

# PRELIMINARY ASBESTOS BUILDING MATERIALS MANAGEMENT SURVEY

CENTRE FOR AQUATIC AND ENVIRONMENTAL RESEARCH,  
4160 MARINE DRIVE, WEST VANCOUVER, BC

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4160 MARINE DRIVE, WEST VANCOUVER, BC**

REAL PROPERTY, SAFETY & SECURITY, FISHERIES AND OCEANS CANADA  
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October 2, 2017

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**Project: Preliminary Asbestos Building Materials Management Survey**

**Location: Centre for Aquatic and Environmental Research,  
4160 Marine Drive, West Vancouver, BC.**

# 1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by Fisheries and Oceans Canada for the provision of a Preliminary Asbestos Building Materials Management Survey (PABMMS) of the Centre for Aquatic and Environmental Research located at 4160 Marine Drive, West Vancouver, BC.

WSP was called upon to attend the Site to establish the presence / absence, location and type of accessible potential asbestos-containing building materials and equipment at the Site by means of interpretive reconnaissance, sample collection and subsequent laboratory analysis.

WSP understands that this survey is required by the client for due diligence, planning, and regulatory compliance purposes as per WorkSafe BC (WSBC) Occupational Health and Safety Regulation (OHSR) and Federal Asbestos Regulations.

WSBC OHSR Section 6.4 requires that an inventory of asbestos materials for buildings constructed prior to 1990 is completed in order to establish the presence/absence, location and type of asbestos materials utilized in the construction of the facility. Asbestos containing materials should be inventoried by means of a room by room visual assessment, and sample collection and subsequent laboratory analysis.

The objective of a PABMMS is to identify asbestos materials which may be disturbed by maintenance or renovation activities. This includes sampling for asbestos materials at the specified locations by means of sample collection and subsequent laboratory analysis. Section 20.112 of the BC Occupational Health and Safety Regulation requires that an asbestos building materials survey should be conducted by a qualified person prior to any demolition or renovation activity which might disturb asbestos materials. The Canadian Occupational Health and Safety Regulations and Canada Labour Code, Part II, which applies to all areas under federal jurisdiction, stipulates the requirements for protection of employees.

Assessable asbestos-containing materials and potentially suspect materials are herein reviewed based on visual assessment, sample collection and subsequent review of laboratory analysis results.

For the purpose of this report, although employees working on the site are governed by Federal Occupational Health and Safety regulations, all local contractors performing work on the site are governed by the WSBC OHSR, and hence the scope of work will be consistent with the requirements of the WSBC OHSR, which are more explicit than the federal regulations.

As of February 1, 2012, the definition of asbestos-containing material (ACM) for manufactured articles or other material, other than vermiculite insulation, includes materials that contain at least 0.5% asbestos, as determined by methods referenced in WSBC OHSR section 6.1. Vermiculite insulation containing any asbestos, as determined by the referenced method, is also an ACM.

In the event that renovation or demolition is planned, an intrusive survey of the impacted areas must be performed as per Section 20.112 of the WSBC OHSR. This survey should include other hazardous materials including lead, mercury, polychlorinated biphenyls (PCBs), ozone depleting substances, microbial contaminants, radioactive materials, crystalline silica, flammable and explosive materials.

This report documents the on-site field review of accessible potential asbestos building materials completed by WSP on August 9, 10, and 11, 2017.

## 2 SITE DESCRIPTION AND LIMITATIONS

WSP understands that the site was previously a cannery facility and was re-developed in the early 1970s as the Pacific Environment Institute. The current Centre for Aquatic and Environmental Research (CAER) facility was largely completed with the building of a main lab and warehouse in 1986/7. On site buildings include the Main Laboratory Complex, Workshop Complex, Donaldson Building, Chemical Storage, Waste Recycling, Oxygen Supply Building, Sand Filter Building, and Salt Water Pump House. Based on the period of construction and subsequent renovations, asbestos building materials may be present.

The PABMMS specifically assessed various areas of the Main Laboratory Complex which is assumed to have been constructed in 1986/7 during an era when use of asbestos in building materials had largely been phased out however the continued limited use of some materials remained potentially common. WSP understands that the main floor level footprint of the Main Laboratory Complex is approximately 24,250 sq. ft. (2,250 m<sup>2</sup>). The second floor level is comprised of a central north-south oriented alignment of offices comprising approximately 6,300 sq. ft. (585 m<sup>2</sup>).

### **Rooms 104 through 133 and 201 through 223 were included in the scope of this PABMMS.**

During site orientation, Fisheries and that required some assessment prior to planned alterations for the facility. **Accordingly** Oceans Canada maintenance staff Mr. Scott McGrath denoted four areas beyond the original scope of the PABMMS, **the following additional limited material assessment was undertaken and included in the scope of this PABMMS:**

- Limited accessible gasket materials were sampled from a heat pump and boiler within the main floor Boiler Room. With the exception of this limited sampling of potential asbestos materials, the Boiler Room was specifically excluded from the scope of this PABMMS.
- Readily observable mastics and sealants associated with the two supply fans and one exhaust fan HVAC walk-in units, and one encountered potentially suspect thermal pipe insulation hard mud elbow were sampled within the second floor level Fan Room. With the exception of this limited sampling of potential asbestos materials, the Fan Room was specifically excluded from the scope of this PABMMS.
- An exterior partially enclosed gas supply connection room was located on the southwest corner of the Main Laboratory Complex. The gas supply connection room was of concrete construction and exhibited considerable paint peeling on the east wall. With the exception of this limited sampling of potential lead based paint within the gas supply room, the exterior of the Main Laboratory Complex was specifically excluded from the scope of this PABMMS.
- Deteriorated 12" floor tile and floor leveling compound materials were sampled from within the maintenance office Room 136F. With the exception of this limited sampling of potential asbestos materials, the Workshop Complex located east of the Main Laboratory Complex was specifically excluded from the scope of this PABMMS.

The Workshop Complex, Donaldson Building, Chemical Storage, Waste Recycling, Oxygen Supply Building, Sand Filter Building, and Salt Water Pump House were specifically excluded and beyond the scope of this PABMMS.

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## 2.1 MATERIAL ACCESS LIMITATIONS

Due to the non-destructive nature of the survey, materials in hidden areas such as wall stud cavities, roof joist cavities, and pipe chases were not assessed as part of this survey.

Rooms 106B, 108b, 119, 123, 129c, 130a, 130b, and 130c were labelled as restricted access and comprised refrigerated walk-in cold storages lined with hard surfacing (sheet metal) and insulation. Accordingly, survey assessment and non-destructive testing was not possible for these rooms.

For safety reasons energised and/or operational electronic, mechanical and hydraulic equipment and systems were not assessed as part of this survey.

Hidden and below-ground materials are not addressed and should be assumed to be hazardous.

Sampling of roofing materials and window caulking were specifically excluded and beyond the scope of this survey due to budgetary constraints and potential for long term weather penetration distresses.

Non-affixed building contents including furniture, laboratory equipment, holding tanks, storage apparatus, and office materials were excluded and beyond the scope of this survey.

Based on the results of this preliminary survey, an additional supplementary survey including re-visiting of the site and additional delineation bulk material sampling and analysis may be required.

# 3 SCOPE OF WORK

To achieve the objective of this investigation, WSP completed the following scope of work:

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## 3.1 ON-SITE ASBESTOS MATERIALS SURVEY

- Review of available site plans (as-built drawings, renovation drawings, and previous asbestos survey reports were not available prior to conducting this PABMMS;
- Conduct the survey on a room-by-room basis visually identifying interior building materials potentially containing asbestos and extrapolation suspect homogenous materials for the purposes of populating an asbestos materials database inventory;
- On site review and collection of bulk building material samples suspected to contain asbestos. Material samples were labelled to include the building room identification number. The sampling methodology and number of samples collected was undertaken in accordance with the appropriate WorkSafe BC Guidelines and included collection of approximately 68 bulk samples of materials (some with multiple layers) suspected to contain asbestos.
- The samples were sent to appropriately accredited laboratories. Eleven (11) samples were sent to Sure Hazmat and Testing for rush 24 hour laboratory analysis of asbestos content. The remaining fifty-seven (57) samples were sent to iATL (International Asbestos Testing Laboratories) for regular turn around (7 business days) analysis of asbestos content.
- Photographs were taken of the materials sampled as well as the general area to give context.
- Preparation of this report summarizing the specific asbestos containing materials identified through review and analysis. The report includes photographs of the determined significant asbestos materials identified and figures completed to indicate the delineated extent of determined asbestos containing materials.

For the purpose of this report, the scope of work was principally limited to suspect building materials comprising the various rooms located in the Main Laboratory Complex (Rooms 104 through 133 and 201 through 223).

Rooms 106B, 108b, 119, 123, 129c, 130a, 130b, and 130c were restricted access, refrigerated walk-in cold storages lined with hard surfacing (sheet metal) and insulated. Accordingly, survey assessment and non-destructive testing was not possible for these rooms.



## 4 METHODOLOGY

On August 9, 10, and 11, 2017, Mr. Gordon Philippe, B. Tech. Environmental Technologist of WSP completed an interior building materials review for potential asbestos content according to the protocol listed below in Section 4.1.

Visual review was conducted for assessable suspect asbestos materials that could potentially be impacted by future renovation activities. Within each accessible room areas typically containing suspect asbestos materials were reviewed from ground level, and from above suspended ceilings and fixed ceilings where reachable via ladder.

Within each accessible room an inventory of potential asbestos materials were tabulated in an excel file. For the purpose of facilitating future renovation zone management of suspect asbestos materials, the tabulated observations of suspect materials were group listed via the following common physical location zones:

- Below Floor;
- Floor;
- Walls;
- Suspended Ceiling;
- Appurtenances: and
- Fixed Ceiling

Observations of suspect materials were tabulated in MS Excel. The majority of materials observed were in good condition. Some observations include recommendations for additional sampling and/or assessment of inaccessible potentially suspect materials prior to alteration/renovation disturbance.

Figures attached in Appendix I include:

- Site Location (Figure 1);
- Site Plans (Figures 2 and 3) for the first and second floors with scope of the areas reviewed;
- Site Sampling Plans (Figures 2A and 3A) with the sampling locations of materials suspected to potentially contain asbestos including in red text those samples ascertained by laboratory analysis to be asbestos-containing;
- Site Sampling Plan (Figure 4) with the sampling locations of client representative requested supplemental materials suspected to potentially contain asbestos (Figure 4) including in red text those samples ascertained by laboratory analysis to be asbestos-containing; and
- Site Plan - Sinks With Asbestos Undercoating (Figure 5) indicating the locations of the determined sinks with asbestos-containing undercoating material applications

Photographs of the aforementioned asbestos-containing materials are presented in Appendix II.



Representative samples of assessable suspect asbestos-containing materials were collected for analysis. The completed Chain-of-Custodies (COCs) and the Laboratory Reports of analytical results are presented in Appendix III.

Suspect asbestos-materials similar to homogenous materials sampled were visually extrapolated.

For the purposes of this report, Asbestos-Containing Material (ACM) means any manufactured article or other material, other than vermiculite insulation which is assumed to be ACM, that would be determined to contain at least 0.5% asbestos if tested in accordance with one of the methods regulated under Section 6.1 of the Occupational Health and Safety (OHS) Regulation [Enacted by B.C. Reg. 188/2011, effective February 1, 2012.].

Conclusions presented in this report have been extrapolated from sample results and site conditions.

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#### 4.1 ASBESTOS-CONTAINING MATERIALS

Based on the period of subject site building construction and alterations, asbestos-containing materials were considered to be limited in application.

For confirmation and delineation purposes bulk sampling for suspect asbestos materials was deemed prudent. Review was based on experienced professional judgment in consideration of, but not necessarily limited to, the era of construction, and uniformity of materials and size of area of homogeneous materials.

The building materials review and bulk material sample collection for analysis of potential asbestos was consistent with recognized industry standards and principles of good occupational hygiene practice for mid-century period of construction/alteration in North America.

#### 4.2 LEAD-BASED PAINT (LBP)

During on site review orientation, a partially enclosed gas supply connection room as located on the southwest corner of the Main Laboratory Complex was denoted for planned alterations. The gas supply connection room was of concrete construction and exhibited considerable paint peeling on the east interior wall.

Accordingly, bulk sampling for surface coating (paint) was deemed necessary. Review was based on experienced professional judgment in consideration of, but not necessarily limited to, the era of construction, uniformity of materials and area size of homogeneous materials.

## 5 REGULATORY FRAMEWORK

The details of the regulatory frameworks for the Asbestos Materials Management Survey of the Workshops, Warehouse & Hanger Building are presented in Appendix IV.

# 6 INTERIOR MATERIAL OBSERVATIONS

A management survey only identifies the asbestos containing building materials that could be encountered or disturbed by building workers or occupants during regular work and/or general maintenance activities.

Interior finishes encountered included:

- Concrete Base Floor Slab, majority with floor coverings (see following flooring material descriptions), portions bare (unpainted), and in limited rooms with an application of grey paint.
- Fused tonal-phase coloured Floor Tile with Black Mastic and associated 4" Light Brown Pliable Baseboard with Elastic Soft Brown Mastic → two associated colour variations observed 1.) cream, taupe and brown 12" x 12" vinyl floor tile with black mastic and alternating pattern application 2.) blue and white 12" x 12" vinyl floor tile with black mastic;
- Modern Marmoleum like Vinyl Sheet Flooring (VSF) with sealed seams and extending up the base portion of walls as integral baseboard → three pattern types observed as 1.) caramel base with brown flecks VSF, 2.) light brown base with dark brown flecks VSF, and 3.) light grey base with dark grey flecks VSF.
- Modern Marmoleum like VSF and associated 4" Light Brown Pliable Baseboard with Elastic Soft Brown Mastic → one pattern type observed as 1.) elongated linear veins of lighter caramel and darker caramel VSF;
- Carpet Tile Flooring Overlay;
- Drywall with Drywall Joint Compound, painted with visually observable normal occupancy areas and unpainted above suspended ceiling tiles.
- Open Concrete Ceilings with applied paint in common with adjacent wall colouring and exposed overhead utilities similarly with applied paint (ducting, piping, and wiring).
- Suspended 2 ft. by 4 ft. Ceiling Tiles → four associated pattern variations observed 1.) curvilinear aligned deep irregular indentations (principal pattern in facility), 2.) predominant density of medium sized pin holes with secondary short length deep indentations, 3.) clustered medium sized pin holes with black space between and sparsely aligned elongated deep fissure like indentations, and 4.) aligned medium sized pin holes with sparse short limited length deep indentations (recent non-suspect corridor replacement application). The suspended ceilings typically obscure unpainted overhead utilities (ducting, piping, and wiring).
- Limited rooms had fixed drop ceilings comprised of painted Drywall with Drywall Joint Compound and dedicated metal hatches for accessing obscured unpainted overhead utilities (ducting, piping, and wiring).
- Eye Level double pane windows with internal spacer bars were observed to be date stamped 1986. Extended ceiling height skylight windows located along the west extent of the lower main floor level were not accessible at the time of the site visit.

- Laboratory counter tops dark grey with limited unpolished utility hole cuts appearing chalky light grey. Impact caused breakage (bulk sampling) results in spalling of opaque chalky light grey smooth surfaced curved shards with sharp edging (glass like with no visible fibers).
- Laboratory stainless steel sinks, both single and double basins, all with applied mastic like undercoatings → two primary colour variants observed 1.) white, and 2.) bronzy - greenish/silver. **The Sink Undercoating, Bronzy Silver and/or Greenish Silver as sampled in Rooms 107b and 110 and similarly as observed to be present in Rooms 107a, 110b, 125, 127a, 127b, 127c, was determined to be Asbestos-Containing (refer to Section 7.1 below).**
- Modern non-suspect Thermal Pipe Insulation (TPI) comprised of straight run fiberglass with white paper covering (painted in exposed open ceiling areas) was observable throughout the majority of the lower main floor level. Elbows were general observed to be modern with plastic covers and supple to applied hand pressure indicating no hard mud within. Similar TPI applications were observed in the Main Floor Boiler Room and Second Level Main Fan Room. Limited observations of large fittings were noted to have TPI consisting of hard mud elbows.
- Ambient room heating was noted to be supplied via various heating, ventilation, and air conditioning (HVAC) system componentry including supply air ducting. Return air was noted to be largely passive via open air ceiling or through uncontrolled grills set into suspended ceilings. Modern Green Duct Seam Mastic was observable throughout the majority of the lower main floor level. On the lower main floor level internal ducting review was limited to a few access ports located in the south east-west aligned corridor where no apparent alternative mastic was observed.
- Second Level Main Fan Room internal ducting access was available via dedicated service door panels located along the sides of the Building Air Intake, two Supply Fan Assemblies, and one Exhaust Fan Assembly where upon → five mastic/sealant variant colour types were observed 1.) interior cabinet assembly pliable white mastic on batt insulation, 2.) interior cabinet assembly pliable black mastic on batt insulation, 3.) aged less pliable grey seam seal between cabinet metal panels, 4.) exterior pliable black mastic about service door frame, and 5.) interior silicon type non-suspect bright grey seam sealant. **The Grey Seam Sealant used between metal panels as sampled and observed on the Exterior Supply Fan SF1 above the right corner of the 4th door to the south in the main Fan Room on the second level was determined to be Asbestos-Containing (refer to Section 7.1 below).**
- Various gasket like materials associated with heat pump connection pipe fittings and boilers were in Room 144 Mechanical. **The gaskets associated with heat pump connection pipe fittings as observed on the south side of heat Pump P11 was determined to be Asbestos-Containing (refer to Section 7.1 below). Associated gaskets and potential internal componentry or packing may also be asbestos containing.**
- Red Fire Stop was observed at wall penetrations.
- Fume Hoods → four supplier manufactured model types observed 1.) Model 3471-SS by Western Scientific Services, 2.) Model 3472-SS by Sisco , 3.) Model 3601-SS by Western Scientific Services, and 4.) Purifier Class II by Labconco. Models 3471-SS, 3472-SS, and 3601-SS had no readily apparent transite board in side panel voids and had exhaust venting with seam mastic. The

Purifier Class II by Labconco was a sealed unit with no visual access for determination of potential transite board and did not appear to be connected to any type of dedicated exhaust venting.

- Custom Simple Structure Fume Hoods → location specific custom fabricated non-suspect Fume Hoods were observed to be fabricated of basic single layer materials including sheet metal and plexiglass.
- Chalk boards were observed in Rooms 105, 108a, 109a, and 110 and may potentially be present in other smaller offices of the Main Laboratory Complex.

The above-noted materials may potentially be altered during planned renovations, regular work and/or general maintenance activities.

Bulk suspect material samples were collected and submitted for analysis following EPA 600/R-93/116 method. Based on WSBC protocol, any encountered vermiculite insulation allow not observed on - site at the time of the survey will be assumed to be asbestos-containing if subsequently encountered.

## 7 ASBESTOS MATERIALS SAMPLING SURVEY RESULTS

The laboratory analytical results of the Asbestos Materials Management Survey are summarized below.

