200 651503629-0200	Stairs- Lot 21 (104 Windflower Ave) - Drywall Joint Compound (Wall)	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	<b>2% Chrysotile</b>

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
A-201 651503629-0201	NW Bedroom Closet- Lot 21 (104 Windflower Ave) - Drywall Joint Compound (Wall)	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	2% Chrysotile
A-202 651503629-0202	SW Bedroom Closet- Lot 21 (104 Windflower Ave) - Drywall Joint Compound (Wall)	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	2% Chrysotile
A-203 651503629-0203	Washroom Closet- Lot 21 (104 Windflower Ave) - Drywall Joint Compound (Ceiling)	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	2% Chrysotile
A-204 651503629-0204	West Bedroom Closet- Lot 21 (104 Windflower Ave) - Drywall Joint Compound (Ceiling)	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	2% Chrysotile
A-205 651503629-0205	Living Room- Lot 21 (104 Windflower Ave) - Ceiling Stipple Coat	Beige Non-Fibrous Homogeneous		30% Perlite 70% Non-fibrous (other)	None Detected

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
A-206 651503629-0206	Hallway- Lot 21 (104 Windflower Ave) - Ceiling Stipple Coat	Beige Non-Fibrous Homogeneous		30% Perlite 70% Non-fibrous (other)	<b>None Detected</b>
A-207 651503629-0207	Southwest Bedroom- Lot 21 (104 Windflower Ave) - Ceiling Stipple Coat	Beige Non-Fibrous Homogeneous		30% Perlite 70% Non-fibrous (other)	<b>None Detected</b>
A-208 651503629-0208	Basement- Lot 21 (104 Windflower Ave) - Grey Paper Duct Wrap	Gray Fibrous Homogeneous	5% Cellulose	20% Non-fibrous (other)	<b>75% Chrysotile</b>
A-209 651503629-0209	Basement- Lot 21 (104 Windflower Ave) - Grey Board Above Furnace	Gray Fibrous Homogeneous	3% Cellulose	22% Non-fibrous (other)	<b>75% Chrysotile</b>
A-210-Texture 651503629-0210	Kitchen- Lot 21 (104 Windflower Ave) - Ceiling Texture Coat	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	<b>None Detected</b>
A-210-Mud 651503629-0210A	Kitchen- Lot 21 (104 Windflower Ave) - Ceiling Texture Coat	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	<b>2% Chrysotile</b>
A-211-Texture 651503629-0211	Kitchen- Lot 21 (104 Windflower Ave) - Ceiling Texture Coat	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	<b>None Detected</b>

Analyst(s)

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>
			% Fibrous	% Non-Fibrous	% Type
A-211-Mud 651503629-0211A	Kitchen- Lot 21 (104 Windflower Ave) - Ceiling Texture Coat	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	2% Chrysotile
A-212-Texture 651503629-0212	Kitchen- Lot 21 (104 Windflower Ave) - Ceiling Texture Coat	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-212-Mud 651503629-0212A	Kitchen- Lot 21 (104 Windflower Ave) - Ceiling Texture Coat	Beige Non-Fibrous Homogeneous		98% Non-fibrous (other)	2% Chrysotile
A-213 651503629-0213	Attic- Lot 21 (104 Windflower Ave) - Black/ Brown Paper Around Fiberglass Batt Insulation	Brown Fibrous Homogeneous	95% Cellulose 3% Min. Wool	2% Non-fibrous (other)	None Detected
A-214 651503629-0214	Attic- Lot 21 (104 Windflower Ave) - Black/ Brown Paper Around Fiberglass Batt Insulation	Brown Fibrous Homogeneous	95% Cellulose 3% Min. Wool	2% Non-fibrous (other)	None Detected
A-215 651503629-0215	Attic- Lot 21 (104 Windflower Ave) - Black/ Brown Paper Around Fiberglass Batt Insulation	Brown Fibrous Homogeneous	95% Cellulose 3% Min. Wool	2% Non-fibrous (other)	None Detected

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
A-216 651503629-0216	Detached Garage-Lot 21 (104 Windflower Ave) - Drywall Joint Compound (Wall)	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-217 651503629-0217	Detached Garage-Lot 21 (104 Windflower Ave) - Drywall Joint Compound (Wall)	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-218 651503629-0218	Detached Garage-Lot 21 (104 Windflower Ave) - Drywall Joint Compound (Wall)	White Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-219 651503629-0219	Detached Garage-Lot 21 (104 Windflower Ave) - Ceiling Texture Coat	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-220 651503629-0220	Detached Garage-Lot 21 (104 Windflower Ave) - Ceiling Texture Coat	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected
A-221 651503629-0221	Detached Garage-Lot 21 (104 Windflower Ave) - Ceiling Texture Coat	Beige Non-Fibrous Homogeneous		100% Non-fibrous (other)	None Detected

