

THE FOLLOWING ADDENDUM SUPERCEDES INFORMATION CONTAINED IN DRAWINGS AND SPECIFICATIONS ISSUED FOR THE PROJECT TO THE EXTENT REFERENCED. THIS ADDENDUM FORMS PART OF THE TENDER DOCUMENTS AND IS SUBJECT TO ALL OF THE CONDITIONS SET OUT IN THE CONTRACT CONDITIONS.

1. ARCHITECTURAL SPECIFICATIONS

.1 Add : Appendix 6 – Hazardous Materials Survey Site Services Building (55 pages)

.1 Refer the hazardous material survey of the Site Services Building.

2. ELECTRICAL ADDENDUM

.1 Refer to Electrical Addendum No. 4 (6 page).

.3 QUESTIONS AND ANSWERS

Q1. Please provide a current survey of the site so we can determine the amount of blasting and excavation still required

A1. Refer to Site Plan WA-03 and SA-03 Existing Site Plan issued in Addendum 2.

Q2. Please provide a hazardous materials report for the demolition required for the existing building.

A2. Refer hazmat report included in this addendum.

END OF ADDENDUM NO. 3

NRC HERZBERG ASTRONOMY & ASTROPHYSICS

ATP INTEGRATION FACILITY

VICTORIA, BRITISH COLUMBIA

Project No: R. 077596.001

APPENDIX 6

Hazardous Materials Survey

Site Services Building

Prepared for:
National Research Council Canada

Victoria, BC V9A 1B3

Hazardous Materials Survey

**Site Services
Victoria, BC
NWEG Project 20127**



Prepared by



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EXECUTIVE SUMMARY

Introduction

North West Environmental Group Ltd. was retained by NRC - National Research Council of Canada to conduct a Hazardous Materials Assessment at the NRC Research Facilities, Site Services.

The surveys were conducted on various dates between May 27th 2013 and - June 28th 2013.

No previous Hazardous Building Materials Assessment reports and documentation were available. Non-destructive floor-by-floor, room-by-room assessments of all building areas were conducted in order to identify hazardous materials and their condition.

Identification of all sampling locations were made on detailed floor plans, and a summary of remedial recommendations made by priority.

FINDINGS AND RECOMMENDATIONS

Asbestos

Table 0.1: Asbestos Containing Materials Summary-

Asbestos containing materials were identified to be in the following materials/locations:			
Sample ID	Building	Material	Recommendation
20127-02	Site Services – Room 013	Sheet Flooring – Green Stone Mosaic	Action 5/6

As per the clients request, non-invasive investigative techniques were used. Even with the most invasive survey techniques, however, it should be noted that the possibility remains for other concealed materials to be found during a renovation or demolition.

Given the non-invasive nature of this survey, concrete block walls were not cored to check for the presence of vermiculite. Asbestos containing vermiculite was verified present within concrete block walls elsewhere on the subject site. All concrete block walls should be assumed to contain asbestos containing vermiculite until invasive evaluation by a qualified professional proves otherwise.

Warning: in the event any additional suspect materials are encountered during demolition or renovation activities, work on those materials must stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material. If this any materials suspected of containing asbestos or another hazardous material are disturbed during the work, all work shall stop until the area is contained, the hazard evaluated by a qualified professional and the hazardous materials, if indeed present, is safely managed by a qualified contractor.



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Lead

Table 0.2: Paint Chip Sampling Results by Flame AAS (SW 846 3050B*/7000B)

Sample #	Date Tested	Location	Lead Concentration % by Weight	Lead Concentration (mg/kg)
20127-12	08/07/2013	Site Services Exterior – White Paint Chips	0.00093	0.93

Paint

Overall, paint coatings were found to be in good to fair condition. Where damaged and deteriorating, paint should be removed following procedures designed to protect the workers from heavy metal exposure and to avoid the spread of contamination. Lead content of painted materials should not increase their disposal costs however; concentrated paint chips would need to be disposed as hazardous waste. Routine removal of lead paint is not recommended; rather it should be managed in place and removed on an “as needed” basis.

Elemental Lead

No sources of elemental lead were observed in the way of planned work. If lead materials are found they are typically recognized as having significant salvage value, disposal therefore should not be a major concern. Workers should exercise caution if heat is to be used to melt any lead found as means of facilitating its extraction. Molten lead can produce significant quantities of inhalable lead fume which can pose a severe health hazard. The BC Occupational Health and Safety Regulation requires that worker exposure to airborne lead be kept below 0.05 mg/m³.

Lead within the copper water pipes/fittings was not tested for lead content however lead content in solder, especially from buildings of this vintage, is known to reach levels up to 98% lead.

Mercury Containing Equipment

Mercury-containing equipment was observed at the subject site during the survey. This equipment includes: fluorescent light tubes. Specific locations are outlined within Section 9.0.

Mercury-containing equipment should be removed prior to any demolition activities and be packaged for transport and storage or disposal/destruction at a licensed facility. Alternatively, if functional, these units could be re-used for their original intended purpose. Caution should be exercised to ensure that mercury-containing equipment is not broken, releasing droplets of mercury or mercury vapor.

Ozone Depleting Substances

Equipment (refrigerator units) potentially containing ozone depleting substances (ODS) were observed at the subject site. Specific locations are outlined within Section 9.0.

NRC maintains a chlorofluorocarbon inventory. Inspect all equipment potentially containing ozone depleting substances prior to disposal.

Crystalline Silica

Testing for crystalline silica in dust was not completed/conducted as part of this survey however it is known to be a component of concrete dust. All concrete, plaster and stucco is suspected of containing silica in crystalline and non-crystalline forms. Many of the removal techniques (grinding, cutting, chipping etc.) for these materials can generate high levels of crystalline silica in the air.

Use wetting techniques and/or HEPA equipped extraction systems attached to drills and other power equipment where possible in order to decrease dust levels.

Mould

Mould was not observed within the building.

Polychlorinated Biphenyls (PCB) in Electrical Equipment

Fluorescent light fixtures were observed and appeared to be of varying vintages often found to contain ballasts which Environment Canada (EC) has developed a guideline called - *Identification of Lamp Ballasts Containing PCBs –Environment Canada 1991*.

Manufacturers of ballasts and capacitors use distinct catalogue and date codes to identify their product, its date of manufacture, and, for some capacitors, its dielectric fluid. Fluorescent lamp ballasts are usually mounted between the fluorescent tubes on the light fixture and are shielded with a metal protective device which reduces heat radiation. Due to the fact the covers are easily broken and the risk of electrical shock when accessing the ballast, it is standard practice to make the observation that there is a potential for PCBs to be present and have the ballasts inspected prior to disposal.

NRC maintains an active halocarbon inventory. Inspect all light ballasts for the presence of PCB prior to disposal. PCB containing ballasts must be disposed as hazardous waste.

Hantavirus-Animal Droppings

Materials suspected of containing Hantavirus were not observed during the survey.

Workers accessing areas where rodent or other animal droppings may be present must be informed of the potential risk of Hantavirus exposure and employ suitable precautions for personal protection and control of the spread of contamination.



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Urea-formaldehyde Foam Insulation (UFFI)

No materials suspected of containing urea-formaldehyde foam insulation were observed during the survey.

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See General Notes

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LIST OF ACRONYMS

ACM.....	asbestos-containing materials
ALARA	As Low As Reasonably Achievable
AMP	Asbestos Management Program
CFCs.....	chlorofluorocarbons
EC.....	Environment Canada
EMA.....	Environmental Management Act
HCFCs	hydrochlorofluorocarbons
HFCs.....	hydrofluorocarbons
HPA	Hazardous Products Act
HWR	Hazardous Waste Regulation
NRC	National Research Council
NWEG.....	North West Environmental Group
ODS	ozone-depleting substances
PCBs.....	Polychlorinated biphenyls (PCBs)
SCMR	Surface Coating Materials Regulation
SOW	Statement of Work
WMO.....	United Nations World Meteorological Organization



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See General Notes

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1.0 INTRODUCTION

North West Environmental Group Ltd. was retained by NRC - National Research Council of Canada to conduct a Hazardous Materials Assessment Survey at the Research Facilities, Site Services. The facility is referred to as the "subject site" or "site" throughout this document. The site location is shown on Drawing 1.

The surveys were conducted between May 27th 2013 and - June 28th 2013 by Julie Scott-Moncrieff, Will Roff, and Dan Morton, Industrial Hygienists from North West Environmental Group Ltd.

Note: this document is detailed review of hazardous materials found within the building fabric of the site; however, it cannot be considered an absolute listing of all hazardous materials present within the structure. Occupant supplies and processes were not generally considered except where they may have contaminated the building fabric and some materials may have been concealed within enclosed areas of the building structure and not visible to the inspectors at the time of the survey. In the event that materials suspected of containing asbestos, heavy metals or other hazardous components are uncovered or impacted during operations, maintenance, renovation, construction or demolition activities, all work must stop until such time as the materials can be evaluated by a qualified person and appropriate precautions are employed to protect workers and building occupants.



2.0 SCOPE OF WORK

- Non-destructive, room-by-room assessment of all building areas, identifying the location, accessibility to personnel, type of material (e.g. vinyl floor tiles, wall paint, thermostat) and condition of all asbestos-containing materials (including vermiculite insulation), lead materials, mercury containing equipment, ozone depleting substances (ODS), crystalline silica, mould, polychlorinated biphenyl's (PCBs), Hantavirus, urea formaldehyde foam insulation (UFFI), arsenic, radioactive materials, above ground storage tanks (AGST), and other chemical hazards.

Site Services was assessed:

- Sampling and subsequent analysis to ascertain the amount of hazardous materials within the subject site using a laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).
- Identification of all sampling locations on detailed floor plans, distinguishing between those that are confirmed to be hazardous and those that are not.
- Preparation of a separate summary of costs for repair, encapsulation or removal of the asbestos containing materials and other hazardous materials, presented as remedial options and report detailing the results, conclusions and recommendations as well as an abatement cost estimate, if necessary.

3.0 SITE DESCRIPTION

3.1 Site Location

The NRC - National Research Council of Canada is located in Victoria, BC, on the southern tip of Vancouver Island. The site is located as shown in Appendix A.

See Appendix A for map of Site Location and Plan.

4.0 REGULATORY FRAMEWORK, GUIDELINES AND CODES

4.1 Federal Occupational Health and Safety

In Federal jurisdictions, asbestos-containing materials (ACM) are regulated 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 competent persons;
- 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.