### 7.1 ASBESTOS-CONTAINING MATERIALS

The WSP sampled suspect building materials of interest associated with two interior levels of the Main Laboratory Complex are presented in the following table along with the Sample ID and the corresponding laboratory results. Also included are the results of the additional limited sampling as noted in Section 2. Rush turn-around results from Sure Hazmat and Testing are indicated as “(SH&T)” and regular turn-around results from International Asbestos Testing Laboratories “(iATL)” of asbestos content are noted in the right column:

Notes: **Bold Red Text indicates that asbestos was detected above the WorkSafeBC 0.5% criteria.**

**Table 1: Suspect Asbestos Analysis Results**

Area	Material of Interest	Sample ID	Content/Type
Room 104 Floor	Vinyl Sheet Flooring (Caramel with Brown Fleck) And Adhesive	17A-104-01A	Both None Detected for asbestos (SH&T)
Room 104 Baseboard	Wall Mastic (Brown) And Drywall Joint Compound	17A-104-01B	Both None Detected for asbestos (iATL)

Area	Material of Interest	Sample ID	Content/Type
Room 104 South Lab Counter East Extent	Lab Counter Top (Dark Grey)	17A-104-02	None Detected for asbestos (SH&T)
Room 104 Central Lab Counter East Extent	Lab Counter Top (Dark Grey)	17A-104-03	None Detected for asbestos (iATL)
Room 104 North Sink	Sink Undercoating (White)	17A-104-04	None Detected for asbestos (SH&T)
Room 104 Lower Drop Ceiling	Drywall Joint Compound	17A-104-05	None Detected for asbestos (SH&T)
Room 104 West Wall Central	Drywall Joint Compound	17A-104-06	None Detected for asbestos (SH&T)
Room 104 South Wall Central	Drywall Joint Compound	17A-104-07	None Detected for asbestos (iATL)
Room 104 East Wall Central	Drywall Joint Compound	17A-104-08	None Detected for asbestos (SH&T)
Room 104 North Wall Central	Drywall Joint Compound	17A-104-09	None Detected for asbestos (iATL)
Room 104 Suspended Ceiling	Suspended Ceiling Tile (Curvilinear Aligned Deep Irregular Indentations)	17A-104-10	None Detected for asbestos (iATL)
Room 104 Ceiling	Duct Mastic (Green)	17A-104-11	None Detected for asbestos (iATL)
Room 104 NE Vent Hood	Exhaust Duct White Caulk and Brown Caulk	17A-104-12	Both None Detected for asbestos (iATL)
Room 106A South Wall West Extent	Drywall Joint Compound	17A-106-01	None Detected for asbestos (iATL)
Room 106A West Wall South Extent	Drywall Joint Compound	17A-106-02	None Detected for asbestos (iATL)
Room 107A Suspended Ceiling	Suspended Ceiling Tile (Medium Pin Holes & Deep Short Length Indentations)	17A-107A-01	None Detected for asbestos (iATL)
<b>Room 107B West Sink</b>	<b>Sink Undercoating (Bronzy Silver)</b>	<b>17A-107B-01</b>	<b>PC 1.1 % Chrysotile (iATL)</b>
Room 108A Drop Fixed Ceiling	Drywall Joint Compound	17A-108A-01	None Detected for asbestos (iATL)
Room 108A South Sink	Sink Undercoating (Light Grey)	17A-108A-02	None Detected for asbestos (iATL)

Area	Material of Interest	Sample ID	Content/Type
Room 109A Suspended Ceiling	Suspended Ceiling Tile (Medium Pin Holes, Blank Space, & Sparsely Aligned Elongated Deep Indentations)	17A-109A-01	None Detected for asbestos (iATL)
Room 110 Floor	Vinyl Sheet Flooring (Caramel Streaked) And Adhesive (Brown)	17A-110-01	Both None Detected for asbestos (iATL)
Room 110 Baseboard	4" Pliable Tan Baseboard And Adhesive (Tan)	17A-110-02	Both None Detected for asbestos (iATL)
Room 110 Drop Fixed Ceiling	Drywall Joint Compound	17A-110-03	None Detected for asbestos (iATL)
Room 110 West Wall Central	Drywall Joint Compound	17A-110-04	None Detected for asbestos (iATL)
Room 110 South Wall Central	Drywall Joint Compound	17A-110-05	None Detected for asbestos (iATL)
Room 110 East Wall Central	Drywall Joint Compound	17A-110-06	None Detected for asbestos (iATL)
Room 110 North Wall Central	Drywall Joint Compound	17A-110-07	None Detected for asbestos (iATL)
Room 110 C-Shaped Lab Counter At Outlet Cut Opening	Lab Counter Top (Dark Grey)	17A-110-08	None Detected for asbestos (iATL)
Room 110 Desk Lab Counter	Lab Counter Top (Dark Grey)	17A-110-09	None Detected for asbestos (iATL)
<b>Room 110 East Sink</b>	<b>Sink Undercoating (Greenish Silver)</b>	<b>17A-110-10</b>	<b>5 - 10 % Chrysotile (SH&amp;T)</b>
Room 112 Southwest Corner Wall	Drywall Joint Compound	17A-112-01	None Detected for asbestos (iATL)
Room 112 North Wall Central	Drywall Joint Compound	17A-112-02	None Detected for asbestos (iATL)
Room 112 Ceiling	Duct Mastic (Green)	17A-112-03	None Detected for asbestos (iATL)
Room 113a Northwest Corner Wall	Drywall Joint Compound	17A-113a-01	None Detected for asbestos (iATL)
Room 116a East Wall North Doorway	Drywall Joint Compound	17A-116a-01	None Detected for asbestos (iATL)
Room 116a East Wall South Doorway	Drywall Joint Compound	17A-116a-02	None Detected for asbestos (iATL)
Room 117 South Wall Central	Drywall Joint Compound	17A-117-01	None Detected for asbestos (iATL)

Area	Material of Interest	Sample ID	Content/Type
Room 118 Floor	12 " Floor Tile (Blended Cream Brown) And Mastic (Black)	17A-118-01	Both None Detected for asbestos (SH&T)
Room 118 Baseboard	4" Pliable Tan Baseboard And Adhesive (Tan)	17A-118-02	Both None Detected for asbestos (iATL)
Room 118 West Wall Central	Drywall Joint Compound	17A-118-03	None Detected for asbestos (SH&T)
Room 118 South Wall Central	Drywall Joint Compound	17A-118-04	None Detected for asbestos (SH&T)
Room 118 East Wall Central	Drywall Joint Compound	17A-118-05	None Detected for asbestos (iATL)
Room 118 North Wall Central	Drywall Joint Compound	17A-118-06	None Detected for asbestos (SH&T)
Room 118 Suspended Ceiling	Suspended Ceiling Tile (Curvilinear Aligned Deep Irregular Indentations)	17A-118-07	None Detected for asbestos (iATL)
Room 118 Upper West Wall	Red Fire Stop At Thermal Pipe Penetration	17A-118-08	None Detected for asbestos (iATL)
Room 120 Floor	12 " Floor Tile (Blended Cream Brown) And Mastic (Black)	17A-120-01	Both None Detected for asbestos (iATL)
Room 120 About Floor Drain	Grey Leveling Compound And Mastic (Black)	17A-120-02	Both None Detected for asbestos (iATL)
Room 120 North Wall West Portion	Drywall Joint Compound	17A-120-03	None Detected for asbestos (iATL)
Room 120 West Wall North Portion	Drywall Joint Compound	17A-120-04	None Detected for asbestos (iATL)
Room 120 Lab Counter Top	Lab Counter Top (Dark Grey)	17A-120-05	None Detected for asbestos (iATL)
Room 120 East Single Basin Sink	Sink Undercoating (White)	17A-120-06	None Detected for asbestos (iATL)
Room 120 Central Double Sink	Sink Undercoating (Off-White)	17A-120-07	None Detected for asbestos (iATL)
Room 136 Maintenance Office Floor	12 " Floor Tile (Marble Pattern) And Leveling Compound	17A-120-01	Both None Detected for asbestos (iATL)
Room 201 Northwest Over Corner Wall	Drywall Joint Compound	17A-201-01	None Detected for asbestos (iATL)
Second Floor Corridor near entry to Room 203	Drywall Joint Compound	17A-2 <sup>nd</sup> FICorr-01	None Detected for asbestos (iATL)
Second Floor Corridor at East Roof Access Door	Drywall Joint Compound	17A-2 <sup>nd</sup> FICorr-02	None Detected for asbestos (iATL)



Area	Material of Interest	Sample ID	Content/Type
Second Floor Corridor near entry to Room 211	Drywall Joint Compound	17A-2 <sup>nd</sup> FICorr-03	None Detected for asbestos (iATL)
Second Floor Corridor South Side of Elevator	Drywall Joint Compound	17A-2 <sup>nd</sup> FICorr-04	None Detected for asbestos (iATL)
Second Floor Corridor across from Room 222	Drywall Joint Compound	17A-2 <sup>nd</sup> FICorr-05	None Detected for asbestos (iATL)
Second Floor Corridor at North End of Hallway	Drywall Joint Compound	17A-2 <sup>nd</sup> FICorr-06	None Detected for asbestos (iATL)
Room 144 Mechanical Boiler B2	North End Layered Packing and Gasket	17A-Boiler-B-2-01	Both None Detected for asbestos (iATL)
<b>Room 144 Mechanical Heat Pump P11</b>	<b>Heat Pump South Gasket</b>	<b>17A-Boiler-P11-02</b>	<b>30 % Chrysotile (iATL)</b>
Second Floor Main Fan Room Exhaust Fan EF1 Interior Walk-In Cabinet	White Mastic on Interior Batt Insulation	17A-Fan-EF1-01	None Detected for asbestos (iATL)
Second Floor Main Fan Room Exhaust Fan EF1 Interior Walk-In Cabinet	Black Mastic on Interior Batt Insulation	17A-Fan-EF1-02	None Detected for asbestos (iATL)
<b>Second Floor Main Fan Room Exterior Supply Fan SFI Above Right corner of 4<sup>th</sup> Door to the South</b>	<b>Grey Seam Sealant Between Metal Panels</b>	<b>17A-Fan-SFI-03</b>	<b>PC 1.8 % Chrysotile (iATL)</b>
Second Floor Main Fan Room Exterior Supply Fan SFI Upper Right Door Frame 5 <sup>th</sup> Door to the South	Black Mastic From Under Door Frame Edge	17A-Fan-SFI-04	None Detected for asbestos (iATL)
Second Floor Main Fan Room North Supply Fan SF2 Near 2 <sup>nd</sup> Door to the West	Thermal Pipe Insulation Hard Mud Elbow	17A-Fan-SF2-05	None Detected for asbestos (iATL)

According to WorkSafeBC, the definition of an asbestos-containing material is 0.5% by weight. The following materials were found to be asbestos containing:

Based on the representative sampling, corresponding IATL results of asbestos content, WorkSafeBC criteria, and site review assessment of visually similar materials, the following materials are herein extrapolated to be Asbestos-Containing:

- **The Sink Undercoating, Bronzy Silver and/or Greenish Silver as sampled in Rooms 107b and 110 and similarly as observed to be present in Rooms 107a, 110b, 125, 127a, 127b, 127c, and 128 are herein extrapolated to be Asbestos-Containing (PC 1.1 – 10% Chrysotile).**
- **The gaskets associated with heat pump connection pipe fittings as observed on the south side of heat Pump P11 in Room 144 Mechanical is herein extrapolated to be Asbestos-Containing (30% Chrysotile).. Associated gaskets and potential internal componentry or packing may also be asbestos containing.**
- **The Grey Seam Sealant used between metal panels as sampled and observed on the Exterior Supply Fan SFI above the right corner of the 4th door to the south in the main Fan Room on the second level is herein extrapolated to be Asbestos-Containing (PC 1.8% Chrysotile).**
- Chalk boards were observed in Rooms 105, 108a, 109a, and 110 and may potentially be present in other smaller offices of the Main Laboratory Complex. The Backing on chalk board panels associated with buildings constructed from the 1940s through to the 1970s have been known to have asbestos content. Based on the assumed 1986/7 construction period of the Main Laboratory Complex asbestos is not anticipated to be associated with chalk boards of a similar or later era. Non-destructive sampling of the chalk board panels was not possible or within the scope of the project at the time of the site visit. The manufacturer should be contacted to determine the hazardous material content(s) of the chalk board panels prior to dismantlement or disposal.
- Laboratory use vent hoods were observed in numerous rooms including Rooms 104 (two), 106a (two), 107a (two), 108a, 109a, 110, 110b, 113b, 120 (two purpose built), 126, 127a (three), 127b (purpose built), 131, and may potentially be asbestos-containing. Fume hoods often have asbestos containing backing boards (transite) and/or internal baffles or components with asbestos content. Destructive sampling was beyond the scope of the project at the time of the site visit. A visual review from above was undertaken of the vent hoods within the aforementioned rooms and the majority appeared to be clear of asbestos containing backing boards in the side panel voids between the interior and exterior of the hoods. Refer to the Excel tabulated information listing of vent hood details including Supplier, Model #, Serial #, Date of Manufacture, Air Flow Testing Company and Date, and WSP's observations of potential transite panels and vent seam mastic. The manufacturers of the vent hoods should be contacted to determine the hazardous material content(s) of the vent hoods and the potential for flammable, explosive or potentially toxic/ hazardous residues should be evaluated prior to dismantlement or disposal.

Based on the representative sampling, corresponding IATL results of 'None Detect' for asbestos content, WorkSafeBC criteria, and site review assessment of visually similar materials, asbestos is not anticipated to be present within the remaining materials types sampled.

The collection locations above-tabulated samples can be references on the Site Sampling Plans (Figures 2A, 3A, and 4 in Appendix I) wherein asbestos-containing material samples are indicated in red text.

Refer to Site Plan – Sinks with Asbestos Undercoating (Figure 5 in Appendix I) indicating the locations of the determined sinks with asbestos-containing undercoating material applications

Photographs of the some of the aforementioned sampled materials are presented in Appendix II.

Representative samples of assessable suspect asbestos-containing materials were collected for analysis. The completed Chain-of-Custodies (COCs) and the Laboratory Reports of analytical results are presented in Appendix III.

---

## 7.2 LEAD BASED PAINTS

WSP sampled suspect surface coating (paint) from the partially enclosed gas supply connection room as located on the southwest corner of the Main Laboratory Complex as denoted for planned alterations. The laboratory analytical results of which are presented in the following table along with the Sample ID and the corresponding laboratory results.

Notes: **Red Text indicates that lead was detected above 600 mg/kg criteria (1 mg/kg = 1 ppm).**

**Table 2: Suspect Paint Analysis Results**

Area	Material of Interest	Sample ID	Content/Type
<b>Gas Supply Connection Room Interior East Wall</b>	<b>White Layered Paint</b>	<b>17L-Gas-01</b>	<b>0.12 % Lead by Weight 1,200 ppm Lead</b>

Lead based paints are not specifically defined in the current WorkSafeBC regulations. BC Environmental Regulations<sup>1</sup> and WorkSafeBC Guidelines<sup>2</sup> require leachate testing prior disposal of lead waste.

Health Canada and the US Consumer Product Safety Improvement Act both consider a lead-containing surface coating as a paint that contains over 0.009% (90 mg/kg) dry weight of lead. This corresponds to the concentration of lead in paint that may present risk to pregnant women and children.

To comply with WorkSafeBC regulations, if lead materials are identified at a site (this includes lead in paint), the employer must, before any renovation/demolition, have a qualified professional conduct a risk assessment and develop an exposure control plan, that contains safe work procedures, to protect workers that may be exposed to lead. When evaluating risk, the concentration of lead in paint and the activity must be considered together. In general, if aggressive techniques (i.e. cutting torch, abrasive blasting, and power grinders/sanders) are not used and if the lead concentration in paint is below 600 mg/kg<sup>3</sup>, renovation/demolition workers are unlikely to be exposed to lead concentrations in air exceeding the 0.05 mg/m<sup>3</sup> TWA limit.

The following paint was found to have lead (Pb) content over 600 mg/kg and thus will require a risk assessment and exposure control plan:

- The gas supply connection room interior white layered paint surface coating was found to have lead (Pb) content of 1,200 ppm lead by weight, which over the WorkSafeBC criteria of 600 mg/kg.

---

<sup>1</sup> Hazardous Waste Regulation

<sup>2</sup> Lead-Containing Coats and Paintings - Preventing Exposure in the Construction Industry

<sup>3</sup> California division of Occupational Safety and Health requires an exposure control plan for concentrations above 600 mg/kg

The completed Chain-of-Custody (COC) and the Laboratory Report of analytical results are presented in Appendix III.

Should the concrete with the above noted paint be designated for demolition and disposal then as per the BC Environmental Regulations and WorkSafeBC Guidelines, WSP recommended leachate testing prior to disposal of lead based paints on non-metallic surfaces. Representative samples of whole materials waste (i.e. substantial substrate and paint OR a cross-section of the paint covered substrate) should be submitted for the toxicity characteristic leaching procedure (TCLP) prior to disposal. Results of the TCLP test should be compared to the BC Ministry of Environment Hazardous Waste Criteria of 5.0 mg/L for Lead.

## 8 RECOMMENDATIONS

- Asbestos-containing materials must be isolated, handled, or removed using safe work practices and procedures before renovation occurs. The WorkSafeBC publication "Safe Work Practices for Handling Asbestos" and the Occupational Health and Safety (OHS) Guideline G6.8 describe acceptable practices.
- A risk assessment for asbestos materials must be performed before renovation work begins to determine the exposure risk to workers and other persons as per OHS Guideline G20.112 Risk Assessment for Identified Asbestos.
- Ensure that any Contractors hired to work on or near asbestos containing materials have reviewed available surveyed material results, have all documents, procedures, training and other responsibilities completed and in place prior to commencement of work.
- Maintain and update the asbestos labelling program to reflect material changes to ACMs managed in place, as per WorkSafeBC occupational health and safety regulation 6.5, identification. All ACM in the building should continue to be inspected annually for evidence of damage and the inventory updated.
- Proper procedures and documentation such as safe work practices, an exposure control plan, risk assessments and/or other controls must be developed for all workers involved in the handling/disturbance/removal of lead-containing paint with a lead content greater than 0.06%. In particular these requirements would apply to areas where the substrate material with surface coatings are to be welded, cut, or ground using abrasive methods or if otherwise disturbed.
- Retain a copy of this report and provide it to any contractors who may be undertaking Renovation work in the building as required by Section 20.112 of the WorkSafeBC regulations.
- As per applicable Fisheries and Oceans Canada asbestos management program(s), this inventory should be referenced by the asbestos management program Administrator prior to the commencement of any installation, maintenance, repair, renovation or construction activities to determine whether any of these activities will take place in the vicinity of known or suspect ACM.

## 9 CLOSURE

No Asbestos Materials Management Survey can wholly eliminate uncertainty regarding the potential for recognized building materials condition at the site. Performance of a standardized asbestos-containing materials review protocol is intended to reduce, but not eliminate uncertainty regarding the potential for recognized asbestos-containing materials at the site, given reasonable limits of time and cost.

This report has been prepared by WSP exclusively for Fisheries and Oceans Canada and is intended to provide a review of the potential for the presence of asbestos-containing materials within the interior of Rooms 104 through 133 and 201 through 223 of the Main Laboratory Complex, located at the Centre for Aquatic and Environmental Research, 4160 Marine Drive, West Vancouver, BC. Any use which a third party makes of this report, or any reliance on or decisions to be made or actions based on it, are the responsibility of such third parties. WSP accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions based on this report. The standard limitations of this report and terms of reference for hazardous materials and occupational health and safety reports are specified in Appendix V.

Respectfully submitted,

### WSP Canada Inc.



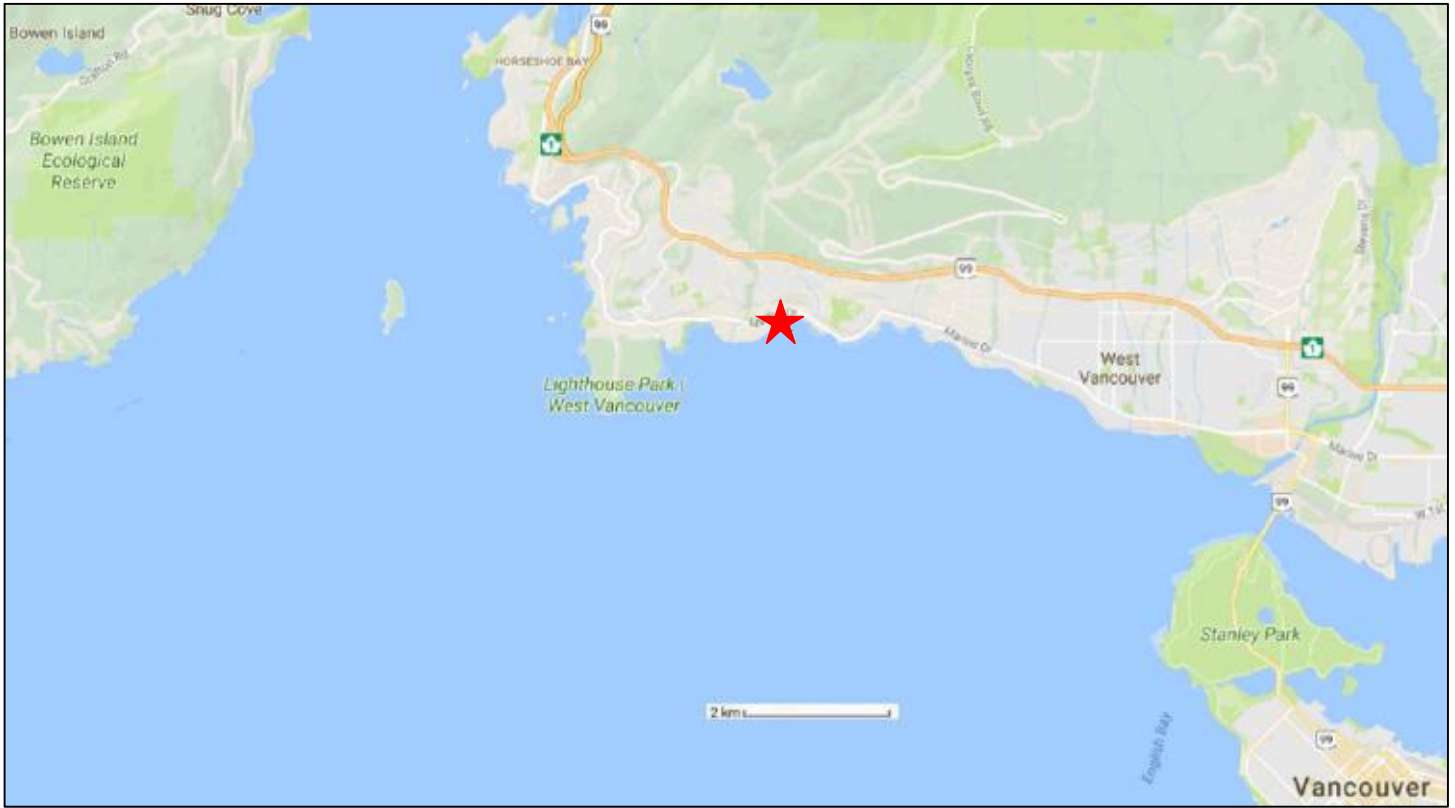
Gordon Philippe, B. Tech.  
Environmental Technologist



Anthony Dickinson, M.A.Sc., P.Eng.  
Senior Environmental Engineer

- Appendix I Figures
- Appendix II Photographs
- Appendix III Chain-of-Custodies and Laboratory Reports
- Appendix IV Regulatory Framework
- Appendix V Standard Limitations

