

**XCG File No. 1-336-183-01**

November 19, 2013

**DESIGNATED SUBSTANCES AND  
HAZARDOUS MATERIALS SURVEY  
2301 MIDLAND AVENUE  
TORONTO, ONTARIO**

Prepared for:

**PUBLIC WORKS AND GOVERNMENT SERVICES CANADA**

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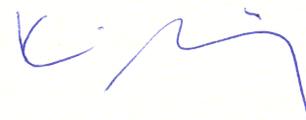
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## **ES 1. EXECUTIVE SUMMARY**

XCG Consultants Ltd. (XCG) was retained by Public Works and Government Services Canada (PWGSC) to complete a Designated Substances and Hazardous Materials Survey (DSHMS) at the Canadian Food Inspection Agency (CFIA) offices and laboratories on the third floor of the Health Canada building located at 2301 Midland Avenue in Toronto, Ontario.

The subject site consists of laboratories occupied by CFIA on the third floor of the building, as well as a portion of the offices occupied by CFIA and Health Canada on the same floor. Only the portions of the third floor that were identified as undergoing future renovations as illustrated on architectural drawing A-01 provided by PWGSC were considered part of the subject site. The CFIA offices on the north side of the third floor were not included as part of this assessment; however, these offices were of similar construction to the Health Canada offices on the east side of the third floor that were included in this investigation. The DSHMS was conducted as part of environmental due diligence activities at the subject site prior to renovations.

The purpose of the DSHMS is to determine what, if any, designated substances are present in the proposed renovation areas on the third floor of the subject property building and to provide recommendations to PWGSC on how to best alleviate the concerns associated with these substances (abatement or control program) for persons entering the building and conducting demolition or renovation activities.

The survey included all of the Designated Substances defined by the Occupational Health and Safety Act (OHSA), with particular emphasis placed on (but not limited to) asbestos-containing materials (ACMs) and lead-based paints (LBP).

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

A total of 34 bulk building material samples were submitted to the laboratory for asbestos analysis. The laboratory results indicated that the following materials are ACMs:

- 6-inch pipe elbow parging cement above the ceiling tile in the Health Canada office area.

Based on the findings of the DSHMS report completed by Genivar Inc. in December 18, 2012, the following asbestos containing materials were noted:

- Fume hoods in the proposed work area are assumed to contain transite asbestos cement board,
- Fire doors are assumed to be asbestos containing.

Transite cement board is not typically sampled in instances where damage to the materials would result from sampling. Based on previous work completed in the building, fire doors were assumed to be asbestos containing due to the insulation bound within the cores of the doors. No fire doors were noted during the on-site survey. If during demolition fire doors are encountered, they should be disposed of in accordance with Ontario Regulation (O. Reg.) 347.



All handling and removal of asbestos should be conducted as specified in O. Reg. 278/05, as amended. The type of removal procedures to be conducted should be defined on a case-by-case basis. Any suspect material encountered should be treated as asbestos unless otherwise indicated by sampling and analytical testing. If additional ACMs (currently hidden or inaccessible) are identified as demolition or renovation work proceeds, these materials should be examined, tested, and handled appropriately. Any asbestos removal needs to be completed by a trained abatement contractor.

#### ***Lead-Containing Materials***

A total of five paint samples were submitted for lead analysis. Three of the five paint samples were found to have lead concentrations greater than 90 mg/kg [parts per million (ppm)] and were determined to be lead-containing.

The paints with confirmed lead concentrations above the standard in the subject area of the building included:

- Brown paint with orange beneath on the doors in the laboratories;
- Green paint on the doors in the laboratories; and
- Off-white paint on the ceilings of the laboratories.

Based on XCG's findings, all brown and green paints on doors and door frames should be considered to be LBP. All white/off-white paint on ceilings should be considered to be LBP.

All lead-based paints, potential lead-based solder, and potential lead-based pipe should be managed in accordance with O. Reg. 490/09 during demolition or renovation activities. If the materials are not to be recycled, the materials should be disposed of in accordance with O. Reg. 347 (as amended).

#### ***Polychlorinated Biphenyls (PCBs)***

PWGSC indicated that no polychlorinated biphenyls (PCBs) were present within the subject site, including in fluorescent light ballasts; therefore, no light ballasts were inspected for PCB content.

#### ***Chlorofluorocarbons (CFCs) and Ozone-Depleting Substances (ODSs)***

Based on observations made during the site reconnaissance, refrigeration and freezer equipment potentially containing chlorofluorocarbons (CFCs) were identified, but not sampled. The roof was not accessed during this DSHMS. Disposal and repairs of any refrigeration equipment and/or refrigerant containers is regulated under the Federal Halocarbon Regulations, 2003 (SOR/2003-289). In accordance with the Federal Halocarbon Regulations, any removal, disposal, and/or repair of refrigeration equipment during construction and removal activities should only be undertaken by a certified person.

#### ***Mercury-Containing Equipment***

Fluorescent lighting in the subject building that is likely to contain small quantities of mercury was observed. There is no occupational or environmental concern associated with mercury in its current state and condition. However, when the



building is renovated or demolished, the fluorescent lamps and mercury-containing thermostats must be handled and disposed of in accordance with O. Reg. 490/09 (as amended) and O. Reg. 347/90 (as amended).

**Silica**

Concrete and mortar-based building materials were observed in the subject site. Exposure to airborne silica is regulated under O. Reg. 490/09 (as amended) regarding silica under the OHSA. Airborne silica can be generated through such processes as blasting, grinding, crushing, and sandblasting silica-containing material. Precautions must be taken to prevent silica-containing particles from becoming airborne during the application of such processes. Such precautions include wetting of silica-containing area(s) to be disturbed, and daily wet sweeping or HEPA vacuuming of silica dust. Additionally, appropriate respiratory protection and ventilation must be utilized during disturbance of silica-containing structures.

**Mould**

No visible mould or water damage was identified during the site inspection.

**Other Designated Substances**

The following designated substances and hazardous materials were not noted in the building, or are not likely to be a concern: acrylonitrile, arsenic, benzene, coke oven emissions, ethylene oxide, isocyanates, radon, urea formaldehyde foam insulation (UFFI), and vinyl chloride.



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**FIGURE**

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**APPENDIX**

Appendix A Laboratory Certificates of Analysis

## **1. INTRODUCTION**

XCG Consultants Ltd. (XCG) was retained by Public Works and Government Services Canada (PWGSC) to complete a Designated Substances and Hazardous Materials Survey (DSHMS) at the Canadian Food Inspection Agency (CFIA) offices and laboratories on the third floor of the Health Canada building located at 2301 Midland Avenue in Toronto, Ontario.

The subject site consists of laboratories occupied by CFIA on the third floor of the building, as well as a portion of the offices occupied by CFIA and Health Canada on the same floor. Only the portions of the third floor that were identified as undergoing future renovations as illustrated on architectural drawing A-01 provided by PWGSC were considered part of the subject site. The CFIA offices on the north side of the third floor were not included as part of this assessment; however these offices were of similar construction to the Health Canada offices on the east side of the third floor that were included in this investigation. The DSHMS was conducted as part of environmental due diligence activities at the subject site prior to renovations.

The purpose of the DSHMS is to determine what, if any, designated substances are present in the proposed renovation areas on the third floor of the subject property building and to provide recommendations to PWGSC on how to best alleviate the concerns associated with these substances (abatement or control program) for persons entering the building and conducting demolition or renovation activities.

The objectives of this DSHMS were as follows:

- To determine if designated substances are present in the proposed renovation areas on the third floor of the subject property.
- To provide professional advice and recommendations as to how to deal with the identified substances, notably with respect to:
  - Health and safety of workers and others;
  - Protection of the environment; and
  - Material management and waste disposal.
- To use the information gathered as a management tool for the proposed future renovations on the third floor of the building at the subject site.

## 2. SCOPE OF WORK

The primary objectives of the DSHMS were to identify readily accessible potential designated substances, and compile an inventory of such materials at the subject site, to satisfy the requirements of the Occupational Health and Safety Act (OHSA), Ontario's Designated Substance Regulation Ontario Regulation (O. Reg.) 490/09 (as amended), and O. Reg. 278/05, *Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations*, as amended. The DSHMS is required prior to initiating work in these areas, as outlined in the OHSA, and enforced by the Ontario Ministry of Labour (MOL).

