MHPM Project Managers Inc.

Hazardous Building Materials Survey – Canadian Museum of Immigration at Pier 21

Report

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EXECUTIVE SUMMARY

LVM / Maritime Testing Limited (LVM) was retained the Canadian Museum of Immigration at Pier 21 to conduct a Hazardous Building Materials Survey (HBMS) at the Canadian Museum of Immigration at Pier 21 (CMIP), located at 1055 Marginal Road in Halifax, NS.

The building survey focused on the common hazardous materials investigated prior to building renovation including asbestos, lead, mercury and arsenic in paint, mould, mercury-containing thermostats, polychlorinated biphenyls (PCBs) containing light ballasts and radioactive smoke detectors. This report will summarize results of the current assessment.

This survey of CMIP included the following building sections: the Kenneth C. Rowe Heritage Hall, the Chrysler Canada Welcome Pavilion and associated bathrooms, classroom, and storage rooms, the Rudolph P. Bratty Exhibition Hall and associated storage rooms, the mechanical mezzanine, the office area, and the kitchen area and associated storage rooms. While the building was previously used as a customs port of entry, it is currently used as a museum, office, and convention hall. The HBMS was conducted on the 2nd level of CMIP, as well as in the mechanical and office mezzanine areas.

The building survey was conducted on July 2, 3 and 16, 2013. The following results were obtained:

Summary of Results

- The following asbestos containing materials were identified during the survey of the subject area of CMIP:
  - Wall plaster in the stairwell adjacent to the northern corridor contains 1-2% chrysotile asbestos.
  - Black tar on the brick wall in the Exhibition Hall contains 20% chrysotile asbestos.
- The following is noted with respect to lead containing paint:
  - Grey/black paint sampled from steel columns (P1), white paint sampled from steel columns (P3), yellow wall paint on plaster (P5), grey/red paint sampled from steel beams (P6), black paint sampled from steel beams (P7), and beige paint on wooden doors (P9) were found to exceed the Nova Scotia Environment (NSE) disposal criteria for total lead. These samples were resubmitted for leachable lead analysis. The grey/black paint sampled from steel columns (P1), grey/red paint sampled from steel beams (P6), and black paint sampled from steel beams (P7) were found to exceed the NSE disposal criteria for leachable lead content.
- The following is noted with respect to mercury containing paint:
  - Yellow wall paint on plaster (P5) was found to exceed the NSE disposal criteria for total mercury. This sample was resubmitted for leachable mercury analysis. Results indicated the sample was below the NSE disposal criteria for leachable mercury content.
- Lead was detected in all dust samples collected.

- Fluorescent light tubes and HID/metal halide lights were observed during the survey. These likely contain mercury or other heavy metal vapour.
- Emergency/exit lights with lead/lithium battery packs were observed during the survey.
- Refrigeration units containing chlorofluorocarbons were identified during the survey.
- Silica may be present in concrete and brick.
- Paints and chemicals were observed to be stored onsite during the survey.

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Property and Confidentiality

Test results mentioned herein are only valid for the sample(s) stated in this report.

LVM Maritime Testing's subcontractors who may have accomplished work either on site or in laboratory are duly qualified as stated in our Quality Manual's procurement procedure. Should you require any further information, please contact your Project Manager."

REVISION AND PUBLICATION REGISTER		
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1 INTRODUCTION

LVM / Maritime Testing Limited (LVM) was retained by the Canadian Museum of Immigration at Pier 21 to conduct a Hazardous Building Materials Survey (HBMS) at the Canadian Museum of Immigration at Pier 21 (CMIP) located at 1055 Marginal Road, in Halifax, NS.

This HBMS of CMIP included the following building sections: the Kenneth C. Rowe Heritage Hall, the Chrysler Canada Welcome Pavilion and associated bathrooms, classroom, and storage rooms, the Rudolph P. Bratty Exhibition Hall and associated storage rooms, the mechanical mezzanine, the office area, and the kitchen area and associated storage rooms. While the building was previously used as a customs port of entry, it is currently used as a museum, office, and convention hall. The HBMS was conducted on the 2nd level of CMIP, as well as in the mechanical and office mezzanine areas.

2 SURVEY METHODOLOGY

The building survey focused on the most common hazardous materials investigated including asbestos, lead, mercury and arsenic in paint, mould, mercury-containing thermostats, polychlorinated biphenyls (PCBs) containing light ballasts and radioactive smoke detectors.

The hazardous building materials survey consisted of a walkthrough of the above-mentioned building on July 2, 3, and 16, 2013. Samples of potential hazardous materials (asbestos, lead, mercury and arsenic in paint, and lead dust) were collected during the site visits.

2.1 Asbestos

During the walkthrough, samples were collected of every material that could have been reasonably expected to contain asbestos. These included drywall joint compound, flooring materials, plaster, mortar, adhesives, insulation, tar, and window and floor caulking. In total, thirty-three (33) samples were collected and submitted for analysis. Discussions were held at various points throughout the survey with Mr. Frank Morash, Building Manager, regarding building renovation history.

When collecting samples for asbestos analysis, care was taken to avoid disturbing the materials more than necessary to prevent fibre release during sampling. Samples were collected by penetrating the material in question through the entire thickness with either a clean knife or a clean hammer and chisel. Personal Protective Equipment (PPE) was worn as required. Samples were placed in individual sample bags with zip-locks. Sample bags were labelled with the sample ID and location.

All collected samples were submitted to our in-house laboratory for analysis by polarized light microscopy.

2.2 Paint Survey

The paint samples collected during the survey represented various colours of paint. Paint samples collected for analysis consisted of paint on substrate, where practical. Eleven (11) paint samples were collected during the assessment. These include various grey, white, yellow, brown, red, black, and green paints and varnish. Discussions were held at various points throughout the survey with Mr. Frank Morash, Building Manager, regarding building renovation history.

When collecting samples of paint for analysis, a clean knife was used to cut/scrape an area of paint and underlying layers, including the original material (where practical). Samples were placed in individual clean sample zipper seal bags. Sample bags were labeled with the sample ID and location. Samples were collected of each paint colour, representing various substrates. A minimum of 10 grams per sample was collected. PPE was worn as required.

Total lead, mercury and arsenic content and leachate analyses were subcontracted to AGAT Laboratories in Dartmouth, Nova Scotia, a laboratory that is Canadian Association for Laboratory Accreditation (CALA) accredited for these analyses.

2.3 Lead Dust

The lead dust samples were collected during the survey at various locations within the subject areas of the building where large amounts of dust was observed to be collecting on materials. Five (5) dust samples were collected during the assessment.

The samples were collected using a Ghost Wipe™, which is cloth-like material suitable for collecting dust samples from hard surfaces and dissolves during the digestion process of the laboratory analysis. At the sample location, the area wiped was measured in order to calculate lead dust loading. Samples were placed in individual clean plastic bottles. Samples were labeled with the sample ID and location. PPE was worn as required.

Lead dust content analysis was subcontracted to AGAT Laboratories.