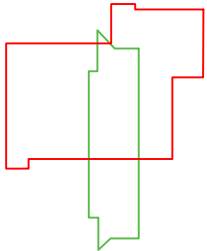
**APPENDIX I  
FIGURES**



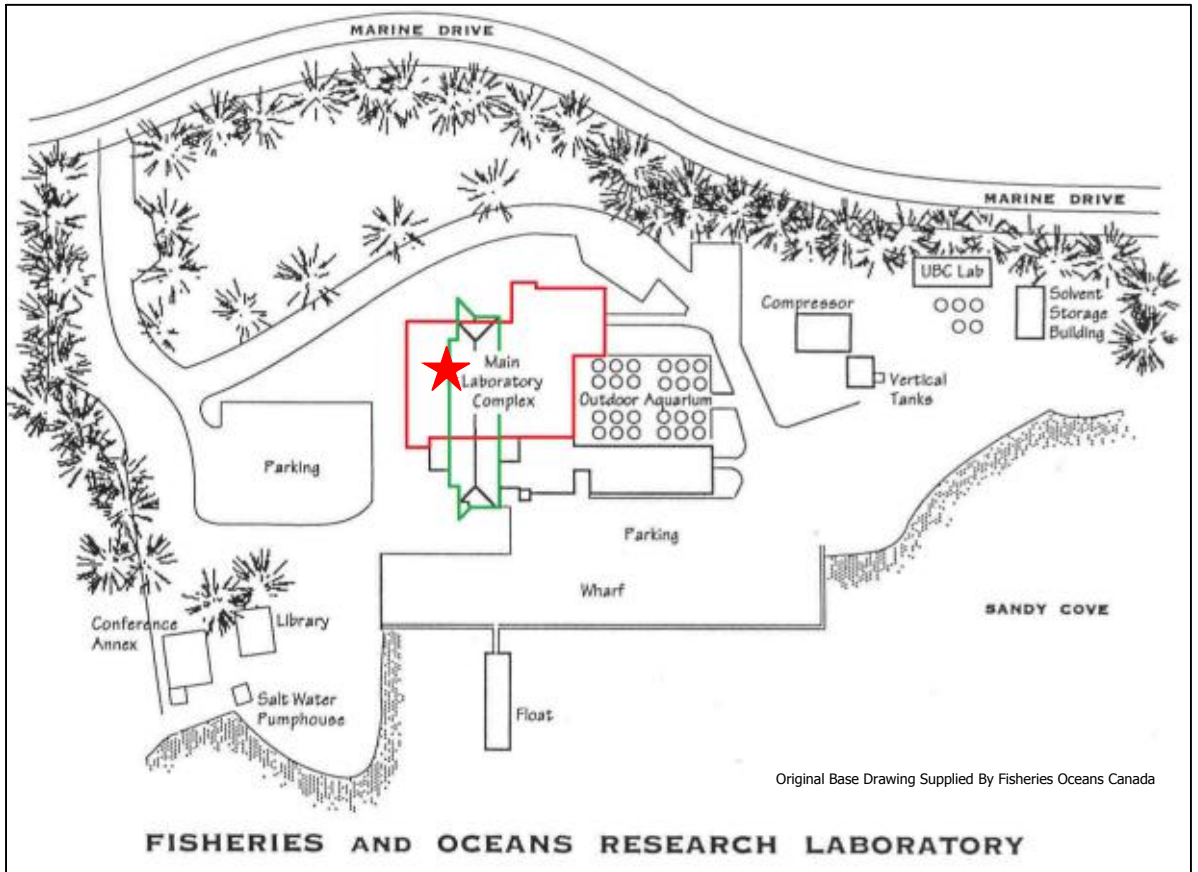
**LEGEND**

★ - SUBJECT SITE

Rooms 104 - 133



Rooms 201 - 223



Original Base Drawing Supplied By Fisheries Oceans Canada

**FISHERIES AND OCEANS RESEARCH LABORATORY**



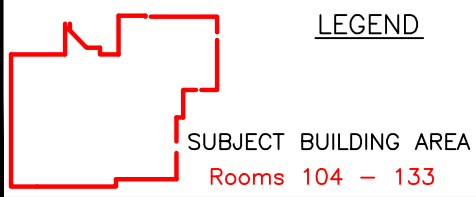
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**PROJECT:** Preliminary Asbestos Building Materials Management Survey  
 Centre for Aquatic and Environmental Research  
 Rooms 104 through 133 and 201 through 223  
 4160 Marine Drive, West Vancouver, BC  
 Fisheries and Oceans Canada  
**CLIENT:**

DES.	DR.	GP
CH.	SCALE	NTS
APP.	DATE	Oct. 2017
FILE NO.	171-11570-00	
DWG. NO.	FIGURE 1	





Original Base Drawing Supplied By Fisheries Oceans Canada



LEGEND

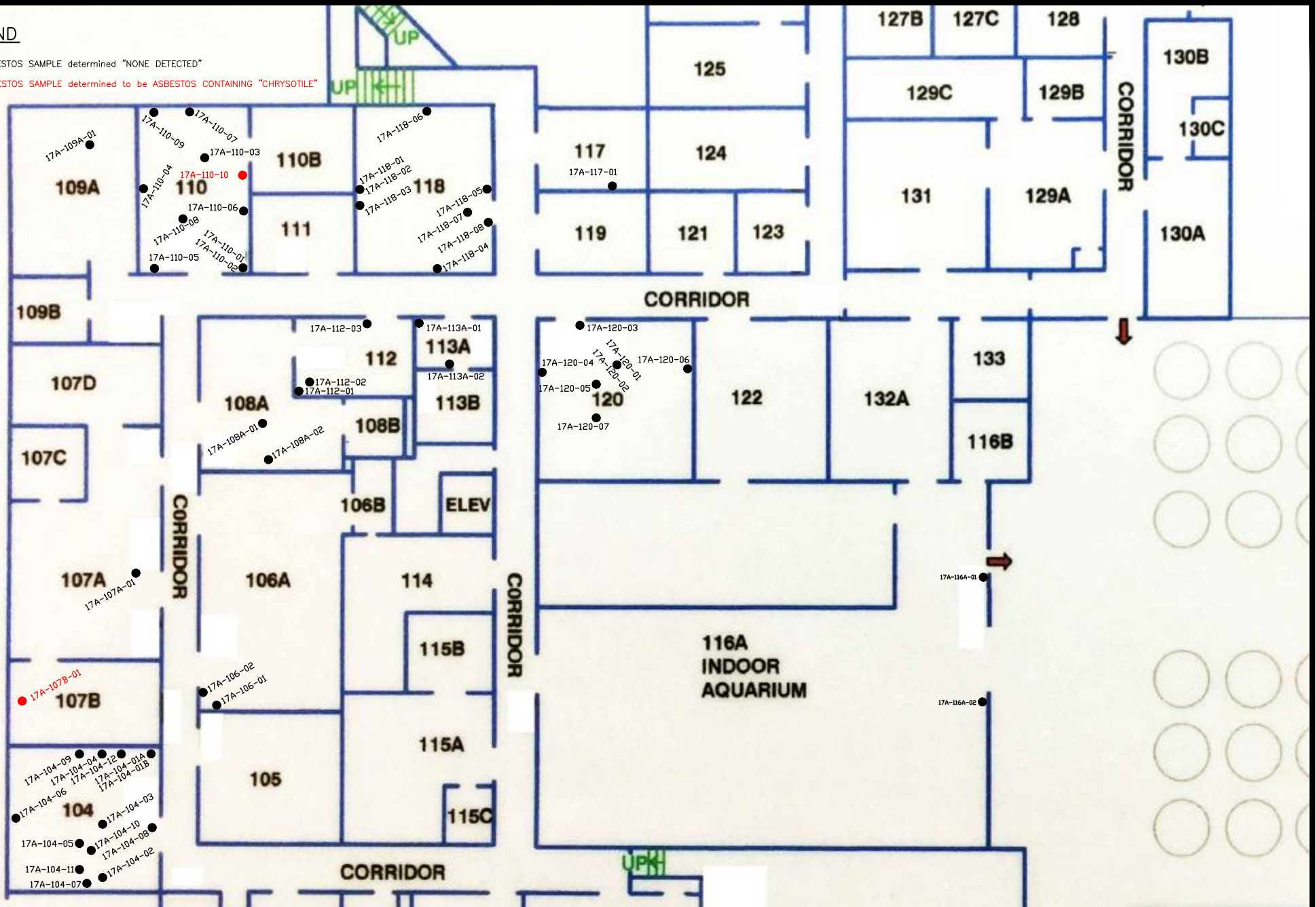
WSP Canada Inc.  
 Victoria, BC V8Z 6R4  
 T: 250.475.1000 F:  
 250.475.2211  
 E: victoriab@levelton.com  
 www.wspgroup.com

TITLE: Site Plan - First Floor  
 PROJECT: Preliminary Asbestos Building Materials Management Survey  
 Centre for Aquatic and Environmental Research  
 Rooms 104 through 133 and 201 through 223  
 4160 Marine Drive, West Vancouver, BC  
 Fisheries and Oceans Canada  
 CLIENT:

DES.	DR.	GP
CH.	SCALE	NTS
APP.	DATE	Oct. 2017
FILE NO.	171-11570-00	
DWG. NO.	FIGURE 2	

**LEGEND**

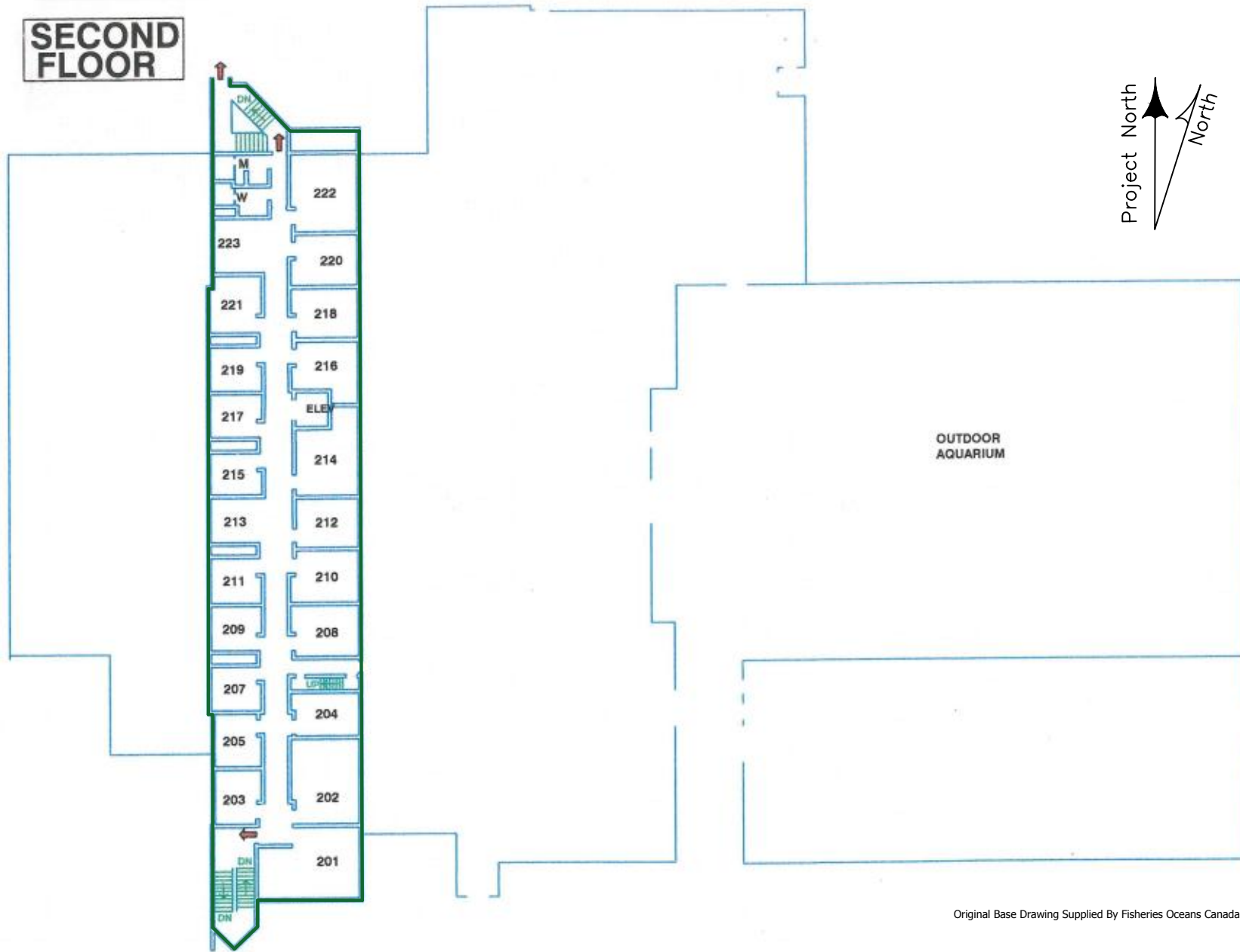
- - ASBESTOS SAMPLE determined "NONE DETECTED"
- - ASBESTOS SAMPLE determined to be ASBESTOS CONTAINING "CHRYSOTILE"



**TITLE:** Site Sampling Plan - First Floor  
**PROJECT:** Preliminary Asbestos Building Materials Management Survey  
 Centre for Aquatic and Environmental Research  
 Rooms 104 through 133 and 201 through 223  
 4160 Marine Drive, West Vancouver, BC  
 Fisheries and Oceans Canada  
**CLIENT:**

DES.	DR.	GP
CH.	SCALE	NTS
APP.	DATE	Oct. 2017
FILE NO.	171-11570-00	
DWG. NO.	FIGURE 2A	

**SECOND FLOOR**



Original Base Drawing Supplied By Fisheries Oceans Canada



LEGEND

SUBJECT BUILDING AREA  
Rooms 201 – 223



WSP Canada Inc.  
Victoria, BC V8Z 6R4  
T: 250.475.1000 F:  
250.475.2211  
E: victoriab@levelton.com  
www.wspgroup.com

TITLE:  
PROJECT:  
CLIENT:

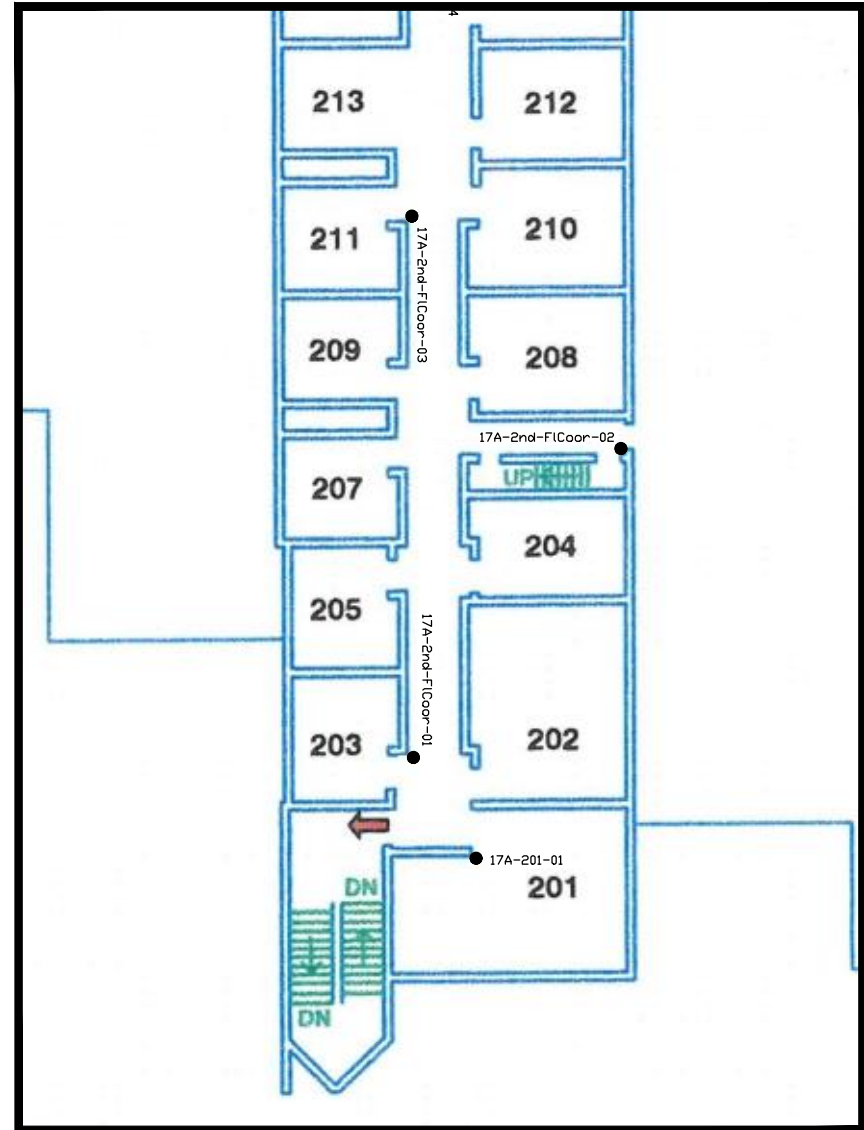
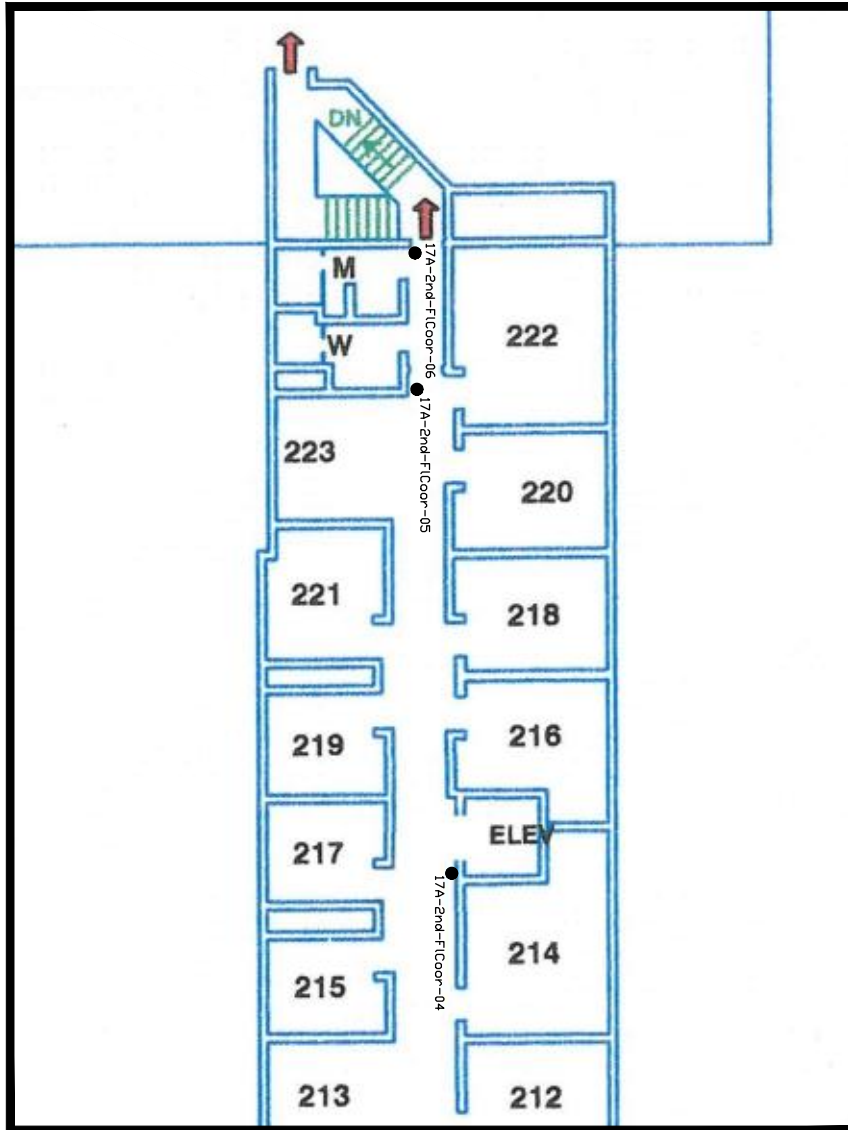
Site Plan - Second Floor  
Preliminary Asbestos Building Materials Management Survey  
Centre for Aquatic and Environmental Research  
Rooms 104 through 133 and 201 through 223  
4160 Marine Drive, West Vancouver, BC  
Fisheries and Oceans Canada

DES.	DR.
CH.	GP
APP.	SCALE NTS
	DATE Oct. 2017
FILE NO.	171-11570-00
DWG. NO.	FIGURE 3



**LEGEND**

- - ASBESTOS SAMPLE determined "NONE DETECTED"
- - ASBESTOS SAMPLE determined to be ASBESTOS CONTAINING "CHRYSOITILE"