The following Designated Substances were included in this survey:

- Acrylonitrile;
- Arsenic;
- Asbestos;
- Benzene;
- Coke oven emissions;
- Ethylene oxide;
- Isocyanates;
- Lead;
- Mercury;
- Silica; and
- Vinyl chloride.

In addition to the 11 regulated Designated Substances listed above, the following other potentially hazardous materials were included as part of this survey:

- Mould;
- Polychlorinated biphenyls (PCBs);
- Chlorofluorocarbons/ozone depleting substances (CFCs and ODSs);
- Radon; and
- Urea formaldehyde foam insulation (UFFI).

The scope of work for the DSHMS is outlined in the sections below.



### **3. INVESTIGATIVE METHODOLOGY**

PWGSC indicated, through discussions with XCG, that the DSHMS would apply to the CFIA offices, laboratories, and a portion of the Health Canada offices slated for proposed renovations on the third floor of the building at 2301 Midland Avenue in Toronto, Ontario.

The scope of work for the DSHMS included the following activities:

- Review of previous DSHMSs conducted at 2301 Midland Avenue;
- Inspection and sampling of potential hazardous materials within the proposed renovation area that were not previously sampled and that could be reasonably accessed by workers and the general public;
- Documentation of the location of potential hazardous materials and estimation of quantities;
- Submission of representative samples of potential hazardous materials for laboratory analysis (asbestos, and lead in paint only). All other materials (i.e. PCBs, CFCs, etc.), if present, were inspected, quantified, and documented for reporting purposes; and
- Preparation of a report submitted to PWGSC summarizing the results of the DSHMS for the subject site.

The field survey included an inspection of each accessible area of the subject site, and the visual identification of potential designated substances. Where confirmation was required to verify the presence or absence of certain designated substances within a building material, representative samples were collected for laboratory analysis.



## 4. INDUSTRY STANDARDS AND GUIDELINES

### 4.1 Asbestos

Asbestos was used in building materials such as mechanical pipe insulation, fireproofing, and interior finishes, such as plaster and drywall joint compound until the mid-1980s. Asbestos was also commonly used in vinyl and linoleum flooring products, acoustic ceiling tiles, adhesives, and caulking, among other materials.

The following govern the management of asbestos-containing materials (ACMs):

- OHSA, 1990,
- Asbestos: O. Reg. 278/05 (as amended): Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations, and
- PWGSC Department Policy 057, 1997-12-03, Asbestos Management.

### 4.2 Lead

Lead is a heavy metal and is typically found in inorganic compounds often occurring as components of products such as insecticides, pigments, varnishes, paints, and glass.

Lead exposure is a particular concern from lead paint dust during renovation, demolition, or construction activities, or from deterioration of wall coverings.

Surface coatings such as paint are considered lead-containing if they have lead concentrations above the permissible concentration of 90 mg/kg [90 parts per million (ppm), 0.009% by weight] as specified in the Federal Hazardous Products Act – Surface Coating Material Regulation (2005), as amended.

Under the OHSA O. Reg. 490/09 (as amended) respecting lead, workers shall be protected from exposure to airborne lead. Workers are not at risk of being exposed to lead unless they are undertaking an activity that disturbs surfaces covered with lead-based paint. Special precautions are required during renovation or demolition activities to ensure that worker exposure to lead does not exceed the limits specified in the OHSA, and its associated regulations.

### 4.3 Mould

Mould spores are present in all indoor and outdoor environments and cannot be completely eliminated. Cellulose-based building materials provide a nutrient base for many mould species; however, moulds generally do not grow unless a food source and adequate moisture is present.

There are no defined regulatory limits for determining the exposure to moulds, or clear numerical guidelines for determining safe or unsafe concentrations of mould contamination. The American Conference of Government Industrial Hygienists (ACGIH) recommends that individual sensory indicators (i.e. visual identification and odour perception) are the most effective way of determining mould presence, thus interpretation of sample analysis is subjective. The guidelines listed below can be used to evaluate visual inspection and sampling results:



- “Guidelines for the Investigation, Assessment, & Remediation of Mould in Workplaces,” Manitoba Department of Labour and Immigration, Workplace Safety and Health Division, March 2001;
- “Fungal Contamination in Public Buildings: A Guide to Recognition and Management,” Health Canada, Federal-Provincial Committee on Environmental and Occupational Health, June 1995;
- “Mold Remediation in Schools and Commercial Buildings,” U.S. E.P.A. Office of Air and Radiation, Indoor Environments Division March 2001;
- “Guidelines on Assessment and Remediation of Fungi in Indoor Environments,” New York City Department of Health, January 2002;
- “S-500 Standard and Reference Guide for Professional Water Damage Restoration,” IICRC, 1999;
- “S520 Standard and Reference Guide for Professional Mold Remediation,” IICRC;
- “1996, Field Guide for the Determination of Biological Contaminants in Environmental Samples,” AIHA;
- “Hazard Alert” fact sheet entitled, “Mould in Workplace Buildings,” Ontario Ministry of Labour, December 2000;
- “Mould Guidelines for the Canadian Construction Industry,” Standard Construction Document CCA 82, 2004; and
- “Mould Abatement Guidelines,” Environmental Abatement Council of Ontario (EACO), 2004.

Currently, the potential or degree of exposure to moulds has been based on the quantity of moulds identified, assuming that potential exposure increases with an increase in overall mould concentrations. The criteria used during the assessment was based on the New York City Department of Health Guideline (NYCDOH) (2002), as well as the Manitoba Department of Labour and Immigration guidelines (2001).

NYCDOH 2002 provides guidance on the assessment and remediation of fungi in indoor environments. These guidelines were initially developed in the 1990s because of mould growth problems in several New York City buildings. The 2002 guidelines are a revised and expanded version of the original guidelines. The guidelines are based on a review of fungi literature and information obtained from a review panel consisting of experts in microbiology and health sciences fields. It is intended for use by building engineers, environmental consultants, health professionals, and the public. The NYCDOH 2002 guidelines were used for quantifying the amount of mould present, and the Manitoba Department of Labour and Immigration 2001 Guideline was used as an additional reference for mould abatement procedures.

All moulds need water to grow, and mould can grow anywhere there is water damage, high humidity, or dampness and a nutrient source. When mouldy material becomes damaged or disturbed, mould spores can be released into the air. Exposure



occurs if people inhale the spores. Mould can cause allergic reactions or infections. The most common symptoms are runny nose, eye irritation, cough, congestion, and aggravation of asthma. The most common indoor moulds are *Cladosporium*, *Penicillium*, *Aspergillus*, and *Alternaria*.

Inhalation of very large concentrations of fungal spores can cause hypersensitivity pneumonitis, but this rarely results from building exposure. Chronic exposure to most fungi can induce allergic or asthmatic reactions in humans, and a very few can cause diseases directly. Some moulds are “toxigenic,” producing mycotoxins that often accumulate in the spores. The inhalation of spores containing certain mycotoxins has been shown to induce many of the symptoms normally associated with Sick Building Syndrome (SBS). Other products of fungi include certain volatile organic compounds (VOCs). Such compounds (characterized by mouldy smells) occur only when there is active and considerable fungi growth. There is some evidence to suggest that these can contribute to SBS.

The five most important mycotoxins to human health are aflatoxin (produced by *Aspergillus*), ochratoxin (produced by *Penicillium*), fumonisins, trichothecenes (produced by *Stachybotrys*), and zearalenone.

Fungal spores, especially *Cladosporium* and *Alternaria*, are common in outdoor air during the growing season, and the principal fungi that grow on leaves constitute 60 to 70 percent of the spores in air. These fungi can introduce allergies, but most people are not particularly affected.

#### **4.4 Silica**

Silica occurs naturally as crystalline or amorphous material. It is normally found in concrete, mortar, acoustic ceiling tiles, and stucco finishes. Silica exposure is a particular concern from airborne silica dust during renovation, demolition, or construction activities.

Crystalline silica is more toxic than amorphous silica, and therefore, is regulated under the OHSA. The time-weighted average exposure limit (TWAEEL) of a worker to silica dust is to be maintained at the lowest practical level with a view to achieving an ambient air concentration lower than 0.10 mg/m<sup>3</sup> of air for quartz and tripoli, and 0.05 mg/m<sup>3</sup> of air for cristobalite and tridymite.