4.2 BC Occupational Health and Safety Regulation

Most of the employees working in the buildings are Federal employees and are subject to the federal OHSA. However the majority of contractors and some site tenants Workplace health and safety is regulated in British Columbia by WorkSafeBC under the *Workers' Compensation Act* (effective April 15, 1998), as amended by *Workers' Compensation (Occupational Health and Safety) Amendment Act* (effective October 1, 1999). The Act defines the general duties and obligations of the employer, employees and others at the work site.

Under this regulation, employers are required to:

- Maintain a record of all hazardous materials;
- Undertake a hazard investigation by competent persons;
- 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

WorkSafeBC Regulations apply to the handling of materials containing designated substances and the prevention of possible worker exposures. Permissible exposure limits to these designated substances, which include asbestos, lead, mercury and arsenic, are established by the American Conference of Governmental Industrial Hygienists (ACGIH) and adopted by WorkSafeBC.

4.3 Environmental Management Act

The *Environmental Management Act* (EMA), brought into force in July 2004, is the principle environmental statute in British Columbia. The EMA prohibits the introduction of waste into the environment in such a manner or quantity as to cause pollution, except in accordance with a regulation, permit, approval or code of practice issued under the Act. The Hazardous Waste Regulation (HWR) addresses the proper

handling, transport and disposal of hazardous wastes, under provisions of the EMA. While the Provincial Regulations do not apply directly to the sites operated by the Federal Government, they do apply when the materials are removed from the site for disposal.

4.4 BC Occupational Health and Safety Regulation

WorkSafeBC Regulations apply to the handling of materials containing designated substances and the prevention of possible worker exposures. These designated substances, which include lead, mercury and arsenic, are established by the American Conference of Governmental Industrial Hygienists (ACGIH) and adopted by WorkSafeBC.

Where worker exposure to a designated substance may exceed 50% of the threshold limit value for a substance, WorkSafeBC requires that the employer establish an exposure control plan. All routes of entry must be considered when establishing the extent of worker exposure. Exposure limits are summarized in Table 4.4.1.

Table 4.4.1: ACGIH / WorkSafeBC Exposure Limits

Substance [CAS No.]	Time Weighted Average (TWA)
Asbestos - All forms [1332-21-4]	0.1 f/cc (F)
Lead - elemental and inorganic compounds, as Pb [7439-92-1]	0.05 mg/m ³
Silica, Crystalline - alpha quartz [14808-60-7; 1317-95-9] and Cristobalite, Respirable [14464-46-1] Revised 2006	0.025 mg/m ³

4.5 Hazardous Products Act, Surface Coating Materials Regulation

The *Hazardous Products Act (HPA), Surface Coating Materials Regulation (SOR/2005-109) (SCMR)* permits the advertising, sale and labeling of surface coatings (including paint) that meet the following criteria set out below. Quantities of lead and mercury are specifically limited. Other heavy metals are not addressed in this regulation.

There has been confusion in the past regarding the limits for lead and mercury in paint and how that relates to worker safety and disposal. An explanation of the SCMR limits for paint and mercury are included in this report to help alleviate this confusion. Although a given paint sample may have concentrations of lead and mercury lower than the limits specified within the SCMR, worker exposure may still occur if sufficient quantities of lead and/or mercury are inhaled, ingested or absorbed through the skin. The risk to workers posed by heavy metal containing coatings is proportional to the work undertaken. Heavy metal laden coatings that are not disturbed pose little risk to non-pre-school aged building occupants.

5.0 SPECIFIC HAZARDOUS MATERIALS

Asbestos

Projects that will result in the disturbance of asbestos-containing materials (ACMs) must satisfy WorkSafeBC's regulations and conform to the guidance document Safe Work Practices for Handling of Asbestos. WorkSafeBC's Occupational Health and Safety Regulation defines an asbestos-containing material as "any manufactured article or other material, other than vermiculite insulation, that would be determined to contain at least 0.5% or more asbestos if tested in accordance with one of the following methods:

METHOD 1

- I. Asbestos, Chrysotile by XRD, Method 9000 (Issue 2, dated August 15, 1994) in the NIOSH Manual of Analytical Methods, published by the United States National Institute for Occupational Safety and Health, Centre for Disease Control;
- II. Asbestos (bulk) by PLM, Method 9002 (Issue 2, dated August 15, 1994) in the NIOSH Manual of Analytical Methods, published by the United States National Institute for Occupational Safety and Health, Centre for Disease Control;
- III. Test Method for the Determination of Asbestos in Bulk Building Materials (EPA/600/R-93/116, dated July 1993) published by the United States Environmental Protection Agency;

METHOD 2

- I. Vermiculite insulation that would be determined to contain any asbestos if tested in accordance with the Research Method for Sampling and Analysis of Fibrous Amphibole in Vermiculite Attic Insulation (EPA/600/R-04/004, dated January 2004) published by the United States Environmental Protection Agency;

The asbestos-containing material can also be characterized as friable and non-friable. Friable asbestos "means any material which, when dry, can be easily crumbled or powdered by hand pressure, or a material that is crumbled or powdered" as defined under the BC Occupational Health and Safety Regulation. The condition of the asbestos and classifications would be used in assessing the level of action required with respect to re-use of the building.

Worker exposure to asbestos fibres is also regulated by the BC Occupational Health and Safety Regulation. The WorkSafeBC eight-hour time-weighted average (TWA) for asbestos fibres (all forms) is 0.1 fibre/cm³. Exposure to these substances must be kept as close to zero as is reasonably practicable.

Bulk samples are collected in accordance with NIOSH Analytical Method 9002 and the WorkSafeBC guideline document, Safe Work Practices for Handling Asbestos.



Asbestos is designated as an ALARA substance; worker exposure to this product must be kept “as low as reasonably achievable” (ALARA). Employers are required under Section 5.54 (Exposure control plan) of the Occupational Health and Safety Regulation (OHSR) to develop an exposure control plan (ECP) when workers are or may be exposed to airborne concentrations of these materials in excess of 50% of the exposure limit.

Lead

Paints containing lead may be advertised, sold or imported into Canada when under standardized testing conducted on a dried sample of the coating indicates that lead concentrations do not exceed 600 mg/kg.

In 2005 the federal Surface Coating Materials Regulation was amended to reduce this threshold from 5,000 mg/kg to 600 mg/kg and then to 90 mg/kg in 2010. As paints under this concentration of lead are acceptable for use in residential settings today, such coatings do not pose a significant hazardous material issue unless rendered airborne within a worker’s breathing zone by fine dust generating processes.

Paints that exceed this concentration threshold are prohibited to be advertised, sold or imported into Canada unless they meet certain conditions of use and labeling.

Permitted uses include:

- as an anti-corrosive or an anti-weathering coating applied on the interior or exterior surface of any building or equipment that is used for an agricultural or industrial purpose;
- as an anti-corrosive or an anti-weathering coating applied on any structure, other than a building, that is used for an agricultural, industrial or public purpose;
- as a touch-up coating for metal surfaces;
- on traffic signs;
- for graphic art on billboards or similar displays;
- for identification marks in industrial buildings; or
- as material for the purposes of arts, crafts or hobbies, other than material for use by children.

Paint

Paints often contain heavy metals as pigments and/or preservatives. Common heavy metal additives to paints are lead, mercury, and arsenic. Under specific circumstances, persons may be exposed to these metals by ingestion, skin absorption and/or inhalation.

Other than during the application process, the primary mechanism of exposure for workers would be the inhalation of dusts through activities such as sanding, scraping, drilling, crushing, heating, burning or other processes likely to damage the coatings themselves. Paints containing heavy metals pose little risk to workers when in good condition and when undisturbed.

Although limits are currently imposed in the quantities of lead permitted in paints intended for specific uses, lead content below these limits may still pose a health hazard if rendered airborne and inhaled, ingested or absorbed through the skin. The same applies to mercury. The Hazardous Products Act, Surface Coating Materials Regulation (SOR/2005-109) (SCMR) permits the advertising, sale and labeling of surface coatings (including paint) that meet the following criteria set out below. Quantities of lead and mercury are specifically limited. Other heavy metals are not addressed in this regulation.

In 1976, the amount of lead that could be added to interior paints was limited by law, but exterior paints could still contain higher amounts of lead, provided they carried a warning label. Under the Surface Coating Materials Regulations, which came into effect in 2005, the lead limit was further reduced (from Health Canada). The 600 mg/kg maximum total lead standard is the same as that proposed for paints and other liquid coating materials used for furniture, household products, children's products, and exterior and interior surfaces of any building frequented by children, under the recent amendment to the Hazardous Products Act Liquid Coating Materials Regulations. It is also the same standard prescribed by the U.S. Consumer Product Safety Commission Regulation 16 CFR Part 1303, for paint and other liquid coatings for residential use, toys and furniture (97). This limit was determined by a risk assessment which calculated that 600 mg/kg of lead in paint was the threshold level, at or below which there would be no significant lead exposure if a child consumed a one square inch paint chip each day.

When lead is present in paint, there is a potential for airborne exposure of lead to workers. Airborne exposure can occur if the material is disturbed (especially if the lead containing materials are hand sanded); hand demolished and/or any other disturbances are made to the coating. An exposure control plan is necessary if workers are, or may be, exposed to lead in excess of 50 % of the exposure limit established by the Workers' Compensation Board (WorkSafeBC) for an 8 hours total weighted average exposure, or if exposure through any route of entry could cause elevated levels of lead in the blood. Lead precautions during demolition or renovation may be required, including the use of personal protective equipment for workers and/or dust suppression methods.

Mercury Containing Equipment

Mercury is hazardous substance, and any maintenance or abatement involving materials containing mercury or mercury compounds must be done in compliance with the BC Occupational Health and Safety Regulations (BCOHSR).

Employers with workers who have a risk of exposure must have an exposure control plan (ECP) in place prior to allowing their workers to come into contact with this material. As with all other hazardous substances, all personnel working around or with such materials must be made aware of their presence and be supplied with training in the potential health effects and means of avoiding exposures.

As a hazardous substance, transportation and disposal of this substance must be done in compliance with the federal Transportation of Dangerous Goods (TDG) Regulations and the BC Hazardous Waste Regulation. Mercury is found in

fluorescent light bulbs, thermostats, manometers, and equipment such as electrical switches.