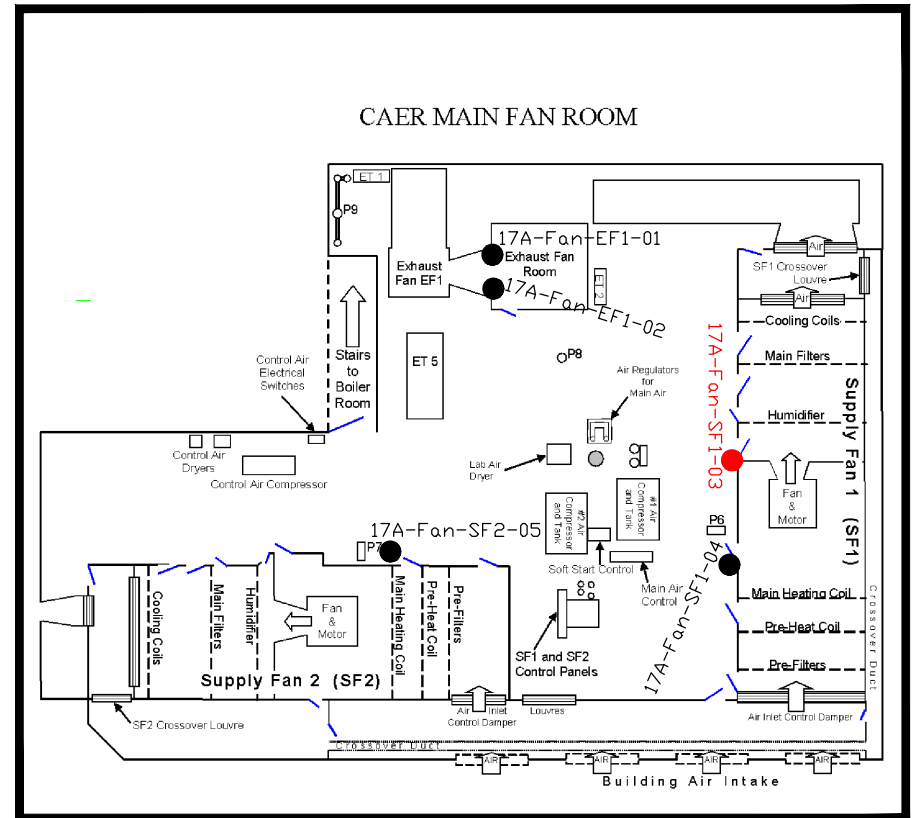
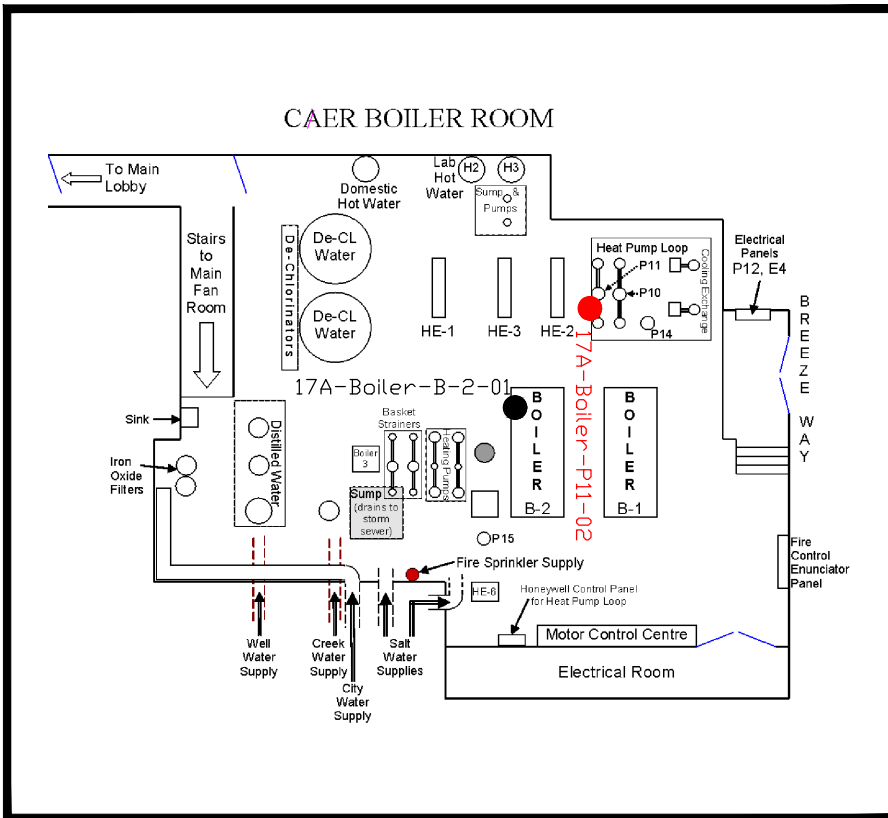
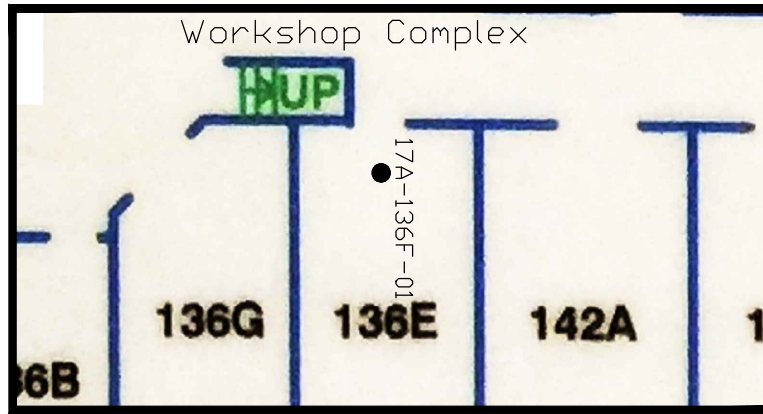
TITLE:  
 PROJECT:  
 CLIENT:


Site Sampling Plan - Second Floor  
 Preliminary Asbestos Building Materials Management Survey  
 Centre for Aquatic and Environmental Research  
 Rooms 104 through 133 and 201 through 223  
 4160 Marine Drive, West Vancouver, BC  
 Fisheries and Oceans Canada

DES.	DR.
CH.	GP
APP.	SCALE NTS
	DATE Oct. 2017
FILE NO.	171-11570-00
DWG. NO.	FIGURE 3A

**LEGEND**

- - ASBESTOS SAMPLE determined "NONE DETECTED"
- - ASBESTOS SAMPLE determined to be ASBESTOS CONTAINING "CHRYSOPILE"

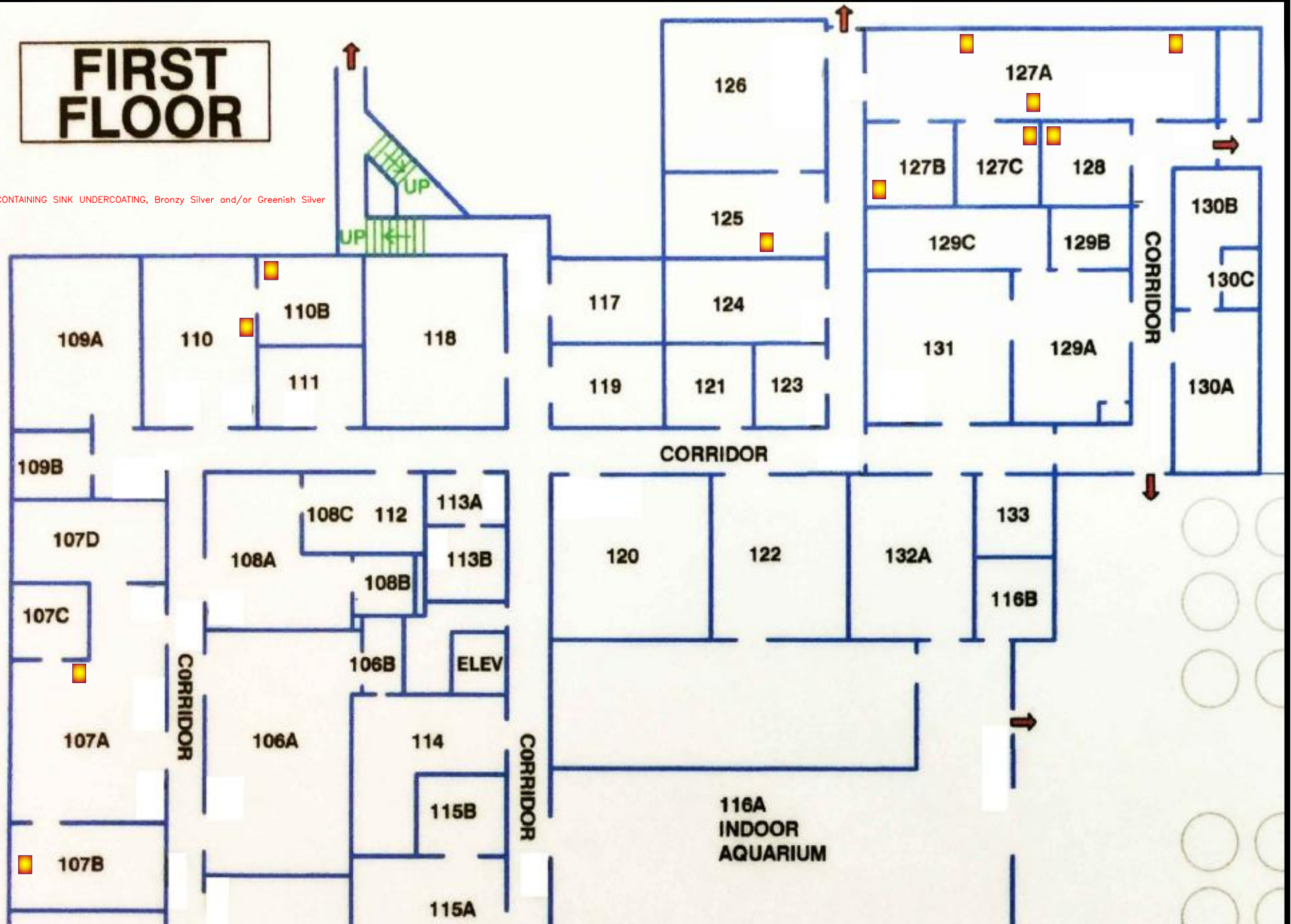


 <p>WSP Canada Inc.          Victoria, BC V8Z 6R4          T: 250.475.1000 F:          250.475.2211          E: victori@levelton.com          www.wspgroup.com</p>	TITLE:	Site Sampling Plan - Supplemental	DES.	DR.	GP
	PROJECT:	Preliminary Asbestos Building Materials Management Survey Centre for Aquatic and Environmental Research Rooms 104 through 133 and 201 through 223 4160 Marine Drive, West Vancouver, BC Fisheries and Oceans Canada	CH.	SCALE	NTS
	CLIENT:		APP.	DATE	Oct. 2017
			FILE NO.	171-11570-00	
			DWG. NO.	FIGURE 4	

# FIRST FLOOR

## LEGEND

 - ASBESTOS-CONTAINING SINK UNDERCOATING, Bronzy Silver and/or Greenish Silver



TITLE: Site Plan - Sinks With Asbestos Undercoating  
 PROJECT: Preliminary Asbestos Building Materials Management Survey  
 Centre for Aquatic and Environmental Research  
 Rooms 104 through 133 and 201 through 223  
 4160 Marine Drive, West Vancouver, BC  
 Fisheries and Oceans Canada  
 CLIENT:

DES.	DR.	GP
CH.	SCALE	NTS
APP.	DATE	Oct. 2017
FILE NO.	171-11570-00	
DWG. NO.	FIGURE 5	

**APPENDIX II  
PHOTOGRAPHS**



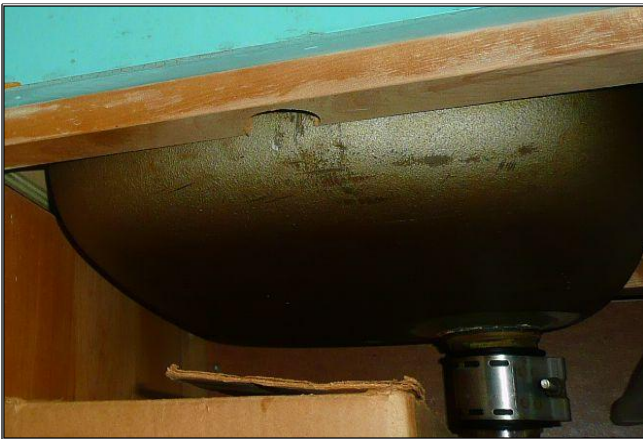


Typical Laboratory - Room 110  
Vinyl Sheet Flooring, Laboratory Counter Top,  
Painted Drywall Walls and Drop Ceiling with Drywall Joint Compound, and Vent Hood.



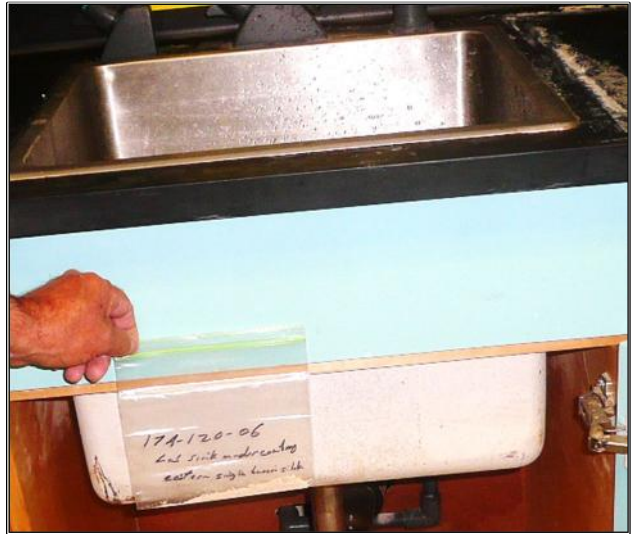
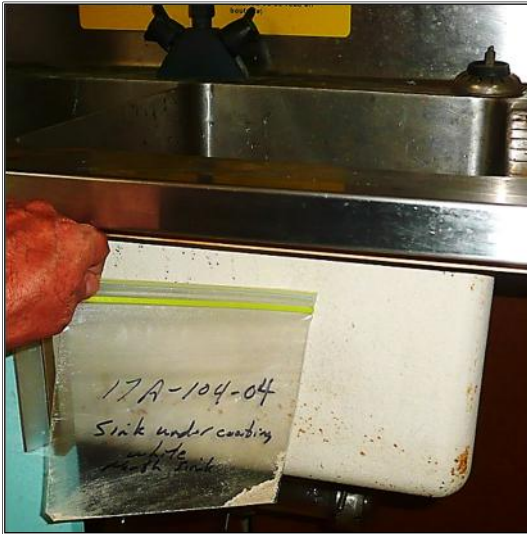
Typical Laboratory - Room 104

Vinyl sheet flooring, Pliable Baseboard Moulding, Laboratory Counter Top,  
Painted Drywall Walls with Drywall Joint Compound,  
Drop Suspended Ceiling Tiles, and Vent Hoods.

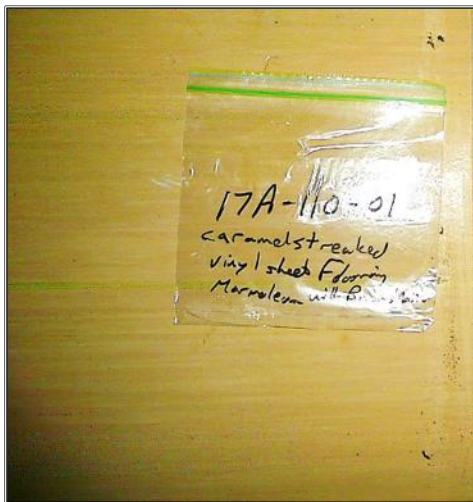


Sinks with Bronzy Silver and/or Greenish Silver Undercoating as sampled in Rooms 107b and 110 and similarly as observed to be present in Rooms 107a, 110b, 125, 127a, 127b, 127c, were determined to be Asbestos-Containing.



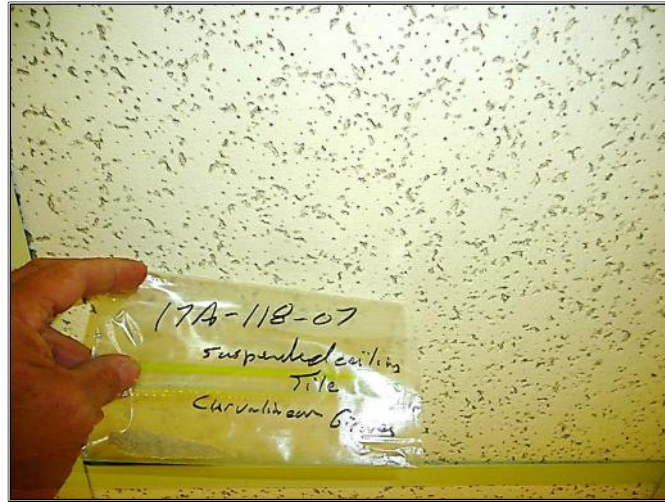


Sinks with White, Off-White and Light Grey Undercoating as sampled were found to be None Detect for asbestos.

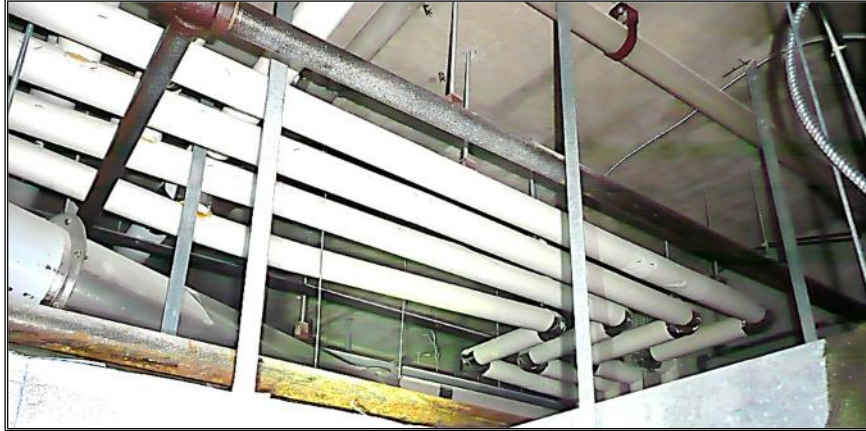


Floor Tile and Vinyl Sheet Flooring  
as sampled were found to be None Detect for asbestos.





Suspended Ceiling Tiles  
as sampled were found to be None Detect for asbestos.



Thermal Pipe Insulation as observed was Modern and Non-Suspect for Asbestos.



Green Duct Mastic and Red Fire Stop as sampled were found to be None Detect for asbestos.





The gasket associated with heat pump connection pipe fittings as observed and sampled on the south side of heat Pump P11 in Room 144 Mechanical was found to be Asbestos-Containing (30% Chrysotile). Associated gaskets and potential internal componentry or packing may also be asbestos containing.

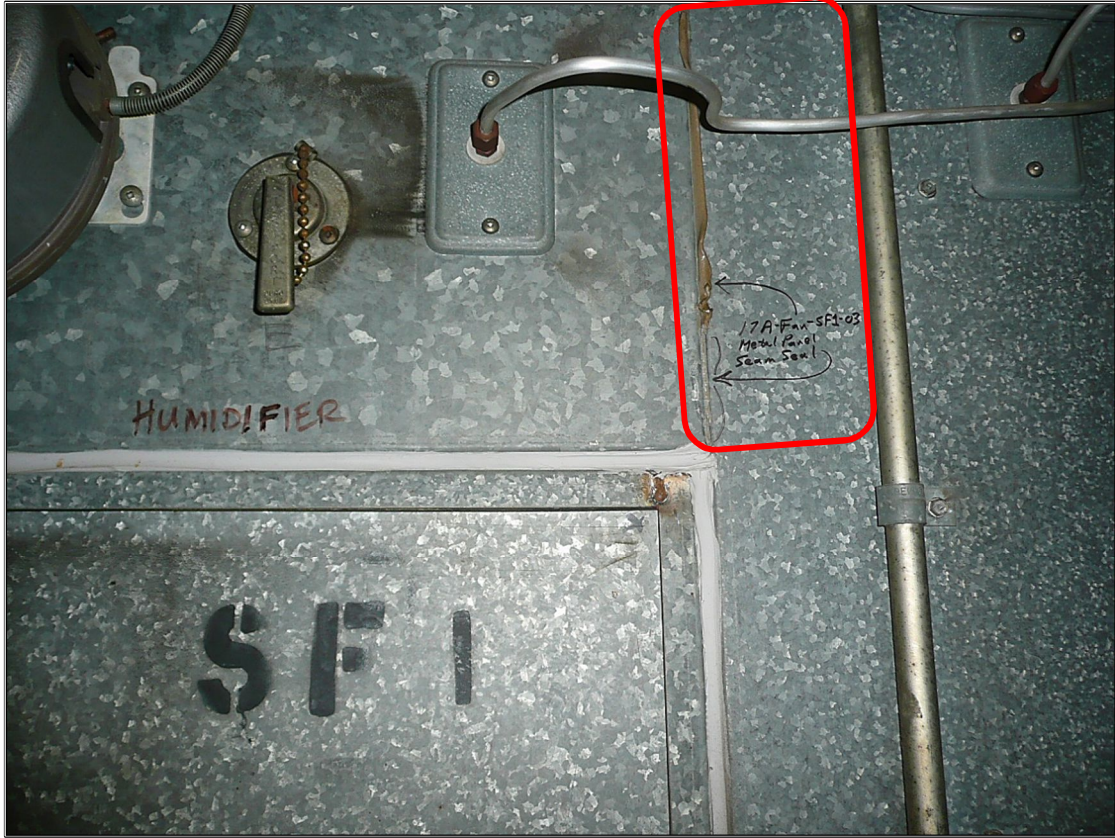


The North End Layered Packing and Gasket associated as observed and sampled on the north end of Boiler B2 in Room 144 Mechanical was found to be None Detected for asbestos.



The White and Black Mastics on Interior Batt Insulation as observed and sampled within the Exhaust Fan EFl in the Main Fan Room was found to be None Detected for asbestos.





The Grey Seam Sealant used between metal panels as sampled and observed on the Exterior Supply Fan SFI above the right corner of the 4th door to the south in the main Fan Room on the second level is herein extrapolated to be Asbestos-Containing (PC 1.8% Chrysotile).



The Black Mastic from under the door edge as sampled and observed on the Exterior Supply Fan SFI Upper Right Door Frame 5th Door to the South was found to be None Detected for asbestos.





The Thermal Pipe Insulation Hard Mud Elbow as sampled and observed on the North Supply Fan SF2, near 2nd Door to the West was found to be None Detected for asbestos.

