Limited Hazardous Materials Survey

Johnson Street Bridge

Victoria, BC

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EXECUTIVE SUMMARY

North West Environmental Group conducted a limited hazardous materials risk assessment of the Johnson Street Bridge, Victoria, BC on August 29, 2011. Structure fabric components suspected of containing hazardous materials were identified, logged and, where necessary, sampled and analyzed to confirm the presence or absence of hazardous materials.

The Structure is a painted, steel framed, counterweighted moveable bridge. The age of the structure is approx. 87 years old. This survey is limited to the rail/pedestrian span portion of the bridge and the dock/pilings on the North West side of the bridge only.

The structure was not occupied during the survey and, therefore, invasive investigative techniques were used. Even with the most invasive survey techniques, however, it should be noted that the possibility remains for other concealed materials to be found during the demolition process.

The span in question is currently locked in the elevated position, making much of the bridge inaccessible for inspection during the survey.

WorkSafeBC Regulations require that all hazardous materials (with the exception of Lead Paint adhered to the substrate) found to be in way of the planned work, including asbestos, be removed prior to demolition. Removal of hazardous materials must be undertaken by a qualified contractor employing WorkSafeBC approved procedures. If materials that are suspected of containing hazardous components such as lead or asbestos, are encountered during deconstruction that differ from, or are in addition to those reported in the bulk sample collection report, then work must stop until the material content can be determined.

The purpose of this hazard assessment was to identify the locations of asbestos and other hazardous materials prior to planned demolition work. This report includes a list of structure materials that are confirmed or suspected of containing hazardous materials.

The survey identified the following hazardous materials:

<table>
<thead>
<tr>
<th>Hazardous Material</th>
<th>Type and Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asbestos</td>
<td>None Detected&lt;br&gt;Note: asbestos may be present in brake linings which were not accessible during the survey.&lt;br&gt;Note: any additional suspect materials encountered during demolition activities should be left undisturbed until testing determines the presence or absence of asbestos or other hazardous materials.</td>
</tr>
<tr>
<td>PCB’s</td>
<td>Fluorescent Light Ballasts present in the mechanical room</td>
</tr>
<tr>
<td>Mercury</td>
<td>Fluorescent Light Tubes present in the mechanical room</td>
</tr>
<tr>
<td>Lead</td>
<td>Lead containing paint detected in original coatings on the bridge Structure</td>
</tr>
<tr>
<td>Silica</td>
<td>Assumed to be present in concrete</td>
</tr>
<tr>
<td>WHMIS Controlled Products</td>
<td>Greases, battery acid, fuels etc.</td>
</tr>
<tr>
<td>Creosote Logs</td>
<td>Dock pilings</td>
</tr>
</tbody>
</table>

Where hazardous materials were found they can be presumed to be found in similar materials throughout the structure.

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

North West Environmental was retained by Chaz Whipp of the City of Victoria to conduct a limited hazardous-material risk assessment at of the Johnson Street Bridge, Victoria, BC as per WorkSafeBC requirements. This is a project-specific risk assessment intended to delineate the nature and content of structure materials that may be impacted by the demolition of the rail/foot traffic span portion of the bridge.

The span in question is currently locked in the elevated position, making much of the bridge inaccessible for inspection during the survey.

The Structure is a painted, steel framed, counterweighted moveable bridge. The age of the structure is approx. 87 years old. This survey is limited to the rail/pedestrian span portion of the bridge and the dock/ pilings on the North West side of the bridge only.

All accessible areas of this structure within the survey area were inspected for the presence of asbestos-containing materials, mould, lead, radioactive sources, ozone depleting substances, mercury, and PCBs. Where appropriate, representative samples of materials suspected of containing asbestos or other hazardous materials were collected and sent for confirmatory testing.

Observations were made to determine the presence of equipment including mercury-containing thermostats, smoke detectors, refrigerating devices, urea-formaldehyde foam insulation, as well as aboveground storage tanks and any other hazardous materials that may be impacted by the work.