Under the OHSA O. Reg. 490/09 (as amended) respecting silica, workers shall be protected from exposure to airborne silica. Workers are not at risk of being exposed to silica unless they are undertaking an activity that disturbs the silica-containing materials. Special precautions are required during renovation or demolition activities to ensure that worker exposure to silica does not exceed the limits specified in the OHSA, and its associated regulations.

#### **4.5 Mercury**

Mercury is contained within thermostats, electrical switches, and fluorescent light bulbs. Mercury exposure may occur from airborne vapours or through skin absorption.



The TWAEL of a worker to mercury is to be maintained at the lowest practical level with a view to achieving an ambient air concentration lower than 0.01 mg/m<sup>3</sup> of air for alkyl compounds of mercury, and 0.025 mg/m<sup>3</sup> of air for all forms of mercury except alkyl compounds.

Under the OHSA O. Reg. 490/09, as amended respecting mercury, workers shall be protected from exposure to airborne mercury. Workers are not at risk of being exposed to mercury unless they are undertaking an activity that disturbs the mercury-containing materials. Special precautions are required during renovation or demolition activities to ensure that worker exposure to mercury does not exceed the limits specified in the OHSA, and its associated regulations.

#### 4.6 **Other Designated Substances and/or Hazardous Materials**

The other designated substances and hazardous materials that were part of the survey are regulated by the following Ontario or Canadian Regulations:

Acrylonitrile, Arsenic, Benzene, Coke Oven Emissions, Ethylene Oxide, Isocyanates, and Vinyl Chloride	O. Reg. 490/09
Chlorofluorocarbons	O. Reg. 463/10 Ozone Depleting Substances and Other Halocarbons
PCBs	SOR/2008-273
Radon	Government of Canada Radon Guideline – Health Canada
UFFI	Under the Hazardous Products Act (R.S. C. H-3, S.1)



## 5. INVESTIGATION RESULTS

Ms. Amy Cardiff of XCG conducted the DSHMS on August 7 and 8, 2013. Ms. Cardiff was accompanied during the initial site tour by Mr. Brian Major, an employee of CFIA.

Figure 1 (end of text) depicts the sample collection locations and approximate locations of designated substances. In addition, Laboratory Certificates of Analysis are provided in Appendix A.

Summaries of the survey activities and findings for each of the designated substances are provided in the following sections.

### 5.1 Summary of Results Based on Historic Reports

As part of this DSHMS, XCG reviewed the following reports:

***Genivar Inc., "Health Canada Laboratory, 2301 Midland Avenue, PWGSC Engineering Asset Properties, Designated Substances and Hazardous Materials Survey Report", dated December 18, 2012.***

Genivar Inc. (Genivar) conducted a DSHMS at the Health Canada Laboratory Rooms 115, 165, and 225 at the subject site. These rooms are located on the first and second floors of the building and are outside the proposed renovation area.

***Advanced Environmental Corp., "Designated Substances Survey, Government of Canada Building, 2301 Midland Avenue, Toronto, Ontario, Complex #5614739", dated February 12, 2009.***

Advanced Environmental Corp. (AEC) conducted a DSHMS at 2301 Midland Avenue in 2009. The DSHMS covered the entire building.

The laboratory results indicated that the following building materials were confirmed as ACM:

- Parging cement pipe fittings and tees throughout the building; and
- Drywall compound throughout the building.

#### **Summary**

Figures showing the locations of the ACM and lead paint samples taken by AEC were not provided to XCG for review and it appeared that AEC only took one sample of each type of building material and interpreted the results of the one sample to be representative of similar materials in the entire building. Therefore, XCG collected samples of materials (e.g. pipe elbow parging cement and drywall joint compound) that may differ from floor to floor, that were found in the proposed renovation area. XCG also collected samples of mastic, window caulking, and cove base that were not sampled by AEC. Since XCG did not access different floors of the building, colours of paint could not be compared from the previous DSHMS reports to the current work; therefore, all different colours of paint within the proposed renovation area were sampled. The acoustic ceiling tiles at the subject site appeared to all be the same, and were identified by AEC as similar to non-ACM ceiling tiles; therefore XCG did not sample the ceiling tiles within the proposed renovation area.



## 5.2 Summary of Results Based on Visual Identification

The likely presence or absence of designated substances and hazardous materials within the proposed work areas was initially assessed through visual observations and discussions with personnel knowledgeable about the building. Table 1 summarizes the potential presence or absence of each designated substance at the subject site.

**Table 1 Summary of Suspected Designated Substances at the Subject Site Based on Visual Identification**

Substance	Not Identified	Potentially Present
Acrylonitrile	X	
Arsenic	X	
Asbestos		X
Benzene	X	
CFCs and ODSs		X
Coke Oven Emissions	X	
Ethylene Oxides	X	
Isocyanates	X	
Lead		X
Mercury		X
Mould	X	
Radon	X	
PCBs	X	
Silica		X
UFFI	X	
Vinyl Chloride	X	

The following is a description of the survey results for each designated substance.

- Acrylonitrile:** Acrylonitrile is a clear colourless or yellow liquid, which is explosive, flammable, and toxic. It is used to produce polymers such as acrylonitrile-butadiene-styrene (ABS) resins. These polymers are used in the manufacture of a wide range of commercial products (i.e. automotive parts, clothing, carpets, etc.). The TWAEL of a worker to airborne acrylonitrile is to be maintained at the lowest practical level, and not exceed an eight-hour average concentration of 4.3 mg/m<sup>3</sup> of air [2 parts per million volume (ppmv)]. In its hardened polymer form, acrylonitrile is not expected to release emissions that would exceed the allowable limits. Acceptable levels may also be present in newer installations (i.e. carpets).

**Pure acrylonitrile was not visually identified or suspected to be present at the subject property building.**

- Arsenic:** Arsenic can be found in minor levels in paint coating on roofing flashings, floors, walls, and the underside of the concrete ground floor structures of old buildings. The TWAEL of a worker to airborne arsenic is to be maintained at the lowest practical level, and not to exceed an eight-hour average concentration of 10 µg/m<sup>3</sup> of air.

**Arsenic is not expected to be present in the building. If any base building materials within the subject site are suspected to contain arsenic, they should be tested prior to renovation activities.**

- **Asbestos:** Asbestos was commonly used as a thermal insulator or fire retardant and is often found in a friable state on piping systems (including domestic water, heating, drains, etc.), air handling systems, ductwork, tanks, and vessels. Asbestos is also found in friable building materials, such as acoustic ceiling tiles, sprayed fireproofing, drywall joint compound, plaster, and textured plaster finishes. Asbestos is present in many manufactured products typically found in a non-friable state such as vinyl flooring, cement board and pipes, mastics, roofing felt and shingles, and flexible duct connectors. The installation of asbestos-containing materials in Ontario was banned in 1985. The TWael of a worker to airborne asbestos is to be maintained at the lowest practical level, and not to exceed an eight-hour average concentration of 0.1 fibre/cm<sup>3</sup> of air. Building materials found to have 0.5 percent or greater asbestos by dry weight are considered to be ACMs.

**Potential ACMs were visually identified in the building. Samples of drywall joint compound, cove base, window caulking, mastic, pipe elbows, were collected and submitted for laboratory analysis, as detailed in Section 5.3.1.**

- **Benzene:** Benzene is typically found in petroleum-based products such as gasoline and diesel fuels, asphalt, and other hydrocarbon-based products. Benzene may also be found in stable form in paints and adhesives. The TWael of a worker to airborne benzene is to be maintained at the lowest practical level, with a view to achieving an ambient air concentration lower than 3.2 mg/m<sup>3</sup> of air (1 ppmv) and not to exceed an eight-hour average concentration of 16 mg/m<sup>3</sup> of air (5 ppmv).

**Direct sources of benzene emissions were not visually identified or suspected to be present at the subject property building.**

- **CFCs and ODSs:** CFCs, also referred to as ODSs, have been widely used in many industrial, commercial, and residential applications. They can be found in applications such as refrigerants in heat pumps, refrigerators, freezers and air conditioners (A/C), blowing agents for plastics, foam product, and insulation, cleaning agents for metals, electronic equipment and components; and as dry-cleaning fluids. Any equipment (i.e. refrigerators, A/C units, etc.) should be managed and serviced appropriately and by qualified, licensed personnel.

**Based on observations made during the site reconnaissance, refrigeration and freezer equipment potentially containing CFCs were identified, but not sampled. The roof was not accessed as part of this DSHMS.**

- **Coke Oven Emissions:** Coke oven emissions result from the burning of coke. The TWael of a worker to coke oven emissions are to be maintained at the lowest practical level, and not exceed an eight-hour average concentration of 0.15 mg/m<sup>3</sup> of air.