2.4 Microbial Contamination

Any areas of the subject areas of the subject areas of the building with extensive visible water damage and/or visible mould growth were noted during the site visit.

2.5 Polychlorinated Biphenyls (PCBs) in Light Ballasts

A representative number of fluorescent lamp ballasts observed were recorded with the manufacturers' serial numbers, and compared to the Environment Canada – Identification of Lamp Ballasts Containing PCBs, Report EPS/CC/2, August 1991.

To inspect lamp ballasts, once the lights were confirmed to be off to the subject area, the decorative light shade, fluorescent light tubes and protective casing were carefully removed. The label on the lamp ballast was then inspected for model, serial number and date code. PPE was worn as required. In

addition, the presence of any electrical transformers or equipment on the premise that were labeled as PCB containing was noted.

2.6 Mercury Containing Devices

During the walkthrough, instruments that could contain mercury such as thermometers and thermostats were noted if present based on visual observations (i.e. the presence of mercury tubes).

2.7 Ozone Depleting Substances

Refrigeration and air conditioning units containing chlorofluorocarbons (CFCs), where present, were identified as required based on visual inspection of refrigerant identification labels.

2.8 Urea Formaldehyde Foam Insulation (UFFI)

Examination of areas behind wall cavities, where possible, was conducted to investigate for UFFI during the site walkabouts, using access panels or the tops of walls for viewing. No samples were collected, but an opinion regarding the type of insulation observed, if any, based on our experience is provided, based on visual observations.

3 RESULTS

3.1 Asbestos

The survey included sampling of both friable and non-friable asbestos-containing building materials (ACMs) and any material suspected to contain asbestos. The term friable means that the building material can be reduced to dust by hand or moderate pressure. Friable ACMs pose a greater risk to workers and building users for releasing airborne asbestos fibers when disturbed.

Asbestos sample results are provided in Table 1.

3.1.1 Highly Friable ACMs

3.1.1.1 Thermal Insulations

Thermal insulations present throughout the subject areas of the building include fiberglass and spray-on insulation.

The wall cavities of the subject areas of the building are insulated with fiberglass insulation where insulation exists. The exterior walls were observed to be insulated with either fiberglass insulation and/or spray-on insulation.

None of the samples of insulation were found to contain asbestos.

3.1.2 Potentially Friable ACMs

3.1.2.1 Plaster and Drywall Finishes

Drywall finishes are present throughout the majority of the subject areas of the building and samples of the joint compound were collected from various locations. A small section of plaster is present in the building, with the majority of it being located in the stairwell near the northern corridor.

Eleven (11) samples of drywall joint compound were collected from the subject areas of the building. All of the samples confirmed the drywall joint compound present is non-asbestos containing.

Two (2) samples of plaster were collected from the building. One (1) of these samples was found to contain 1-2% chrysotile asbestos. The asbestos containing plaster is located in the stairwell next to the northern corridor. No plaster was noted within the northern corridor.

3.1.3 Non-Friable ACMs

3.1.3.1 Vinyl Floor Tiles

Vinyl floor tiles are only present in the Theater Control room and were found not to contain asbestos.

3.1.3.2 Adhesives

A single area of wall adhesive was encountered in the subject area of the building and was sampled for asbestos content. The adhesive sample was not found to contain asbestos. This sample was collected from the stair storage area in Heritage Hall.

3.1.3.3 Caulking

Seven (7) varieties of caulking were observed on doors, windows, and floors present in the subject areas of the building. White colored caulking, grey colored caulking and black colored caulking were observed on the interior of the subject areas of the building.

Samples of caulking were not found to contain asbestos.

3.1.3.4 Tar

Samples of tar including tar on brick walls and tar between ceiling boards in the mechanical mezzanine were collected. The sample of tar collected from between the ceiling boards in the mechanical mezzanine was not found to contain asbestos.

A tar sample collected from the brick wall between the Exhibition Hall and Welcome Pavilion, approximately 6 meters up the wall on the Exhibition Hall side, contains 20% chrysotile asbestos.

3.1.4 Summary of ACMs

The following is a summary of the ACMs identified during the survey:

- Plaster on the west wall of the stairwell near the northern corridor contains 1-2% chrysotile asbestos; and

- Black colored tar found on the Exhibition Hall brick wall between the Exhibition Hall and Welcome Pavilion contains 20% chrysotile asbestos.

3.1.5 Asbestos Analytical Results

Analytical results from the asbestos samples are provided in Table 1:

Table 1 Bulk Asbestos Results

ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	ASBESTOS PRESENT	FRIABILITY
A1	Heritage Hall, chair storage wall	Drywall joint compound	None detected	-
A2	Heritage Hall, concrete floor	Floor caulking	None detected	-
A3	Heritage Hall, chair storage wall	Wall adhesive	None detected	-
A4	Heritage Hall, stage	Drywall joint compound	None detected	-
A5	Heritage Hall, brick wall	Brick mortar	None detected	-
A6	Kitchen, dishwashing area	Door caulking	None detected	-
A7	Kitchen storage	Drywall joint compound	None detected	-
A8	Kitchen storage, mezzanine area	Drywall joint compound	None detected	-
A9	Men's bathroom	floor mortar	None detected	-
A10	Men's bathroom	Cinder block mortar	None detected	-
A11	Welcome Pavilion	Drywall joint compound	None detected	-
A12	Welcome Pavilion	Brick mortar	None detected	-
A13	Exhibition Hall, brick wall	Black wall tar	**Yes, 20% chrysotile asbestos**	Low
A14	Exhibition Hall, concrete floor	Floor caulking	None detected	-
A15	Exhibition Hall	Drywall joint compound	None detected	-
A16	World War Two Deck	Window caulking	None detected	-
A17	Theater Control Room	12" grey speckled vinyl floor tile	None detected	-
A18	Exhibition Hall, stage	Wall plaster	None detected	-
A19	Office, reception	Drywall joint compound	None detected	-
A20	Stairwell, beside northern corridor	Wall plaster	**Yes, 1-2% chrysotile asbestos**	Moderate
A21	Northern corridor	Ceiling insulation	None detected	-

ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	ASBESTOS PRESENT	FRIABILITY
A22	Northern corridor	Drywall joint compound around steel joists	None detected	-
A23	Mechanical Mezzanine	Brick mortar	None detected	-
A24	Mechanical Mezzanine	Ceiling tar	None detected	-
A25	Mechanical Mezzanine	Paper insulation	None detected	-
A26	Mechanical Mezzanine, concrete floor	Floor caulking	None detected	-
A27	Mechanical Mezzanine	Spray on insulation	None detected	-
A28	Mechanical Mezzanine	Drywall joint compound	None detected	-
A29	Stairwell, beside northern corridor	Floor caulking	None detected	-
A30	Kitchen, dishwashing area	Drywall joint compound	None detected	-
A31	Exhibition Hall, west side windows	Window caulking	None detected	-
A32	Exhibition Hall, west side windows	Drywall joint compound	None detected	-
A33	Exhibition Hall, west side windows	Window material	None detected	-

3.2 Paint

Eleven paint samples were collected from the subject areas of the CMIP and were analyzed for total lead, mercury, and arsenic. Various grey, white, yellow, brown, red, black, and green paint colours and varnish were identified in the building.