**APPENDIX III  
CHAIN-OF-CUSTODIES, AND  
LABORATORY REPORTS**





# SURE Hazmat and Testing

101-4268 Lozells Avenue,  
Burnaby, B.C.  
Tel: 604.444.0204

## Chain of Custody - Bulk Samples

### Billing Information

### Project Information

Company Name:	WSP	Project #:	P17-11058-25
Address:	760 Enterprise Crescent	Project Name:	DFO CAER WVan
City/ Province:	Victoria	Postal Code:	V8Z 6R4
Contact Name:	Gordon Philippe	Site Location:	4160 Marine Dr. West Vancouver
Phone:	250-360-6537	PO #:	
Email (Results):	Gordon.Philippe@WSPgroup.com	Sampled By:	Gordon Philippe
Email (Invoice):	"	Date Sampled:	August 9, 2017
		Turnaround:	<input type="checkbox"/> Rush 4hr <input checked="" type="checkbox"/> Rush 24hr <input type="checkbox"/> Rush 3 Day <input type="checkbox"/> 5 Day <input type="checkbox"/> Other, specify

\*\* Surcharge applies for RUSH samples

By Friday afternoon

SAMPLE ID	Sample Location	Sample Material Description
1 17A-104-01A	Room 104 - Floor	VSF Caramel with Brown Flecks & Mastic
2 17A-104-02	Room 104 - Lab Counter	Lab Counter Top Dark Grey
3 17A-104-04	Room 104 - Sink	Sink Under coating White.
4 17A-104-05	Room 104 - Lower Prop Ceiling	Drywall Joint Compound = DWJC
5 17A-104-06	Room 104 - West Wall central	DWJC
6 17A-104-08	Room 104 - East Wall central	DWJC
7 17A-112-10	Room 110 - Sink	Sink Under coating greenish silver
8 17A-118-01	Room 118 - Floor	12" Floor Tile blended cream brown & black mastic
9 17A-118-03	Room 118 - West Wall central	DWJC
10 17A-118-04	Room 118 - South Wall central	DWJC

Special Instructions

* Relinquished by:	Date:	Received by:	Date:
Gordon Philippe	Aug 10, 2017		

\* It is the responsibility of the relinquisher to ensure the accuracy of the Chain of Custody Record



Lab #193144

Bulk NIOSH 9002 Analytical Method / Air NIOSH 7400 Analytical Method



# SURE Hazmat and Testing

101-4268 Lozells Avenue,  
Burnaby, B.C.  
Tel: 604-444-0204

## Chain of Custody - Bulk Samples

### Billing Information

### Project Information

Company Name:	WSP	Project #:	P17-11058-25
Address:	760 Enterprise Crescent	Project Name:	DFO CAER W Van
City/ Province:	Victoria	Postal Code:	V8Z6R4
Contact Name:	Gordon Philippe	Site Location:	4160 Marine Dr. West Vancouver
Phone:	250-360-6537	PO #:	
Email (Results):	Gordon.Philippe@WSPgroup.com	Sampled By:	Gordon Philippe
Email (Invoice):	"	Date Sampled:	August 9, 2017
		Turnaround:	<input type="checkbox"/> Rush 4hr <input checked="" type="checkbox"/> Rush 24hr <input type="checkbox"/> Rush 3 Day <input type="checkbox"/> 5 Day <input type="checkbox"/> Other, specify

\*\* Surcharge applies for RUSH samples

By Friday afternoon

SAMPLE ID	Sample Location	Sample Material Description
1 17A-118-06	Room 118- North Wall central	DWJC
2		
3		
4		
5		
6		
7		
8		
9		
10		

Special Instructions

\* Relinquished by:

Date:

Received by:

Date:

\* It is the responsibility of the relinquisher to ensure the accuracy of the Chain of Custody Record



Lab #193144

Bulk NIOSH 9002 Analytical Method / Air NIOSH 7400 Analytical Method

Page 2 of 2



# *SURE Hazmat and Testing*

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---

August 11, 2017

**WSP Canada Inc.**

#200 - 1985 West Broadway  
Vancouver, BC  
V6J 4Y3

**Reference: Bulk Material Identification Report  
DFO CAER WVan; 4160 Marine Drive, West Vancouver, BC**

---

Please find enclosed our laboratory results for the eleven (11) bulk samples that were submitted to our office for the analysis for asbestos content on August 10, 2017

## **Results**

- The sink undercoating (greenish silver) in sample 17A-110-10 that was submitted for analysis was found to be asbestos containing. Please see attached bulk sample analysis results sheet.

Examination of the samples was conducted in accordance with the **NIOSH 9002** PLM Bulk Sampling analytical method using polarized light microscopy and dispersion staining techniques. The detection limit of this method is listed as <1%. These samples will be disposed of after 2 months, unless we are instructed otherwise.

Prior to the performance of any work that impacts asbestos-containing materials, it is a regulatory requirement that a qualified person perform a Risk Assessment. This requirement is in compliance with the WorkSafe-BC Occupational Health & Safety (OH&S) Regulation *Part 6 "Substance Specific Requirements"*; specifically Section 6.6 subsections (1), (2), (3) and (4).

If further clarification is required, please call our office. Thank-you for having Sure Hazmat and Testing perform this work for you.

Sincerely,

---

Karen Smith  
*Office Administrator*

Encl. Laboratory Bulk Results

Ref: 11959-B01-L01



# SURE Hazmat and Testing

## Bulk Asbestos Results

Client: 11959 - WSP Canada

Sampled By/ Date: G. Philippe/ August 9, 2017

Reference: Drop Off Samples - DFO CAER WVan; 4160 Marine Drive, West Vancouver, BC

PO #: P17-11058-25

Client	Date Analyzed	Analyst	Sample Location	Material Type	Other Materials glass, synthetics, cellulose	Asbestos Type & Amount
11959-01	10-Aug-17	IW	17A-104-01A Room 104 - Floor	Vinyl Sheet Flooring (Caramel with Brown Fleck) Adhesive	Non-Fibrous 95% Other Fibres <5% Non-Fibrous 95% Other Fibres <5%	Non-Detected Non-Detected
11959-02	10-Aug-17	IW	17A-104-02 Room 104 - Lab Counter	Lab Counter Top (Dark Grey)	Non-Fibrous 95% Other Fibres <5%	Non-Detected
11959-03	10-Aug-17	IW	17A-104-04 Room 104 - Sink	Sink Undercoating (White)	Non-Fibrous 95% Other Fibres <5%	Non-Detected
11959-04	10-Aug-17	IW	17A-104-05 Room 104 - Lower Drop Ceiling	Drywall Joint Compound	Non-Fibrous 95% Other Fibres <5%	Non-Detected
11959-05	10-Aug-17	IW	17A-104-06 Room 104 - West Wall Central	Drywall Joint Compound	Non-Fibrous 95% Other Fibres <5%	Non-Detected
11959-06	10-Aug-17	IW	17A-104-08 Room 104 - East Wall Central	Drywall Joint Compound	Non-Fibrous 95% Other Fibres <5%	Non-Detected
11959-07	10-Aug-17	IW	17A-110-10 Room 110 - Sink	Sink Undercoating (Greenish Silver)	Non-Fibrous 85% Other Fibres >1%	<b>Chrysotile 5-10%</b>
11959-08	10-Aug-17	IW	17A-118-01 Room 118 - Floor	12" Floor Tile (Blended Cream Brown) Mastic (Black)	Non-Fibrous 95% Other Fibres <5% Non-Fibrous 95% Other Fibres <5%	Non-Detected Non-Detected
11959-09	10-Aug-17	IW	17A-118-03 Room 118 - West Wall Central	Drywall Joint Compound	Non-Fibrous 95% Other Fibres <5%	Non-Detected
11959-10	10-Aug-17	IW	17A-118-04 Room 118 - South Wall Central	Drywall Joint Compound	Non-Fibrous 95% Other Fibres <5%	Non-Detected

Note\* Chrysotile is part of the Serpentine Asbestos Mineral Group



Lab #193144

\*Samples analyzed in accordance with NIOSH 9002 PLM Bulk Sampling Method

Sure Hazmat and Testing is an active participant of the American Industrial Hygiene Association (AIHA) Bulk Asbestos Proficiency Analytical Testing (BAPAT)



# SURE Hazmat and Testing

## Bulk Asbestos Results

Client: 11959 - WSP Canada

Sampled By/ Date: G. Philippe/ August 9, 2017

Reference: Drop Off Samples - DFO CAER WVan; 4160 Marine Drive, West Vancouver, BC

PO #: P17-11058-25

Client	Date Analyzed	Analyst	Sample Location	Material Type	Other Materials glass, synthetics, cellulose	Asbestos Type & Amount
11959-11	11-Aug-17	IW	17A-118-06 Room 118 - North Wall Central	Drywall Joint Compound	Non-Fibrous 95% Other Fibres <5%	Non-detected



Lab #193144

\*Samples analyzed in accordance with NIOSH 9002 PLM Bulk Sampling Method

Sure Hazmat and Testing is an active participant of the American Industrial Hygiene Association (AIHA) Bulk Asbestos Proficiency Analytical Testing (BAPAT)

## Chain of Custody

-Bulk Asbestos -

<u>Contact Information</u>	
<b>Client Company:</b> <u>WSP Canada Inc.</u>	<b>Project Number:</b> <u>171-11570-00 Phase 01</u>
<b>Office Address:</b> <u>760 Enterprise Crescent</u>	<b>Project Name:</b> <u>ACM CAER W Van DFO</u>
<b>City, State, Zip:</b> <u>Victoria, BC, Canada V8Z 6R4</u>	<b>Primary Contact:</b> <u>Gordon Philippe</u>
<b>Fax Number:</b> <u>250-475-2211</u>	<b>Office Phone:</b> <u>250-475-1000</u>
<b>Email Address:</b> <u>Gordon.Philippe@WSPgroup.com</u>	<b>Cell Phone:</b> <u>250-360-6537</u>

<u>PLM Instructions:</u>	
<input checked="" type="checkbox"/> PLM: Bulk Asbestos Building Materials EPA 600 R-93/116, 1993	
<input type="checkbox"/> PLM: Bulk Asbestos Building Materials EPA 600 M-4/82-020, 1982	
<input type="checkbox"/> PLM: Bulk Asbestos Building Materials NIOSH 9002, 1985	
<input type="checkbox"/> PLM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.1, 2002	
<input type="checkbox"/> PLM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.6, 2010	
<input type="checkbox"/> TEM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.4, 2009	
<input type="checkbox"/> PLM: Point Counting	<input type="checkbox"/> PLM: Analyze Until Positive (Positive Stop)
<input type="checkbox"/> PC: via ELAP 198.1	<input type="checkbox"/> AUP: by Homogenous Area as Noted
<input type="checkbox"/> PC: 400 Points	<input type="checkbox"/> AUP: by Material Type as Noted
<input type="checkbox"/> PC: 800 Points *	<input type="checkbox"/> PLM: NOB via 198.6
<input type="checkbox"/> PC: 1600 Points *	<input type="checkbox"/> PLM: Friable via EPA 600 2.3
<input type="checkbox"/> PLM: Instructions for Multi-Layered Samples	<input type="checkbox"/> If <1% by PLM, to TEM via 198.4 *
<input type="checkbox"/> Analyze and Report All Separable Layers per EPA 600	<input type="checkbox"/> If <1% by PLM, Hold for Instructions
<input type="checkbox"/> Report Composite for Drywall Systems per NESHAP	<input type="checkbox"/> PLM: Non-Building Material*** (Dust, Wipe, Tape)
<input type="checkbox"/> Report All Layers and Composite Where Applicable	<input type="checkbox"/> Soil or Vermiculite Analysis
<input type="checkbox"/> Only Analyze and Report Specifically Noted Layer	<input type="checkbox"/> CARB 435
<b>Special Instructions:</b> _____	
* Additional charge and turnaround may be required      ** Alternative Method (ex: EPA 600/R-04/004) may be recommended by Laboratory	

<u>Turnaround Time</u>	
Preliminary Results Requested Date: _____	<input type="checkbox"/> Verbal <input checked="" type="checkbox"/> Email <input type="checkbox"/> Fax
Specific date / time	
<input type="checkbox"/> 10 Day <input type="checkbox"/> 5 Day <input checked="" type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 1 Day* <input type="checkbox"/> 12 Hour** <input type="checkbox"/> 6 Hour** <input type="checkbox"/> RUSH**	
* End of next business day unless otherwise specified. ** Matrix Dependent. ***Please notify the lab before shipping***	

<u>Chain of Custody</u>		
Relinquished (Name/Organization): <u>Gordon/WSP</u>	Date: <u>14 August 2017</u>	Time: <u>14:30</u>
Received (Name / iATL): _____	Date: _____	Time: _____
Sample Login (Name / iATL): _____	Date: _____	Time: _____
Analysis(Name(s) / iATL): <u>MD 8/23/2017</u>	Date: <u>8-23-17</u>	Time: <u>AUG 17 2017</u>
QA/QC Review (Name / iATL): _____	Date: _____	Time: _____
Archived / Released: _____	QA/QC InterLAB Use: _____	Date: _____

## Sample Log

### -Bulk Asbestos-

Client: WSP Canada Inc. Project: 171-11570-00 Phase 01/ ACM CAER W Van DFO

Sampling Date/Time: 9 - 11 August 2017

Bulk Asbestos Sample Log			
Client Sample #	IATL #	Location/Description	Notes
17A-104-01B	6317051	Baseboard/ Brown Mastic & DWJC	
17A-104-03		Lab Central East Extent/Dark Grey Counter Top	
17A-104-07	6317052 6317053	South Wall Central/DWJC	
17A-104-09	6317054	North Wall Central/DWJC	
17A-104-10	6317055	Suspended Ceiling Tile/ curvilinear aligned deep irregular indentations	
17A-104-11	6317056	Duct Mastic Green	
17A-104-12	6317057	Vent Hood Exhaust Duct Mastic - 2 Layers	
17A-106-01	6317058	South Wall West Extent/DWJC	
17A-106-02	6317059	West Wall South Extent/DWJC	
17A-107A-01	6317060	Suspended Ceiling Tile/ medium pin holes with deep short length indentations	
17A-107B-01	6317061	Laboratory Sink/Bronzey Silver Undercoating	
17A-108A-01	6317062	Fixed Drop Ceiling/DWJC	
17A-108A-02	6317053 6317054	South Laboratory Sink/Light Grey Undercoating	
17A-109A-01		Suspended Ceiling Tile/ med pin holes, blank space & sparsely elongated deep indentations	
		DWJC = Drywall Joint Compound	



## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544203 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 1

**Client:** WSP786

### PLM BULK SAMPLE ANALYSIS SUMMARY

**Lab No.:** 6317051  
**Client No.:** 17A-104-01B  
Percent Asbestos:  
*None Detected*

**Analyst Observation:** Brown Mastic  
**Client Description:** Brown Mastic And DWJC  
Percent Non-Asbestos Fibrous Material:  
None Detected

**Location:** Baseboard  
**Facility:**  
Percent Non-Fibrous Material:  
100

**Lab No.:** 6317051(L2)  
**Client No.:** 17A-104-01B  
Percent Asbestos:  
*None Detected*

**Analyst Observation:** Tan Joint Compound  
**Client Description:** Brown Mastic And DWJC  
Percent Non-Asbestos Fibrous Material:  
None Detected

**Location:** Baseboard  
**Facility:**  
Percent Non-Fibrous Material:  
100

**Lab No.:** 6317052  
**Client No.:** 17A-104-03  
Percent Asbestos:  
*None Detected*

**Analyst Observation:** Black Non-Fibrous  
**Client Description:** Dark Grey Counter Top  
Percent Non-Asbestos Fibrous Material:  
None Detected

**Location:** Lab Central East Extent  
**Facility:**  
Percent Non-Fibrous Material:  
100

**Lab No.:** 6317053  
**Client No.:** 17A-104-07  
Percent Asbestos:  
*None Detected*

**Analyst Observation:** White Joint Compound  
**Client Description:** DWJC  
Percent Non-Asbestos Fibrous Material:  
None Detected

**Location:** South Wall Central  
**Facility:**  
Percent Non-Fibrous Material:  
100

**Lab No.:** 6317054  
**Client No.:** 17A-104-09  
Percent Asbestos:  
*None Detected*

**Analyst Observation:** White Joint Compound  
**Client Description:** DWJC  
Percent Non-Asbestos Fibrous Material:  
None Detected

**Location:** North Wall Central  
**Facility:**  
Percent Non-Fibrous Material:  
100

**Lab No.:** 6317055  
**Client No.:** 17A-104-10  
Percent Asbestos:  
*None Detected*

**Analyst Observation:** Tan Ceiling Tile  
**Client Description:** Curvilinear Aligned Deep Irregular  
Indentations  
Percent Non-Asbestos Fibrous Material:  
30 Cellulose

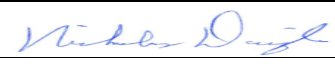
**Location:** Suspended Ceiling Tile  
**Facility:**  
Percent Non-Fibrous Material:  
70

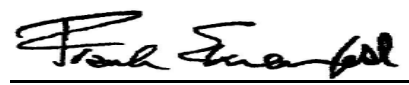
**Lab No.:** 6317056  
**Client No.:** 17A-104-11  
Percent Asbestos:  
*None Detected*

**Analyst Observation:** Green/Black Mastic  
**Client Description:** Duct Mastic Green  
Percent Non-Asbestos Fibrous Material:  
None Detected

**Location:**  
**Facility:**  
Percent Non-Fibrous Material:  
100

Analytical Method -US EPA 600, R93-116. Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/17/2017  
**Date Analyzed:** 08/23/2017  
**Signature:**   
**Analyst:** Nick Daigle

**Approved By:**   
Frank E. Ehrenfeld, III  
Laboratory Director

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

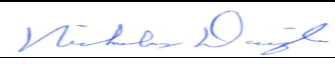
**Report Date:** 8/23/2017  
**Report No.:** 544203 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 1

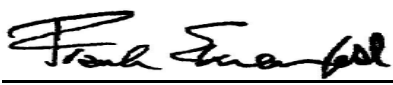
**Client:** WSP786

### PLM BULK SAMPLE ANALYSIS SUMMARY

<b>Lab No.:</b> 6317057 <b>Client No.:</b> 17A-104-12	<b>Analyst Observation:</b> White Caulk <b>Client Description:</b> Exhaust Duct Mastic-2 Layer	<b>Location:</b> Vent Hood <b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100
<b>Lab No.:</b> 6317057(L2) <b>Client No.:</b> 17A-104-12	<b>Analyst Observation:</b> Brown Caulk <b>Client Description:</b> Exhaust Duct Mastic-2 Layer	<b>Location:</b> Vent Hood <b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100
<b>Lab No.:</b> 6317058 <b>Client No.:</b> 17A-106-01	<b>Analyst Observation:</b> White Joint Compound <b>Client Description:</b> DWJC	<b>Location:</b> South Wall West Extent <b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100
<b>Lab No.:</b> 6317059 <b>Client No.:</b> 17A-106-02	<b>Analyst Observation:</b> White Joint Compound <b>Client Description:</b> DWJC	<b>Location:</b> West Wall South Extent <b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100
<b>Lab No.:</b> 6317060 <b>Client No.:</b> 17A-107A-01	<b>Analyst Observation:</b> White Ceiling Tile <b>Client Description:</b> Medium Pin Holes With Deep Short Length Indentations	<b>Location:</b> Suspended Ceiling Tile <b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> 30 Cellulose	<u>Percent Non-Fibrous Material:</u> 70
<b>Lab No.:</b> 6317061 <b>Client No.:</b> 17A-107B-01	<b>Analyst Observation:</b> Brown Mastic <b>Client Description:</b> Bronzey Silver Undercoating	<b>Location:</b> Laboratory Sink <b>Facility:</b>
<u>Percent Asbestos:</u> <i>PC 1.1 Chrysotile</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 98.9
<b>Lab No.:</b> 6317062 <b>Client No.:</b> 17A-108A-01	<b>Analyst Observation:</b> White Joint Compound <b>Client Description:</b> DWJC	<b>Location:</b> Fixed Drop Ceiling <b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100

Analytical Method -US EPA 600, R93-116. Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/17/2017  
**Date Analyzed:** 08/23/2017  
**Signature:**   
**Analyst:** Nick Daigle

**Approved By:**   
Frank E. Ehrenfeld, III  
Laboratory Director

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544203 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 1

**Client:** WSP786

### PLM BULK SAMPLE ANALYSIS SUMMARY

**Lab No.:** 6317063  
**Client No.:** 17A-108A-02

**Analyst Observation:** Grey Mastic  
**Client Description:** Light Grey Undercoating

**Location:** South Laboratory Sink  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317064  
**Client No.:** 17A-109A-01

**Analyst Observation:** Tan Ceiling Tile  
**Client Description:** Medium Pin Holes Blank Space And  
Sparsely Elongated Deep Indentations

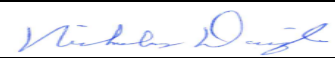
**Location:** Suspended Ceiling Tile  
**Facility:**

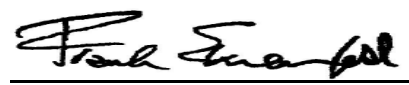
Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
30 Cellulose

Percent Non-Fibrous Material:  
70

Analytical Method -US EPA 600, R93-116. Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/17/2017  
**Date Analyzed:** 08/23/2017  
**Signature:**   
**Analyst:** Nick Daigle

**Approved By:**   
Frank E. Ehrenfeld, III  
Laboratory Director

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544203 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 1

**Client:** WSP786

### Appendix to Analytical Report

**Customer Contact:**

**Analysis:** US EPA 600, R93-116

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

**iATL Customer Service:** customerservice@iatl.com

**iATL Office Manager:** cdavis@iatl.com

**iATL Account Representative:** Shirley Clark

**Sample Login Notes:** See Batch Sheet Attached

**Sample Matrix:** Bulk Building Materials

**Exceptions Noted:** See Following Pages

#### General Terms, Warrants, Limits, Qualifiers:

General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at [www.iATL.com](http://www.iATL.com) and in our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

#### Information Pertinent to this Report:

Analysis by US EPA 600 93-116: Determination of Asbestos in Bulk Building Materials by Polarized Light Microscopy (PLM).

#### Certifications:

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

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.

Analytical Methodology Alternatives: Your initial request for analysis may not have accounted for recent advances in regulatory requirements or advances in technology that are routinely used in similar situations for other qualified projects. You may have the option to explore additional analysis for further information. Below are a few options, listed as the matrix followed by the appropriate methodology. Also included are links to more information on our website.

Bulk Building Materials that are Non-Friable Organically Bound (NOB) by Gravimetric Reduction techniques employing PLM and TEM: ELAP 198.6 (PLM-NOB), ELAP 198.4 (TEM-NOB)

Loose Fill Vermiculite Insulation, Attic Insulation, Zonolite (copyright), etc.: US EPA 600 R-4/004 (multi-tiered analytical process)

Sprayed On Insulation/Fireproofing with Vermiculite (SOF-V): ELAP 198.8 (PLM-SOF-V)>

Soil, sludge, sediment, aggregate, and like materials analyzed for asbestos or other elongated mineral particles (ex. erionite, etc.): ASTM D7521, CARB 435, and other options available

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544203 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 1

**Client:** WSP786

Asbestos in Surface Dust according to one of ASTM's Methods (very dependent on sampling collection technique – by TEM): ASTM D 5755, D5756, or D6480

Various other asbestos matrices (air, water, etc.) and analytical methods are available.