**No coke ovens were visually identified or suspected to be present at the subject property building.**

- **Ethylene Oxide:** Ethylene oxide is a common by-product of fumigation or sterilization procedures. The TWAEEL of a worker to airborne ethylene oxide is to be maintained at the lowest practical level, and not to exceed an eight-hour average concentration of 1.8 mg/m<sup>3</sup> of air (1 ppmv).

**Materials or processes that may release ethylene oxide to ambient air were not visually identified or suspected to be present at the subject property building.**

- **Isocyanates:** Isocyanates are compounds that contain at least one group of atoms made of nitrogen (N), carbon (C), and oxygen (O). They are usually classified by the number of NCO groups contained in each molecule (monoisocyanates, diisocyanates, and polyisocyanates). Isocyanates are mainly used in the manufacture of plastics, foams, and coatings. The TWAEEL of a worker to isocyanate dust is to be maintained at the lowest practical level, and not to exceed an eight-hour average concentration of 0.2 µmoles/m<sup>3</sup> of air (0.005 ppmv). Manufactured products under normal conditions do not pose a health risk. However, sawing or scraping uncured polyurethane that still contains some unreacted-NCO groups will release isocyanate dust.

**Pure isocyanates were not visually identified or suspected to be present at the subject property building.**

- **Lead:** Lead may be present as an additive in gasoline, in solder joints, glazing on ceramic finishes, and on copper piping. Paints applied prior to 1980 have the potential to contain lead and should be tested prior to any renovations or demolition. In Canada, it is also advisable to consider any exterior paint applied until at least the end of the 1980s to be possibly lead-contaminated. Canadian regulations did not apply to exterior paint until the late 1980s. According to the Surface Coating Materials Regulations, the maximum allowable lead content in paint is 90 mg/kg (90 ppm, 0.009% by weight). If work on lead paint or other lead-containing materials is likely to produce lead dust or fumes, for example during welding, torch cutting, grinding, sanding, or sandblasting, then proper precautions as outlined under O. Reg. 490/09 should be followed. The eight-hour TWA exposure of a worker to airborne lead shall not exceed 0.05 milligrams of lead per cubic metre of air.

**Potential lead-containing paints were visually identified at the subject property building. Samples of these materials were collected and submitted for laboratory analysis, as detailed in Section 5.3.2.**

- **Mercury:** Mercury may be commonly found in thermostats, fluorescent lamp tubes, or High Intensity Discharge (HID) light bulbs. The TWAEEL of a worker to mercury compounds is to be maintained at the lowest practical level, and not to exceed an eight-hour average concentration of 0.05 mg/m<sup>3</sup> of air for all mercury, except alkyl mercury oxide, for which a concentration of 0.01 mg/m<sup>3</sup> of air should not be exceeded. Any switches or thermostats that may contain mercury

should be managed and serviced appropriately and by qualified, licensed personnel.

**Small quantities of mercury are likely present within fluorescent lighting observed inside in the building. No samples were collected and submitted for laboratory analysis.**

- **Mould:** Mould is commonly observed as a downy or furry coating on porous, organic building materials, and is associated with dampness or water intrusion.

**No potential visible mould or water damage was observed at the subject site.**

- **Radon:** Radon is a colourless, tasteless, radioactive gas derived from uranium with an Ontario MOL criterion of 20 pico Curies per litre of air (pCi/L). Health Canada has established a radon guideline that recommends an action level of 200 Bq/m<sup>3</sup> radon in air. The health risk potential of radon is associated with its rate of accumulation within confined areas, particularly confined areas near or in the ground, such as basements, where vapours can readily transfer to indoor air from the ground through foundation cracks or other pathways. Large, adequately ventilated rooms generally present limited risk for radon exposure. To determine the presence of radon within the survey areas, a radon survey of the building would have to be undertaken. Such a survey was not performed as part of the scope of work for this survey.

**Based on XCG's review of available information and a document entitled *Background Concentrations of Radon and Radon Daughters in Canadian Homes (1999)*, the average typical radon level in Canadian homes for the Greater Toronto area is approximately 0.31 pCi/L (picocuries per litre). Based on a compilation by Federal Department of National Health and Welfare, this level is below the criteria of 20 pCi/L for indoor radon levels.**

**Based on XCG's review of the above information, radon is not expected to represent a significant risk pertaining to the subject property building, and therefore, a radon survey is not recommended.**

- **Silica:** Silica occurs naturally as crystalline or amorphous material. It is normally found in concrete, mortar, acoustic ceiling tiles, and stucco finishes. Crystalline silica is more toxic than amorphous silica, and therefore is regulated under the OHSA. The TWael of a worker to silica dust is to be maintained at the lowest practical level with a view to achieving an ambient air concentration lower than 0.10 mg/m<sup>3</sup> of air for quartz and tripoli, and 0.05 mg/m<sup>3</sup> of air for cristobalite and tridymite.

**Typically, samples for silica are not collected during a DSHMS if concrete and mortar are visually identified within the building construction materials (this applies to the majority of buildings). Free crystalline silica is expected to be present within all concrete and mortar-based building materials, within the building. Workers should wear personal protective equipment (PPE) and should take appropriate precautions to minimize the levels of airborne dust when concrete and/or mortar dust are being generated within the work areas.**



- **PCBs:** PCBs can be found in equipment such as transformers, capacitors, electromagnets, heat transfer units, hydraulic engines, and fluorescent lamp ballasts. Two Federal Canadian Environmental Protection Act (CEPA) regulations apply to the use and storage of PCBs. The Chlorobiphenyls Regulation (SOR/2008-273) limits the quantity of out-of-service PCB materials that can be stored at a facility for more than six months to 1 kilogram of PCBs. There are also several government policies and guidelines that outline safe practices for the handling and storage of PCB-containing materials. Fluorescent lamp ballasts may contain minor quantities of PCBs, and if they are to be removed in bulk, the ballasts should be inspected for PCB content prior to disposal. Magnetic ballasts manufactured before 1979 contain PCBs in the dielectric of their capacitors. Estimates indicate that about one-half of these old ballasts have a potting compound contaminated by leaking PCB capacitors. This environmental problem requires the attention of technicians in recycling magnetic ballasts, especially those with date codes of 1979 or earlier.

**Fluorescent lighting was noted throughout the subject building; however, PWGSC indicated that no PCBs were located at the subject site, including in fluorescent light ballasts. Therefore, no ballasts were inspected as part of this DSHMS.**

- **Vinyl Chloride:** Vinyl chloride is found in many applications such as PVC pipes and fittings. The TWAEL of a worker to vinyl chloride emission is to be maintained at the lowest practical level and not exceed an eight-hour average concentration of 5.2 mg/m<sup>3</sup> of air (2 ppmv).

**Vinyl chloride in PVC compounds is bound in a solid matrix and is unlikely to become airborne. Vinyl chloride emissions are not likely to exceed the prescribed limits at the subject property building.**

- **Urea Formaldehyde Foam Insulation (UFFI):** UFFI was developed as an improved means of insulating difficult to reach cavities in house walls. It is typically made at a construction site from a mixture of urea-formaldehyde resin, a foaming agent, and compressed air. When the mixture is injected into the wall, urea and formaldehyde unite and “cure” into an insulating foam plastic. Most installations occurred between 1977 and its ban in Canada in 1980. UFFI was sometimes improperly installed or used in locations where it should not have been. While small amounts of formaldehyde are harmless, it is an irritating and toxic gas in significant concentrations. Health Canada has determined that 0.1 ppm is a safe level of formaldehyde in the home.

**No indication of UFFI being present within the subject property building was visually identified during the DSHMS; however, no destructive investigation for UFFI was conducted (i.e. wall penetrations through concrete block).**



### 5.3 **Summary of Results Based on Laboratory Analysis**

On August 7 and 8, 2013, XCG collected 34 bulk samples for asbestos analysis and six paint chip samples, five of which were submitted for lead in paint analysis. The results of these analyses are presented in Sections 5.3.1 and 5.3.2.

#### 5.3.1 **Target Materials (Asbestos)**

Suspect ACMs were identified by visual inspection within various areas of the subject site. On the basis of this assessment, samples of suspected ACMs were collected, assigned numbers, and submitted for laboratory analyses.