3.2.1 Paint Analytical Results

Analytical results from the paint samples are provided in Table 2. Laboratory certificates of analysis are provided in Appendix 1.

Table 2 Lead, Arsenic, and Mercury in Paints

ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	TOTAL LEAD (mg/kg)	LEACH. LEAD (mg/L)	TOTAL ARSENIC (mg/kg)	TOTAL MERCURY (mg/kg)	LEACH. MERCURY (mg/L)
P1	Heritage Hall	Grey/black paint on steel column	**83,100**	**20**	<25	0.24	-
P2	Heritage Hall, stage	Grey paint on walls and floor	104	-	<25	<0.05	-
P3	Kitchen storage	White paint on steel column	**1,910**	0.808	<25	0.28	-
P4	Kitchen storage, mezzanine area	Light grey paint on wall	76	-	<25	<0.05	-
P5	Stairwell, beside northern corridor	Yellow paint on plaster wall	**4,380**	0.121	<25	**16.2**	<0.0005
P6	Mechanical Mezzanine	Grey/red paint on steel beams	**48,100**	**22.8**	48	0.15	-
P7	Mechanical Mezzanine	Black paint on steel beams	**158,000**	**127**	<25	1.86	-
P8	Kitchen storage	White paint on walls	102	-	<25	<0.05	-
P9	Welcome Pavilion, storage room	Beige paint on old wooden door	**2,240**	0.237	<25	1.42	-
P10	Mechanical Mezzanine	Stain on wooden slat ceiling	25	-	<25	0.26	-
P11	Heritage Hall	Yellow paint on drywall	<15	-	<25	0.08	-
NSDE-Disposal Criteria*			1,000	5	50	10	0.1

* **Shaded Boxed** values exceed Provincial Disposal Guidelines

As shown above, grey floor and wall paint in the stage area in the Heritage Hall (P2), light grey wall paint on drywall in the Kitchen Mezzanine (P4), white wall paint on drywall (P8), stain on wood ceiling slats in the mechanical mezzanine (P10), and yellow paint on drywall in Heritage Hall (P11) were found to contain levels of total lead ranging from 25 mg/kg to 104 mg/kg. These results are below the NSE disposal criteria for total lead.

Grey/black paint sampled from steel columns (P1), white paint sampled from steel columns (P3), yellow wall paint on plaster (P5), grey/red paint sampled from steel beams (P6), black paint sampled from steel beams (P7), and beige paint on wooden doors (P9) were found to exceed the NSE disposal criteria for total lead. These samples were resubmitted for leachable lead analysis. The grey/black paint sampled from steel columns (P1), grey/red paint sampled from steel beams (P6), and black paint sampled from steel beams (P7) were found to exceed the NSE disposal criteria for leachable lead content.

As shown above, all the paint samples collected with the exception of grey/red paint sampled from steel beams (P6) were found to contain no detectable levels of total arsenic. The grey/red paint sampled from steel beams (P6) result was below the NSE disposal criteria for total arsenic.

As shown above, grey floor and wall paint sampled from the stage area in the Heritage Hall (P2), light grey wall paint on drywall sampled from the Kitchen Mezzanine (P4), and white wall paint on drywall sampled from the kitchen area (P8), were not found to contain detectable levels of total mercury.

Grey/black paint sampled from steel columns (P1), white paint sampled from steel columns (P3), grey/red paint sampled from steel beams (P6), black paint sampled from steel beams (P7), beige paint on wooden doors (P9), stain on wood ceiling slats in the mechanical mezzanine (P10) and yellow paint on drywall in Heritage Hall (P11) were found to contain levels of total mercury ranging from 0.08 mg/kg to 1.86 mg/kg. These results are below the NSE disposal criteria for total mercury. All the other samples contained no detectable levels of total mercury.

Yellow wall paint on plaster (P5) was found to exceed the NSE disposal criteria for total mercury. This sample was resubmitted for leachable mercury analysis. Results indicated the sample was below the NSE disposal criteria for leachable mercury content.

3.3 Lead Dust

Five (5) lead in dust samples were collected from various locations. Samples were compared to the *Lead in Paint and Dust Guidelines, Revision Number 4, Workplace Health and Public Safety Programme*, Health Canada, March 2001 for occupied buildings. The criteria is set at 4.3 µg/100cm^2 for floors, 27 µg/100cm^2 for window sills and 86 µg/100cm^2 for window troughs. Although samples were collected from beams, and not areas with designated criteria in the Health Canada guidelines, lead dust may contaminate these areas during building renovation. As the subject area is to be gutted during the upcoming renovation project, results were compared to the least conservative number (86 µg/100cm^2).

3.4 Lead Dust Analytical Results

Laboratory results are provided in Appendix 1. Analytical results from the dust samples are provided in Table 3.

Table 3 Lead Dust

ID	SAMPLE LOCATION	SAMPLE DESCRIPTION	LAB RESULT (µg/100cm^2)
Dust 01	Heritage Hall	Ceiling beam	729
Dust 02	Kitchen Storage, Dishwashing area	Ceiling beam	6600
Dust 03	Exhibition Hall	Ceiling beam	33
Dust 04	Stair well to Mechanical Mezzanine	Beam	1030
Dust 05	Mechanical Mezzanine	Ceiling beam	432
Health Canada Guideline			**86**

* **Shaded Boxed** values exceed Lead in Paint and Dust Guidelines

Dust samples were found to contain between 33 µg/100 cm^2 and 6600 µg/100 cm^2. Lead was detected in all samples collected.

3.5 Microbial Growth

During the walkabout of the subject areas of the building, areas of potential microbial contamination such as water staining on ceiling tiles, walls, pipes, etc., were examined for mould growth. No areas of concern were noted throughout the subject areas of the building.

3.6 Polychlorinated Biphenyls (PCBs)

Ten (10) light ballasts were inspected for the presence of PCBs and were compared to the *Environment Canada – Identification of Lamp Ballasts Containing PCBs, Report EPS/CC/2, August 1991* which contains guidance to aid in the identification of PCB containing electrical equipment in fluorescent light ballasts. The results of the lamp ballast survey are presented in Table 4.

Table 4 Lamp Ballast Survey

MANUFACTURER	SERIAL / MODEL NUMBER / DATE CODE	SUSPECT PCBs	NUMBER EXAMINED
Advance	GCN-3S32	No	5
Advance	G-2532-TP	No	1
Philips	2-LAMPT8	No	2

MANUFACTURER	SERIAL / MODEL NUMBER / DATE CODE	SUSPECT PCBs	NUMBER EXAMINED
Philips	ICN-2P32-N	No	1
Triad	B232IUNVHP-B	No	1

If lamp ballasts with different serial numbers than those identified above should be uncovered during renovation activities, the serial numbers should be compared to the *Environment Canada – Identification of Lamp Ballasts Containing PCBs, Report EPS/CC/2, August 1991*, and the ballasts disposed of accordingly.