WorkSafeBC Regulations require that all hazardous materials (with the exception of Lead Paint adhered to the substrate) including asbestos be removed prior to demolition. Removal of hazardous materials must be undertaken by a qualified contractor employing WorkSafeBC approved procedures. If materials are encountered during deconstruction that differ from, or are in addition to those described in this report, then work must stop until the material content can be determined and appropriate precautionary measures employed to protect workers and others at or near the worksite.
2 REGULATORY CRITERIA

As per WorkSafeBC requirements, the structure was surveyed for the presence of several different types of hazardous materials including:

- Polychlorinated biphenyls
- Asbestos
- Mercury
- Arsenic
- Ozone Depleting Substances
- Urea formaldehyde foam insulation
- radioactive Materials
- Above or Underground Storage Tanks
- Lead
- Hantavirus – rodent droppings
- Silica
- Mould
- Creosote Logs
- Other products and chemicals as applicable.

2.1 Polychlorinated Biphenyls (PCB)

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

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

2.2 Asbestos

Projects that will result in the disturbance of asbestos-containing materials (ACMs) must satisfy WorkSafeBC's regulations and conform to the guidance document Safe Work Practices for Handling of Asbestos. WorkSafeBC's Occupational Health and Safety Regulation defines an asbestos-containing material as "any manufactured article or other material which contains one (1) per cent or more asbestos by weight at the time of manufacture, or which contains one (1) per cent or more asbestos as determined by NIOSH Analytical Method 9002 (dispersion staining, polarized light microscope) or x-ray diffraction". This limit is currently being reviewed by WorkSafeBC with a view to reducing it to 0.5 percent by weight.

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

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

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

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

### 2.3 Mercury

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

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

As a hazardous substance, transportation and disposal of this substance must be done in compliance with the federal Transportation of Dangerous Goods (TDG) Regulations and the BC Hazardous Waste Regulation. Mercury is found in fluorescent light bulbs, thermostats, manometers, and equipment such as electrical switches.

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

### 2.4 Arsenic

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

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

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

### 2.5 Ozone-depleting Substances (CFCs/ODS)

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

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

### 2.6 Urea Formaldehyde Foam Insulation

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

### 2.7 Radioactive Materials

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

Ceramic tiles and some forms of granite sometimes contain radioactive materials. These materials should be checked prior to work being carried out on them to determine if radioactive materials are present.

Radon gas is a by-product of radioactive decay of certain naturally occurring radioactive materials. Structures with basements should be checked for the presence of radon gas.

### 2.8 Aboveground / Underground Storage Tanks

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

### 2.9 Lead

Lead is a hazardous substance and as such is regulated under the BC Occupational Health and Safety Regulation. Airborne exposure criteria, respirator requirements and mandatory worker testing requirements are also outlined under this regulation. As with all other designated substances, all personnel working around or with such materials must be made aware of their presence and be supplied with training in the potential health effects and means of avoiding exposures.

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

Most houses and structures built before 1950 have had lead-based paint applied to the interior or exterior surfaces. In most cases, lead paint of this era contained up to 40% lead by weight. Paints made between 1950 and 1978 typically contained smaller quantities of lead.
As leachable lead is a hazardous waste, disposal sites should be contacted in advance to ensure their willingness to accept the waste. Specialized sample preparation and analysis must be undertaken in order to determine if the lead is leachable. As a hazardous substance, transportation and disposal of this substance must be done in compliance with the federal Transportation of Dangerous Goods (TDG) Regulations and the BC Hazardous Waste Regulation.

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

### 2.10 Hantavirus – Rodent Droppings

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

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

### 2.11 Silica

Silica is a hazardous substance and as such is regulated under the BC Occupational Health and Safety Regulation. Airborne exposure criteria, respirator requirements and mandatory worker testing requirements are also outlined under this regulation. As with all other designated substances, all personnel working around or with such materials must be made aware of their presence and be supplied with training in the potential health effects and means of avoiding exposures.

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

Crystalline silica dust can cause a disabling, sometimes fatal disease called silicosis. The fine particles are deposited in the lungs, causing thickening and scarring of the lung tissue. The scar tissue restricts the lungs’ ability to extract oxygen from the air. This damage is permanent, but symptoms of the disease may not appear for many years.

Employers have a duty to protect their workers from silica dust exposure on construction projects. Studies show that when common construction work tasks involving the sanding, drilling, chipping, grinding, cutting, sawing, sweeping, and blasting of concrete and concrete products are conducted without using dust controls, workers are exposed to airborne silica concentrations at levels far above the occupational exposure limits.

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

### 2.12 Mould

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

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

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

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

### 2.13 Creosote Logs

‘Creosotes’ is a term most commonly used to describe a group of complex and variable mixtures made from the distillation of coal and containing more than 300 compounds (2). Creosotes derived in this way are often referred to as coal-tar creosotes and are used to protect wood from fungi, insects, and marine organisms.