Mercury is designated as an ALARA substance whereby worker exposure to this product must be kept “as low as reasonably achievable”. Employers are required under Section 5.54 (Exposure control plan) of the Occupational Health and Safety Regulation (OHSR) to develop an exposure control plan (ECP) when workers are or may be exposed to airborne concentrations of this material in excess of 50% of the exposure limit.

Ozone-depleting Substances (CFCs/ODS)

Chlorofluorocarbons (CFCs) are ozone-depleting substances (ODS) and a type of halocarbon. ODS are regulated by the *Canadian Environmental Protection Act* under the *Ozone-Depleting Substances Regulations 1998 SOR/99-7* and the *Federal Halocarbon Regulations (FHR) SOR/99-225*. Compounds that contain only chlorine, fluorine and carbon are called CFCs. These materials are used in refrigeration systems and in fire suppression systems. The other main refrigerants are hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs) and blends of fluorocarbons (designated by “R”).

In BC these substances are regulated under the BC Ozone Depleting Substances and Other Halocarbons Regulation.

While the regulations allow the continued use of halocarbon refrigerants, they strictly prohibit any person from releasing any halocarbons into the environment.

In the case of demolition, ODS will require proper recovery and disposal. The BC Ozone-Depleting Substances Regulations would also apply to any CFC/ODS abatement procedures. These regulations require that all ODS be collected, stored and recycled, or collected and disposed of accordingly.

Crystalline Silica

Crystalline silica is a substance which is considered hazardous by inhalation and can result in serious and sometimes fatal lung disease. The ACGIH and WorkSafeBC, under the Occupational Health and Safety Regulation and the Canada Labour Code specify an exposure limit of 0.025 mg/m³.

Mould

Within the BC Occupational Health and Safety Regulations, there are no established permissible exposure levels for mould spores in air. This means that there are no published concentrations above which worker exposure is deemed to be hazardous and under which workers would not need respiratory protection. WorkSafeBC does, however, provide guidance on protocols for protecting workers from the hazards of airborne mould and bacteria within the section(s) of the Regulation guidelines addressing Indoor Air Quality.

Various other many guidelines are provided for addressing mould in Canada including:

- The Institute of Inspection, Cleaning and Restoration and Certification (IICRC) standard S500 governing both water damage restoration and entitled: Standard for Professional Water Damage Restoration – S500. This document is approved by the American National Standards Institute (ANSI)
- Health Canada: Fungal contamination in public buildings: A guide to recognition and management, 1995
- Health Canada. Fungal Contamination in Public Buildings: Health Effects and Investigation Methods, 2004

These guidelines also state that any non-porous (metal, glass and hard plastics) and semi-porous (wood and concrete) materials that are structurally sound and visibly mouldy can be cleaned and re-used. However, porous materials such as ceiling tiles, wallpaper, insulation, drywall, and sometimes carpets with more than a small area of contamination should be removed and discarded.

Polychlorinated Biphenyls

Polychlorinated biphenyls (PCBs) are regulated under both Federal (*Canadian Environmental Protection Act*) and Provincial (*BC Hazardous Waste Regulation*) legislation and must be treated as PCB waste and be stored and disposed of accordingly.

Each fluorescent light fixture removed during facility renovation or demolition should have the ballast checked to determine if it contains PCBs. Ballasts containing PCBs must be removed, sorted and transported to a licensed facility. Although rare, paints have been known to contain PCBs.

Hantavirus – Rodent Droppings

The Hantavirus is a virus associated with Hantavirus Pulmonary Syndrome, a disease caught through contact with the urine or droppings, or by being bitten or scratched by infected rodents. The disease starts off like a cold or flu (fever, sore muscles, headaches, nausea, vomiting), but progresses to pneumonia-like conditions within a few days. The change in intensity of the symptoms is very rapid and can result in fluid build-up in the lungs and respiratory failure.

Hantavirus is a hazardous substance and as such is regulated under the BC Occupational Health and Safety Regulation. Employers with workers who have a risk of exposure must have an exposure control plan (ECP) in place prior to allowing their workers to come into contact with this material. As with all other hazardous substances, all personnel working around or with such materials must be made aware of their presence and be supplied with training in the potential health effects and means of avoiding exposures.

Urea Formaldehyde Foam Insulation (UFFI)

UFFI was banned in 1978. All such material was to have been removed and replaced. Standard real estate agreements currently contain a “No UFFI” clause and as a best management practice, all buildings containing UFFI should have the material removed. UFFI is still found in many buildings in BC.

Arsenic

Arsenic is hazardous substance, and any maintenance or abatement involving materials containing arsenic or arsenic compounds must be done in compliance with the BC Occupational Health and Safety Regulations (BCOHSR).

Employers with workers who have a risk of exposure must have an exposure control plan (ECP) in place prior to allowing their workers to come into contact with this material. As with all other hazardous substances, all personnel working around or with such materials must be made aware of their presence and be supplied with training in the potential health effects and means of avoiding exposures.

Arsenic has long been used as a pesticide due to its toxic properties. Arsenical pesticides, often in the form of chromated copper arsenate (CCA), when applied with high pressure to wood, serve to extend the structural life of the material by making it resistant to mould, rot and insect infestation. Studies have shown that these materials have the ability to leach arsenic into the soil. Arsenic may also be found in paints. Although wood and wood dusts contaminated with arsenical pesticides do not require specialized disposal in BC, care must be exercised to minimize the potential for worker exposure to these materials through direct skin contact or through inhalation of dusts and fumes.

Radioactive Materials

Many buildings contain smoke alarms which contain small sealed radioactive sources in the form of ²⁴¹Americium. The Canadian Nuclear Safety Commission (CNSC) and the Canadian Nuclear Safety Act regulate radioactive materials. These materials are sealed into a metal case within the smoke detector and must not be damaged or tampered with. Smoke detectors intended for disposal must be handled in accordance with CNSC regulations.

Above Ground Storage Tanks (AGST)

Storage tanks containing fuels have the ability to leak over time and can result in soil and groundwater contamination. These tanks must be observed and checked over time to ensure they do not leak. Evidence of leaks must be investigated and any potential contamination remediated. The Canadian Council of Ministers of the Environment (CCME) publishes a Code of Practice for the safe management of aboveground and underground storage tanks.

Other Chemical Hazards

Storage and Handling of controlled products fall under the Hazardous Products Act and Workplace Hazardous Materials Information System (WHMIS).

6.0 METHODOLOGY

The methodology of the survey is summarized in the following sections.

Asbestos

The asbestos survey methodology and sampling procedure are outlined in the following sections.

Survey Methodology

The survey was designed to determine the type and extent of asbestos containing material (ACM) presence within the subject site. The survey was non-destructive and therefore did not include areas that were inaccessible at the time of the survey. Where practicable, sample volumes were minimized to avoid unnecessary damage to building systems. Specific building material components were examined within the building and include, where applicable:

- Structural – all visible structural components including walls, roofs and supporting members
- Mechanical systems - insulation, domestic hot and cold water, and caulks.
- Architectural – systems including: texture coats, sheet flooring, vinyl floor tile, ceiling tile, wall board, drywall joint compound, asbestos sheet products.

Where materials were observed that were suspected of containing asbestos, representative samples were collected. Eleven (11) samples of materials suspected of containing asbestos were collected and submitted with a chain of custody to the contract laboratory.

A complete listing of all materials suspected of containing asbestos that were sampled, including the results of analysis is found in Section 9 of this report.

Sampling Procedures

Bulk Samples

Sampling procedures for various building materials vary somewhat depending on the exact conditions at each site. In all cases standardized protocols are used for collecting samples for asbestos analysis. All accessible suspect materials that were visually unique were sampled. Visually similar materials were only sampled once unless known to be heterogeneous such as drywall joint compound.

Sampled materials were cut down to the base substrate to ensure that a representative sample was collected.

Paint

Painted surfaces were scraped down to the base substrate to ensure that all layers of paint were included. Paint samples were tested using the following analytical method:

- Lead: EMSL (SW 846 3050B*/7000B) Lead in Paint Chips by Flame Atomic Absorption Spectrophotometer

Mercury Containing Equipment

The subject site was inspected for the presence of mercury containing equipment. Devices suspected of containing mercury were documented so that they can be removed prior to demolition. These devices typically include fluorescent light tubes, thermostats, and manometers.

Ozone Depleting Substances (ODS) and Other Halocarbons

The subject building was inspected for the presence of devices that are known or suspected of containing to contain ODS or other halocarbons. Devices suspected of containing these materials were documented so that any hazardous materials can be removed prior to demolition or disposal of the equipment. These devices typically include refrigeration and air conditioning equipment.

Crystalline Silica

Testing for crystalline silica in dust was not completed/conducted as part of this survey however it is known to be a component of concrete dust. All concrete, plaster and stucco is suspected of containing silica in crystalline and non-crystalline forms. Many of the removal techniques (grinding, cutting, chipping etc) for these materials can generate high levels of crystalline silica in the air.

Mould

Within the BC Occupational Health and Safety Regulations, there are no established permissible exposure levels for mould spores in air. This means that there are no published concentrations above which worker exposure is deemed to be hazardous and under which workers would not need respiratory protection. WorkSafeBC does, however, provide guidance on protocols for protecting workers from the hazards of airborne mould and bacteria within the section(s) of the Regulation guidelines addressing Indoor Air Quality.

Various other guidelines are provided for addressing mould in Canada including:

- The Institute of Inspection, Cleaning and Restoration and Certification (IICRC) standard S500 governing both water damage restoration and entitled: Standard for Professional Water Damage Restoration – S500. This document is approved by the American National Standards Institute (ANSI)
- Health Canada: Fungal contamination in public buildings: A guide to recognition and management, 1995
- Health Canada. Fungal Contamination in Public Buildings: Health Effects and Investigation Methods, 2004

These guidelines also state that any non-porous (metal, glass and hard plastics) and semi-porous (wood and concrete) materials that are structurally sound and visibly mouldy can be cleaned and re-used. However, porous materials such as ceiling tiles,

wallpaper, insulation, drywall, and sometimes carpets with more than a small area of contamination should be removed and discarded.

Polychlorinated Biphenyls (PCB)

The Site was surveyed for the presence of PCBs in electrical equipment.

Manufacturers of ballasts and capacitors use distinct catalogue and date codes to identify their product, its date of manufacture, and, for some capacitors, its dielectric fluid. Fluorescent lamp ballasts are usually mounted between the fluorescent tubes on the light fixture and are shielded with a metal protective device which reduces heat radiation. In order to determine if fluorescent light ballasts contain PCB's the metal protective cover is removed while the power is off to the fixture. With the ballast exposed the date code is visible and can be referenced in the EC guideline.