According to O. Reg. 278/05, as amended, a material containing asbestos is considered to be friable if it can be crumbled, pulverized, or powdered by hand pressure when dry, or is found in a crumbled, pulverized, or powdered form.

A total of 10 homogenous types of building material samples suspected to contain asbestos were found at the subject property building. In accordance with O. Reg. 278/05 (as amended), a minimum of three samples of each homogenous material was obtained from the surveyed areas. At least 5 to 10 grams of each sample were collected and placed in a labelled, sealable plastic bag and submitted to International Asbestos Testing Laboratory (IATL), a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory, for analysis by polarized light microscopy (PLM) with dispersion staining, following USEPA method 600/R-93/116. Materials sampled were dampened with an amended water solution using a spray bottle. No vinyl floor tiles were observed during the inspection, and therefore, no samples were submitted for transmission electron microscopy (TEM) analysis.

The following building components were assessed individually during the survey as part of routine field procedures:

- Walls;
- Ceiling;
- Window caulking;
- Floors; and
- Thermal insulation.

Table 2 provides a summary of the asbestos analyses by PLM for the surveyed areas at the subject site.



**Table 2 Summary of Suspect ACM Samples Collected from the Subject Property Building**

Sample Number	Description	Location	Laboratory Result
MAS-01-A,B,C	Yellow mastic	Beneath carpet – Health Canada offices	ND – Tan Mastic
MAS-02-A,B,C	Green mastic	Beneath carpet – Health Canada offices	ND – Green Mastic
MAS-03-A,B,C	Yellow mastic	Adjacent to ceramic tile – Room 325A	ND – Tan Mastic
CK-01-A,B,C	White window caulking	Room 337	ND – White Caulk
CB-01-A,B,C	Black cove base	Health Canada offices	ND – Black Cove Base ND – Tan Mastic
CB-02-A,B,C	Grey cove base	Health Canada offices	ND – Grey Cove Base ND – Tan Mastic
CB-03-A,B,C	Green cove base	Rooms 334, 355A, 355B, 355C	ND – Green Cove Base ND – Tan Mastic ND – Grey Mastic
CB-04-A,B,C	Blue cove base	Room 347	ND - Blue Cove Base ND – Tan Mastic
<b>PC-01-A,B,C</b>	<b>Pipe elbow parging cement</b>	<b>Health Canada offices</b>	<b>65% Chrysotile</b>
DJCA,B,C,D,E,F,G	Drywall joint compound	Throughout subject site	ND – White Joint Compound
<b>Notes:</b> <b>Bold</b> – Samples confirmed to be an asbestos-containing material. ND – None Detected. NA – Not Analyzed.			

The locations of all of the samples listed in Table 2 are depicted on Figure 1. The samples with confirmed ACM materials are identified on Figure 1. The Laboratory Certificates of Analysis are included as Appendix A.

The laboratory results indicated that the following materials are ACMs:

- 6-inch pipe elbow parging cement above the ceiling tile in the Health Canada office area.

Based on the findings of the DSHMS report completed by Genivar Inc. on December 18, 2012, the following asbestos containing materials were noted:

- Fume hoods in the proposed work area are assumed to contain transite asbestos cement board, and
- Fire doors are assumed to be asbestos containing.

Transite cement board is not typically sampled in instances where damage to the materials would result from sampling. Based on previous work completed in the



building, fire doors were assumed to be asbestos containing due to the insulation bound within the cores of the doors. No fire doors were noted during the on-site survey. If during demolition fire doors are encountered, they should be disposed of in accordance with O. Reg. 347.

### 5.3.2 Target Materials (Lead)

Samples of six visibly different paints were collected through small scrapings of the paint from the substrate and/or where paint was observed to be peeling or flaking. Five of the six paint samples were submitted to a qualified third party laboratory for analysis. IATL analyzed all samples by EPA 7420 Atomic Absorption Spectrophotometry. Sample P-02 was not sampled for analysis. This sample was similar to the top layer of P-03, which also had a layer of orange paint beneath the brown paint.

Table 3 provides a summary of the lead analyses for the surveyed areas within the building.

**Table 3** Summary of Suspect Lead-Based Paint Samples Collected from the Subject Site

Sample Number	Description	Location	Laboratory Result (mg/kg)
P1	Creamy-yellow paint	Walls throughout subject site	<67
P2	Brown paint	Doors throughout subject site	NA
<b>P3</b>	<b>Brown paint, orange beneath</b>	<b>Doors throughout subject site</b>	<b>140</b>
P4	Blue paint, white beneath	Doors – Rooms 347A, 347	<84
<b>P5</b>	<b>Green paint</b>	<b>Doors – Rooms 341, 335B, Doors and Windows 335A, 335C</b>	<b>170</b>
<b>P6</b>	<b>Off-white paint</b>	<b>Ceiling – Room 321, 347</b>	<b>440</b>
<b>Notes:</b> <b>Bold</b> – Samples confirmed to be lead-containing in excess of regulatory limit of 90.0 mg/kg. <i>Italics</i> – Sample considered lead-containing since laboratory detection limit above 90 mg/kg. < - Concentration is less than the laboratory reporting limit. Void – Not enough sample to analyze; paint too well adhered. NA – Not analyzed.			

The locations of all lead-based paint samples are depicted on Figure 1. The samples with confirmed lead-based paint are identified on Figure 1. The Laboratory Certificate of Analysis is included as Appendix A.



## 6. DISCUSSION AND RECOMMENDATIONS

### 6.1 Asbestos

The following confirmed and assumed ACMs were identified during the DSHMS:

**Table 4 Summary of Asbestos-Containing Materials from the Subject Site**

Description	Location	Condition	Estimated Quantity	Friability <sup>1</sup>	Exposure Risk <sup>2</sup>	Access <sup>3</sup>
6" pipe elbow parging cement	Health Canada offices, near stairwell	Good	5 elbows	Friable	2	C (concealed)
Transite Board	Within Fume hoods in rooms 337 and 347	Good	5 units	Non-Friable	-	-

**Notes:**

1. Friability is assessed as friable (can break with hands or fingers) or non-friable.
2. Exposure Risk is ranked (for friable, asbestos-containing samples only) as: 1 – little or no risk, 2 – minor repairs required, or 3 – exposure hazard and remedial action required.
3. Accessibility is rated (for friable, asbestos-containing samples only) as: A - Areas of the building within reach (from floor level) of all building users; B - Frequently entered maintenance areas within reach of maintenance staff, without the need of a ladder; C (exposed) - Areas of the building above 2.4 m where use of a ladder is required to reach the asbestos-containing material; C (concealed) - Areas of the building that require the removal of a building component, including lay-in ceilings and access panels into solid ceiling systems; D - Areas of the building behind inaccessible solid ceiling systems, walls, or mechanical equipment etc. where demolition of the ceiling, wall, or equipment, etc. is required to reach the asbestos containing material.

All ACMs should be managed in accordance with O. Reg. 490/09 and O. Reg. 278/05, which includes the preparation of an Asbestos Management Plan (AMP). As of November 1, 2007, O. Reg. 278/05 requires the owner of a building to prepare and keep on the premises a record containing the location and exposure risks of all confirmed and suspected ACMs (both friable and non-friable). Awareness training is also required for any staff who may come in contact with the ACM.

All handling and removal of asbestos should be conducted as specified in O. Reg. 278/05. The type of removal procedures to be conducted should be defined on a case-by-case basis. Any suspect material encountered should be treated as asbestos unless otherwise indicated by sampling and analytical testing. If additional asbestos materials (currently hidden or inaccessible) are identified as renovation or demolition work proceeds, these materials should be examined, tested, and handled appropriately. Any asbestos removal needs to be completed by a trained abatement contractor. ACMs indicated to be in fair or poor condition should be assessed, and repaired or removed by a qualified asbestos contractor to prevent the spread of asbestos fibres.



## **6.2 Lead**

Three of the five paint samples from the building submitted by XCG for lead analysis were found to have lead concentrations greater than 90 mg/kg (ppm) and are determined to be lead-containing.

The paints with confirmed lead concentrations above the standard in the building are:

- Brown paint with orange paint beneath on the doors of the laboratories;
- Green paint on the doors of the laboratories; and
- Off-white paint on the ceilings of the laboratories.

Based on XCG's findings, all brown and green paints on doors and door frames should be considered to be lead-based paint. All white/off-white paint on ceilings should be considered to be lead-based paint.