In BC, creosote is regulated by the *Integrated Pest Management Act*, and the *Environmental Management Act*. Creosote treated logs can be disposed of at Hartland landfill.
3 FINDINGS & RECOMMENDATIONS

As per WorkSafeBC requirements, the structure was surveyed for the presence of several different types of hazardous materials including:

- Polychlorinated biphenyls
- Asbestos
- Mercury
- Arsenic
- Ozone Depleting Substances
- Urea formaldehyde foam insulation
- Radioactive Materials
- Above or Underground Storage Tanks
- Lead
- Hantavirus – rodent droppings
- Silica
- Mould
- Creosote Logs
- Other products and chemicals as applicable.

Copies of the analytical reports are provided in Appendix 1.

Photographs of materials are in Appendix 2.

Sample Locations are in Appendix 3.

3.1 Polychlorinated Biphenyls (PCB)

Fluorescent light fixtures were observed in the bridge mechanical room during the survey. Prior to demolition, any fluorescent light fixtures should be checked to ensure that ballasts do not contain PCB’s. If PCB’s are found to be present, the ballasts should be removed and disposed in accordance section 2.1 of this report.

Paints were not tested for PCB content.

3.2 Asbestos

3.2.1 Bulk Samples

All accessible areas of the structure in the way of planned work were inspected for the presence of structure materials suspected of containing asbestos and sampled where appropriate and analysed for the presence of asbestos fibres.

Bulk samples of structure materials suspected of containing asbestos were collected from a number of areas in the structure in accordance with WorkSafeBC requirements and analyzed to determine the type and approximate content of asbestos.

Asbestos was found in the following locations:

<table>
<thead>
<tr>
<th>Asbestos</th>
<th>Material and Location</th>
<th>Approximate Quantity</th>
<th>Risk Level for Abatement</th>
</tr>
</thead>
<tbody>
<tr>
<td>None Detected</td>
<td>– Potential presence in lift mechanism brake linings</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: any additional suspect materials encountered during demolition activities should be left undisturbed until testing determines the presence or absence of asbestos or other hazardous material. In the event they are damaged or otherwise impacted, all work shall stop until appropriate control can be put in place to protect workers and the public.
It is suspected that brake pads on the lift mechanism of the bridge may contain asbestos. These pads were not accessible for sampling. During demolition activities, these pads should be inspected and sampled for asbestos content.

### 3.3 Mercury

Mercury-containing thermostats were not observed in the way of planned work.

Mercury containing thermostats should be removed prior to demolition and be packaged for transport and storage or disposal/destruction at a licensed facility. Alternatively, if functional, these units could be re-used for its original intended purpose.

Mercury is also found in fluorescent light tubes. Caution should be exercised to ensure light tubes are not broken, releasing droplets of mercury.

### 3.4 Arsenic

Wood likely to have been preserved with arsenical pesticides was not observed in the way of planned work.

### 3.5 Ozone-depleting Substances (CFCs/ODS)

Equipment that may use chlorofluorocarbons (CFCs) or ozone-depleting substances (ODS) was not observed in the way of planned work.

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

### 3.6 Urea Formaldehyde Foam Insulation

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

### 3.7 Radioactive Materials

Smoke detectors containing sealed $^{241}$Americium sources were not observed in the way of planned work. Smoke detectors containing sealed $^{241}$Americium sources may be in the structure. Smoke detectors that may be removed during the planned work should be collected and disposed in accordance with Canadian Nuclear Safety Commission regulations.

### 3.8 Aboveground Storage Tanks

No aboveground tanks were observed near the areas of the subject site that where the planned work will be undertaken. The conducting of a Stage 1 Preliminary Site Investigation was beyond the scope of this report.

### 3.9 Lead

#### 3.9.1 Lead Paint

Bridge paint was found to contain lead (see appendix 2 for analytical results) Lead based, or containing paints were commonly used during the era of construction for these structures and all original surface coatings should be considered to be lead.
3.9.2 Elemental Lead

No sources of elemental lead were observed in the way of planned work. If lead materials are found they are typically recognized as having significant salvage value, disposal therefore should not be a major concern. Workers should exercise caution if heat is to be used to melt any lead found as means of facilitating its extraction. Molten lead can produce significant quantities of inhalable lead fume which can pose a severe health hazard. The BC Occupational Health and Safety Regulation requires that worker exposure to airborne lead be kept below 0.05 mg/m$^3$.