For ballasts not stamped "no PCB", in most cases, fluorescent light ballasts need to be removed from the fixture before the date of manufacture can be determined. The date of manufacture is critical in establishing whether PCB may be present in the ballast capacitor.

Hantavirus

Observations were made by the technicians on site for the presence of rodent droppings and other evidence of rodent presence.

Urea-formaldehyde Foam Insulation

The subject site was inspected for the presence of UFFI. No sampling was undertaken for UFFI as materials suspected of containing UFFI were not observed.

Arsenic

The subject site was inspected for the presence of materials that are known or suspected of containing arsenic. Materials suspected of containing arsenic were documented so that they can be removed prior to demolition. These materials typically include wood likely to have been preserved with arsenical pesticides.

Radioactive Materials

Testing for radioactive materials was not included within the scope of the survey. However, smoke detectors are known to contain radioactive sources and other radioactive materials may have been used on the site in the past. Observations were made by the technician on site for the presence and locations of radioactive sources.

Above Ground Storage Tanks

Observations were made by the technician on site for the presence of aboveground storage tanks that may be in the way of planned work. The conducting of a Stage 1 preliminary site assessment was beyond the scope of this report.

7.0 FINDINGS AND RISK ASSESSMENT

The findings of the survey are discussed in the following sections. Photographs of sample locations are provided in Section 8.0. The asbestos risk assessment and indicative cost estimates are provided in this section. The analytical reports are provided in Appendix B.

Given the non-invasive nature of this survey, concrete block walls were not cored to check for the presence of vermiculite. Asbestos containing vermiculite was verified present within concrete block walls elsewhere on the subject site. All concrete block walls should be assumed to contain asbestos containing vermiculite until invasive evaluation by a qualified professional proves otherwise.

7.1 Asbestos in Bulk Building Material Samples

A total of eleven (11) samples of suspected asbestos containing materials were collected and submitted for analysis to the contract laboratory. The analytical results are provided in Appendix B.

Recommendations are based on Public Works and Government Services Canada Departmental Policy 057 – Asbestos Management (DP 057).

Asbestos Containing Materials must be managed under an Asbestos Management Plan (AMP). The purpose of the AMP is to assist the organization in managing ACM in a systematic fashion to ensure identified ACM are managed in a safe manner which complies with the Canada Labour Code and WorkSafeBC guidelines.

ACM in good condition may be managed in place in accordance with the implementation of the Asbestos Management Plan (AMP). Institute routine surveillance of the ACM. Trained workers or contractors must use appropriate asbestos precautions (Type 1, Type 2 or Type 3) during disturbance of the remaining ACM.

Inspect all identified asbestos containing materials annually to identify any damage and ensure proper labeling is present.

Any damaged ACM found during future inspections, as well as ACM that could be impacted by any demolition or renovation activity, should be removed following procedures outlined in the AMP.

Throughout any abatement activities, appropriate air monitoring and inspection should be conducted by qualified personnel to ensure all contamination is contained and ACM are disposed of appropriately. It is recommended that a proper scope of work and asbestos removal specifications be written to ensure the complete and proper removal of all ACM.

Table 7.1.1: Asbestos Containing Materials Summary-Current Survey

Asbestos containing materials were identified to be in the following materials/locations:			
Sample ID	Building	Material	Recommendation
20127-02	Site Services – Room 013	Sheet Flooring – Green Stone Mosaic	Action 5/6

Evaluation of asbestos containing materials is based on the condition of the material and its accessibility. Following are the guidelines used to evaluate ACMs and the action, if any, required to safely manage them.

Figure 7.1.1: Action Matrix from DP 057

ACCESS	CONDITION			
	GOOD	FAIR	POOR	DEBRIS
(A)	ACTION 5/7	ACTION 5/6	ACTION 3	ACTION 1
(B)	ACTION 7	ACTION 6/5	ACTION 3	ACTION 1
(C) exposed	ACTION 7	ACTION 6	ACTION 4	ACTION 2
(C) concealed	ACTION 7	ACTION 7	ACTION 4	ACTION 2
(D)	ACTION 7	ACTION 7	ACTION 7	ACTION 7

The following is excerpted from Public Works and Government Services Canada Departmental Policy 057 – Asbestos Management (DP 057).

Condition

Spray Applied Fireproofing, Insulation and Texture Finishes

In evaluating the condition of ACM spray applied as fireproofing, thermal insulation or texture, decorative or acoustic finishes, the following criteria apply;

GOOD	Surface of material shows no significant signs of damage, deterioration or delamination. Up to one percent visible damage to surface is allowed within range of GOOD. Evaluation of sprayed fireproofing requires the surveyor to be familiar with the irregular surface texture typical of sprayed asbestos products. GOOD condition includes unencapsulated or unpainted fireproofing or texture finishes, where no delamination or damage is observed, and encapsulated fireproofing or texture finishes where the encapsulation has been applied after the damage or fallout occurred.
POOR	Sprayed materials show signs of damage, delamination or deterioration. More than one percent damage to surface of ACM spray.

Mechanical Insulation

In evaluating the condition of mechanical insulation (on boilers, breeching, ductwork, piping, tanks, equipment etc.) the following criteria are used:

GOOD	Insulation is completely covered in jacketing and exhibits no evidence of damage or deterioration. No insulation is exposed. Includes conditions where the jacketing has minor surface damage (i.e., scuffs or stains), but the jacketing is not penetrated.
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FAIR	Minor penetration damage to jacketed insulation (cuts, tears, nicks, deterioration or delamination) or undamaged insulation that has never been jacketed. Insulation is exposed but not showing surface disintegration. The extent of missing insulation ranges should be minor to none.
POOR	Original insulation jacket is missing, damaged, deteriorated or delaminated. Insulation is exposed and significant areas have been dislodged. Damage cannot be readily repaired.

Non-Friable and Potentially Friable Materials

Non-friable materials generally have little potential to release airborne fibres, even when damaged by mechanical breakage. However, some non-friable materials, i.e., exterior asbestos Concrete products, may have deteriorated so that the binder no longer effectively contains the asbestos fibres. In such cases of significantly deteriorated non-friable material, the material will be treated as a friable product.

Accessibility

The accessibility of building materials known or suspected of being ACM is rated according to the following criteria:

Access (A)	Areas of the building within reach (from floor level) of all building users. Includes areas such as gymnasiums, workshops, and storage areas where activities of the building users may result in disturbance of ACM not normally within reach from floor level.
Access (B)	Frequently entered maintenance areas within reach of maintenance staff, without need for a ladder. Includes: frequently entered pipe chases, tunnels and service areas or areas within reach from a fixed ladder or catwalk, i.e., tops of equipment, mezzanines.
Access (C) Exposed	Areas of the building above 8'0" where use of a ladder is required to reach the ACM. Only refers to ACM materials that are exposed to view, from the floor or ladder, without removing or opening other building components such as ceiling tiles, or service access doors or hatches. Does not include infrequently accessed service areas of the building.
Access (C) Concealed	Areas of the building which require removal of a building component including lay-in ceilings and access panels into solid ceiling systems. Includes rarely entered crawl spaces, attic spaces etc. Observations are limited to the extent visible from the access points.
Access (D)	Areas of the building behind inaccessible solid ceiling systems, walls, or mechanical equipment, etc., where demolition or the ceiling, wall or equipment etc., is required to reach the ACM. Evaluation of condition and extent of ACM is limited or impossible, depending on the surveyor's ability to visually examine the materials in Access D.

Figure 7.1.2: Action Key

Action 1	Immediate Clean Up of Debris That is Likely to be Disturbed Restrict access that is likely to cause a disturbance of the ACM DEBRIS and clean up ACM DEBRIS immediately. Utilize correct asbestos procedures. This action is required for compliance with regulatory requirements.
Action 2	Entry Into Areas with ACM Debris At locations where ACM DEBRIS can be isolated in lieu of removal or clean up, use appropriate means to limit entry to the area. Restrict access to the area to persons utilizing Type 2 asbestos-work precautions. The precautions will be required until the ACM DEBRIS has been cleaned up, and the source of the DEBRIS has been stabilized or removed.
Action 3	ACM Removal Required for Compliance Remove ACM for compliance with regulatory requirements. Utilize asbestos procedures appropriate to the scope of the removal work.
Action 4	Access into Areas Where ACM is Present and Likely to be Disturbed by Access Use asbestos precautions when entry or access into an area likely to disturb the ACM. ACTION 4 must be used until the ACM is removed (Use ACTION 1 or 2 if DEBRIS is present).
Action 5	Proactive ACM Removal Remove ACM in lieu of repair, or at locations where the presence of asbestos in GOOD condition is not desirable.
Action 6	ACM Repair Repair ACM found in FAIR condition, and not likely to be damaged again or disturbed by normal use of the area or room. Upon completion of the repair work, treat ACM as material in GOOD condition and implement ACTION 7. If ACM is likely to be damaged or disturbed during normal use of the area or room, implement ACTION 5.
Action 7	Routine Surveillance Institute routine surveillance of the ACM. Trained workers or contractors must use appropriate asbestos precaution during disturbance of the remaining ACM.

Note: any additional suspect materials encountered during renovation or demolitions activities must be left undisturbed until testing determines the presence or absence of asbestos or other hazardous material. In the event they are damaged or otherwise impacted, all work shall stop until appropriate control can be put in place to protect workers and the public.

7.2 Lead

Lead Paint

Analysis of paint samples indicated that lead is present within exterior white paint at a concentration of 9.3 mg/kg. This paint sample was found to have a lead concentration below the threshold specified in the federal *Surface Coatings Material Regulation* SCMR of 90 mg/kg for new paint acceptable for use in residential applications.

Table 7.2.1: Paint Chip Sampling Results by Flame AAS (SW 846 3050B*/7000B)

Sample #	Date Tested	Location	Lead Concentration % by Weight	Lead Concentration (mg/kg)
20127-12	08/07/2013	Site Services Exterior – White Paint Chips	0.00093	9.3

Overall, paint coatings were found to be in good to fair condition . Where damaged and deteriorating, paint should be removed following procedures designed to protect the workers from heavy metal exposure and to avoid the spread of contamination. Lead content of painted materials should not increase their disposal costs however; concentrated paint chips would need to be disposed as hazardous waste. Routine removal of lead paint is not recommended; rather it should be managed in place and removed on an “as needed” basis.