All lead-based paints, potential lead-based solder and potential lead-based pipe should be managed in accordance with O. Reg. 490/09 during renovation or demolition activities. If the materials are not to be recycled, the materials should be disposed of in accordance with O. Reg. 347 (as amended).

## **6.3 Chlorofluorocarbons (CFCs) and Ozone-Depleting Substances (ODSs)**

Based on observations made during the site reconnaissance, refrigeration and freezer equipment potentially containing CFCs were identified, but not sampled. The roof was not accessed during this DSHMS. Disposal and repairs of any refrigeration equipment and/or refrigerant containers is regulated under the Federal Halocarbon Regulations, 2003 (SOR/2003-289). In accordance with the Federal Halocarbon Regulations, any removal, disposal and/or repair of refrigeration equipment during construction and removal activities should only be undertaken by a certified person.

## **6.4 Mercury**

Fluorescent lighting observed in the subject building that is likely to contain small quantities of mercury was observed. There is no occupational or environmental concern associated with mercury in its current state and condition. However, when the building is renovated or demolished, the fluorescent lights and any mercury-containing thermostats must be handled and disposed of in accordance with O. Reg. 490/09 (as amended) and O. Reg. 347/90 (as amended).

## **6.5 Silica**

Concrete and mortar-based building materials were observed at the subject site. Exposure to airborne silica is regulated under O. Reg. 490/09 regarding silica under the OHSA. Airborne silica can be generated through such processes as blasting, grinding, crushing, and sandblasting silica-containing material. Precautions must be taken to prevent silica-containing particles from becoming airborne during the application of such processes. Such precautions include wetting of silica-containing area(s) to be disturbed, and daily wet sweeping or HEPA vacuuming of silica dust.



Additionally, appropriate respiratory protection and ventilation must be utilized during disturbance of silica-containing structures.



**7. RECOMMENDED ABATEMENT PROCEDURES**

Based on the DSHMS found and assumed to be present in the proposed work areas, the following abatement procedures are recommended:

***Asbestos Containing Materials***

Based on the locations and types of ACMs, XCG recommends the following abatement procedures:

- Pipe elbow insulation, and
- Type II Glove Bag removal as described in O. Reg. 278/05.

Transite Cement Board

- Type I removal as described in O. Reg. 278/05.

***Lead-Containing Paint***

Based on the locations and proposed renovation activities regarding lead-containing painted surfaces, XCG recommends the following abatement procedures:

- Type 2 Operations as described in Lead on Construction Projects, Occupational Health and Safety, Branch Ministry of Labour, 2004



## **8. COST ALLOWANCE FOR ABATEMENT**

In determining the cost allowance, XCG has assumed that the asbestos-containing material abatement will consist of complete removal.

1. The recommended cost allowance for the removal of five asbestos-containing pipe elbows using Type II glove bag abatement procedures is between \$2,500 and \$3,500.
2. The recommended cost allowance for the removal of a fume hood and associated transite cement board using Type I procedures is between \$1,200 and \$2,000.

The proposed renovation activities involving lead-containing painted surfaces may be addressed using either of two approaches: (1) removal and disposal of the paint-coated building materials (e.g. doors) and replacement with new materials, or (2) removal and disposal of the paint layers followed by repainting. XCG has assumed that the doors covered with lead-containing paint will be removed and disposed of, and replaced with new doors. This is typically a more cost-effective approach than lead paint removal/abatement and repainting.

The recommended cost allowances for lead-containing paint abatement are outlined below:

1. If the affected substrate materials may be removed and disposed of, and replaced with new materials, the cost would be minimal if the plan for the renovations already includes replacement of those materials (e.g. doors). If replacement of these materials is not part of the renovation plan, the cost for each door replaced would depend on the type of replacement door, and would typically fall into the range of \$750 to \$1,250 per door (including an allowance for labour to install the door). It is assumed that the door replacement would be completed as a Type I operation.
2. If the lead-containing paint on the ceiling surface is to be disturbed, and will require removal prior to the renovations, XCG recommends a cost allowance for the paint removal of \$1,500 plus \$100 dollars per square metre.

**9. LIMITATIONS**

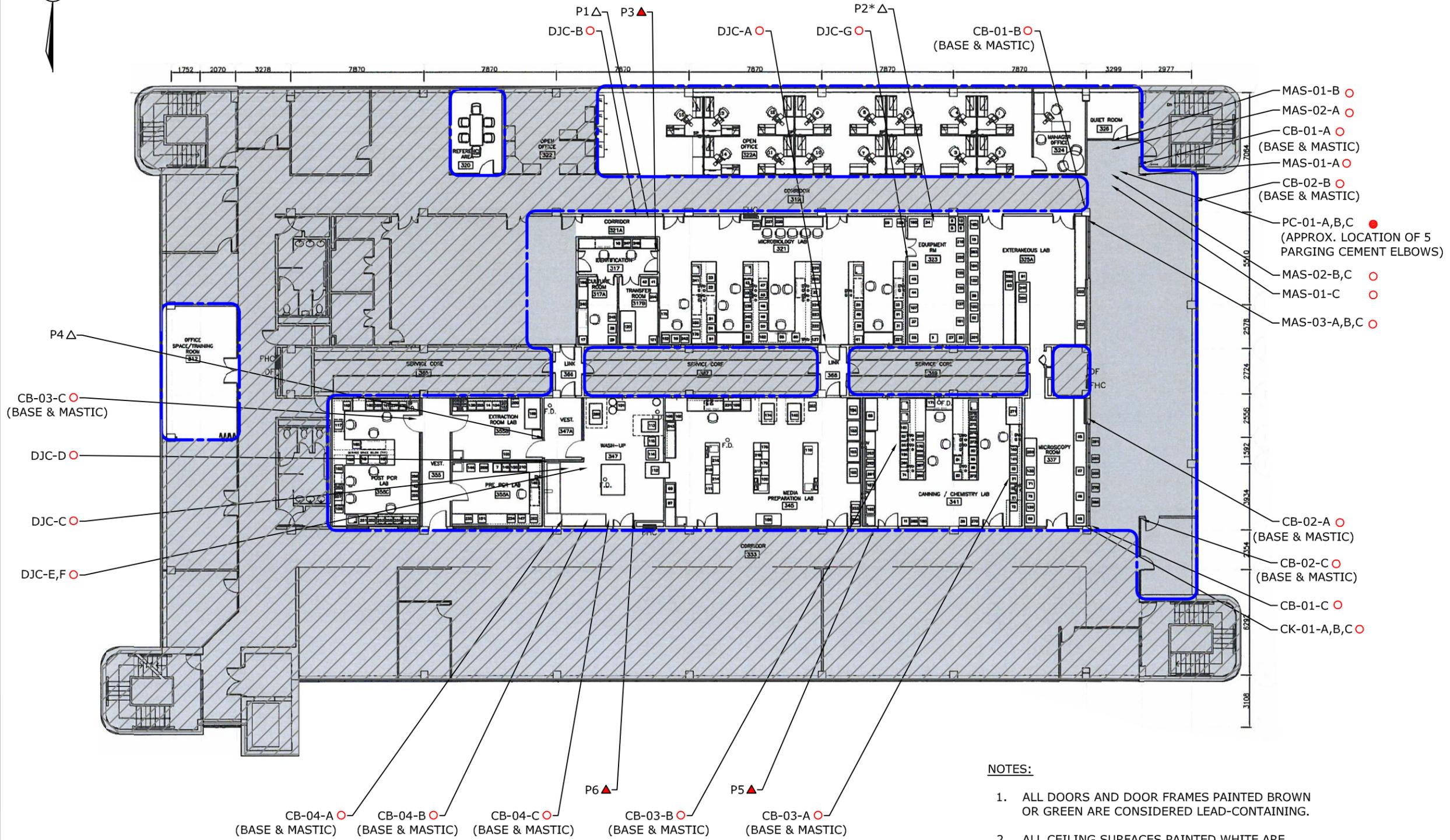
Limited sampling of building materials was undertaken as part of this investigation. As such, detailed investigations or testing in subsequent studies may encounter conditions not apparent at this time, or at other locations. No access to the roof was provided to XCG. Roofing samples should be analyzed for ACMs prior to renovation or demolition of the roof.

The conclusions presented in this report are professional opinions based on visual observations, limited information provided by persons familiar with the subject building, and analytical results. As such, XCG cannot be held responsible for environmental conditions at the site, which were not apparent from the available information.