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

3.10 Hantavirus – Rodent Droppings

Rodent droppings were not observed in the way of planned work. If rodent droppings are encountered during demolition, then the Contractor should develop and follow a worker hantavirus program. The contractor must provide worker instruction on the hazards of rodent droppings and other biohazardous materials, including the types of respirators and protective clothing to be worn.

3.11 Silica

All concrete is suspected of containing silica in crystalline and non-crystalline forms. Many of the removal techniques (grinding, cutting, chipping etc) for these materials can generate high levels of crystalline silica in the air. Use wetting techniques and/or HEPA equipped extraction systems attached to drills and other power equipment where possible in order to decrease dust levels.

3.12 Mould

Mould was not observed in the way of planned work. If mould is encountered during demolition, work should stop and a risk assessment per WorkSafeBC Guidelines G4.79 (Moulds and indoor air quality) be conducted.

**Table 1: Guide for Removing Visible Mould Growth in the Indoor Environment**

<table>
<thead>
<tr>
<th>Extent of Visible and Hidden Mould Growth (surface area)</th>
<th>Minimum Recommended PPE</th>
<th>Control Measures to Prevent Dust or Spore Dispersion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small (Total surface area affected is less than 1 square metre (10 square feet))</td>
<td>N95 respirator or half facepiece respirator with HEPA filters, gloves, and goggles.</td>
<td>Isolation of the work area; wet wiping or misting of surfaces with water containing a surfactant (wetting agent); and the use of drop sheets to prevent dispersion of dust and spores. Material is removed with minimum of dust and spore dispersal and placed in a plastic bag and sealed.</td>
</tr>
<tr>
<td>Medium (Total surface area affected is between 1 square metre and 10 square metres (10 square feet to 100 square feet))</td>
<td>N95 respirator or half facepiece respirator with HEPA filters, gloves, disposable coveralls, and goggles.</td>
<td>Limited containment: use of polyethylene sheeting ceiling to floor around the affected area with a slit entry and covering flap. Maintain area under negative pressure with HEPA filtered negative air unit. Block supply and return air vents within the containment area.</td>
</tr>
<tr>
<td>Large (Total surface area is greater than 10 square metres (100 square feet) or the potential for increased occupant or remediator exposure during remediation is estimated to be significant.)</td>
<td>Full face piece or powered air purifying respirator (PAPR) with HEPA filters, gloves, disposable coveralls (covering head and boots), and goggles.</td>
<td>Full containment: use of critical barriers. Maintain area under negative pressure with HEPA filtered fan unit exhausted outside the structure. Block supply and return air vents within the containment area. Provide facilities and procedures for decontamination and personal hygiene.</td>
</tr>
</tbody>
</table>
3.13 Creosote Logs

Creosote logs were found on the dock to be demolished on the North West side of the Johnson Street Bridge.

Workers must take precautions to prevent skin exposure to creosote when removing these logs. These logs can be disposed of at Hartland Landfill.

3.14 WHMIS Controlled Products

Several WHMIS controlled products were detected including:

- Blue Grease HT
- Fluid Film Aerosol
- Graffiti Wipes
- High Traction Base
- Sulfuric Acid
- Brake Clean Aerosol
- Gasoline

These products should be re-used where possible or disposed of per manufacturer directions.
4 SUMMARY

Based on the previously stated findings, the recommendations are as summarized below:

1. Provide copies of this report to site personnel, including contractors. A copy of the survey must be immediately available at the site whenever workers are present.

2. The contractor shall have an exposure control plan in place for each hazardous substance identified in this report as being in way of the planned work.

3. Work must STOP if suspect materials are encountered during renovations and/or demolition activities. These suspect materials must be left undisturbed until testing determines the presence or absence of asbestos or other hazardous materials. In addition, work must also STOP in the event these suspect materials are disturbed inadvertently.

4. It is recommended that the brake linings in the mechanical room be investigated for the presence of asbestos when available.

5. Workers should use caution to avoid activities such as sanding or heat stripping of paints containing lead, arsenic or mercury since such activities can create airborne dusts and fumes in concentrations that may pose an inhalation hazard.

6. Each fluorescent light fixture removed during demolition should have the ballast checked to determine if it contains PCB. Ballasts containing PCB must be removed, sorted and transported to a licensed facility.