3.7 Mercury Containing Devices

Mercury containing thermostats were not observed throughout the subject areas of the building during the survey.

Mercury is likely to be present in vapour form in the fluorescent light tubes found throughout the subject area of building.

High Intensity Discharge (HID) lighting/metal halide lighting is present throughout the building. These could possibly contain mercury or other heavy metals.

3.8 Smoke Detectors

Smoke detectors were not observed in the subject areas of building during the survey.

3.9 Lead/Lithium Batteries

Emergency/exit lights were observed during the survey of the subject areas of CMIP. Multiple units were observed throughout the subject area of the survey.

3.10 Ozone Depleting Substances

Refrigeration units were observed in the kitchen, kitchen storage, class room, and office area during the survey of the subject areas of CMIP.

The Nova Scotia Environment Act Ozone Layer Protection Regulations stipulate stringent control of ozone-depleting substances and any unit containing CFCs must be maintained or recharged by a licensed CFC handler. Two (2) refrigerator units were identified in the kitchen to contain the coolant R12, which is a CFC. The coolant in the large freezer unit in the kitchen storage could not be identified at the time of the inspection and should be considered to contain CFCs until it can be proven otherwise.

3.11 Urea Formaldehyde Foam Insulation

UFFI was not identified during the site assessment of the subject areas of CMIP. Fibreglass and spray-on insulation was observed during the survey.

3.12 Silica

CMIP has concrete and brick components that typically contain silica that can be aerosolised during certain activities such as crushing, pulverizing, smashing abrasive blasting, jack hammering, cutting, sawing, etc.

3.13 Additional Items

Various paints were observed to be stored in the storage area/stairwell to mechanical mezzanine. A container of what appeared to be glycol was observed in the mechanical mezzanine.

3.14 Summary of Hazardous Materials

A summary of the hazardous building materials encountered in the subject areas of CMIP is provided in Table 5.

Table 5 Summary of Hazardous Materials

HAZARDOUS MATERIAL	DESCRIPTION	PRECAUTIONS / DISPOSAL CRITERIA
Asbestos	Black tar on brick	Precautions must be taken during upcoming renovation activities to avoid worker exposure to asbestos fibres. Material must be manifested as a Dangerous Good during transport. Material requires disposal at approved facility.
	Wall plaster in stairwell	
Non-Leachable Lead/Mercury Paint	White paint on structural support beams and columns in Kitchen Storage	Lead paint results were above the NSE disposal criteria for total lead and/or total mercury; precautions must be taken during the upcoming renovation activities to avoid worker exposure to lead/mercury dust. Non-leachable material can be disposed of at a municipal disposal facility, except for those materials that contain asbestos (plaster).
	Yellow paint on plaster wall	
	Beige paint on wooden doors	
Leachable Lead Paint	Grey/black paint on structural support beams and columns	Leachable lead paint results were above the NSE disposal criteria for leachable lead; precautions must be taken during the upcoming renovation activities to avoid worker exposure to lead dust. Material must be disposed of at a hazardous waste disposal facility. There are currently no facilities in NS that accept leachable lead waste. Leachable hazardous wastes are accepted at the Clean Harbours hazardous waste disposal facility in the Sarnia area of Ontario, and at the Stablex facility in Blainville, Quebec.
	Grey/red paint on structural support beams and columns	
	Black paint on structural support beams and columns	
Lead Dust	Dust in areas that aren't typically included in regular cleaning (on support beams, etc.)	Lead dust is present in the building. Precautions must be taken prior to the upcoming renovation activities to avoid worker exposure to lead dust, and to avoid contaminating the area with lead dust.
Mercury & Other Heavy Metals	Fluorescent light tubes, HID/metal halide lighting likely containing mercury and other heavy metal vapour	Material must be manifested as a Dangerous Good. Material requires disposal at approved disposal facility.

HAZARDOUS MATERIAL	DESCRIPTION	PRECAUTIONS / DISPOSAL CRITERIA
Lead/lithium Batteries	Emergency lights	Material must be manifested as a Dangerous Good. Material requires disposal at approved disposal facility.
CFCs	Refrigeration unit coolants	The Nova Scotia Environment Act Ozone Layer Protection Regulations stipulate stringent control of ozone-depleting substances and any unit containing CFCs must be maintained or recharged by a licensed CFC handler.
Silica	Concrete and brick dust	During demolition precautions must be taken to avoid worker exposure to crystalline silica. Materials can be disposed at a municipal disposal facility, except for those materials that are painted with leachable lead paint.
Chemical Storage	Paints and glycol	Materials require disposal/recycling at approved disposal/recycling facility.

4 DISCUSSION OF RESULTS & RECOMMENDED CONTROL PROCEDURES

It should be noted that for all construction activities described below, in addition to the work-specific personal protection equipment described below (i.e., respirators, protective clothing, etc.), steel-toed boots, hard hats, safety glasses must be worn.

4.1 Asbestos

NSE regulates the disposal of ACMs under the Asbestos Waste Management Regulations. Under the Regulations, "asbestos waste" refers to friable waste material containing fibres or asbestos dust in a concentration 1% by weight or greater.

Two (2) types of ACMs were identified during the survey: asbestos containing plaster (in the stairwell adjacent to the corridor to the Annex) and asbestos containing tar on the brick wall between the Exhibition Hall and Welcome Pavilion approximately 6 meters up the wall on the Exhibition Hall side.

Due to the small amount of plaster present, it can be removed following Type II removal conditions. This plaster should be removed regardless of whether or not it is included in the scope of work of the upcoming renovation as the plaster was observed to be damaged. Type II removals include disabling the mechanical ventilation system serving the work area and sealing the ventilation ducts to and from the work area, constructing an enclosure made from polyethylene sheeting, providing suitable negative air exchange in the enclosure using a HEPA filtered negative air unit vented to the building exterior, the use of personal protective equipment (CSA/NIOSH approved respirators appropriate for the work equipped with P100 HEPA filters, appropriate protective clothing, gloves, etc.) and the removal of the asbestos containing plaster using non-powered hand tools, the use of wetting techniques and applying a lockdown agent in the enclosure.

The asbestos containing tar can be removed following Type I removal conditions. Type I removals include the use of drop sheets to aid in the control of the spread of dust, personal protective equipment (CSA/NIOSH approved respirators appropriate for the work equipped with P100 HEPA filters, appropriate protective clothing, gloves, etc.) and the removal of asbestos containing tar using non-powered hand tools. It should be noted that the asbestos containing tar is at a height that requires fall protection procedures for access/removal.

For each area where asbestos abatement work is to be conducted, dust and debris must be cleaned up during and after the removal of the ACMs. A close inspection is required to ensure no dust or debris remains following the removal work. It may be desirable to have asbestos clearance testing conducted following abatement work. Once the removal work is complete, all tools must be decontaminated. A wash station must be present for workers to wash exposed skin. Drop sheets, enclosures, and protective clothing must not be reused. These items, as well as the asbestos containing tar and plaster, must be disposed of as asbestos waste.