Elemental Lead

Lead within the copper water pipes/fittings was not tested for lead content however lead content in solder, especially from buildings of this vintage, is known to reach levels up to 98% lead.

If lead materials are found they are typically recognized as having significant salvage value, disposal therefore should not be a major concern. Workers should exercise caution if heat is to be used to melt any lead found as means of facilitating its extraction. Molten lead can produce significant quantities of inhalable lead fume which can pose a severe health hazard. The BC Occupational Health and Safety Regulation require that worker exposure to airborne lead be kept below 0.05 mg/m³.

7.3 Mercury Containing Equipment

Mercury-containing equipment was observed at the subject site during the survey. This equipment includes: fluorescent light tubes. Specific locations are outlined within Section 9.0.

Mercury-containing equipment should be removed prior to any demolition activities and be packaged for transport and storage or disposal/destruction at a licenced facility. Alternatively, if functional, these units could be re-used for their original intended purpose. Caution should be exercised to ensure that mercury-containing equipment is not broken, releasing droplets of mercury or mercury vapor.

7.4 Ozone Depleting Substances

Equipment suspected of containing ozone depleting substances (ODS) was observed within the subject site. A Refrigerator is present.

7.5 Crystalline Silica

Testing for crystalline silica in dust was not completed/conducted as part of this survey however it is known to be a component of concrete dust. All concrete, plaster, ceramic tile and stucco is suspected of containing silica in crystalline and non-crystalline forms. Many of the removal techniques (grinding, cutting, chipping etc) for these materials can generate high levels of crystalline silica in the air.

Use wetting techniques and/or HEPA equipped extraction systems attached to drills and other power equipment where possible in order to decrease dust levels.

7.6 Mould

Mould was not observed within the building.

7.7 Polychlorinated Biphenyls (PCB) in Electrical Equipment

Fluorescent light fixtures were observed and appeared to be of varying vintages often found to contain ballasts which Environment Canada (EC) has developed a guideline called - *Identification of Lamp Ballasts Containing PCBs –Environment Canada 1991*.

Manufacturers of ballasts and capacitors use distinct catalogue and date codes to identify their product, its date of manufacture, and, for some capacitors, its dielectric fluid. Fluorescent lamp ballasts are usually mounted between the fluorescent tubes on the light fixture and are shielded with a metal protective device which reduces heat radiation. Due to the fact the covers are easily broken and the risk of electrical shock when accessing the ballast, it is standard practice to make the observation that there is a potential for PCBs to be present and have the ballasts inspected prior to disposal.

NRC maintains an active halocarbon inventory. Inspect all light ballasts for the presence of PCB prior to disposal. PCB containing ballasts must be disposed as hazardous waste.

7.8 Hantavirus-Animal Droppings

Materials suspected of containing Hantavirus were not observed during the survey.

Workers accessing areas where rodent or other animal droppings may be present must be informed of the potential risk of Hantavirus exposure and employ suitable precautions for personal protection and control of the spread of contamination.

7.9 UFFI

No sampling was undertaken for Urea Formaldehyde Foam Insulation (UFFI) as materials suspected of containing UFFI were not observed in the way of planned work.

7.10 Arsenic

Wood likely to have been preserved with arsenical pesticides was not observed on the subject site.

Although wood and wood dusts contaminated with arsenical pesticides do not require specialized disposal in BC, care must be exercised to minimize the potential for worker exposure to these materials through direct skin contact or through inhalation of dusts and fumes. Caution must be taken to ensure this material is not burned or composted if removed during renovation or demolition.

7.11 Radioactive Materials

Smoke detectors were not observed in the building.

If encountered, smoke detectors, that may be removed during the demolition and/or renovations should be collected and disposed in accordance with Canadian Nuclear Safety Commission regulations. Alternatively, if still functional, they may be reused for their original intended purpose.

7.12 Above Ground Storage Tanks

An aboveground storage tank was observed on the subject site. The conducting of a Stage 1 Preliminary Site Investigation was beyond the scope of this report.

Warning: in the event any additional suspect materials are encountered during demolition or renovation activities, work on those materials must stop immediately and remain undisturbed until testing confirms the presence or absence of asbestos or other hazardous material. If this any materials suspected of containing asbestos or another hazardous material are disturbed during the work, all work shall stop until the area is contained, the hazard evaluated by a qualified professional and the hazardous materials, if indeed present, is safely managed by a qualified contractor.

8.0 ABATEMENT COST ESTIMATE

- 1) Removal of all floor tiles at Site Services in anticipation of demolition using Type 2 (intermediate precautions)

Cost for the removal and disposal of this floor tile/mastic on a wood substrate: (including labor, materials, air sampling and inspection) is estimated at \$ 8.50/ft²

9.0 BULK SAMPLES

The following photo plate is a summary of the room by room assessment including samples collected.

Building: Site Services Exterior

Exterior Details:

- Sheet Metal Roofing
- Concrete Block Walls

Hazardous Materials Observed:

- **Asbestos:**
Concrete block may contain vermiculite.
- **Silica:**
Concrete and stucco materials contain silica.
- **AGST:**
Above ground storage tank observed.

Samples:

20127-12 Paint Chips - White (lead content: 9.3 mg/kg)



20127-12

Building: Site Services – Room 013

Interior Details:

- Ceiling: Drywall With Joint Compound
- Walls: Concrete Block, Drywall With Joint Compound
- Floors: **Sheet Flooring 2 – Green Stone Mosaic, Wood**

Hazardous Materials Observed:

- **Asbestos:**
Sheet Flooring 2 contains asbestos .

Concrete block may contain vermiculite.
- **PCB:**
Fluorescent light ballasts may contain PCBs, prior to modification, check ballast to determine if PCBs are present.
- **Mercury containing:**
Fluorescent light tubes contain mercury.

Samples:

- 20127-02** Sheet Flooring 2 – Green Stone Mosaic (Chrysotile 15%)
- 20127-06** Drywall Joint Compound (No asbestos detected)
- 20127-08** Pipe Wrap Textile (No asbestos detected)
- 20127-09** Parging on Concrete (No asbestos detected)



20127-02



20127-06



20127-08



20127-09



Building: Site Services – Room 011

Interior Details:

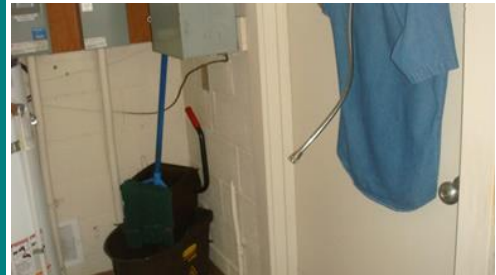
- Above Ceiling: Drywall With Joint Compound
- Ceiling: Acoustic Ceiling Tile 1
- Walls: Concrete Block, Drywall With Joint Compound
- Floors: Sheet Flooring 1 – Brown Stone Mosaic

Hazardous Materials Observed:

- **Asbestos:**
Concrete block may contain vermiculite.
- **PCB:**
Fluorescent light ballasts may contain PCBs, prior to modification, check ballast to determine if PCBs are present.
- **Mercury containing:**
Fluorescent light tubes contain mercury.

Samples:

- 20127-05 Drywall Joint Compound (No asbestos detected)
- 20127-07 Acoustic Ceiling Tile 1 (No asbestos detected)
- 20127-11 Window Putty (No asbestos detected)



20127-05



20127-11



20127-07



Building: Site Services – Washroom 010**Interior Details:**

- Ceiling: Drywall Tile
- Walls: Concrete Block, Drywall With Joint Compound
- Floors: Sheet Flooring 1 – Brown Stone Mosaic

Hazardous Materials Observed:

- **Asbestos:**
Concrete block may contain vermiculite.
- **PCB:**
Fluorescent light ballasts may contain PCBs, prior to modification, check ballast to determine if PCBs are present.
- **Mercury containing:**
Fluorescent light tubes contain mercury.

Samples:

No samples collected



Building: Site Services – Room 009**Interior Details:**

- Ceiling: Acoustic Ceiling Tile 1
- Walls: Concrete Block, Drywall With Joint Compound
- Floors: Wood Laminate , Sheet Flooring 1 – Brown Stone Mosaic

Hazardous Materials Observed:

- **Asbestos:**
Concrete block may contain vermiculite.
- **PCB:**
Fluorescent light ballasts may contain PCBs, prior to modification, check ballast to determine if PCBs are present.
- **Mercury containing:**
Fluorescent light tubes contain mercury.

Samples:

No samples collected



Building: Site Services – Room 008**Interior Details:**

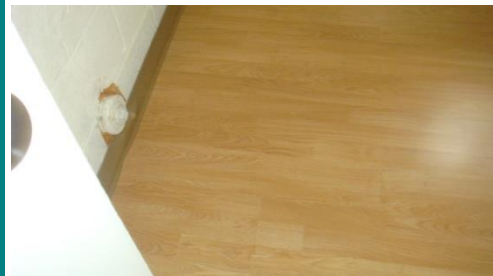
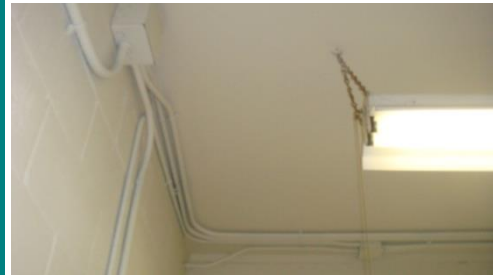
- Ceiling: Drywall With Joint Compound
- Walls: Concrete Block
- Floors: Wood Laminate, Sheet Flooring 1 – Brown Stone Mosaic

Hazardous Materials Observed:

- **Asbestos:**
Concrete block may contain vermiculite.
- **PCB:**
Fluorescent light ballasts may contain PCBs, prior to modification, check ballast to determine if PCBs are present.
- **Mercury containing:**
Fluorescent light tubes contain mercury.

Samples:

No samples collected



Building: Site Services – Room 007**Interior Details:**

- Ceiling: Drywall With Joint Compound
- Walls: Drywall With Joint Compound, Concrete Block
- Floors: Wood Laminate, Sheet Flooring 1 – Brown Stone Mosaic

Hazardous Materials Observed:

- **Asbestos:**
Concrete block may contain vermiculite
- **PCB:**
Fluorescent light ballasts may contain PCBs, prior to modification, check ballast to determine if PCBs are present.
- **Mercury containing:**
Fluorescent light tubes contain mercury.