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Project: 15 - 34393 / 1000

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	<u>Non-Asbestos</u>		<u>Asbestos</u>	
			%	Type	%	Type
A-222 651503629-0222	Detached Garage- Lot 21 (104 Windflower Ave) - Wall Board (10- test)	Brown Fibrous Homogeneous	90%	Cellulose	10%	Non-fibrous (other)
A-223 651503629-0223	Kitchen- Lot 3/4 (Duplex 106) - Beige Speckled Sheet Floor	Beige Fibrous Homogeneous	25%	Cellulose	75%	Non-fibrous (other)
A-224 651503629-0224	Kitchen- Lot 3/4 (Duplex 106) - Beige Speckled Sheet Floor	Beige Fibrous Homogeneous	25%	Cellulose	75%	Non-fibrous (other)
A-225 651503629-0225	Kitchen- Lot 3/4 (Duplex 106) - Beige Speckled Sheet Floor	Beige Fibrous Homogeneous	25%	Cellulose	75%	Non-fibrous (other)
A-226 651503629-0226	Living Room- Lot 3/4 (Duplex 106) - Black Flooring Underlay	Brown Fibrous Homogeneous	98%	Cellulose	2%	Non-fibrous (other)
A-227 651503629-0227	Kitchen- Lot 3/4 (Duplex 106) - Black Flooring Underlay	Brown Fibrous Homogeneous	98%	Cellulose	2%	Non-fibrous (other)
A-228 651503629-0228	Kitchen- Lot 3/4 (Duplex 104) - Black Flooring Underlay	Brown Fibrous Homogeneous	98%	Cellulose	2%	Non-fibrous (other)

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Samples analyzed by EMSL Canada Inc. Calgary, AB NVLAP Lab Code 500100

Initial report from 10/27/2015 13:09:12



## Sample Results

Lead				Matrix: Paint
				Sample Date: 13-Oct-15
Paracel ID	Client ID	Units	MDL	Result
1543152-01	L-01 - Brown - Wood Siding/Trim - Exterior Bunk House	ug/g	20	354
1543152-02	L-02 - Off-White - Drywall/Wood Trim - Unit 13 Bunk House	ug/g	20	587
1543152-03	L-03 - Beige (orange) - Wood Doors/Cabinets - Unit 13 Bunk House	ug/g	20	1190
1543152-04	L-04 - Off-White - Drywall/Wood Trim - Unit 26 Bunk House	ug/g	20	731
1543152-05	L-05 - Light-Grey - Drywall - Post Office	ug/g	20	365
1543152-06	L-06 - Black - Wood Trim - Exterior Post Office/Residence	ug/g	20	<20
1543152-07	L-07 - White - Wood Trim - Exterior Post Office/Residence	ug/g	20	67
1543152-08	L-08 - Beige - Drywall - Residence Side (Post Office)	ug/g	20	<20
1543152-09	L-09 - White - Drywall - Residence Side (Post Office)	ug/g	20	336
1543152-10	L-10 - Grey - Concrete Floor - Residence Side (Post Office)	ug/g	20	2020
1543152-11	L-11 - Beige - Drywall/Wood Walls - Lot 42	ug/g	20	<20
1543152-12	L-12 - White - Wood Trim/ Ceiling Tile - Lot 42	ug/g	20	46
1543152-13	L-13 - Grey - Concrete Floor - Lot 42	ug/g	20	1610
1543152-14	L-14 - Beige - Wood Trim / Stucco - Exterior Lot 42	ug/g	20	52400
1543152-15	L-15 - Red - Wood Trim - Exterior Lot 42	ug/g	20	1460
1543152-16	L-16 - Beige - Drywall - Lot 41	ug/g	20	<20
1543152-17	L-17 - White - Wood Trim - Interior Lot 41	ug/g	20	2020
1543152-18	L-18 - Grey - Plywood Floor - Interior Lot 41	ug/g	20	629
1543152-19	L-19 - Beige - Wood Siding - Exterior Lot 41	ug/g	20	13200
1543152-20	L-20 - Dark Brown - Wood Fencing/Trim - Exterior Lot 41	ug/g	20	979
1543152-21	L-21 - Light Brown - Wood Deck / Siding - Lot 41	ug/g	20	26
1543152-22	L-22 - Beige - Drywall - Lot 21	ug/g	20	346
1543152-23	L-23 - White - Wood Trim - Interior - Lot 21	ug/g	20	27100
1543152-24	L-24 - White - Wood Trim - Exterior - Lot 21	ug/g	20	9590
1543152-25	L-25 - Grey - Concrete Floor - Interior Lot 21	ug/g	20	2260
1543152-26	L-26 - White - Wood Trim - Exterior Lot 21	ug/g	20	1280
1543152-27	L-27 - Grey - Wood Deck - Exterior Lot 21	ug/g	20	1950
1543152-28	L-28 - Grey - Concrete Base of Wall - Exterior Lot 21	ug/g	20	<20
1543152-29	L-29 - Beige - Wood Panelling - Interior Main Floor - Lot 3/4	ug/g	20	419
1543152-30	L-30 - White - Wood Panelling - Interior Basement - Lot 3/4	ug/g	20	63
1543152-31	L-31 - Grey - Concrete Floor - Interior Lot 3/4	ug/g	20	196

## Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Matrix Blank</b>									
Lead	ND	20	ug/g						
<b>Matrix Duplicate</b>									
Lead	283	20	ug/g	354			22.2	30	



## Certificate of Analysis

AGAT WORK ORDER: 15C034028

PROJECT: 15-34393/1000

2910 12TH STREET NE  
CALGARY, ALBERTA  
CANADA T2E 7P7  
TEL (403)735-2005  
FAX (403)735-2771  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD.

SAMPLING SITE:

ATTENTION TO: Bessie Abella

SAMPLED BY:

### Polychlorinated Biphenyls Analysis

DATE RECEIVED: 2015-10-23

DATE REPORTED: 2015-10-26

				P-01 - Brown		P-14 - Beige		P-19 - Beige		P-20 - Dark		P-21 - Light		P-24 - White	
				Wood	P-07 - White	Wood	P-15 - Red	Wood	Brown Wood	Brown Wood	P-21 - Light	P-24 - White			
SAMPLE DESCRIPTION:				Siding/Trim-Ext	Wood Trim-Ext	Trim/Stucco-Ext	Wood Trim-Ext	Siding-Ext	Fencing/Trim	Deck/Siding	Wood Trim-Ext				
SAMPLE TYPE:				Paint	Paint	Paint	Paint	Paint	Paint	Paint	Paint				
DATE SAMPLED:				10/13/2015	10/14/2015	10/15/2015	10/15/2015	10/16/2015	10/16/2015	10/16/2015	10/16/2015				
Parameter	Unit	G / S	RDL	7116202	7116271	7116272	7116273	7116274	7116275	7116276	7116277				
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Aroclor 1254	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Surrogate	Unit	Acceptable Limits													
Decachlorobiphenyl	%	50-150		110	105	105	110	145	105	115	110				
				P-26 - White		P-27 - Grey		P-28 - Grey							
SAMPLE DESCRIPTION:				Wood Trim-Ext	Wood Deck-Ext	Concrete Base									
SAMPLE TYPE:				Paint	Paint	Paint									
DATE SAMPLED:				10/16/2015	10/16/2015	10/16/2015									
Parameter	Unit	G / S	RDL	7116278	7116279	7116280									
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05									
Aroclor 1254	mg/kg		0.05	<0.05	<0.05	<0.05									
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05									
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	<0.05	<0.05									
Surrogate	Unit	Acceptable Limits													
Decachlorobiphenyl	%	50-150		110	105	80									

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

Certified By:



**AGAT** Laboratories

## Certificate of Analysis

AGAT WORK ORDER: 15C034981

PROJECT: 15-34393/1000

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<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES LTD.

SAMPLING SITE:

ATTENTION TO: Bessie Abella

SAMPLED BY:

### Polychlorinated Biphenyls Analysis

DATE RECEIVED: 2015-10-26

DATE REPORTED: 2015-10-27

P-06-Black-				
SAMPLE DESCRIPTION: Wood Trim-Ext				
SAMPLE TYPE: Paint				
DATE SAMPLED: 10/14/2015				
Parameter	Unit	G / S	RDL	7129531
Aroclor 1242	mg/kg		0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05
Aroclor 1260	mg/kg		0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05
Surrogate	Unit	Acceptable Limits		
Decachlorobiphenyl	%	50-150	87	

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

Certified By:

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

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