Asbestos is classified as a hazardous material under the Transportation of Dangerous Goods Act (TDGA). Transport Canada requires specific requirements for transfer (i.e. manifests, placards, etc.). Where asbestos is transported, friable materials must be appropriately bagged (placed in two six mil polyethylene bags or a first bag inserted into a suitable rigid container). All asbestos waste is to be disposed at an approved municipal solid waste disposal site.

The provincial Occupational Health and Safety Act must be consulted when determining the exact requirements for removal of a particular material. Also, the Nova Scotia Department of Labour and Advanced Education has guidance documents for the removal of ACMs. These should be referred to as a minimum. As with any planned removal of ACM, only suitably qualified personnel should conduct this sort of work.

4.2 Paint

4.2.1 Paint Handling Requirements

Any disturbance or removal of metals-based painted materials that may generate metals dust or respirable aerosols will need to conform to the federal and provincial Occupational Health and Safety Act Regulations.

Lead/mercury painted materials include paint on structural support beams and columns, beige painted older style wood doors and yellow paint on asbestos containing plaster. These painted materials were observed to be in good condition (i.e., paint was not observed to be peeling) at the time of the survey.

With respect to the yellow painted asbestos containing plaster, as described above, it is recommended that the plaster be removed due to damage. This paint will be removed at the same time under the same Type II removal method as described above while the asbestos plaster is removed. The paint does not need to be removed from the substrate. Since the leachate results from the yellow paint on asbestos containing plaster satisfies the disposal guidelines, special consideration for disposal with

respect to metals is not required for this painted material. Asbestos precautions will apply, as described above.

LVM recommends one of two courses of action with respect to lead/mercury painted materials on the structural support beams and columns, as well as the older style wood doors. Since the lead/mercury painted materials were observed to be in good condition, these items may be painted over with a non-metals based paint. It should be noted that if this is to be conducted, lead dust will require removal prior to re-painting. Control procedures for lead dust removal are discussed below in Section 4.3. It should be noted that while these paints were observed to be in good condition at the time of the survey, it is possible that conditions may deteriorate overtime, and in the future, these paints may require removal if not removed during the upcoming renovation, due to the potential for future deteriorating conditions.

Another option is to remove the lead/mercury paint. While this may be done with sandblasting, LVM recommends using chemical paint strippers instead in order reduce the amount of dust generation, since the amount of paint to be removed would be significant. The chemical stripping of paint can be done following minimum precautions including: the use of drop sheets to aid in the control of the spread of dust, personal protective equipment (CSA/NIOSH approved respirators appropriate for the work equipped with P100 HEPA filters, appropriate protective clothing, gloves, etc.) and pre-cleaning lead dust (described below). Dust and debris in the work area must be cleaned with HEPA vacuum during and after the abatement work. A close inspection is required to ensure no lead/mercury paint remains following removal work. It may be desirable to conduct lead/mercury wipe sampling following removal. Once the abatement work is complete, all tools must be decontaminated. A wash station must be present for workers to wash exposed skin. Drop sheets and protective clothing must be disposed of appropriately and not re-used.

All work should be carried out by individuals qualified to handle metals-containing materials and will require, as a minimum, workers to wear proper personal protection (respirators, disposable clothing, gloves, etc.). It should be noted that the majority of structural steel columns and beams are at heights that require fall protection procedures for access/removal.

4.2.2 Paint Disposal Criteria

Disposal of lead, mercury and arsenic containing construction debris is regulated provincially through NSE. The landfill disposal limit for total lead, mercury and arsenic in metals based paint is 1000 mg/kg for lead, 10 mg/kg for mercury, and 50 mg/kg for arsenic. If total lead, mercury or arsenic levels exceeds these limits, a leachate test is conducted. If the leachate concentration of lead, mercury or arsenic is 5 mg/L for lead, 0.1 mg/L for mercury, or 5 mg/L for arsenic, or greater, then the waste material is considered a hazardous waste and will not be approved for disposal in a waste disposal site in this Province.

Currently there is no facility in NS that accepts leachable metals waste. Leachable hazardous wastes are accepted at the Clean Harbours hazardous waste disposal facility in the Sarnia area of Ontario, and at the Stablex facility in Blainville, Quebec.

The beige painted older style wooden doors are considered to be painted with lead paint; however, this material may be disposed of as municipal waste, since leachate results were below disposal guidelines.

Paint on structural steel beams and columns exceeded the leachable lead guidelines. Paint chips and debris must be disposed of as hazardous leachable lead waste.

Materials with leachable metals concentrations greater than the disposal guidelines must be manifested as dangerous goods during transport under the federal TDGA regulations. If materials are to be disposed of out of province, transportation must comply with the Interprovincial Movement of Hazardous Waste Regulations under the Canadian Environmental Protection Act.

4.3 Lead Dust

Although samples were collected from beams, and not areas with designated criteria in the Health Canada guidelines, lead dust may contaminate areas with set criteria during the upcoming renovation. Since the subject areas of the building are to be gutted for the upcoming renovation, results were compared to the least conservative number set out in the Health Canada Lead in Paint and Dust Guidelines of 86 µg/100cm^2. Based on the test results, the reported lead dust results exceed this value and therefore, suggest potential exposure concern to any building occupants (including workers) in the subject area during the upcoming renovation. The elevated concentrations of lead in the settled dust also indicate that aerosolization of lead dust may occur during building renovation. The threshold limit value (TLV) for occupational health exposure for lead is set as a time weighted average (TWA) of 0.05 mg/m3 by ACGIH (The American Conference of Governmental Industrial Hygienists).

It is recommended that prior to renovation, all dust is removed with a HEPA vacuum and wet wiping and employees wear the appropriate respiratory protection and disposable clothing during the dust removal work. It should be noted that the majority of lead dust is present at heights that require fall protection procedures to access/clean.

The removal of lead dust should be conduct whether or not the renovation work occurs to avoid potential future contamination of surfaces at occupied levels in the building.

4.4 Mercury Containing Devices

With respect to fluorescent tubes and HID/metal halide lighting, bulbs should be handled carefully to ensure that they are not broken, and then carefully packaged in suitable boxes (i.e. the type in which the lamps were purchased or in similar packaging) for recycle or disposal. Alternatively, light tubes and bulbs should be broken inside a purpose made sealed enclosure to prevent release of mercury and other heavy metals into the atmosphere.

4.5 Lead/Lithium Batteries

Lead or lithium containing batteries cannot be disposed of with other solid waste. Lead/lithium batteries must be disposed of through a licensed hazardous waste disposal contractor or taken to a licensed recycling facility.

4.6 Ozone Depleting Substances

CFCs are coolants that are typically found in air-conditioning and refrigeration systems, and are ozone-depleting substances. The Nova Scotia Environment Act Ozone Layer Protection Regulations stipulate stringent control of ozone-depleting substances and any unit containing CFCs must be maintained, recharged or decommissioned by a licensed CFC handler.

4.7 Silica

Typically, the crushing, pulverizing or smashing of concrete and brick leads to the possible formation of freshly cleaved crystalline silica. Exposure to crystalline silica can cause lung cancer and silicosis, a disease affecting the lungs' ability to utilize oxygen.