Samples:

No samples collected



Building: Site Services – Room 006

Interior Details:

- Ceiling: Drywall With Joint Compound
- Walls: Concrete Block, Drywall With Joint Compound
- Floors: Wood Laminate, Sheet Flooring 1 – Brown Stone Mosaic

Hazardous Materials Observed:

- **Asbestos:**
Concrete block may contain vermiculite.
- **PCB:**
Fluorescent light ballasts may contain PCBs, prior to modification, check ballast to determine if PCBs are present.
- **Mercury containing:**
Fluorescent light tubes contain mercury.

Samples:

20127-03 Drywall Joint Compound (no asbestos detected)



20127-03

Building: Site Services – Room 005**Interior Details:**

- Ceiling: Acoustic Ceiling Tile 1
- Walls: Concrete Block, Drywall With Joint Compound
- Floors: Wood Laminate, Sheet Flooring 1 – Brown Stone Mosaic

Hazardous Materials Observed:

- **Asbestos:**
Concrete block may contain vermiculite.
- **PCB:**
Fluorescent light ballasts may contain PCBs, prior to modification, check ballast to determine if PCBs are present.
- **Mercury containing:**
Fluorescent light tubes contain mercury.

Samples:

No samples collected



Building: Site Services – Room 004

Interior Details:

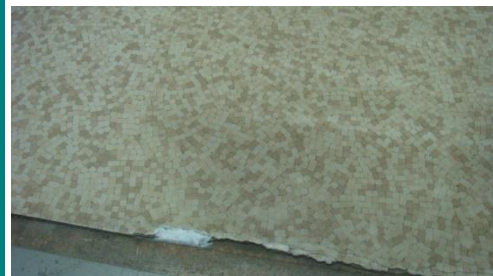
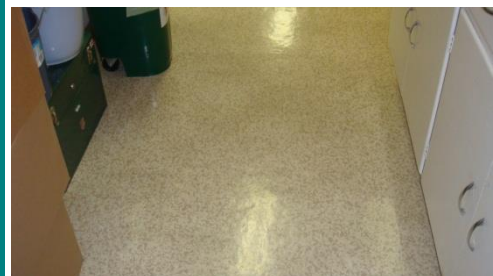
- Ceiling: Drywall With Joint Compound
- Walls: Concrete Block, Drywall With Joint Compound
- Floors: Sheet Flooring 1 – Brown Stone Mosaic

Hazardous Materials Observed:

- **Asbestos:**
Concrete block may contain vermiculite.
- **PCB:**
Fluorescent light ballasts may contain PCBs, prior to modification, check ballast to determine if PCBs are present.
- **Mercury containing:**
Fluorescent light tubes contain mercury.
- **ODS:**
Refrigerator may contain ozone-depleting substances.

Samples:

20127-01 Sheet Flooring 1 – Brown Stone Mosaic
(no asbestos detected)



20127-01

Building: Site Services – Room 003

Interior Details:

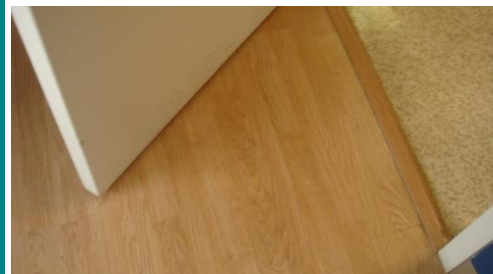
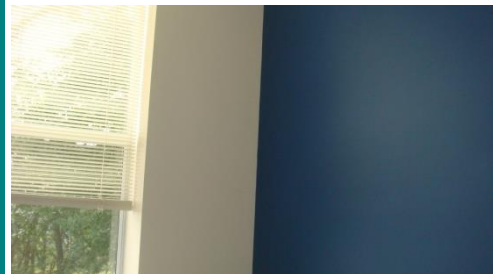
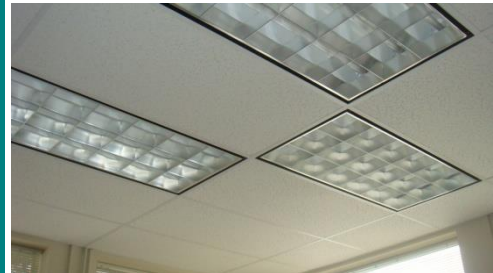
- Above Ceiling: Ceiling Tile 3
- Ceiling: Acoustic Ceiling Tile 1
- Walls: Drywall With Joint Compound
- Floors: Wood Laminate, Sheet Flooring 1 – Brown Stone Mosaic

Hazardous Materials Observed:

- **PCB:**
Fluorescent light ballasts may contain PCBs, prior to modification, check ballast to determine if PCBs are present.
- **Mercury containing:**
Fluorescent light tubes contain mercury.

Samples:

20127-10 Ceiling Tile 3 (no asbestos detected)



20127-10

Building: Site Services – Room 002**Interior Details:**

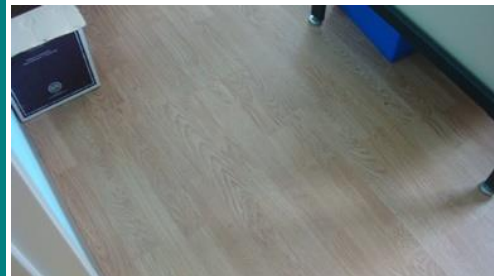
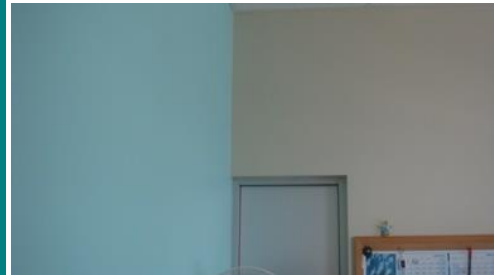
- Above Ceiling: Ceiling Tile 3
- Ceiling: Acoustic Ceiling Tile 1
- Walls: Drywall With Joint Compound
- Floors: Wood Laminate, Sheet Flooring 1 – Brown Stone Mosaic

Hazardous Materials Observed:

- **PCB:**
Fluorescent light ballasts may contain PCBs, prior to modification, check ballast to determine if PCBs are present.
- **Mercury containing:**
Mercury thermostat present
Fluorescent light tubes contain mercury

Samples:

No samples collected



Building: Site Services – Room 001

Interior Details:

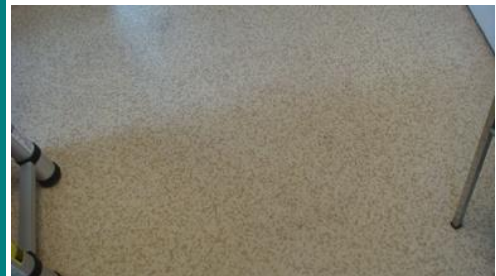
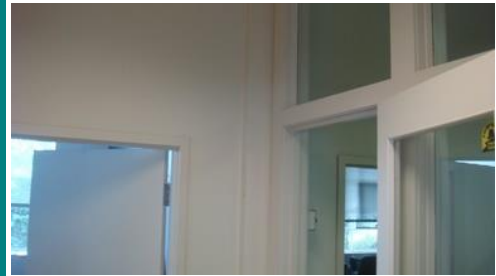
- Above Ceiling: Ceiling Tile 3
- Ceiling: Acoustic Ceiling Tile 1
- Walls: Concrete, Drywall With Joint Compound
- Floors: Wood Laminate, Sheet Flooring 1 – Brown Stone Mosaic

Hazardous Materials Observed:

- **PCB:**
Fluorescent light ballasts may contain PCBs, prior to modification, check ballast to determine if PCBs are present.
- **Mercury containing:**
Fluorescent light tubes contain mercury.

Samples:

20127-04 Drywall Joint Compound (no asbestos detected)



20127-04

10.0 Limitation of Survey

This document details the methodology, findings and conclusions of this survey and assessment conducted on the subject site in May and June 2013

Analytical results included in the report reflect the sampled materials at the specific sample locations. Visually similar materials were referenced to specific analyzed samples.

The survey of the buildings did not include destructive sampling which would permit an intrusive investigation of inaccessible wall and ceiling cavities. Limited access into interior and perimeter walls, voids, crawlspaces, and mechanical shafts was obtained for the investigation of insulation materials. It is possible that hazardous materials are present in these areas but were not identified. If materials suspected of containing asbestos or other hazardous materials are encountered during future renovations or demolition, they should be treated as hazardous proven otherwise. Locations and building materials that have not been surveyed should be considered potentially hazardous materials-containing until such time as they can be evaluated by a qualified person. Until such time as the material can be appropriately evaluated, all work that could impact the suspect materials shall cease in the affected areas until such time as appropriate precautions can be implemented to protect workers and others at the subject site.

Roofing materials may contain asbestos, however, due to the potential for damage to the building and its contents, full depth roofing core samples were not obtained from the roofing systems. Invasive roofing materials should be sampled and analyzed for asbestos prior to disturbance in the event that roof repairs or replacement is required.

All vermiculite insulation should be considered as asbestos containing until such time as a comprehensive destructive testing sampling program is carried out within the building or structure. Asbestos containing vermiculite should be considered present within all concrete block walls, voids, and spaces including attics, walls, ceiling and floor voids.

Some materials cannot be reasonably surveyed without causing significant damage to the building structure or envelope systems. These materials should be assessed for risk specific to any planned renovations or demolition activities. Materials suspected of containing asbestos may be located in concealed locations on this site include:

- Concealed roofing, caulk and felts,
- Internal parts of appliances, equipment and white goods,
- Buried cement pipes,
- Gaskets in pipe flanges and valves and
- Fire Doors

Other materials were not sampled for fear of causing damage to building systems including vibration dampeners and electrical wiring.

An asbestos risk assessment must be completed prior to any removal and/or alteration work in or on a building. Removal and/or alteration work requires control measures to be implemented in accordance with WorkSafeBC. Regulations. Protective personal equipment is required during any work or major alteration that may disturb synthetic or asbestos insulation and/or dust that may be present.

Yours very truly,

North West Environmental Group Ltd.