7. Mould was not observed in the structure. If encountered it must be removed as per WorkSafeBC 4.12: Table 1.

8. Workers should use caution to avoid creating airborne silica dust while removing concrete and stucco. Use wetting techniques and/or HEPA equipped extraction systems attached to drills and other power equipment where possible in order to decrease dust levels.

9. Remaining WHMIS controlled chemicals must be re-used elsewhere or disposed of per manufacturer & regulatory instructions.

10. Workers must take precautions to prevent skin exposure to creosote while removing creosote logs. Logs may be disposed of at Hartland landfill.
5 CLOSURE

This survey and assessment report has been prepared exclusively for the client and is intended to provide a delineation of the presence and condition of asbestos-containing materials and other hazardous materials as outlined in the report as observed on the date this survey was conducted. The conclusions and recommendations contained in this assessment report are based upon professional opinions with regard to the subject matter. These opinions are in accordance with accepted hygiene assessment standards and practices applicable to these locations and are subject to the following inherent limitations:

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

The data reported and the findings, observations and conclusions expressed in this report are limited by the Scope of Work. The Scope of Work was defined by the request of the client, the time and budgetary constraints imposed by the client, and availability of access to the properties. A stage 1 Preliminary Site Investigation was not part of our scope of work.

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

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

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Jason Smit, B.Sc., CIH, CRSP
Senior Occupational Hygienist

William (Bill) Sullivan
President
APPENDIX 1       Sample Report
North West Environmental Group Ltd.

Lead in Paint Chips by Flame AAS (SW 846 3050B* and 7000B)

Client: City of Victoria – Public Works
Site: Johnson Street Bridge

NW Project number: 15229

Monday, September 12, 2011

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Location</th>
<th>Date Analysed</th>
<th>Analyst</th>
<th>Description</th>
<th>Lead % (wt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15229–02</td>
<td>Traffic Bridge Span - Composite</td>
<td>August 3, 2011</td>
<td>EM</td>
<td>Paint Chips</td>
<td>15</td>
</tr>
<tr>
<td>15229-03</td>
<td>Rail Bridge Span - Composite</td>
<td>August 3, 2011</td>
<td>EM</td>
<td>Paint Chips</td>
<td>0.013</td>
</tr>
</tbody>
</table>

Note: When rendered airborne, dust from lead containing paint can pose an inhalation hazard to workers. Activities that can contribute to this airborne hazard include: sanding, burning, grinding, needle gunning, or any other dust producing procedure.

WorkSafeBC regulations specify that employers must develop and implement an exposure control plan where the worker are or may be exposed to airborne lead concentrations in excess of 50% of the exposure limit of 0.05 mg/m³ or where exposure through any route of entry could cause elevated blood levels.

Appropriate precautions for protecting workers from lead exposure should be implemented during any work involving lead or lead paint including, as appropriate, use of personal protective equipment for workers, localized ventilation and/or dust suppression methods.

Disposal of materials containing lead or lead paint must meet the Ministry of the Environment requirements. Waste must be tested using the “Toxicity Characteristic Leaching Procedure” to determine whether special disposal requirements apply.

North West Environmental Group Ltd. provided analytical services only for the samples submitted by the client and makes no representations regarding the representative nature of the sampling procedures employed by the individual collecting the samples. The client is solely responsible for the use and interpretation of these recommended action guidelines. North West Environmental Group Ltd. makes no express or implied warranties as to such use or interpretation. North West Environmental Group Ltd. are not able to make, and do not make, a determination as to the environmental soundness, safety or health of a work site from only the samples sent to their laboratory for analysis.

If you have any questions, please do not hesitate to contact us.

Best Regards

[Signature]

Jason Smit B.Sc., CIH, CRSP
Occupational Hygienist
North West Environmental Group
APPENDIX 2   Photographs
<table>
<thead>
<tr>
<th>Sample:</th>
<th>Unit/Location: Mechanical Room</th>
<th>Description: Break Shoe</th>
<th>Asbestos: No sample Collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample:</td>
<td>Unit/Location: Mechanical Room</td>
<td>Description: Bridge Drive Components</td>
<td>Asbestos:</td>
</tr>
<tr>
<td>Sample:</td>
<td>Unit/Location: Bridge Walkway</td>
<td>Description: Typical</td>
<td>Asbestos:</td>
</tr>
<tr>
<td>Sample:</td>
<td>Unit/Location: Dock on NW corner of Bridge</td>
<td>Description: Overview</td>
<td>Asbestos:</td>
</tr>
</tbody>
</table>