It is our recommendation that during the upcoming renovation, if materials that are potentially silica containing are to be disturbed, wetting techniques be applied to ensure that any dust created is immediately wetted to prevent the release of potential crystalline silica into the air. Proper personal protective equipment and procedures should be implemented to ensure worker safety. These typically would include properly fitted half or full-faced faced respirators with P-, N- or R-100 filters, suitable dust control in enclosed indoor areas which could include wetting of debris and use of site isolation, possible use of negative air equipment, and personal monitoring to ensure compliance with American Conference of Governmental Industrial Hygienists exposure standards.

4.8 Additional Items

Any chemicals not in use must be disposed of properly.

5 ORDER OF MAGNITUDE COST ESTIMATES

Presented in Table 6 are cost estimates to remove identified hazardous materials and implement the control procedures described above in Section 4. It should be noted that these cost estimates are intended to be order of magnitude cost estimates only. These cost estimates do not include any "rebuild" costs. Cost estimates are based on typical current contractor unit rates based on LVM's experience in working with contractors.

Table 6 Order Of Magnitude Cost Estimates

HAZARDOUS MATERIAL	DESCRIPTION	COST ESTIMATE
Asbestos	Black tar on brick	$1000
	Wall plaster in stairwell	$1000
Lead/Mercury Paint	Yellow paint on plaster wall	Cost included under asbestos removal estimate
	Beige paint on wooden doors	Paint overtop of existing lead/mercury paint (following lead dust removal): $30,000
	Paint on structural support beams and columns	Removal of lead/mercury paint using chemical paint strippers: $50,000
Lead Dust	Dust in areas that aren't typically included in regular cleaning (on support beams, etc.)	$30,000
Mercury	Fluorescent light tubes likely containing mercury vapour	$7000
Lead/lithium Batteries	Emergency lights	$1500
CFCs	Refrigeration unit coolants	$500
Silica	Concrete and brick dust	Since LVM is not aware of renovation plans involving the removal of concrete/brick building components, costs to implement control procedures for working with silica containing materials are not included.
Chemical Storage	Paints and glycol	$500

6 REFERENCES

1. Department of Justice Canada - Canadian Environmental Protection Act, 1999 (CEPA) -Interprovincial Movement of Hazardous Waste Regulations.

2. Department of Justice Canada - Canada Consumer Safety Products Act, 2010-Surface Coating Materials Regulations, SOR/2005-109.

3. Health Canada - Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).

4. Health Canada – Mould and Your Health: What You Need to Know For a Healthier Home, 2012.

5. Human Resources and Social Development Canada (HRSDC) - Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.

6. Transport Canada (TC) -Transportation of Dangerous Goods Act, 1992 (TDGA).

7. Canada Occupational Safety and Health Regulation (SOR/86-304, as amended) – Part X, Hazardous Substances, Human Resources and Development Canada, May 2002.

8. Environment Canada - Identification of Lamp Ballasts Containing PCBs, Environment Canada Report EPS 2/CC/2, August 1991.

9. Nova Scotia Department of Environment – Guidelines for Disposal of Contaminated Solids in Landfills, 1994.

10. Nova Scotia Department of Labour and Advanced Education - Outdoor Work with Asbestos, March 26, 1998.

11. Nova Scotia Department of Labour and Advanced Education - Maintenance Operations Involving Asbestos, March 26, 1998.

12. Nova Scotia Department of Labour and Advanced Education - Removal of Friable Asbestos Containing Materials, March 12, 2003.

13. Nova Scotia Department of Labour and Advanced Education - Newfoundland and Labrador Department of Environment and Conservation - Managing Asbestos in Buildings: Code of Practice.

14. Dangerous Goods and Hazardous Wastes Management Act, Asbestos Waste Regulations, December 1988.

15. Asbestos Waste Management Regulations, Nova Scotia Environment and Labour, April 11, 1995, N.S. Reg.53/95.

16. Occupational Health Regulations, Nova Scotia Environment and Labour.

17. Public Works and Government Services Canada - Deputy Minister Directive (DIR:057) –Respecting Asbestos Management in Federal Owned or Leased Buildings or Facilities Containing Asbestos. March 12, 1997.

18. Canadian Construction Association – Standard Construction Document CCA 82-2004 Mould Guidelines for the Canadian Construction Industry.

19. Federal-Provincial Committee on Environmental and Occupational Health – Fungal Contamination in Public Buildings: A Guide to Recognition and Management, June 1995.

20. Environmental Abatement Council of Ontario – Mould Abatement Guidelines, 2010.

21. Institute of Inspection, Cleaning and Restoration – Mold Remediation (Standard S520), 2004.

7 REPORT USE AND CONDITIONS

This report was prepared for the exclusive use of MHPM Project Managers Inc. and the Canadian Museum of Immigration at Pier 21, and is based on data and information obtained during a site visit by LVM on the subject property, and is based solely upon the condition of the property on the date of such inspection, supplemented by information obtained and described herein.

The regulated building materials survey addresses the specified hazardous building materials only. Attempt was made to identify all materials in the building with potential to contain hazardous substances. Several representative wall cavities were inspected during the survey; however, since the

building was in use at the time of the survey, all areas of concealed wall and ceiling cavities could not be visually assessed at the time of the survey.

Some conclusions are based on conversations held with building personnel. LVM has relied in good faith upon representation and information furnished by individuals noted in the report with respect to operations and existing property conditions and previous renovations conducted in the building. Accordingly, LVM accepts no responsibility for any deficiency or inaccuracy in this report as a result of omissions, misstatements or misrepresentations of the persons interviewed. In addition, LVM will not accept liability for loss, injury, claim or damage arising from any use or reliance on this report as a result of misrepresentation or fraudulent information.

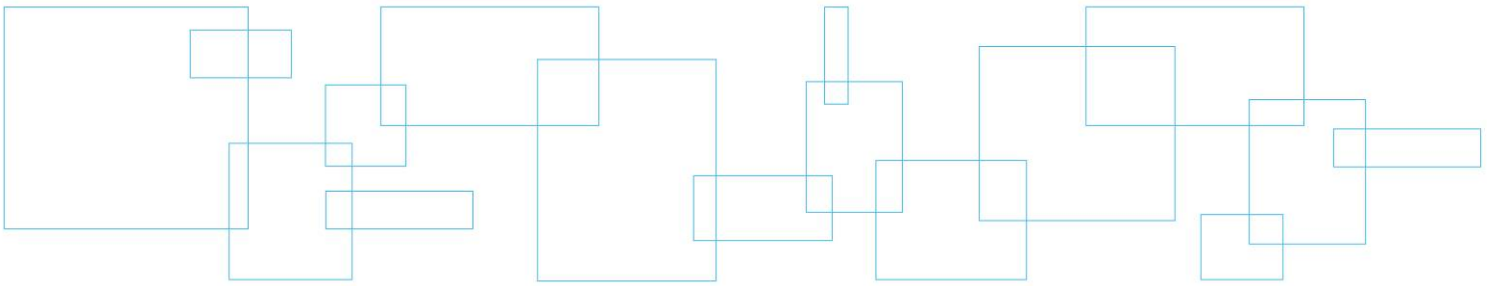
It should be noted that equipment was not disassembled to identify hazardous materials (other than fluorescent lamp ballasts).