Julie Scott-Moncrieff, B.Sc.,
Senior Occupational Hygienist

APPENDICES



APPENDIX A: Site Map

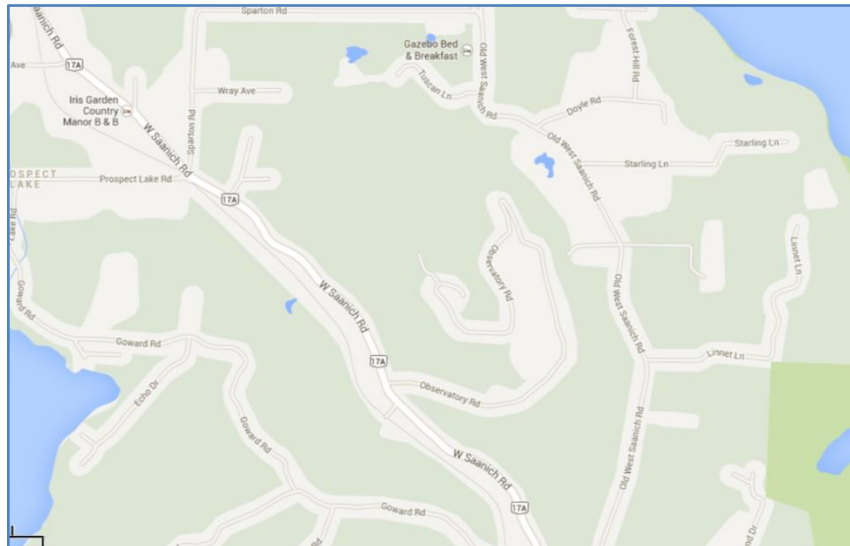


Figure A1: Overhead Map of NRC (Google Maps - ©2013 Google)

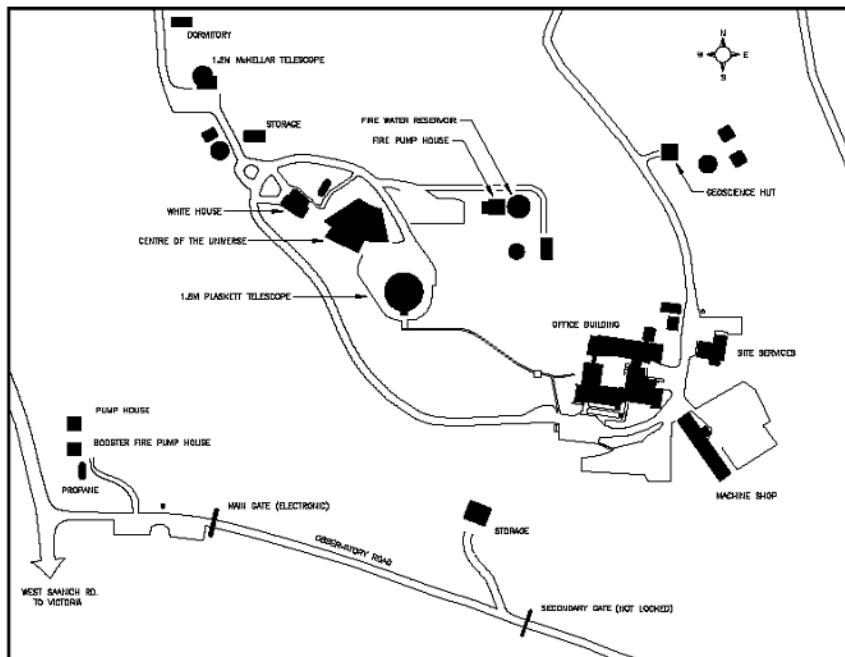


Figure A2: Provided map of NRC buildings (not an all inclusive list)

APPENDIX B: Sample Results



Bulk Sample Report

Asbestos Analysis of Bulk Materials using Polarized Light Microscopy

Client: National Research Council Canada
Contractor: National Research Council Canada
Project: NRC - Site Services (1950)

Date: July 09, 2013
Client Job or PO#:
Project number: 20127

Sample No	Location	Date Analysed	Analyst	Description	Phase	%	Asbestos	%	Other Materials	%
20127-1	004	Jul-08-2013	EMSL	Sheet Flooring - Brown Stone Mosaic	Brown/Grey/Tan	100	None Detected	0	Fibrous (Other) (35%) Non-Fibrous (65%)	100
20127-2 Layer 1	013	Jul-08-2013	EMSL	Sheet Flooring - Green Stone Mosaic	Sheet Flooring - Grey/Tan/Green	90	Chrysotile	15	Non-Fibrous	85
20127-2 Layer 2	013	Jul-08-2013	EMSL	Sheet Flooring - Green Stone Mosaic	Mastic - Yellow	10	Chrysotile	0.5	Non-Fibrous	99.5
20127-3	006	Jul-08-2013	EMSL	Drywall Joint Compound - Ceiling (Spider Silk)	Grey/White	100	None Detected	0	Non-Fibrous	100
20127-4	001	Jul-08-2013	EMSL	Drywall Joint Compound	White	100	None Detected	0	Non-Fibrous	100
20127-5	Mech 011	Jul-08-2013	EMSL	Drywall Joint Compound	Tan/White	100	None Detected	0	Non-Fibrous	100
20127-6	013	Jul-08-2013	EMSL	Drywall Joint Compound - Ceiling (Spider Silk)	White	100	None Detected	0	Non-Fibrous	100
20127-7	Mech 011	Jul-08-2013	EMSL	ACT 1 Small Pinhole & Random Fissure	Grey/White	100	None Detected	0	Fibrous (Other) (80%) Non-Fibrous (20%)	100
20127-8	013	Jul-08-2013	EMSL	Pipe Textile/Paper Over FG Pipe Insulation	Tan/Black	100	None Detected	0	Fibrous (Other) (60%) Non-Fibrous (40%)	100
20127-9	013	Jul-08-2013	EMSL	Parging - On Concrete	Grey/White	100	None Detected	0	Non-Fibrous	100
20127-10	003	Jul-08-2013	EMSL	Ceiling Tile - Above Ceiling	Grey/White	100	None Detected	0	Fibrous (Other) (80%) Non-Fibrous (20%)	100
20127-11	Mech 011	Jul-08-2013	EMSL	Interior Window Putty	Grey - Grey	100	None Detected	0	Non-Fibrous	100

Note: Samples were analyzed by method: EPA/600/R-93/116" Bulk Asbestos Analysis by Polarized Light Microscopy". For heterogenous materials the concentration may vary. No reproduction without permission.



EMSL Analytical, Inc.

200 Route 130 North, Cinnaminson, NJ 08077

Phone: (856) 303-2500 Fax: (856) 858-4571 Email: jsmith@emsl.com

Attn:

**Janet Peto
North West Environmental Group
2950 Douglas Street
Unit 210
Victoria, BC V8T 4N4**

7/9/2013

Phone: (250) 384-9695
Fax: (250) 384-9865

The following analytical report covers the analysis performed on samples submitted to EMSL Analytical, Inc. on 7/1/2013. The results are tabulated on the attached data pages for the following client designated project:

20127, NRC - Site Services (1950)

The reference number for these samples is EMSL Order #011302974. Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact me at (856) 303-2500.

Reviewed and Approved By:

Julie Smith - Laboratory Director



The test results contained within this report meet the requirements of NELAC and/or the specific certification program that is applicable, unless otherwise noted.
NELAP Certifications: NJ 03036, NY 10872, PA 68-00367

The samples associated with this report were received in good condition unless otherwise noted. This report relates only to those items tested as received by the laboratory. The QC data associated with the sample results meet the recovery and precision requirements established by the NELAP, unless specifically indicated. All results for soil samples are reported on a dry weight basis, unless otherwise noted. This report may not be reproduced except in full and without written approval by EMSL Analytical, Inc.

**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone/Fax: (856) 303-2500 / (856) 858-4571

<http://www.emsl.com>jsmith@emsl.com

EMSL Order:	011302974
CustomerID:	PAEC50
CustomerPO:	
ProjectID:	

Attn: **Janet Peto**
North West Environmental Group
2950 Douglas Street
Unit 210
Victoria, BC V8T 4N4

Phone: (250) 384-9695
 Fax: (250) 384-9865
 Received: 07/01/13 8:40 AM
 Collected: 6/28/2013

Project: 20127, NRC - Site Services (1950)

Analytical Results

Client Sample Description 20127-12 **Collected:** 6/28/2013 **Lab ID:** 0001
 Exterior

Method	Parameter	Result	RL	Units	Prep Date	Analyst	Analysis Date	Analyst
6010C	Lead	0.00093	0.00023	% wt	7/5/2013	JS	7/8/2013	BE

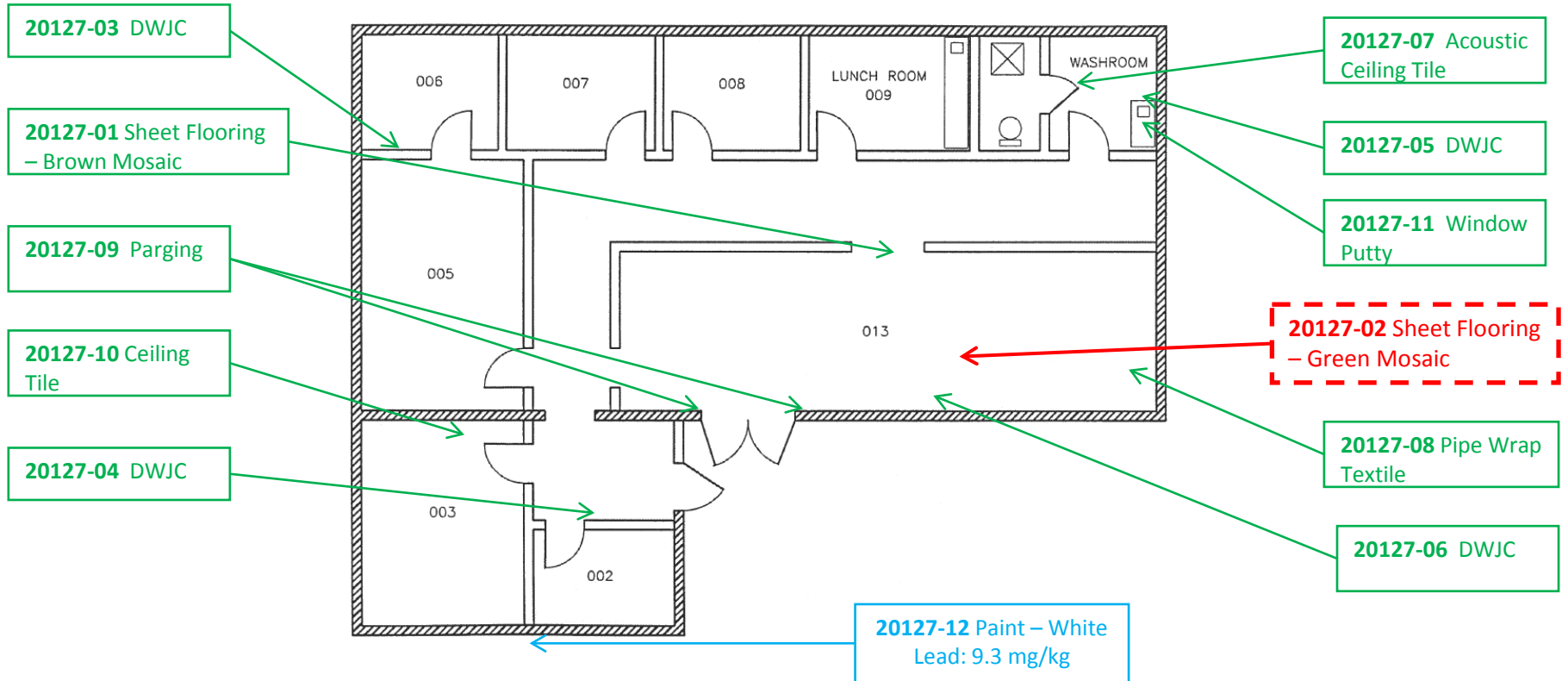
Definitions:

ND - indicates that the analyte was not detected at the reporting limit

RL - Reporting Limit

APPENDIX C: Sample Locations





DRAWING NOT TO SCALE

LEGEND

ASBESTOS

ADDRESS/LOCATION:

PROJECT NO.: 20127



North West
 Environmental Group Ltd.