### Disclaimers / Qualifiers:

There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation. Here is a list with highlighted disclaimers that may be pertinent to this project. For a full explanation of these and other disclaimers, please inquire at [customerservice@iatl.com](mailto:customerservice@iatl.com).

- 1) Note: No mastic provided for analysis.
- 2) Note: Insufficient mastic provided for analysis.
- 3) Note: Insufficient material provided for analysis.
- 4) Note: Insufficient sample provided for QC reanalysis.
- 5) Note: Different material than indicated on Sample Log / Description.
- 6) Note: Sample not submitted.
- 7) Note: Attached to asbestos containing material.
- 8) Note: Received wet.
- 9) Note: Possible surface contamination.
- 10) Note: Not building material. 1% threshold may not apply.
- 11) Note: Recommend TEM-NOB analysis as per EPA recommendations.
- 12) Note: Asbestos detected but not quantifiable.
- 13) Note: Multiple identical samples submitted, only one analyzed.
- 14) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.080%.
- 15) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.125%.

### Recommendations for Vermiculite Analysis:

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gänge, homogeneous exfoliated books of mica, or mixed mineral composites). Please contact your client representative for pricing and turnaround time options available.

iATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004).

Further information on this method and other vermiculite and asbestos issues can be found at the following: Agency for Toxic Substances and Disease Registry (ATSDR) [www.atsdr.cdc.gov](http://www.atsdr.cdc.gov), United States Geological Survey (USGS) [www.minerals.usgs.gov/minerals/](http://www.minerals.usgs.gov/minerals/), US EPA [www.epa.gov/asbestos](http://www.epa.gov/asbestos). The USEPA also has an informative brochure "Current Best Practices for Vermiculite Attic Insulation" EPA 747F03001 May 2003, that may assist the health and remediation professional.

The following is a summary of the analytical process outlines in the EPA 600/R-04/004 Method:

- 1) **Analytical Step/Method:** Initial Screening by PLM, EPA 600R-93/116  
**Requirements/Comments:** Minimum of 0.1 g of sample. ~0.25% LOQ for most samples.
- 2) **Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Sinks" only.
- 3) **Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Floats" only.
- 4) **Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Sinks" only.
- 5) **Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Suspension" only.

LOQ, Limit of Quantitation estimates for mass and volume analyses.

\*With advance notice and confirmation by the laboratory.

\*\*Approximately 1 Liter of sample in double-bagged container (~9x6 inch bag of sample).



## Chain of Custody

-Bulk Asbestos -

<b>Contact Information</b>	
<b>Client Company:</b> <u>WSP Canada Inc.</u>	<b>Project Number:</b> <u>171-11570-00 Phase 01</u>
<b>Office Address:</b> <u>760 Enterprise Crescent</u>	<b>Project Name:</b> <u>ACM CAER W Van DFO</u>
<b>City, State, Zip:</b> <u>Victoria, BC, Canada V8Z 6R4</u>	<b>Primary Contact:</b> <u>Gordon Philippe</u>
<b>Fax Number:</b> <u>250-475-2211</u>	<b>Office Phone:</b> <u>250-475-1000</u>
<b>Email Address:</b> <u>Gordon.Philippe@WSPgroup.com</u>	<b>Cell Phone:</b> <u>250-360-6537</u>

**PLM Instructions:**

- PLM: Bulk Asbestos Building Materials EPA 600 R-93/116, 1993
- PLM: Bulk Asbestos Building Materials EPA 600 M-4/82-020, 1982
- PLM: Bulk Asbestos Building Materials NIOSH 9002, 1985
- PLM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.1, 2002
- PLM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.6, 2010
- TEM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.4, 2009

<ul style="list-style-type: none"> <li><input type="checkbox"/> PLM: Point Counting           <ul style="list-style-type: none"> <li><input type="checkbox"/> PC: via ELAP 198.1</li> <li><input type="checkbox"/> PC: 400 Points</li> <li><input type="checkbox"/> PC: 800 Points *</li> <li><input type="checkbox"/> PC: 1600 Points *</li> </ul> </li> <li><input type="checkbox"/> PLM: Instructions for Multi-Layered Samples           <ul style="list-style-type: none"> <li><input type="checkbox"/> Analyze and Report All Separable Layers per EPA 600</li> <li><input type="checkbox"/> Report Composite for Drywall Systems per NESHAP</li> <li><input type="checkbox"/> Report All Layers and Composite Where Applicable</li> <li><input type="checkbox"/> Only Analyze and Report Specifically Noted Layer</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> PLM: Analyze Until Positive (Positive Stop)           <ul style="list-style-type: none"> <li><input type="checkbox"/> AUP: by Homogenous Area as Noted</li> <li><input type="checkbox"/> AUP: by Material Type as Noted</li> </ul> </li> <li><input type="checkbox"/> PLM: NOB via 198.6           <ul style="list-style-type: none"> <li><input type="checkbox"/> PLM: Friable via EPA 600 2.3</li> <li><input type="checkbox"/> If &lt;1% by PLM, to TEM via 198.4 *</li> <li><input type="checkbox"/> If &lt;1% by PLM, Hold for Instructions</li> </ul> </li> <li><input type="checkbox"/> PLM: Non-Building Material*** (Dust, Wipe, Tape)           <ul style="list-style-type: none"> <li><input type="checkbox"/> Soil or Vermiculite Analysis</li> <li><input type="checkbox"/> CARB 435</li> </ul> </li> </ul>
---	--

**Special Instructions:** \_\_\_\_\_

\* Additional charge and turnaround may be required    \*\* Alternative Method (ex: EPA 600/R-04/004) may be recommended by Laboratory

**Turnaround Time**

Preliminary Results Requested Date: \_\_\_\_\_

Specific date / time

10 Day  
  5 Day  
  3 Day  
  2 Day  
  1 Day\*  
  12 Hour\*\*  
  6 Hour\*\*  
  RUSH\*\*

\* End of next business day unless otherwise specified. \*\* Matrix Dependent. \*\*\*Please notify the lab before shipping\*\*\*

Verbal  
  Email  
  Fax

**Chain of Custody**

Relinquished (Name/Organization): <u>Gordon/WSP</u>	Date: <u>14 August 2017</u>	Time: <u>16:30</u>
Received (Name / iATL): _____	Date: _____	Time: _____
Sample Login (Name / iATL): _____	Date: _____	Time: _____
Analysis(Name(s) / iATL): _____	Date: <u>8/27/2017</u>	Time: _____
QA/QC Review (Name / iATL): _____	Date: <u>8/23/17</u>	Time: _____
Archived / Released: _____	QA/QC InterLAB Use: _____	Date: _____

RECEIVED  
AUG 17 2017

## Sample Log

### -Bulk Asbestos -

Client: WSP Canada Inc.

Project: 171-11570-00 Phase 01/ ACM CAER W Van DFO

Sampling Date/Time: 9 - 11 August 2017

Bulk Asbestos Sample Log			
Client Sample #	IATL #	Location/Description	Notes
17A-110-01	6317023	VSF Caramel Streaked with Brown Mastic	
17A-110-02	6317024	4" Beige-Brown Pliable Baseboard & Brown Mastic	
17A-110-03	6317025	Fixed Drop Ceiling/DWJC	
17A-110-04	6317026	West Wall Central/DWJC	
17A-110-05	6317027	South Wall Central/DWJC	
17A-110-06	6317028	East Wall Central/DWJC	
17A-110-07	6317029	North Wall Central/DWJC	
17A-110-08	6317030	C-Shaped Counter @ Outlet/Dark Grey Counter Top	
17A-110-09	6317031	Back of Desk Counter/Dark Grey Counter Top	
17A-112-01	6317032	Southwest Corner Wall/DWJC	
17A-112-02	6317033	North Wall Central/DWJC	
17A-112-03	6317034	Duct Mastic Green	
17A-113A-01	6317035	Northwest Corner Wall/DWJC	
17A-113A-02	6317036	South Wall Central/DWJC	
		VSF = Vinyl Sheet Flooring	
		DWJC = Drywall Joint Compound	

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544201 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 01

**Client:** WSP786

### PLM BULK SAMPLE ANALYSIS SUMMARY

**Lab No.:** 6317023  
**Client No.:** 17A-110-01

**Analyst Observation:** Tan Vinyl Sheet Flooring  
**Client Description:** VSF Caramel Streaked With Brown Mastic

**Location:**  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317023(L2)  
**Client No.:** 17A-110-01

**Analyst Observation:** Tan Mastic  
**Client Description:** VSF Caramel Streaked With Brown Mastic

**Location:**  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317024  
**Client No.:** 17A-110-02

**Analyst Observation:** Tan Cove Base; 4"  
**Client Description:** 4" Beige-Brown Pliable Baseboard And Brown Mastic

**Location:**  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317024(L2)  
**Client No.:** 17A-110-02

**Analyst Observation:** Tan Mastic  
**Client Description:** 4" Beige-Brown Pliable Baseboard And Brown Mastic

**Location:**  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317025  
**Client No.:** 17A-110-03

**Analyst Observation:** White Joint Compound  
**Client Description:** Fixed Drop Ceiling/DWJC

**Location:**  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317026  
**Client No.:** 17A-110-04

**Analyst Observation:** White Joint Compound  
**Client Description:** DWJC

**Location:** West Wall Central  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

Analytical Method -US EPA 600, R93-116. Please refer to the Appendix of this report for further information regarding your analysis.

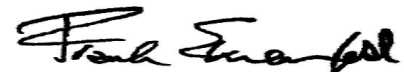
**Date Received:** 8/17/2017

**Date Analyzed:** 08/23/2017

**Signature:**

**Analyst:** Ellen Smith

**Approved By:**



Frank E. Ehrenfeld, III  
Laboratory Director

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

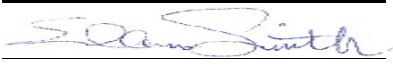
**Report Date:** 8/23/2017  
**Report No.:** 544201 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 01

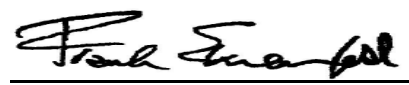
**Client:** WSP786

### PLM BULK SAMPLE ANALYSIS SUMMARY

<b>Lab No.:</b> 6317027 <b>Client No.:</b> 17A-110-05  <u>Percent Asbestos:</u> <i>None Detected</i>	<b>Analyst Observation:</b> White Joint Compound <b>Client Description:</b> DWJC  <u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<b>Location:</b> South Wall Central <b>Facility:</b>  <u>Percent Non-Fibrous Material:</u> 100
<b>Lab No.:</b> 6317028 <b>Client No.:</b> 17A-110-06  <u>Percent Asbestos:</u> <i>None Detected</i>	<b>Analyst Observation:</b> White Joint Compound <b>Client Description:</b> DWJC  <u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<b>Location:</b> East Wall Central <b>Facility:</b>  <u>Percent Non-Fibrous Material:</u> 100
<b>Lab No.:</b> 6317029 <b>Client No.:</b> 17A-110-07  <u>Percent Asbestos:</u> <i>None Detected</i>	<b>Analyst Observation:</b> White Joint Compound <b>Client Description:</b> DWJC  <u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<b>Location:</b> North Wall Central <b>Facility:</b>  <u>Percent Non-Fibrous Material:</u> 100
<b>Lab No.:</b> 6317030 <b>Client No.:</b> 17A-110-08  <u>Percent Asbestos:</u> <i>None Detected</i>	<b>Analyst Observation:</b> Grey Non-Fibrous <b>Client Description:</b> Dark Grey Counter Top  <u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<b>Location:</b> C-Shaped Counter At Outlet <b>Facility:</b>  <u>Percent Non-Fibrous Material:</u> 100
<b>Lab No.:</b> 6317031 <b>Client No.:</b> 17A-110-09  <u>Percent Asbestos:</u> <i>None Detected</i>	<b>Analyst Observation:</b> Grey Non-Fibrous <b>Client Description:</b> Dark Grey Counter Top  <u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<b>Location:</b> Back Of Desk Counter <b>Facility:</b>  <u>Percent Non-Fibrous Material:</u> 100
<b>Lab No.:</b> 6317032 <b>Client No.:</b> 17A-112-01  <u>Percent Asbestos:</u> <i>None Detected</i>	<b>Analyst Observation:</b> White Joint Compound <b>Client Description:</b> DWJC  <u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<b>Location:</b> Southwest Corner Wall <b>Facility:</b>  <u>Percent Non-Fibrous Material:</u> 100
<b>Lab No.:</b> 6317033 <b>Client No.:</b> 17A-112-02  <u>Percent Asbestos:</u> <i>None Detected</i>	<b>Analyst Observation:</b> White Joint Compound <b>Client Description:</b> DWJC  <u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<b>Location:</b> North Wall Central <b>Facility:</b>  <u>Percent Non-Fibrous Material:</u> 100

Analytical Method -US EPA 600, R93-116. Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/17/2017  
**Date Analyzed:** 08/23/2017  
**Signature:**   
**Analyst:** Ellen Smith

**Approved By:**   
 Frank E. Ehrenfeld, III  
 Laboratory Director

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544201 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 01

**Client:** WSP786

### PLM BULK SAMPLE ANALYSIS SUMMARY

**Lab No.:** 6317034  
**Client No.:** 17A-112-03

**Analyst Observation:** Green/Brown Mastic  
**Client Description:** Duct Mastic Green

**Location:**  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317035  
**Client No.:** 17A-113A-01

**Analyst Observation:** White Joint Compound  
**Client Description:** DWJC

**Location:** Northwest Corner Wall  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317036  
**Client No.:** 17A-113A-02

**Analyst Observation:** White Joint Compound  
**Client Description:** DWJC

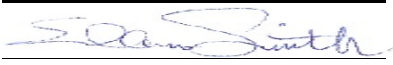
**Location:** South Wall Central  
**Facility:**

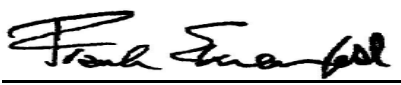
Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

Analytical Method -US EPA 600, R93-116. Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/17/2017  
**Date Analyzed:** 08/23/2017  
**Signature:**   
**Analyst:** Ellen Smith

**Approved By:**   
Frank E. Ehrenfeld, III  
Laboratory Director



## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544201 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 01

**Client:** WSP786

### Appendix to Analytical Report

**Customer Contact:**

**Analysis:** US EPA 600, R93-116

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

**iATL Customer Service:** customerservice@iatl.com

**iATL Office Manager:** cdavis@iatl.com

**iATL Account Representative:** Shirley Clark

**Sample Login Notes:** See Batch Sheet Attached

**Sample Matrix:** Bulk Building Materials

**Exceptions Noted:** See Following Pages

#### General Terms, Warrants, Limits, Qualifiers:

General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at [www.iATL.com](http://www.iATL.com) and in our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

#### Information Pertinent to this Report:

Analysis by US EPA 600 93-116: Determination of Asbestos in Bulk Building Materials by Polarized Light Microscopy (PLM).

#### Certifications:

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

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.

Analytical Methodology Alternatives: Your initial request for analysis may not have accounted for recent advances in regulatory requirements or advances in technology that are routinely used in similar situations for other qualified projects. You may have the option to explore additional analysis for further information. Below are a few options, listed as the matrix followed by the appropriate methodology. Also included are links to more information on our website.

Bulk Building Materials that are Non-Friable Organically Bound (NOB) by Gravimetric Reduction techniques employing PLM and TEM: ELAP 198.6 (PLM-NOB), ELAP 198.4 (TEM-NOB)

Loose Fill Vermiculite Insulation, Attic Insulation, Zonolite (copyright), etc.: US EPA 600 R-4/004 (multi-tiered analytical process)  
Sprayed On Insulation/Fireproofing with Vermiculite (SOF-V): ELAP 198.8 (PLM-SOF-V)>

Soil, sludge, sediment, aggregate, and like materials analyzed for asbestos or other elongated mineral particles (ex. erionite, etc.): ASTM D7521, CARB 435, and other options available

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544201 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 01

**Client:** WSP786

Asbestos in Surface Dust according to one of ASTM's Methods (very dependent on sampling collection technique – by TEM): ASTM D 5755, D5756, or D6480

Various other asbestos matrices (air, water, etc.) and analytical methods are available.

### Disclaimers / Qualifiers:

There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation. Here is a list with highlighted disclaimers that may be pertinent to this project. For a full explanation of these and other disclaimers, please inquire at [customerservice@iatl.com](mailto:customerservice@iatl.com).

- 1) Note: No mastic provided for analysis.
- 2) Note: Insufficient mastic provided for analysis.
- 3) Note: Insufficient material provided for analysis.
- 4) Note: Insufficient sample provided for QC reanalysis.
- 5) Note: Different material than indicated on Sample Log / Description.
- 6) Note: Sample not submitted.
- 7) Note: Attached to asbestos containing material.
- 8) Note: Received wet.
- 9) Note: Possible surface contamination.
- 10) Note: Not building material. 1% threshold may not apply.
- 11) Note: Recommend TEM-NOB analysis as per EPA recommendations.
- 12) Note: Asbestos detected but not quantifiable.
- 13) Note: Multiple identical samples submitted, only one analyzed.
- 14) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.080%.
- 15) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.125%.

### Recommendations for Vermiculite Analysis:

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gänge, homogeneous exfoliated books of mica, or mixed mineral composites). Please contact your client representative for pricing and turnaround time options available.

iATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004).

Further information on this method and other vermiculite and asbestos issues can be found at the following: Agency for Toxic Substances and Disease Registry (ATSDR) [www.atsdr.cdc.gov](http://www.atsdr.cdc.gov), United States Geological Survey (USGS) [www.minerals.usgs.gov/minerals/](http://www.minerals.usgs.gov/minerals/), US EPA [www.epa.gov/asbestos](http://www.epa.gov/asbestos). The USEPA also has an informative brochure "Current Best Practices for Vermiculite Attic Insulation" EPA 747F03001 May 2003, that may assist the health and remediation professional.

The following is a summary of the analytical process outlines in the EPA 600/R-04/004 Method:

- 1) **Analytical Step/Method:** Initial Screening by PLM, EPA 600R-93/116  
**Requirements/Comments:** Minimum of 0.1 g of sample. ~0.25% LOQ for most samples.
- 2) **Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Sinks" only.
- 3) **Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Floats" only.
- 4) **Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Sinks" only.
- 5) **Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Suspension" only.

LOQ, Limit of Quantitation estimates for mass and volume analyses.

\*With advance notice and confirmation by the laboratory.

\*\*Approximately 1 Liter of sample in double-bagged container (~9x6 inch bag of sample).

# Chain of Custody

-Bulk Asbestos-

**Contact Information**

**Client Company:** WSP Canada Inc.  
**Office Address:** 760 Enterprise Crescent  
**City, State, Zip:** Victoria, BC, Canada V8Z 6R4  
**Fax Number:** 250-475-2211  
**Email Address:** Gordon.Philippe@WSPgroup.com

**Project Number:** 171-11570-00 Phase 01  
**Project Name:** ACM CAER W Van DFO  
**Primary Contact:** Gordon Philippe  
**Office Phone:** 250-475-1000  
**Cell Phone:** 250-360-6537

**PLM Instructions:**

- PLM: Bulk Asbestos Building Materials EPA 600 R-93/116, 1993
- PLM: Bulk Asbestos Building Materials EPA 600 M-4/82-020, 1982
- PLM: Bulk Asbestos Building Materials NIOSH 9002, 1985
- PLM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.1, 2002
- PLM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.6, 2010
- TEM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.4, 2009
  
- PLM: Point Counting
  - PC: via ELAP 198.1
  - PC: 400 Points
  - PC: 800 Points \*
  - PC: 1600 Points \*
- PLM: Instructions for Multi-Layered Samples
  - Analyze and Report All Separable Layers per EPA 600
  - Report Composite for Drywall Systems per NESHAP
  - Report All Layers and Composite Where Applicable
  - Only Analyze and Report Specifically Noted Layer
- PLM: Analyze Until Positive (Positive Stop)
  - AUP: by Homogenous Area as Noted
  - AUP: by Material Type as Noted
- PLM: NOB via 198.6
  - PLM: Friable via EPA 600 2.3
  - If <1% by PLM, to TEM via 198.4 \*
  - If <1% by PLM, Hold for Instructions
- PLM: Non-Building Material\*\*\* (Dust, Wipe, Tape)
  - Soil or Vermiculite Analysis \*
  - CARB 435

**Special Instructions:** \_\_\_\_\_

\* Additional charge and turnaround may be required    \*\* Alternative Method (ex: EPA 600/R-04/004) may be recommended by Laboratory

**Turnaround Time**

Preliminary Results Requested Date: \_\_\_\_\_  
Specific date / time       Verbal     Email     Fax

10 Day     5 Day     3 Day     2 Day     1 Day\*     12 Hour\*\*     6 Hour\*\*     RUSH\*\*

\* End of next business day unless otherwise specified. \*\* Matrix Dependent. \*\*\*Please notify the lab before shipping\*\*\*

**Chain of Custody**

Relinquished (Name/Organization): <u>Gordon/WSP</u>	Date: <u>14 August 2017</u>	<b>RECEIVED</b>
Received (Name / iATL): _____	Date: _____	Time: <u>14:30</u>
Sample Login (Name / iATL): _____	Date: <u>8/23/17</u>	Time: _____
Analysis (Name(s) / iATL): _____	Date: <u>8/23/17</u>	Time: _____
QA/QC Review (Name / iATL): _____	Date: <u>8/23/17</u>	Time: <u>AUG 17 2017</u>
Archived / Released: _____	QA/QC InterLAB Use: _____	Time: _____
	Date: <u>8/23/17</u>	Time: _____

*(Signature)*  
IATL - By \_\_\_\_\_

## Sample Log

### -Bulk Asbestos -

Client: WSP Canada Inc.