Recommendations are based on the condition of materials observed at the time of the survey.

Cost estimates are intended to be order of magnitude cost estimates only. The cost estimates provided in the report do not include any “rebuild” costs. Cost estimates are based on typical current contractor unit rates based on LVM’s experience in working with contractors. The costs are based on the condition of the materials at the time of the survey.

The statements and conclusions presented in this report are professional opinions based upon data and information obtained during a site survey by LVM, visual observations made during the site survey, and on interpretation of asbestos, paint and dust laboratory analyses on the subject property. The opinions in this report are given using generally accepted scientific judgement, principles, and practices; however, because of the inherent uncertainty in this process no guarantee of conclusion is intended or can be given.

Appendix 1 Laboratory Certificates



AGAT Laboratories

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http://www.agatlabs.com

CLIENT NAME: LVM INC.
97 TROOP AVE
DARTMOUTH, NS B3B2A7
(902) 468-6486

ATTENTION TO: ASHELY ZOTTARELLI

PROJECT NO: 17241

AGAT WORK ORDER: 13X736964

SOIL ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

DATE REPORTED: Jul 25, 2013

PAGES (INCLUDING COVER): 3

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Certificate of Analysis

AGAT WORK ORDER: 13X736964

PROJECT NO: 17241

CLIENT NAME: LVM INC.

ATTENTION TO: ASHELY ZOTTARELLI

Lead in Swab - mg/swab

DATE RECEIVED: 2013-07-16

DATE REPORTED: 2013-07-25

		SAMPLE DESCRIPTION:		Dust-01	Dust-02	Dust-03	Dust-04	Dust-05
		SAMPLE TYPE:		Swab	Swab	Swab	Swab	Swab
		DATE SAMPLED:		7/16/2013	7/16/2013	7/16/2013	7/16/2013	7/16/2013
Parameter	**Unit**	**G / S**	**RDL**	**4555808**	**4555818**	**4555819**	**4555820**	**4555821**
Lead in Swab	mg/swab		0.001	0.729	6.60	0.033	1.03	0.432

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

Certified By:

AGAT Laboratories

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Method Summary

CLIENT NAME: LVM INC.

AGAT WORK ORDER: 13X736964

PROJECT NO: 17241

ATTENTION TO: ASHELY ZOTTARELLI

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Lead in Swab			ICP-MS

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ATTENTION TO: ASHELY ZOTTARELLI

PROJECT NO: 17241

AGAT WORK ORDER: 13X732678

SOIL ANALYSIS REVIEWED BY: Laura Baker, Inorganics Data Reporter

DATE REPORTED: Jul 16, 2013

PAGES (INCLUDING COVER): 6

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Certificate of Analysis

AGAT WORK ORDER: 13X732678
PROJECT NO: 17241

CLIENT NAME: LVM INC.

ATTENTION TO: ASHELY ZOTTARELLI

Arsenic In Paint

DATE RECEIVED: 2013-07-04

DATE REPORTED: 2013-07-16

		SAMPLE DESCRIPTION:		P11
		SAMPLE TYPE:		Paint
		DATE SAMPLED:		7/3/2013
Parameter	Unit	G / S	RDL	4517024
Arsenic	mg/kg		25	<25
Total Sample Mass	g			NA

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

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 13X732678

PROJECT NO: 17241

CLIENT NAME: LVM INC.

ATTENTION TO: ASHELY ZOTTARELLI

Lead In Paint

DATE RECEIVED: 2013-07-04

DATE REPORTED: 2013-07-16

		SAMPLE DESCRIPTION:		P11
		SAMPLE TYPE:		Paint
		DATE SAMPLED:		7/3/2013
Parameter	Unit	G / S	RDL	4517024
Lead	mg/kg		15	<15
Total Sample Mass	g			NA

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

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 13X732678

PROJECT NO: 17241

CLIENT NAME: LVM INC.

ATTENTION TO: ASHELY ZOTTARELLI

Mercury Analysis in Paint

DATE RECEIVED: 2013-07-04

DATE REPORTED: 2013-07-16

		SAMPLE DESCRIPTION:		P11
		SAMPLE TYPE:		Paint
		DATE SAMPLED:		7/3/2013
Parameter	Unit	G / S	RDL	4517024
Mercury	mg/kg		0.05	0.08

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

Certified By:

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Quality Assurance

CLIENT NAME: LVM INC.

AGAT WORK ORDER: 13X732678

PROJECT NO: 17241

ATTENTION TO: ASHELY ZOTTARELLI

Soil Analysis

RPT Date: Jul 16, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Arsenic In Paint															
Arsenic	878	7777	<25	<25	0.0%	< 25	103%	80%	120%		80%	120%	96%	70%	130%
Mercury Analysis in Paint															
Mercury	1	4515681	< 0.05	< 0.05	0.0%	< 0.05	115%	70%	130%		70%	130%	100%	70%	130%
Lead In Paint															
Lead	878	7777	<15	<15	0.0%	< 15	97%	70%	130%		70%	130%	95%	70%	130%

Certified By:

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Method Summary

CLIENT NAME: LVM INC.

AGAT WORK ORDER: 13X732678

PROJECT NO: 17241

ATTENTION TO: ASHELY ZOTTARELLI

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Arsenic	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Total Sample Mass			
Lead	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B, SM3125, AOAC 974.02	ICP/MS
Total Sample Mass			
Mercury	INOR-121-6101 & INOR-121-6107	Based on EPA 245.5 & SM 3112B	CV/AA

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(902) 468-6486

ATTENTION TO: ASHELY ZOTTARELLI

PROJECT NO: 17241

AGAT WORK ORDER: 13X732630

SOIL ANALYSIS REVIEWED BY: Laura Baker, Inorganics Data Reporter

DATE REPORTED: Jul 19, 2013

PAGES (INCLUDING COVER): 6

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 13X732630
PROJECT NO: 17241

CLIENT NAME: LVM INC.

ATTENTION TO: ASHELY ZOTTARELLI

Arsenic In Paint

DATE RECEIVED: 2013-07-04

DATE REPORTED: 2013-07-19

		SAMPLE DESCRIPTION:		P1	P2	P3	P4	P5	P6	P7	P8
		SAMPLE TYPE:		Paint	Paint	Paint	Paint	Paint	Paint	Paint	Paint
		DATE SAMPLED:		7/3/2013	7/3/2013	7/3/2013	7/3/2013	7/3/2013	7/3/2013	7/3/2013	7/3/2013
Parameter	Unit	G / S	RDL	4516822	4516823	4516824	4516825	4516826	4516827	4516828	4516829
Arsenic	mg/kg		25	<25	<25	<25	<25	<25	48	<25	<25
Total Sample Mass	g			0.5068	0.5061	0.5189	0.5002	0.4994	0.4970	0.5149	0.5079

		SAMPLE DESCRIPTION:		P9	P10
		SAMPLE TYPE:		Paint	Paint
		DATE SAMPLED:		7/3/2013	7/3/2013
Parameter	Unit	G / S	RDL	4516830	4516831
Arsenic	mg/kg		25	<25	<25
Total Sample Mass	g			0.5082	0.5040

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

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 13X732630
PROJECT NO: 17241

CLIENT NAME: LVM INC.