The scope of this work is limited to the matters expressly covered. This report is prepared for the sole benefit of Public Works and Government Services Canada and may not be relied upon by any other person or entity without the written authorization of XCG Consultants Limited. The scope of services performed in the execution of this investigation may not be appropriate to satisfy the needs of other users, and any use or reuse of this document or the findings and conclusions represented herein is at the sole risk of the said users.



**FIGURE**



- NOTES:**
1. ALL DOORS AND DOOR FRAMES PAINTED BROWN OR GREEN ARE CONSIDERED LEAD-CONTAINING.
  2. ALL CEILING SURFACES PAINTED WHITE ARE CONSIDERED LEAD-CONTAINING.



**LEGEND**

- CONFIRMED ASBESTOS CONTAINING MATERIAL > 0.5%
- NON-ASBESTOS CONTAINING MATERIAL
- ▲ CONFIRMED LEAD PAINT SAMPLING LOCATION
- ▲ NON-LEAD BASED PAINT SAMPLING LOCATION
- LIMIT OF OBSERVED AREAS
- AREAS NOT CURRENTLY OCCUPIED BY CFIA
- AREAS NOT INCLUDED IN SCOPE OF WORK
- P2\* SAMPLE NOT ANALYZED

0 5 10m

1 : 250

DRAWING REFERENCE: Canadian Food Inspection Agency, Laboratory Expansion Feasibility Study, Sheet No. A-01, Dated Sept 25, 2012, provided by PWGSC.  
 NOTE: Location of building, underground utilities, etc. are for reference only and should not be relied upon for detailed design, renovation, or construction purposes. Property boundary and building locations shown may not represent actual surveyed boundaries.

**TITLE:**  
 DSHM SURVEY

**SAMPLE LOCATIONS**

**LOCATION:**  
 2301 MIDLAND AVENUE  
 TORONTO, ONTARIO

**DATE:** SEP 2013    **DRAWN:** GGM    **FIGURE:** 1

**PROJECT No:** 1-336-183-01



**APPENDIX A**  
**LABORATORY CERTIFICATES OF ANALYSIS**

## CERTIFICATE OF ANALYSIS

**Client:** XCG Consultants Ltd.  
820 Trillium Drive  
Kitchener ON, Canada N2R 1K4

**Report Date:** 8/13/2013  
**Report Number:** 312199  
**Project:** 8/7-8/8/13  
**Project No.:** 1-336-183-01

### LEAD PAINT SAMPLE ANALYSIS SUMMARY

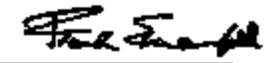
<u>Lab No.</u>	<u>Client No.</u>	<u>Location / Description</u>	<u>Concentration Lead By Weight (%)</u>
5091735	P1	Creamy Yellow Paint	<0.0067
5091736	P3	Brown/Orange Paint	0.014
5091737	P4	Blue/White Paint	<0.0084
5091738	P5	Green Paint	0.017
5091739	P6	Off-White Paint	0.044

**Accreditations:** **NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM (NLLAP)**  
AIHA-LAP, LLC No. 100188 NYSDOH-ELAP No. 11021

**Analytical Methods:** ASTM D3335-85A "Standard Method To Test For Low Concentrations Of Lead In Paint By Atomic Absorption Spectrophotometry"  
EPA SW846-(3050B:7000B) "Standard Method To Test For Low Concentrations Of Lead In Soils, Sludges and Sediments By AAS"

**Comments:** Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation. All results are based on the samples as received at the lab. IATL assumes that appropriate sampling methods have been used and the data upon which these results are based have been accurately supplied by the client. Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Appendix B. Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies. LSD=0.2 ppm MDL=0.0044% by weight. RL= 0.010% by weight (based upon 100 mg sampled). \* Insufficient sample provided to perform QC reanalysis (<200 mg) \*\* Not enough sample provided to analyze (<50 mg) \*\*\* Matrix / substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks. This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any government agency. This report shall not be reproduced except in full, without written approval of the laboratory.

**Date Received:** 8/9/2013  
**Date Analyzed:** 8/13/2013  
**Analyst:** C. Shaffer

**Approved By:** 

Frank E. Ehrenfeld, III  
Laboratory Director

## CERTIFICATE OF ANALYSIS

**Client:** XCG Consultants Ltd.  
820 Trillium Drive  
Kitchener ON, Canada N2R 1K4

**Report Date:** 8/14/2013  
**Report No.:** 312234  
**Project:**  
**Project No.:** 1-336-183-01

### BULK SAMPLE ANALYSIS SUMMARY

**Lab No.:** 5092220      **Description / Location:** Tan Mastic  
**Client No.:** MAS-01-A

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092221      **Description / Location:** Tan Mastic  
**Client No.:** MAS-01-B

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092222      **Description / Location:** Tan Mastic  
**Client No.:** MAS-01-C

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092223      **Description / Location:** Green Mastic  
**Client No.:** MAS-02-A

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Accreditations:**      **NIST-NVLAP No. 101165-0**      **NY-DOH No. 11021**      **AIHA-LAP, LLC No. 100188**  
*This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any agency of the U.S. government  
This report shall not be reproduced except in full, without written approval of the laboratory.*

**Analytical Method:**      EPA 600/R-93/116, by Polarized Light Microscopy

**Comments:**      Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

**Analysis Performed By:**      S. Robb

**Approved By:**      

**Date:**      8/14/2013

Frank E. Ehrenfeld, III  
Laboratory Director

## CERTIFICATE OF ANALYSIS

**Client:** XCG Consultants Ltd.  
820 Trillium Drive  
Kitchener ON, Canada N2R 1K4

**Report Date:** 8/14/2013  
**Report No.:** 312234  
**Project:**  
**Project No.:** 1-336-183-01

### BULK SAMPLE ANALYSIS SUMMARY

<b>Lab No.:</b> 5092224	<b>Description / Location:</b> Green Mastic		
<b>Client No.:</b> MAS-02-B			
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>
None Detected	None Detected	None Detected	None Detected
			100

<b>Lab No.:</b> 5092225	<b>Description / Location:</b> Green Mastic		
<b>Client No.:</b> MAS-02-C			
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>
None Detected	None Detected	None Detected	None Detected
			100

<b>Lab No.:</b> 5092226	<b>Description / Location:</b> Tan Mastic		
<b>Client No.:</b> MAS-03-A			
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>
None Detected	None Detected	None Detected	None Detected
			100

<b>Lab No.:</b> 5092227	<b>Description / Location:</b> Tan Mastic		
<b>Client No.:</b> MAS-03-B			
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>
None Detected	None Detected	None Detected	None Detected
			100

**Accreditations:** **NIST-NVLAP No. 101165-0**      **NY-DOH No. 11021**      **AIHA-LAP, LLC No. 100188**  
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**Analytical Method:** EPA 600/R-93/116, by Polarized Light Microscopy

**Comments:** Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

**Analysis Performed By:** S. Robb

**Date:** 8/14/2013

**CERTIFICATE OF ANALYSIS****Client:** XCG Consultants Ltd.  
820 Trillium Drive  
Kitchener ON, Canada N2R 1K4**Report Date:** 8/14/2013  
**Report No.:** 312234  
**Project:**  
**Project No.:** 1-336-183-01**BULK SAMPLE ANALYSIS SUMMARY**

<b>Lab No.:</b> 5092228	<b>Description / Location:</b> Tan Mastic			
<b>Client No.:</b> MAS-03-C				
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

<b>Lab No.:</b> 5092229	<b>Description / Location:</b> White Caulk			
<b>Client No.:</b> CK-01-A				
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

<b>Lab No.:</b> 5092230	<b>Description / Location:</b> White Caulk			
<b>Client No.:</b> CK-01-B				
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

<b>Lab No.:</b> 5092231	<b>Description / Location:</b> White Caulk			
<b>Client No.:</b> CK-01-C				
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Accreditations:** **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188***This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any agency of the U.S. government  
This report shall not be reproduced except in full, without written approval of the laboratory.***Analytical Method:** EPA 600/R-93/116, by Polarized Light Microscopy**Comments:** Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.**Analysis Performed By:** S. Robb**Date:** 8/14/2013