Project: 171-11570-00 Phase 01/ ACM CAER W Van DFO

Sampling Date/Time: 9 - 11 August 2017

Bulk Asbestos Sample Log			
Client Sample #	IATL #	Location/Description	Notes
17A-116A-01	6317037	East Wall North Doorway/DWJC	
17A-116A-02	6317038	East Wall South Doorway/DWJC	
17A-117-01	6317039	South Wall Central/DWJC	
17A-118-02	6317040	4" Beige-Brown Pliable Baseboard & Brown Mastic	
17A-118-05	6317041	East Wall Central/DWJC	
17A-118-07	6317042	Suspended Ceiling Tile/curvilinear aligned deep (regular indentations)	
17A-118-08	6317043	<b>Red Fire Stop</b>	
17A-120-01	6317044	12" Cream/taupe/brown blended Floor Tile & Black Mastic	
17A-120-02	6317045	Cementitious Leveling Compound at Drain	
17A-120-03	6317046	North Wall West Portion/DWJC	
17A-120-04	6317047	West Wall North Portion/DWJC	
17A-120-05	6317048	Counter/Dark Grey Counter Top	
17A-120-06	6317049	Eastern Single Lab Sink/White Undercoating	
17A-120-07	6317050	Central Double Lab Sink/White Undercoating	
		DWJC = Drywall Joint Compound	

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544202 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 1

**Client:** WSP786

### PLM BULK SAMPLE ANALYSIS SUMMARY

**Lab No.:** 6317037  
**Client No.:** 17A-116A-01

**Analyst Observation:** White Joint Compound  
**Client Description:** DWJC

**Location:** East Wall North Doorway  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317038  
**Client No.:** 17A-116A-02

**Analyst Observation:** White Joint Compound  
**Client Description:** DWJC

**Location:** East Wall South Doorway  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317039  
**Client No.:** 17A-117-01

**Analyst Observation:** White Joint Compound  
**Client Description:** DWJC

**Location:** South Wall Central  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317040  
**Client No.:** 17A-118-02

**Analyst Observation:** Tan Cove Base; 4"  
**Client Description:** 4" Beige-Brown Pliable Baseboard And  
Brown Mastic

**Location:**  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317040(L2)  
**Client No.:** 17A-118-02

**Analyst Observation:** Tan Mastic  
**Client Description:** 4" Beige-Brown Pliable Baseboard And  
Brown Mastic

**Location:**  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317041  
**Client No.:** 17A-118-05

**Analyst Observation:** White Joint Compound  
**Client Description:** DWJC

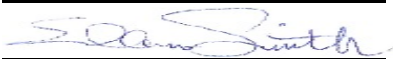
**Location:** East Wall Central  
**Facility:**

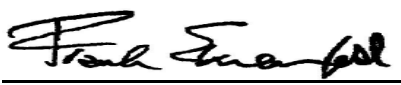
Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

Analytical Method -US EPA 600, R93-116. Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/17/2017  
**Date Analyzed:** 08/23/2017  
**Signature:**   
**Analyst:** Ellen Smith

**Approved By:**   
Frank E. Ehrenfeld, III  
Laboratory Director



## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544202 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 1

**Client:** WSP786

### PLM BULK SAMPLE ANALYSIS SUMMARY

<p><b>Lab No.:</b> 6317042 <b>Client No.:</b> 17A-118-07</p> <p><u>Percent Asbestos:</u> <i>None Detected</i></p>	<p><b>Analyst Observation:</b> Tan Ceiling Tile <b>Client Description:</b> Suspended Ceiling Tile/Curvilinear Aligned Deep Irregular Indentations</p> <p><u>Percent Non-Asbestos Fibrous Material:</u> 35 Cellulose 15 Fibrous Glass</p>	<p><b>Location:</b> <b>Facility:</b></p> <p><u>Percent Non-Fibrous Material:</u> 50</p>
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<p><b>Lab No.:</b> 6317043 <b>Client No.:</b> 17A-118-08</p> <p><u>Percent Asbestos:</u> <i>None Detected</i></p>	<p><b>Analyst Observation:</b> Red Gasket <b>Client Description:</b> Red Fire Stop</p> <p><u>Percent Non-Asbestos Fibrous Material:</u> None Detected</p>	<p><b>Location:</b> <b>Facility:</b></p> <p><u>Percent Non-Fibrous Material:</u> 100</p>
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<p><b>Lab No.:</b> 6317044 <b>Client No.:</b> 17A-120-01</p> <p><u>Percent Asbestos:</u> <i>None Detected</i></p>	<p><b>Analyst Observation:</b> Tan Floor Tile; 12" <b>Client Description:</b> 12" Cream/Taupe/Brown Blended Floor Tile And Black Mastic</p> <p><u>Percent Non-Asbestos Fibrous Material:</u> None Detected</p>	<p><b>Location:</b> <b>Facility:</b></p> <p><u>Percent Non-Fibrous Material:</u> 100</p>
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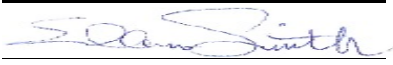
<p><b>Lab No.:</b> 6317044(L2) <b>Client No.:</b> 17A-120-01</p> <p><u>Percent Asbestos:</u> <i>None Detected</i></p>	<p><b>Analyst Observation:</b> Black Mastic <b>Client Description:</b> 12" Cream/Taupe/Brown Blended Floor Tile And Black Mastic</p> <p><u>Percent Non-Asbestos Fibrous Material:</u> None Detected</p>	<p><b>Location:</b> <b>Facility:</b></p> <p><u>Percent Non-Fibrous Material:</u> 100</p>
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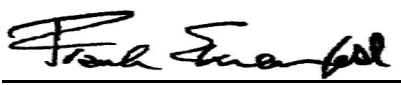
<p><b>Lab No.:</b> 6317045 <b>Client No.:</b> 17A-120-02</p> <p><u>Percent Asbestos:</u> <i>None Detected</i></p>	<p><b>Analyst Observation:</b> Grey Leveling Compound <b>Client Description:</b> Cementitious Leveling Compound</p> <p><u>Percent Non-Asbestos Fibrous Material:</u> None Detected</p>	<p><b>Location:</b> At Drain <b>Facility:</b></p> <p><u>Percent Non-Fibrous Material:</u> 100</p>
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<p><b>Lab No.:</b> 6317045(L2) <b>Client No.:</b> 17A-120-02</p> <p><u>Percent Asbestos:</u> <i>None Detected</i></p>	<p><b>Analyst Observation:</b> Black Mastic <b>Client Description:</b> Cementitious Leveling Compound</p> <p><u>Percent Non-Asbestos Fibrous Material:</u> None Detected</p>	<p><b>Location:</b> At Drain <b>Facility:</b></p> <p><u>Percent Non-Fibrous Material:</u> 100</p>
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Analytical Method -US EPA 600, R93-116. Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/17/2017  
**Date Analyzed:** 08/23/2017

**Signature:**   
**Analyst:** Ellen Smith

**Approved By:**   
Frank E. Ehrenfeld, III  
Laboratory Director

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544202 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 1

**Client:** WSP786

### PLM BULK SAMPLE ANALYSIS SUMMARY

<b>Lab No.:</b> 6317046	<b>Analyst Observation:</b> White Joint Compound	<b>Location:</b> North Wall West Portion
<b>Client No.:</b> 17A-120-03	<b>Client Description:</b> DWJC	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100

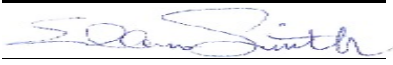
<b>Lab No.:</b> 6317047	<b>Analyst Observation:</b> White Joint Compound	<b>Location:</b> West Wall North Portion
<b>Client No.:</b> 17A-120-04	<b>Client Description:</b> DWJC	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100

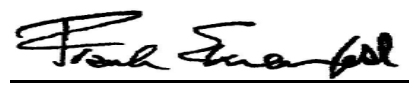
<b>Lab No.:</b> 6317048	<b>Analyst Observation:</b> Black Non-Fibrous	<b>Location:</b> Counter
<b>Client No.:</b> 17A-120-05	<b>Client Description:</b> Dark Grey	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100

<b>Lab No.:</b> 6317049	<b>Analyst Observation:</b> Off-White Sink Undercoating	<b>Location:</b> Eastern Single Lab Sink
<b>Client No.:</b> 17A-120-06	<b>Client Description:</b> White Undercoating	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> 1 Cellulose	<u>Percent Non-Fibrous Material:</u> 99

<b>Lab No.:</b> 6317050	<b>Analyst Observation:</b> Off-White Sink Undercoating	<b>Location:</b> Central Double Lab Sink
<b>Client No.:</b> 17A-120-07	<b>Client Description:</b> White Undercoating	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> 1 Cellulose	<u>Percent Non-Fibrous Material:</u> 99

Analytical Method -US EPA 600, R93-116. Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/17/2017  
**Date Analyzed:** 08/23/2017  
**Signature:**   
**Analyst:** Ellen Smith

**Approved By:**   
Frank E. Ehrenfeld, III  
Laboratory Director

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544202 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 1

**Client:** WSP786

### Appendix to Analytical Report

**Customer Contact:**

**Analysis:** US EPA 600, R93-116

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

**iATL Customer Service:** customerservice@iatl.com

**iATL Office Manager:** cdavis@iatl.com

**iATL Account Representative:** Shirley Clark

**Sample Login Notes:** See Batch Sheet Attached

**Sample Matrix:** Bulk Building Materials

**Exceptions Noted:** See Following Pages

#### General Terms, Warrants, Limits, Qualifiers:

General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at [www.iATL.com](http://www.iATL.com) and in our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

#### Information Pertinent to this Report:

Analysis by US EPA 600 93-116: Determination of Asbestos in Bulk Building Materials by Polarized Light Microscopy (PLM).

#### Certifications:

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

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.

Analytical Methodology Alternatives: Your initial request for analysis may not have accounted for recent advances in regulatory requirements or advances in technology that are routinely used in similar situations for other qualified projects. You may have the option to explore additional analysis for further information. Below are a few options, listed as the matrix followed by the appropriate methodology. Also included are links to more information on our website.

Bulk Building Materials that are Non-Friable Organically Bound (NOB) by Gravimetric Reduction techniques employing PLM and TEM: ELAP 198.6 (PLM-NOB), ELAP 198.4 (TEM-NOB)

Loose Fill Vermiculite Insulation, Attic Insulation, Zonolite (copyright), etc.: US EPA 600 R-4/004 (multi-tiered analytical process)  
Sprayed On Insulation/Fireproofing with Vermiculite (SOF-V): ELAP 198.8 (PLM-SOF-V)>

Soil, sludge, sediment, aggregate, and like materials analyzed for asbestos or other elongated mineral particles (ex. erionite, etc.): ASTM D7521, CARB 435, and other options available

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544202 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 1

**Client:** WSP786

Asbestos in Surface Dust according to one of ASTM's Methods (very dependent on sampling collection technique – by TEM): ASTM D 5755, D5756, or D6480

Various other asbestos matrices (air, water, etc.) and analytical methods are available.

### Disclaimers / Qualifiers:

There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation. Here is a list with highlighted disclaimers that may be pertinent to this project. For a full explanation of these and other disclaimers, please inquire at [customerservice@iatl.com](mailto:customerservice@iatl.com).

- 1) Note: No mastic provided for analysis.
- 2) Note: Insufficient mastic provided for analysis.
- 3) Note: Insufficient material provided for analysis.
- 4) Note: Insufficient sample provided for QC reanalysis.
- 5) Note: Different material than indicated on Sample Log / Description.
- 6) Note: Sample not submitted.
- 7) Note: Attached to asbestos containing material.
- 8) Note: Received wet.
- 9) Note: Possible surface contamination.
- 10) Note: Not building material. 1% threshold may not apply.
- 11) Note: Recommend TEM-NOB analysis as per EPA recommendations.
- 12) Note: Asbestos detected but not quantifiable.
- 13) Note: Multiple identical samples submitted, only one analyzed.
- 14) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.080%.
- 15) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.125%.

### Recommendations for Vermiculite Analysis:

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gänge, homogeneous exfoliated books of mica, or mixed mineral composites). Please contact your client representative for pricing and turnaround time options available.

iATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004).

Further information on this method and other vermiculite and asbestos issues can be found at the following: Agency for Toxic Substances and Disease Registry (ATSDR) [www.atsdr.cdc.gov](http://www.atsdr.cdc.gov), United States Geological Survey (USGS) [www.minerals.usgs.gov/minerals/](http://www.minerals.usgs.gov/minerals/), US EPA [www.epa.gov/asbestos](http://www.epa.gov/asbestos). The USEPA also has an informative brochure "Current Best Practices for Vermiculite Attic Insulation" EPA 747F03001 May 2003, that may assist the health and remediation professional.

The following is a summary of the analytical process outlines in the EPA 600/R-04/004 Method:

- 1) **Analytical Step/Method:** Initial Screening by PLM, EPA 600R-93/116  
**Requirements/Comments:** Minimum of 0.1 g of sample. ~0.25% LOQ for most samples.
- 2) **Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Sinks" only.
- 3) **Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Floats" only.
- 4) **Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Sinks" only.
- 5) **Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Suspension" only.

LOQ, Limit of Quantitation estimates for mass and volume analyses.

\*With advance notice and confirmation by the laboratory.

\*\*Approximately 1 Liter of sample in double-bagged container (~9x6 inch bag of sample).

# Chain of Custody

-Bulk Asbestos -

Contact Information	
Client Company:	WSP Canada Inc.
Office Address:	760 Enterprise Crescent
City, State, Zip:	Victoria, BC, Canada V8Z 6R4
Fax Number:	250-475-2211
Email Address:	Gordon.Philippe@WSPgroup.com
Project Number:	171-11570-00 Phase 01
Project Name:	ACM CAER W Van DFO
Primary Contact:	Gordon Philippe
Office Phone:	250-475-1000
Cell Phone:	250-360-6537

**PLM Instructions:**

- PLM: Bulk Asbestos Building Materials EPA 600 R-93/116, 1993
- PLM: Bulk Asbestos Building Materials EPA 600 M-4/82-020, 1982
- PLM: Bulk Asbestos Building Materials NIOSH 9002, 1985
- PLM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.1, 2002
- PLM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.6, 2010
- TEM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.4, 2009

- PLM: Point Counting
  - PC: via ELAP 198.1
  - PC: 400 Points
  - PC: 800 Points \*
  - PC: 1600 Points \*
- PLM: Instructions for Multi-Layered Samples
  - Analyze and Report All Separable Layers per EPA 600
  - Report Composite for Drywall Systems per NESHAP
  - Report All Layers and Composite Where Applicable
  - Only Analyze and Report Specifically Noted Layer
- PLM: Analyze Until Positive (Positive Stop)
  - AUP: by Homogenous Area as Noted
  - AUP: by Material Type as Noted
- PLM: NOB via 198.6
  - PLM: Friable via EPA 600 2.3
  - If <1% by PLM, to TEM via 198.4 \*
  - If <1% by PLM, Hold for Instructions
- PLM: Non-Building Material\*\*\* (Dust, Wipe, Tape)
  - Soil or Vermiculite Analysis \*
  - CARB 435

**Special Instructions:** \_\_\_\_\_

\* Additional charge and turnaround may be required    \*\* Alternative Method (ex: EPA 600/R-04/004) may be recommended by Laboratory

**Turnaround Time**

Preliminary Results Requested Date: \_\_\_\_\_

Specific date / time

10 Day  
  5 Day  
  3 Day  
  2 Day  
  1 Day\*  
  12 Hour\*\*  
  6 Hour\*\*  
  RUSH\*\*

\* End of next business day unless otherwise specified. \*\* Matrix Dependent. \*\*\*Please notify the lab before shipping\*\*\*

Verbal  
  Email  
  Fax

**Chain of Custody**

Relinquished (Name/Organization):	Gordon/WSP	Date:	14 August 2017	Time:	14:30
Received (Name / iATL):		Date:		Time:	
Sample Login (Name / iATL):		Date:		Time:	
Analysis(Name(s) / iATL):		Date:	8/23/2017	Time:	
QA/QC Review (Name / iATL):		Date:	8-23-17	Time:	
Archived / Released:		Date:		Time:	17 2017
QA/QC InterLAB Use:		Date:		Time:	





# Sample Log

–Bulk Asbestos–

Client: WSP Canada Inc.

Project: 171-11570-00 Phase 01/ ACM CAER W Van DFO

Sampling Date/Time: 9 - 11 August 2017

**Bulk Asbestos Sample Log**

Client Sample #	iATL #	Location/Description	Notes
17A-136F-01	6317015	12" Marble Pattern Floor Tile on Leveling Compound	
* 17A-210-01	6317016	Northwest Overt Corner @ Entry/DWJC	
17A-2nd FICorr-01	6317017	Near Entry to 203/DWJC	
17A-2nd FICorr-02	6317018	East Roof Access Door/DWJC	
17A-2nd FICorr-03	6317019	Near Entry to 211/DWJC	
17A-2nd FICorr-04	6317020	South Side of Elevator/DWJC	
17A-2nd FICorr-05	6317021	Across from Entry to 222/DWJC	
17A-2nd FICorr-06	6317022	At Far North End of Hall/DWJC	
*labeled as <u>17A-201-01</u>			
		DWJC = Drywall Joint Compound	

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544200 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 01

**Client:** WSP786

### PLM BULK SAMPLE ANALYSIS SUMMARY

<b>Lab No.:</b> 6317015	<b>Analyst Observation:</b> Off-White/Grey Floor Tile	<b>Location:</b>
<b>Client No.:</b> 17A-136F-01	<b>Client Description:</b> 12" Marble Pattern Floor Tile On Leveling Compound	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100

<b>Lab No.:</b> 6317015(L2)	<b>Analyst Observation:</b> Tan/White Mastic/Leveling Compound	<b>Location:</b>
<b>Client No.:</b> 17A-136F-01	<b>Client Description:</b> 12" Marble Pattern Floor Tile On Leveling Compound	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100

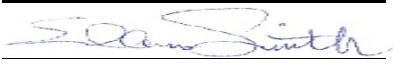
<b>Lab No.:</b> 6317016	<b>Analyst Observation:</b> White Joint Compound	<b>Location:</b> Northwest Overt Corner At Entry
<b>Client No.:</b> 17A-201-01	<b>Client Description:</b> DWJC	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100

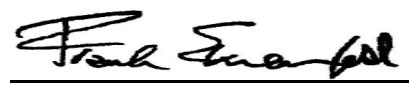
<b>Lab No.:</b> 6317017	<b>Analyst Observation:</b> White Joint Compound	<b>Location:</b> Near Entry To 203
<b>Client No.:</b> 17A-2nd FICorr-01	<b>Client Description:</b> DWJC	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100

<b>Lab No.:</b> 6317018	<b>Analyst Observation:</b> White Joint Compound	<b>Location:</b> East Roof Access Door
<b>Client No.:</b> 17A-2nd FICorr-02	<b>Client Description:</b> DWJC	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100

<b>Lab No.:</b> 6317019	<b>Analyst Observation:</b> White Joint Compound	<b>Location:</b> Near Entry To 211
<b>Client No.:</b> 17A-2nd FICorr-03	<b>Client Description:</b> DWJC	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100

Analytical Method -US EPA 600, R93-116. Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/17/2017  
**Date Analyzed:** 08/23/2017  
**Signature:**   
**Analyst:** Ellen Smith

**Approved By:**   
Frank E. Ehrenfeld, III  
Laboratory Director

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544200 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 01

**Client:** WSP786

### PLM BULK SAMPLE ANALYSIS SUMMARY

**Lab No.:** 6317020  
**Client No.:** 17A-2nd FICorr-04

**Analyst Observation:** White Joint Compound  
**Client Description:** DWJC

**Location:** South Side Of Elevator  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317021  
**Client No.:** 17A-2nd FICorr-05

**Analyst Observation:** White Joint Compound  
**Client Description:** DWJC

**Location:** Across From Entry To 222  
**Facility:**

Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

**Lab No.:** 6317022  
**Client No.:** 17A-2nd FICorr-06

**Analyst Observation:** White Joint Compound  
**Client Description:** DWJC

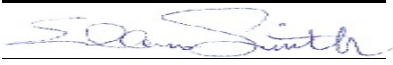
**Location:** At Far North End Of Hall  
**Facility:**

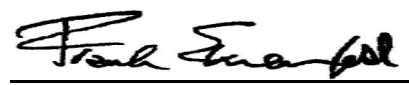
Percent Asbestos:  
*None Detected*

Percent Non-Asbestos Fibrous Material:  
None Detected

Percent Non-Fibrous Material:  
100

Analytical Method -US EPA 600, R93-116. Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/17/2017  
**Date Analyzed:** 08/23/2017  
**Signature:**   
**Analyst:** Ellen Smith

**Approved By:**   
Frank E. Ehrenfeld, III  
Laboratory Director

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
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### Appendix to Analytical Report

**Customer Contact:**

**Analysis:** US EPA 600, R93-116

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

**iATL Customer Service:** customerservice@iatl.com

**iATL Office Manager:** cdavis@iatl.com

**iATL Account Representative:** Shirley Clark

**Sample Login Notes:** See Batch Sheet Attached

**Sample Matrix:** Bulk Building Materials

**Exceptions Noted:** See Following Pages

#### General Terms, Warrants, Limits, Qualifiers:

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iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

#### Information Pertinent to this Report:

Analysis by US EPA 600 93-116: Determination of Asbestos in Bulk Building Materials by Polarized Light Microscopy (PLM).

#### Certifications:

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

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.

Analytical Methodology Alternatives: Your initial request for analysis may not have accounted for recent advances in regulatory requirements or advances in technology that are routinely used in similar situations for other qualified projects. You may have the option to explore additional analysis for further information. Below are a few options, listed as the matrix followed by the appropriate methodology. Also included are links to more information on our website.

Bulk Building Materials that are Non-Friable Organically Bound (NOB) by Gravimetric Reduction techniques employing PLM and TEM: ELAP 198.6 (PLM-NOB), ELAP 198.4 (TEM-NOB)

Loose Fill Vermiculite Insulation, Attic Insulation, Zonolite (copyright), etc.: US EPA 600 R-4/004 (multi-tiered analytical process)  
Sprayed On Insulation/Fireproofing with Vermiculite (SOF-V): ELAP 198.8 (PLM-SOF-V)>

Soil, sludge, sediment, aggregate, and like materials analyzed for asbestos or other elongated mineral particles (ex. erionite, etc.): ASTM D7521, CARB 435, and other options available

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760 Enterprise Crescent  
Victoria BC V8Z 6R4

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Asbestos in Surface Dust according to one of ASTM's Methods (very dependent on sampling collection technique – by TEM): ASTM D 5755, D5756, or D6480

Various other asbestos matrices (air, water, etc.) and analytical methods are available.