ATTENTION TO: ASHELY ZOTTARELLI

Lead In Paint

DATE RECEIVED: 2013-07-04

DATE REPORTED: 2013-07-19

		SAMPLE DESCRIPTION:		P1	P2	P3	P4	P5	P6	P7	P8
		SAMPLE TYPE:		Paint	Paint	Paint	Paint	Paint	Paint	Paint	Paint
		DATE SAMPLED:		7/3/2013	7/3/2013	7/3/2013	7/3/2013	7/3/2013	7/3/2013	7/3/2013	7/3/2013
Parameter	Unit	G / S	RDL	4516822	4516823	4516824	4516825	4516826	4516827	4516828	4516829
Lead	mg/kg		15	83100	104	1910	76	4380	48100	158000	102
Total Sample Mass	g			0.5068	0.5061	0.5189	0.5002	0.4994	0.4970	0.5149	0.5079

		SAMPLE DESCRIPTION:		P9	P10
		SAMPLE TYPE:		Paint	Paint
		DATE SAMPLED:		7/3/2013	7/3/2013
Parameter	Unit	G / S	RDL	4516830	4516831
Lead	mg/kg		15	2240	25
Total Sample Mass	g			0.5082	0.5040

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

Certified By: Laura Bale

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Certificate of Analysis

AGAT WORK ORDER: 13X732630
PROJECT NO: 17241

CLIENT NAME: LVM INC.

ATTENTION TO: ASHELY ZOTTARELLI

Mercury Analysis in Paint

DATE RECEIVED: 2013-07-04

DATE REPORTED: 2013-07-19

		SAMPLE DESCRIPTION:		P1	P2	P3	P4	P5	P6	P7	P8
		SAMPLE TYPE:		Paint	Paint	Paint	Paint	Paint	Paint	Paint	Paint
		DATE SAMPLED:		7/3/2013	7/3/2013	7/3/2013	7/3/2013	7/3/2013	7/3/2013	7/3/2013	7/3/2013
Parameter	Unit	G / S	RDL	4516822	4516823	4516824	4516825	4516826	4516827	4516828	4516829
Mercury	mg/kg		0.05	0.24	<0.05	0.28	<0.05	16.2	0.15	1.86	<0.05

		SAMPLE DESCRIPTION:		P9	P10
		SAMPLE TYPE:		Paint	Paint
		DATE SAMPLED:		7/3/2013	7/3/2013
Parameter	Unit	G / S	RDL	4516830	4516831
Mercury	mg/kg		0.05	1.42	0.26

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

Certified By:

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Quality Assurance

CLIENT NAME: LVM INC.

AGAT WORK ORDER: 13X732630

PROJECT NO: 17241

ATTENTION TO: ASHELY ZOTTARELLI

Soil Analysis

RPT Date: Jul 19, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Arsenic In Paint															
Arsenic	878	7777	<25	<25	NA	< 25	103%	80%	120%	NA	80%	120%	96%	70%	130%
Mercury Analysis in Paint															
Mercury	1	4515681	< 0.05	< 0.05	0.0%	< 0.05	115%	70%	130%		70%	130%	100%	70%	130%
Lead In Paint															
Lead	878		<15	<15	NA	< 15	97%	70%	130%	NA	70%	130%	95%	70%	130%

Certified By:

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Method Summary

CLIENT NAME: LVM INC.

AGAT WORK ORDER: 13X732630

PROJECT NO: 17241

ATTENTION TO: ASHELY ZOTTARELLI

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Arsenic	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Total Sample Mass			
Lead	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B, SM3125, AOAC 974.02	ICP/MS
Total Sample Mass			
Mercury	INOR-121-6101 & INOR-121-6107	Based on EPA 245.5 & SM 3112B	CV/AA

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CLIENT NAME: LVM INC.
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DARTMOUTH, NS B3B2A7
(902) 468-6486

ATTENTION TO: ASHELY ZOTTARELLI

PROJECT NO: 17412

AGAT WORK ORDER: 13X740478

SOIL ANALYSIS REVIEWED BY: Jason Coughtrey, Inorganics Supervisor

DATE REPORTED: Jul 30, 2013

PAGES (INCLUDING COVER): 4

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 13X740478

PROJECT NO: 17412

CLIENT NAME: LVM INC.

ATTENTION TO: ASHELY ZOTTARELLI

CGSB Leachable Metals - Lead

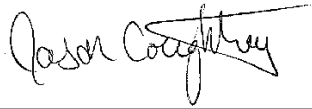
DATE RECEIVED: 2013-07-25

DATE REPORTED: 2013-07-30

SAMPLE DESCRIPTION:				P1	P2	P3	P4	P5	P6
SAMPLE TYPE:				Paint	Paint	Paint	Paint	Paint	Paint
DATE SAMPLED:				7/25/2013	7/25/2013	7/25/2013	7/25/2013	7/25/2013	7/25/2013
Parameter	Unit	G / S	RDL	4587080	4587090	4587092	4587094	4587097	4587099
Lead	ug/L		5	13	9	7	4990	379	93
Initial pH	NA		NA	6.72	6.92	6.76	6.43	5.13	5.51
Final pH	NA		NA	5.27	5.66	6.02	5.25	4.97	5.06
% Moisture	%		1	<1	<1	<1	<1	<1	<1
Total Sample Mass	g			5.03	5.15	5.07	5.08	5.13	5.09

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

Certified By:



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Quality Assurance

CLIENT NAME: LVM INC.

AGAT WORK ORDER: 13X740478

PROJECT NO: 17412

ATTENTION TO: ASHELY ZOTTARELLI

Soil Analysis

RPT Date: Jul 30, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
CGSB Leachable Metals - Lead															
Lead	73013	4587099	93	92	1.1%	< 5	100%	80%	120%	101%	80%	120%	77%	70%	130%

Certified By:

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Method Summary

CLIENT NAME: LVM INC.

AGAT WORK ORDER: 13X740478

PROJECT NO: 17412

ATTENTION TO: ASHELY ZOTTARELLI

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Lead	MET-121-6110, MET-121-6105	Based on CGSB 164-GP-1MP & In-House Method, SM3125	ICP/MS
Initial pH	MET-121-6110	Based on CGSB 164-GP-1MP & In-House Method	pH Meter
Final pH	MET-121-6110	Based on CGSB 164-GP-1MP & In-House Method	pH Meter
% Moisture	LAB-131-4024	Topp, G.C. 1993. Soil Water Content. CSSS	GRAVIMETRIC
Total Sample Mass