## CERTIFICATE OF ANALYSIS

**Client:** XCG Consultants Ltd.  
820 Trillium Drive  
Kitchener ON, Canada N2R 1K4

**Report Date:** 8/14/2013  
**Report No.:** 312234  
**Project:**  
**Project No.:** 1-336-183-01

### BULK SAMPLE ANALYSIS SUMMARY

**Lab No.:** 5092232      **Description / Location:** Black Cove Base  
**Client No.:** CB-01-A

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092232      **Description / Location:** Tan Mastic      **Layer No.:** 2  
**Client No.:** CB-01-A

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092233      **Description / Location:** Black Cove Base  
**Client No.:** CB-01-B

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092233      **Description / Location:** Tan Mastic      **Layer No.:** 2  
**Client No.:** CB-01-B

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Accreditations:**      **NIST-NVLAP No. 101165-0**      **NY-DOH No. 11021**      **AIHA-LAP, LLC No. 100188**  
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**Analytical Method:**      EPA 600/R-93/116, by Polarized Light Microscopy

**Comments:**      Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

**Analysis Performed By:**      S. Robb

**Date:**      8/14/2013

## CERTIFICATE OF ANALYSIS

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**Report Date:** 8/14/2013  
**Report No.:** 312234  
**Project:**  
**Project No.:** 1-336-183-01

### BULK SAMPLE ANALYSIS SUMMARY

<b>Lab No.:</b> 5092234	<b>Description / Location:</b> Black Cove Base		
<b>Client No.:</b> CB-01-C			
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>
None Detected	None Detected	None Detected	None Detected
			<u>% Non-Fibrous Material</u> 100

<b>Lab No.:</b> 5092235	<b>Description / Location:</b> Grey Cove Base		
<b>Client No.:</b> CB-02-A			
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>
None Detected	None Detected	None Detected	None Detected
			<u>% Non-Fibrous Material</u> 100

<b>Lab No.:</b> 5092235	<b>Description / Location:</b> Tan Mastic		<b>Layer No.:</b> 2
<b>Client No.:</b> CB-02-A			
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>
None Detected	None Detected	None Detected	None Detected
			<u>% Non-Fibrous Material</u> 100

<b>Lab No.:</b> 5092236	<b>Description / Location:</b> Grey Cove Base		
<b>Client No.:</b> CB-02-B			
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>
None Detected	None Detected	None Detected	None Detected
			<u>% Non-Fibrous Material</u> 100

**Accreditations:** **NIST-NVLAP No. 101165-0**      **NY-DOH No. 11021**      **AIHA-LAP, LLC No. 100188**  
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**Analytical Method:** EPA 600/R-93/116, by Polarized Light Microscopy

**Comments:** Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

**Analysis Performed By:** S. Robb

**Date:** 8/14/2013

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**Report Date:** 8/14/2013  
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**Project:**  
**Project No.:** 1-336-183-01

### BULK SAMPLE ANALYSIS SUMMARY

**Lab No.:** 5092237      **Description / Location:** Grey Cove Base  
**Client No.:** CB-02-C

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092237      **Description / Location:** Tan Mastic      **Layer No.:** 2  
**Client No.:** CB-02-C

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092238      **Description / Location:** Green Cove Base  
**Client No.:** CB-03-A

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092238      **Description / Location:** Tan Mastic      **Layer No.:** 2  
**Client No.:** CB-03-A

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Accreditations:**      **NIST-NVLAP No. 101165-0**      **NY-DOH No. 11021**      **AIHA-LAP, LLC No. 100188**  
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**Analytical Method:**      EPA 600/R-93/116, by Polarized Light Microscopy

**Comments:**      Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

**Analysis Performed By:**      S. Robb

**Date:**      8/14/2013

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**Project No.:** 1-336-183-01

### BULK SAMPLE ANALYSIS SUMMARY

<b>Lab No.:</b> 5092239	<b>Description / Location:</b> Green Cove Base			
<b>Client No.:</b> CB-03-B				
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

<b>Lab No.:</b> 5092239	<b>Description / Location:</b> Tan Mastic	<b>Layer No.:</b> 2		
<b>Client No.:</b> CB-03-B				
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

<b>Lab No.:</b> 5092240	<b>Description / Location:</b> Green Cove Base			
<b>Client No.:</b> CB-03-C				
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

<b>Lab No.:</b> 5092240	<b>Description / Location:</b> Grey Mastic	<b>Layer No.:</b> 2		
<b>Client No.:</b> CB-03-C				
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Accreditations:** **NIST-NVLAP No. 101165-0**      **NY-DOH No. 11021**      **AIHA-LAP, LLC No. 100188**  
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**Analytical Method:** EPA 600/R-93/116, by Polarized Light Microscopy

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**Analysis Performed By:** S. Robb

**Date:** 8/14/2013

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820 Trillium Drive  
Kitchener ON, Canada N2R 1K4**Report Date:** 8/14/2013  
**Report No.:** 312234  
**Project:**  
**Project No.:** 1-336-183-01**BULK SAMPLE ANALYSIS SUMMARY**

<b>Lab No.:</b> 5092241	<b>Description / Location:</b> Blue Cove Base			
<b>Client No.:</b> CB-04-A				
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

<b>Lab No.:</b> 5092241	<b>Description / Location:</b> Tan Mastic	<b>Layer No.:</b> 2		
<b>Client No.:</b> CB-04-A				
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

<b>Lab No.:</b> 5092242	<b>Description / Location:</b> Blue Cove Base			
<b>Client No.:</b> CB-04-B				
<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Accreditations:** **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188***This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any agency of the U.S. government  
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**Report Date:** 8/14/2013  
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**Project:**  
**Project No.:** 1-336-183-01

### BULK SAMPLE ANALYSIS SUMMARY

**Lab No.:** 5092243      **Description / Location:** Blue Cove Base  
**Client No.:** CB-04-C

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092243      **Description / Location:** Tan Mastic      **Layer No.:** 2  
**Client No.:** CB-04-C

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092244      **Description / Location:** Grey Insulation  
**Client No.:** PC-01-A

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
65	Chrysotile	15	Cellulose	20

**Lab No.:** 5092245      **Description / Location:** Grey Insulation  
**Client No.:** PC-01-B

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
65	Chrysotile	15	Cellulose	20

**Accreditations:**      **NIST-NVLAP No. 101165-0**      **NY-DOH No. 11021**      **AIHA-LAP, LLC No. 100188**

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**Analytical Method:**      EPA 600/R-93/116, by Polarized Light Microscopy

**Comments:** Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

**Analysis Performed By:**      S. Robb

**Date:**      8/14/2013

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**Project:**  
**Project No.:** 1-336-183-01

**BULK SAMPLE ANALYSIS SUMMARY**

**Lab No.:** 5092246 **Description / Location:** Grey Insulation  
**Client No.:** PC-01-C

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
65	Chrysotile	15	Cellulose	20

**Lab No.:** 5092247 **Description / Location:** White Joint Compound  
**Client No.:** DJC-A

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092248 **Description / Location:** Sample Not Analyzed  
**Client No.:** DJC-B

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
	Sample Not Analyzed		Sample Not Analyzed	

**Lab No.:** 5092249 **Description / Location:** White Joint Compound  
**Client No.:** DJC-C

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Accreditations:** **NIST-NVLAP No. 101165-0** **NY-DOH No. 11021** **AIHA-LAP, LLC No. 100188**

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**Analytical Method:** EPA 600/R-93/116, by Polarized Light Microscopy

**Comments:** Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

**Analysis Performed By:** S. Robb

**Date:** 8/14/2013

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### BULK SAMPLE ANALYSIS SUMMARY

**Lab No.:** 5092250      **Description / Location:** White Joint Compound  
**Client No.:** DJC-D

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092251      **Description / Location:** White Joint Compound  
**Client No.:** DJC-E

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092252      **Description / Location:** White Joint Compound  
**Client No.:** DJC-F

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Lab No.:** 5092253      **Description / Location:** White Joint Compound  
**Client No.:** DJC-G

<u>% Asbestos</u>	<u>Type</u>	<u>% Non-Asbestos Fibrous Material</u>	<u>Type</u>	<u>% Non-Fibrous Material</u>
None Detected	None Detected	None Detected	None Detected	100

**Accreditations:**      **NIST-NVLAP No. 101165-0**      **NY-DOH No. 11021**      **AIHA-LAP, LLC No. 100188**

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**Analytical Method:**      EPA 600/R-93/116, by Polarized Light Microscopy

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**Analysis Performed By:**      S. Robb

**Date:**      8/14/2013