123

None Detected

Herzberg Institute of Astrophysics

DATE: 10/06/2013

#210 – 2950 Douglas St.

123

Material Contains Asbestos

DRAWING TITLE:

SURVEYED BY: DM/WR

Victoria, BC V8T 4N4

123

Lead Sample

Site Services

DRAWING NO.: 001

THE FOLLOWING ADDENDUM SUPERCEDES INFORMATION CONTAINED IN DRAWINGS AND SPECIFICATIONS ISSUED FOR THE PROJECT TO THE EXTENT REFERENCED. THIS ADDENDUM FORMS PART OF THE TENDER DOCUMENTS AND IS SUBJECT TO ALL OF THE CONDITIONS SET OUT IN THE CONTRACT CONDITIONS.

This electrical addendum contains seven (7) pages.

Part 1 **Specifications**

1.1 **SECTION 27 05 14 – COMMUNICATION CABLES INSIDE BUILDINGS**

- .1 ADD attached section 27 05 14 Communication Cables Inside Buildings.

END OF ELECTRICAL ADDENDUM NO. 4

Part 1 General

1.1 SECTION INCLUDES

- .1 This section specifies the materials and installation for communication cables inside buildings including shielded (STP) and unshielded twisted pair (UTP) copper cables.

1.2 SCOPE

- .1 Supply and installation of a data/communication cabling system, complete with complete with provision and placing of cables. Termination and testing of communication cables will be by Shared Services Canada representative/contractor. Coordinate installation of all cabling with proposed schedule for building occupancy and presence on site by Shared Services Canada representative/contractor.
- .2 The complete data/communications system installation is to be in accordance with EIA/TIA-568 Standards.

1.3 REFERENCES

- .1 Canadian Standards Association, (CSA International)
 - .1 CSA-T529-latest edition, Telecommunications Cabling Systems in Commercial Buildings (Adopted ANSI/EIA TIA 568a with modifications).
 - .2 CSA-C22.2 No. 214-latest edition, Communications Cables (Bi-national Standard, with UL 444).
 - .3 CAN/CSA-C22.2 No. 182.4-latest edition, Plugs, Receptacles, and Connectors for Communication Systems.
- .2 Telecommunications Industry Association (TIA)
 - .1 TIA/EIA-568-latest edition, Commercial Building Telecommunications Cabling Standards Set.

1.4 SYSTEM DESCRIPTION

- .1 Structured system of telecommunications cables (copper) installed within buildings for distributing voice and data, including video signals.
- .2 Installed in physical star configuration with separate horizontal and backbone sub-systems. Horizontal cables link work areas to telecommunications closet located on same floor.

Part 2 Products

2.1 CABLE AND CONNECTORS

- .1 Each STP/UTP cable shall meet the requirements of will consist of four unshielded twisted pairs of 24 AWG (0.5mm) 100-ohm nominal characteristic impedance, solid round annealed copper conductors insulated with flame retardant polymer.
- .2 All cables will be certified/approved by CSA Standard PCC FT6 flammability test and UL CMP.
- .3 STP/UTP cables will meet or exceed the requirements in the proposed National Electrical Manufacturers Association (NEMA) Standard for Low-Loss Extended Frequency Premises Telecommunication Cable. The cable will meet the performance requirements of Category cable of the Underwriters Laboratories Inc. specifications and cable surface markings shall indicate this classification.
- .4 STP and UTP cabling indicated for data communications shall be Cat 6 rated.
- .5 UTP cabling indicated for telephone shall be Cat 6 rated.

2.2 COMMUNICATION OUTLETS AND TERMINAL CONNECTIONS

- .1 Data/communications outlets are to consist of 100 x 100 box c/w single gang plaster ring and flush mounted into walls unless indicated otherwise. Outlets to be complete with quantity of modular RJ45 jacks as indicated on plans.
- .2 Cable runs will have 300mm length of cable left coiled up inside outlet box for termination of RJ45 jacks.
- .3 All cables shall have all pares connected using the EIA/TIA standard pin configuration 568A. When combined, telephone jacks are to mount in the top position of outlets, and data jacks in the lower position.

2.3 COVERPLATES

- .1 Coverplates are to be brushed stainless steel in accordance with Section 26 27 26 complete with provision for data/communication jacks as indicated on plans.
- .2 Cover plates to have 2, 4 or 6 cutouts for jacks.
- .3 Provide blank filler plugs for all unused ports.
- .4 The wall plates shall be clearly and permanently marked with icon identification for both service types as well as with clear identification of cable/termination numbers.

2.6 GROUND BAR

- .1 Label bus bar connections.
- .2 All patch panels, racks, and cable trays must be bonded to ground with #6 Cu. green insulated ground wire.

2.7 LABELLING

- .1 Labels on wall plates and patch panels computer printed, black lettering on white tape. Labelling identification numbering to be as directed by Owner's representative.
- .2 All raceways shall be clearly and permanently marked at both ends to indicate destination and function. The markings shall be clearly visible after construction is completed.
- .3 All empty raceways shall be clearly and permanently marked at both ends to indicate destination and function. The markings shall be clearly visible after construction is completed.
- .4 Each cable shall be clearly marked with a permanent sequential identifier at each end of the cable. All horizontal cable terminations will be labelled at patch panels and at data/comm. outlets. Label of wiring to be the same identifier as the label at the termination point.

2.8 PERFORMANCE REQUIREMENTS

- .1 The complete end-to-end installation, of cables and
shall meet the industry standard performance parameters for enhanced Category 6 as recommended by CAN/CSA-T529, latest revision. Test parameters shall include: Attenuation, Return Loss, NEXT, Power Sum NEXT, ELNEXT, Power Sum NEXT, ELFEXT, ACR, Power Sum ACR, Propagation Delay, and Delay Skew.

2.9 RACKING AND CABLE MANAGEMENT

- .1 Provide submittals for all rack and accessory hardware. Provide submittal with proposed rack installation showing:
 - .1 Seismic restraint
 - .2 Patch panel, cable management and grounding positions
 - .3 Active hardware positions and arrangements
- .2 Four post racking, 42U with openings for cage nuts. Fully welded construction, bolted rack assemblies not accepted.
- .3 Provide all required hardware for mounting, fastening and seismic restraint.
- .4 Provide cage nuts and 10-32 screws suitable for ALL openings available in racks. Provide spare hardware to owner.
- .5 Racking, hardware and cable management shall be from a single supplier specializing in network hardware and infrastructure components.

Part 3 Execution

3.1 INSTALLATION OF HORIZONTAL DISTRIBUTION CABLES

- .1 Communications raceway shall be minimum 27mm (1") EMT conduit stubbed into accessible ceiling space. All cables shall be installed in conduit or cable tray and as indicated on the drawings.
- .2 Wires and cable shall be as short as practical except that sufficient slack shall be provided to:
 - .1 Prevent undue stress on cable forms, wires, and connections.
 - .2 Enable network components to be removed and replaced during servicing without disconnecting other parts.
 - .3 Facilitate movement of equipment for maintenance purposes.
- .3 Wires and cables shall be placed and protected to avoid contact with rough surfaces or sharp edges. Where wires or cables run through holes in metal, they shall be protected by suitable grommets or bushings.
- .4 Clearance between cables and heat emitting or interference generating devices shall be such as to avoid deterioration of these wires and cables due to heat dissipation from these devices, and to comply with industry standards. In particular cables shall have a minimum separation of 150mm from unshielded power lines and 600mm from fluorescent lighting.
- .5 The horizontal wiring shall be continuous with no splice points. Bridged taps are not permitted and there will be no cross-connects between the outlet and the patch panel.
- .6 The maximum cable length for each run is 90 metres and will allow for 3 extra metres at the work station end and 7 extra metres for the patch cord/cross-connect end.

- .7 Each cable shall be clearly marked with a permanent sequential identifier at each end of the cable. All horizontal cable terminations will be labelled at cross-connects and at telecommunications outlets. Labelling will include room number or patch panel as per labelling requirements reference.
- .8 Horizontal conduit fill must comply with the Canadian Electrical Code requirements.

3.2 INSTALLATION OF BACKBONE CABLES

- .1 Install wiring and devices as indicated on plans
- .2 Provide 20mm G.1.S. painted plywood for equipment mounting.
- .3 The cabling components installed in the structured cabling system shall be warranted for a minimum of 25 years from the date of installation against defects in materials and workmanship.
- .4 Leave a pullstring in each data/communications outlet conduit.
- .5 Provide bushings on all conduit ends.

3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Test communication cables for continuity and accurately label end-to-end.

3.4 RACKING

- .1 Install racking and accessories as shown in drawings.
- .2 Seismically restrain racking to prevent toppling in the event of seismic event. Provide signoff and Schedule from specialty engineer.
- .3 Ground/bond rack and accessory equipment.
- .4 Finalize arrangement of hardware, patch panels and management in racking with Departmental Representative during shop drawing submittal process.

END OF SECTION