### Disclaimers / Qualifiers:

There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation. Here is a list with highlighted disclaimers that may be pertinent to this project. For a full explanation of these and other disclaimers, please inquire at [customerservice@iatl.com](mailto:customerservice@iatl.com).

- 1) Note: No mastic provided for analysis.
- 2) Note: Insufficient mastic provided for analysis.
- 3) Note: Insufficient material provided for analysis.
- 4) Note: Insufficient sample provided for QC reanalysis.
- 5) Note: Different material than indicated on Sample Log / Description.
- 6) Note: Sample not submitted.
- 7) Note: Attached to asbestos containing material.
- 8) Note: Received wet.
- 9) Note: Possible surface contamination.
- 10) Note: Not building material. 1% threshold may not apply.
- 11) Note: Recommend TEM-NOB analysis as per EPA recommendations.
- 12) Note: Asbestos detected but not quantifiable.
- 13) Note: Multiple identical samples submitted, only one analyzed.
- 14) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.080%.
- 15) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.125%.

### Recommendations for Vermiculite Analysis:

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gänge, homogeneous exfoliated books of mica, or mixed mineral composites). Please contact your client representative for pricing and turnaround time options available.

iATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004).

Further information on this method and other vermiculite and asbestos issues can be found at the following: Agency for Toxic Substances and Disease Registry (ATSDR) [www.atsdr.cdc.gov](http://www.atsdr.cdc.gov), United States Geological Survey (USGS) [www.minerals.usgs.gov/minerals/](http://www.minerals.usgs.gov/minerals/), US EPA [www.epa.gov/asbestos](http://www.epa.gov/asbestos). The USEPA also has an informative brochure "Current Best Practices for Vermiculite Attic Insulation" EPA 747F03001 May 2003, that may assist the health and remediation professional.

The following is a summary of the analytical process outlines in the EPA 600/R-04/004 Method:

- 1) **Analytical Step/Method:** Initial Screening by PLM, EPA 600R-93/116  
**Requirements/Comments:** Minimum of 0.1 g of sample. ~0.25% LOQ for most samples.
- 2) **Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Sinks" only.
- 3) **Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Floats" only.
- 4) **Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Sinks" only.
- 5) **Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Suspension" only.

LOQ, Limit of Quantitation estimates for mass and volume analyses.

\*With advance notice and confirmation by the laboratory.

\*\*Approximately 1 Liter of sample in double-bagged container (~9x6 inch bag of sample).



## Chain of Custody

-Bulk Asbestos -

<b>Contact Information</b>	
<b>Client Company:</b> <u>WSP Canada Inc.</u>	<b>Project Number:</b> <u>171-11570-00 Phase 01</u>
<b>Office Address:</b> <u>760 Enterprise Crescent</u>	<b>Project Name:</b> <u>ACM CAER W Van DFO</u>
<b>City, State, Zip:</b> <u>Victoria, BC, Canada V8Z 6R4</u>	<b>Primary Contact:</b> <u>Gordon Philippe</u>
<b>Fax Number:</b> <u>250-475-2211</u>	<b>Office Phone:</b> <u>250-475-1000</u>
<b>Email Address:</b> <u>Gordon.Philippe@WSPgroup.com</u>	<b>Cell Phone:</b> <u>250-360-6537</u>

**PLM Instructions:**

- PLM: Bulk Asbestos Building Materials EPA 600 R-93/116, 1993
- PLM: Bulk Asbestos Building Materials EPA 600 M-4/82-020, 1982
- PLM: Bulk Asbestos Building Materials NIOSH 9002, 1985
- PLM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.1, 2002
- PLM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.6, 2010
- TEM: Bulk Asbestos Building Materials NYSDOH-ELAP 198.4, 2009

<ul style="list-style-type: none"> <li><input type="checkbox"/> PLM: Point Counting           <ul style="list-style-type: none"> <li><input type="checkbox"/> PC: via ELAP 198.1</li> <li><input type="checkbox"/> PC: 400 Points</li> <li><input type="checkbox"/> PC: 800 Points *</li> <li><input type="checkbox"/> PC: 1600 Points *</li> </ul> </li> <li><input type="checkbox"/> PLM: Instructions for Multi-Layered Samples           <ul style="list-style-type: none"> <li><input type="checkbox"/> Analyze and Report All Separable Layers per EPA 600</li> <li><input type="checkbox"/> Report Composite for Drywall Systems per NESHAP</li> <li><input type="checkbox"/> Report All Layers and Composite Where Applicable</li> <li><input type="checkbox"/> Only Analyze and Report Specifically Noted Layer</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> PLM: Analyze Until Positive (Positive Stop)           <ul style="list-style-type: none"> <li><input type="checkbox"/> AUP: by Homogenous Area as Noted</li> <li><input type="checkbox"/> AUP: by Material Type as Noted</li> </ul> </li> <li><input type="checkbox"/> PLM: NOB via 198.6           <ul style="list-style-type: none"> <li><input type="checkbox"/> PLM: Friable via EPA 600 2.3</li> <li><input type="checkbox"/> If &lt;1% by PLM, to TEM via 198.4 *</li> <li><input type="checkbox"/> If &lt;1% by PLM, Hold for Instructions</li> </ul> </li> <li><input type="checkbox"/> PLM: Non-Building Material *** (Dust, Wipe, Tape)           <ul style="list-style-type: none"> <li><input type="checkbox"/> Soil or Vermiculite Analysis *</li> <li><input type="checkbox"/> CARB 435</li> </ul> </li> </ul>
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**Special Instructions:** \_\_\_\_\_

\* Additional charge and turnaround may be required    \*\* Alternative Method (ex: EPA 600/R-04/004) may be recommended by Laboratory

**Turnaround Time**

Preliminary Results Requested Date: \_\_\_\_\_

Verbal     Email     Fax

Specific date / time

10 Day     5 Day     3 Day     2 Day     1 Day\*     12 Hour\*\*     6 Hour\*\*     RUSH\*\*

\* End of next business day unless otherwise specified. \*\* Matrix Dependent. \*\*\*Please notify the lab before shipping\*\*\*

**Chain of Custody**

Relinquished (Name/Organization): <u>Gordon/WSP</u>	Date: <u>14 August 2017</u>	Time: <u>14:30</u>
Received (Name / iATL): _____	Date: _____	Time: _____
Sample Login (Name / iATL): _____	Date: _____	Time: <u>AUG 17 2017</u>
Analysis(Name(s) / iATL): <u>MS 8123/2017</u>	Date: _____	Time: _____
QA/QC Review (Name / iATL): _____	Date: <u>8-23-17</u>	Time: _____
Archived / Released: _____	QA/QC InterLAB Use: _____	Date: _____

RECEIVED

# Sample Log

## --Bulk Asbestos --

Client: WSP Canada Inc.

Project: 171-11570-00 Phase 01/ ACM CAER W Van DFO

Sampling Date/Time: 9 - 11 August 2017

Bulk Asbestos Sample Log			
Client Sample #	iATL #	Location/Description	Notes
17A-Boiler-B-2-01	6317065	Boiler Rm B2/End Layered (1) Packing and (2) Gasket	
17A-Boiler-P11-02	6317066	Boiler Rm P11/Heat Pump Gasket	
17A-Fan-EF1-01	6317067	Fan Rm EF1 interior walk-in/White Mastic on batt insulation	
17A-Fan-EF1-02	6317068	Fan Rm EF1 interior walk-in/Black Mastic on batt insulation	
17A-Fan-SF1-03	6317069	Fan Rm SF1 exterior/Grey Seam Seal between metal panels	
17A-Fan-SF1-04	6317070	Fan Rm SF1 exterior/Black Mastic about metal door frame	
17A-Fan-SF2-05	6317071	Fan Rm SF2 exterior/TPI Hard Mud Elbow Cream	

## CERTIFICATE OF ANALYSIS

**Client:** WSP Canada -786  
760 Enterprise Crescent  
Victoria BC V8Z 6R4

**Report Date:** 8/23/2017  
**Report No.:** 544204 - PLM  
**Project:** ACM CAER W Van DFO  
**Project No.:** 171-11570-00 Phase 01

**Client:** WSP786

### PLM BULK SAMPLE ANALYSIS SUMMARY

<b>Lab No.:</b> 6317065	<b>Analyst Observation:</b> Yellow Insulation	<b>Location:</b> Boiler Rm B2
<b>Client No.:</b> 17A-Boiler-B-2-01	<b>Client Description:</b> End Layered (1) Packing And (2) Gasket	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> 15 Fibrous Glass	<u>Percent Non-Fibrous Material:</u> 85

<b>Lab No.:</b> 6317065(L2)	<b>Analyst Observation:</b> Grey Gasket	<b>Location:</b> Boiler Rm B2
<b>Client No.:</b> 17A-Boiler-B-2-01	<b>Client Description:</b> End Layered (1) Packing And (2) Gasket	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> 15 Fibrous Glass	<u>Percent Non-Fibrous Material:</u> 85


<b>Lab No.:</b> 6317066	<b>Analyst Observation:</b> Tan/Black Gasket	<b>Location:</b> Boiler Rm P11
<b>Client No.:</b> 17A-Boiler-P11-02	<b>Client Description:</b> Heat Pump Gasket	<b>Facility:</b>
<u>Percent Asbestos:</u> <b>30 Chrysotile</b>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 70

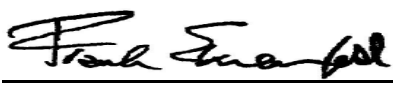
<b>Lab No.:</b> 6317067	<b>Analyst Observation:</b> White/Black Insulation/ Mastic	<b>Location:</b> Fan Rm EF1 Interior Walk-In
<b>Client No.:</b> 17A-Fan-EF1-01	<b>Client Description:</b> White Mastic On Batt Insulation	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100

<b>Lab No.:</b> 6317068	<b>Analyst Observation:</b> Black Mastic	<b>Location:</b> Fan Rm EF1 Interior Walk-In
<b>Client No.:</b> 17A-Fan-EF1-02	<b>Client Description:</b> Black Mastic On Batt Insulation	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100

<b>Lab No.:</b> 6317069	<b>Analyst Observation:</b> Grey Sealant	<b>Location:</b> Fan Rm SF1 Exterior
<b>Client No.:</b> 17A-Fan-SF1-03	<b>Client Description:</b> Grey Seam Between Metal Panels	<b>Facility:</b>
<u>Percent Asbestos:</u> <b>PC 1.8 Chrysotile</b>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 98.2

Analytical Method -US EPA 600, R93-116. Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/17/2017  
**Date Analyzed:** 08/23/2017  
**Signature:**   
**Analyst:** Nick Daigle

**Approved By:**   
Frank E. Ehrenfeld, III  
Laboratory Director

## CERTIFICATE OF ANALYSIS

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760 Enterprise Crescent  
Victoria BC V8Z 6R4

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**Client:** WSP786

### PLM BULK SAMPLE ANALYSIS SUMMARY

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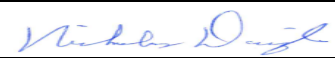
<b>Lab No.:</b> 6317070	<b>Analyst Observation:</b> Black Mastic	<b>Location:</b> Fan Rm SF1 Exterior
<b>Client No.:</b> 17A-Fan-SF1-04	<b>Client Description:</b> Black Mastic About Metal Door Frame	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100

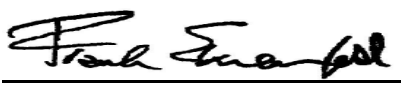
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<b>Lab No.:</b> 6317071	<b>Analyst Observation:</b> Tan Insulation	<b>Location:</b> Fan Rm SF2 Exterior
<b>Client No.:</b> 17A-Fan-SF2-05	<b>Client Description:</b> TPI Hard Mud Elbow Cream	<b>Facility:</b>
<u>Percent Asbestos:</u> <i>None Detected</i>	<u>Percent Non-Asbestos Fibrous Material:</u> None Detected	<u>Percent Non-Fibrous Material:</u> 100

---

Analytical Method -US EPA 600, R93-116. Please refer to the Appendix of this report for further information regarding your analysis.

**Date Received:** 8/17/2017  
**Date Analyzed:** 08/23/2017  
**Signature:**   
**Analyst:** Nick Daigle

**Approved By:**   
Frank E. Ehrenfeld, III  
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iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

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- AIHA-LAP, LLC No. 100188

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Sprayed On Insulation/Fireproofing with Vermiculite (SOF-V): ELAP 198.8 (PLM-SOF-V)>

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**Project No.:** 171-11570-00 Phase 01

**Client:** WSP786

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- 15) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.125%.

### Recommendations for Vermiculite Analysis:

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gänge, homogeneous exfoliated books of mica, or mixed mineral composites). Please contact your client representative for pricing and turnaround time options available.

iATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004).

Further information on this method and other vermiculite and asbestos issues can be found at the following: Agency for Toxic Substances and Disease Registry (ATSDR) [www.atsdr.cdc.gov](http://www.atsdr.cdc.gov), United States Geological Survey (USGS) [www.minerals.usgs.gov/minerals/](http://www.minerals.usgs.gov/minerals/), US EPA [www.epa.gov/asbestos](http://www.epa.gov/asbestos). The USEPA also has an informative brochure "Current Best Practices for Vermiculite Attic Insulation" EPA 747F03001 May 2003, that may assist the health and remediation professional.

The following is a summary of the analytical process outlines in the EPA 600/R-04/004 Method:

- 1) **Analytical Step/Method:** Initial Screening by PLM, EPA 600R-93/116  
**Requirements/Comments:** Minimum of 0.1 g of sample. ~0.25% LOQ for most samples.
- 2) **Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Sinks" only.
- 3) **Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Floats" only.
- 4) **Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Sinks" only.
- 5) **Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004  
**Requirements/Comments:** Minimum 50g\*\* of dry sample. Analysis of "Suspension" only.

LOQ, Limit of Quantitation estimates for mass and volume analyses.

\*With advance notice and confirmation by the laboratory.

\*\*Approximately 1 Liter of sample in double-bagged container (~9x6 inch bag of sample).

**APPENDIX IV**  
**REGULATORY FRAMEWORK**

## **REGULATORY FRAMEWORK**

1. Occupational Health and Safety Regulation (Including amendments up to B.C. Reg. 142/2017),
2. Safe Work Practices for Handling Asbestos, WorkSafeBC, (Publication Date April, 2017).
3. Hazardous Waste Regulation, BC Ministry Of Environment. (Including amendments up to B.C. Reg. 179/2016, July 19, 2016).
4. Environmental Management Act (As Current to August 24, 2016).
5. Lead-Containing Paint and Coatings, Preventing Exposure in the Construction Industry, WorkSafe BC, June 2011.
6. Safe Work Practices for Handling Lead, WorkSafeBC, (Publication April 2017)
7. BC Ministry of Environment Technical Guidance 4, Environmental Management Act Applications, Guideline To Managing Lead-Containing Construction and Demolition Waste In BC, Version 1.0, January 2015
8. Federal Register, 40 CFR Part 745 Lead; Identification of Dangerous Levels of Lead; Final Rule, Environmental Protection Agency, January 5, 2001
9. Transportation of Dangerous Goods Regulations (Including amendments up to SOR / 2016-95).
10. Canadian Occupational Health and Safety Regulations (Including amendments up to SOR / 86-304).
11. Canada Labour Code, Part II, - R.S.C., 1985, c. L-2

**APPENDIX V**  
**STANDARD LIMITATIONS**

**1. STANDARD OF CARE**

WSP Canada Inc. (“WSP”) prepared and issued this report (the “Report”) for its client (the “Client”) in accordance with generally-accepted consulting practices for the hazardous materials and occupational health and safety disciplines. No other warranty, expressed or implied, is made. Unless specifically stated in the Report, the Report does not address environmental issues.

The terms of reference for hazardous materials and occupational health and safety reports issued by WSP (the “Terms of Reference”) contained in the present document provide additional information and caution related to standard of care and the use of the Report. The Client should read and familiarize itself with these Terms of Reference.

**2. COMPLETENESS OF THE REPORT**

All documents, records, drawings, correspondence, data, files and deliverables, whether hard copy, electronic or otherwise, generated as part of the services for the Client are inherent components of the Report and, collectively, form the instruments of professional services (the “Instruments of Professional Services”). The Report is of a summary nature and is not intended to stand alone without reference to the instructions given to WSP by the Client, the communications between WSP and the Client, and to any other reports, writings, proposals or documents prepared by WSP for the Client relative to the specific site described in the Report, all of which constitute the Report.

TO PROPERLY UNDERSTAND THE INFORMATION, OBSERVATIONS, FINDINGS, SUGGESTIONS, RECOMMENDATIONS AND OPINIONS CONTAINED IN THE REPORT, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WSP CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT AND ITS VARIOUS COMPONENTS.

**3. BASIS OF THE REPORT**

WSP prepared the Report for the Client for the specific objectives and purpose that the Client described to WSP. The applicability and reliability of any of the information, observations, findings, suggestions, recommendations and opinions contained in the Report are only valid to the extent that there was no material alteration to or variation from any of the said descriptions provided by the Client to WSP unless the Client specifically requested WSP to review and revise the Report in light of such alteration or variation.

**4. USE OF THE REPORT**

The information, observations, findings, suggestions, recommendations and opinions contained in the Report, or any component forming the Report, are for the sole use and benefit of the Client and the team of consultants selected by the Client for the specific project that the Report was provided. **NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION OR COMPONENT WITHOUT THE WRITTEN CONSENT OF WSP.** WSP will consent to any reasonable request by the Client to approve the use of this Report by other parties designated by the Client as the “Approved Users”. As a condition for the consent of WSP to approve the use of the Report by an Approved User, the Client must provide a copy of these Terms of Reference to that Approved User and the Client must obtain written confirmation from that Approved User that the Approved User will comply with these Terms of Reference, such written confirmation to be provided separately by each Approved User prior to beginning use of the Report. The Client will provide WSP with a copy of the written confirmation from an Approved User when it becomes available to the Client, and in any case, within two weeks of the Client receiving such written confirmation.

The Report and all its components remain the copyright property of WSP and WSP authorises only the Client and the Approved Users to make copies of the Report, but only in such quantities as are reasonably necessary for the use of the Report by the Client and the Approved Users. The Client and the Approved Users may not give, lend, sell or otherwise disseminate or make the Report, or any portion thereof, available to any party without the written permission of WSP. Any use which a third party makes of the Report, or any portion of the Report, is the sole responsibility of such third parties. WSP accepts no responsibility for damages suffered by any third party resulting from the use of the Report. The Client and the Approved Users acknowledge and agree to indemnify and hold harmless WSP, its officers, directors, employees, agents, representatives or sub-consultants, or any or all of them, against any claim of any nature whatsoever brought against WSP by any third parties, whether in contract or in tort, arising or related to the use of contents of the Report.



**5. INTERPRETATION OF THE REPORT**

- a. **Hidden Conditions:** The Client acknowledges that subsurface and concealed conditions may vary from those encountered or reviewed. WSP can only comment on the conditions observed on the date(s) the assessment is performed. The work is limited to those areas of concern identified by the Client and/or outlined in our proposal. Other areas of concern may exist but were not investigated within the scope of this assessment.
- b. **Reliance on information:** The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site investigation and field review and on the basis of information provided to WSP. WSP has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, WSP cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the report as a result of misstatements, omissions, misrepresentations or fraudulent acts of persons providing information.
- c. **Additional Involvement by WSP:** To avoid misunderstandings, WSP should be retained to assist other professionals to explain relevant hazardous materials and occupational health and safety findings and to review the hazardous materials and occupational health and safety aspects of the plans, drawings and specifications of other professionals relative to the services provided by WSP. To ensure compliance and consistency with the applicable hazardous materials and occupational health and safety codes, legislation, regulations, guidelines and generally-accepted practices, WSP should also be retained to provide field review services during the performance of any related work. Where applicable, it is understood that such field review services must meet or exceed the minimum necessary requirements to ascertain that the work being carried out is in general conformity with the recommendations made by WSP. Any reduction from the level of services recommended by WSP will result in WSP providing qualified opinions regarding adequacy of the work.

**6. ALTERNATE REPORT FORMAT**

When WSP submits both electronic and hard copy versions of the Instruments of Professional Services, the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding upon WSP. The hard copy versions submitted by WSP shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancy, the hard copy versions shall govern over the electronic versions; furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed and sealed versions of the Instruments of Professional Services maintained or retained, or both, by WSP shall be deemed to be the overall originals for the Project.

The Client agrees that the electronic file and hard copy versions of Instruments of Professional Services shall not, under any circumstances, no matter who owns or uses them, be altered by any party except WSP. The Client warrants that the Instruments of Professional Services will be used only and exactly as submitted by WSP.

The Client recognizes and agrees that WSP prepared and submitted electronic files using specific software or hardware systems, or both. WSP makes no representation about the compatibility of these files with the current or future software and hardware systems of the Client, the Approved Users or any other party. The Client further agrees that WSP is under no obligation, unless otherwise expressly specified, to provide the Client, the Approved Users and any other party, or any or all of them, with specific software and hardware systems that are compatible with any electronic submitted by WSP. The Client further agrees that should the Client, an Approved User or a third party require WSP to provide specific software or hardware systems, or both, compatible with the electronic files prepared and submitted by WSP, for any reason whatsoever included but not restricted to an order from a court, then the Client will pay WSP for all reasonable costs related to the provision of the specific software or hardware systems, or both. The Client further agrees to indemnify and hold harmless WSP, its officers, directors, employees, agents, representative or sub-consultant, or any or all of them, against any claim or any nature whatsoever brought against WSP, whether in contract or in tort, arising or related to the provision or use or any specific software or hardware provided by WSP.