-FINAL-

DEMOLITION HAZARDOUS BUILDING MATERIALS ASSESSMENT AND INVENTORY BACALHAO ISLAND LIGHTSTATION BACALHAO ISLAND, NEWFOUNDLAND AND LABRADOR DFRP 01407

Submitted to:

Public Works and Government Services Canada
Environmental Services
The John Cabot Building
10 Barter's Hill, PO Box 4600
St. John's, NL
A1C 5T2

Submitted by:

AMEC Environment & Infrastructure
A Division of AMEC Americas Limited
133 Crosbie Road, PO Box 13216
St. John's, NL
A1B 4A5

February 2014

AMEC Project No. TF13076513

IMPORTANT NOTICE

This report was prepared exclusively for Public Works and Government Services Canada (PWGSC), Fisheries and Oceans Canada (DFO) and the Canadian Coast Guard (CCG) by AMEC Environment & Infrastructure, a Division of AMEC Americas Limited (AMEC). The quality of information, conclusions and estimates contained herein is consistent with the level of effort involved in AMEC's services and based on: i) information available at the time of preparation, ii) data supplied by outside sources and iii) the assumptions, conditions and qualifications set forth in this report. This report is for use by PWGSC and DFO only, subject to the terms and conditions of its contract with AMEC. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

SECTION 1.0 EXECUTIVE SUMMARY

AMEC Environment & Infrastructure, a division of AMEC Americas Limited (AMEC), was retained by Public Works and Government Services Canada (PWGSC), on behalf of the Canadian Coast Guard (CCG), Fisheries and Oceans Canada (DFO), to conduct a Hazardous Building Materials Assessment (HBMA) for the structures slated for demolition at the Bacalhao Island Lightstation located on Bachalhao Island, Newfoundland and Labrador (NL), herein referred to as the "Site". The demolition HBMA was requested as follow-up to a previous Hazardous Building Materials Survey (HBMS) completed by AMEC in March 2013.

The Site is a DFO Lightstation located on the southern end of Bacalhao Island, approximately 2 kilometers (km) northwest of Herring Islands and near the northern end of New World Island, in Notre Dame Bay, NL. The lightstation was established in 1894 and the fog alarm was installed in 1963. The Site is accessible by boat or helicopter. The Site is currently used as an active Lightstation with an automated light and fog horn. The Site is not staffed by DFO/CCG on a fulltime basis; DFO/CCG employees visit the Site on a regular basis for inspections and maintenance.

The Site buildings are currently located on three separate areas of the Site: the main area, the light tower area and the satellite solar array area. The main area contains a dwelling, a tramway storage shed, a helicopter pad, a videograph building, an equipment building, a fog horn and a 64 panel solar array. The light tower area contains a light tower with an attached shed, solar shed 1 and a seven (7) panel solar array. The satellite solar array area contains solar shed 2 and a 30 panel solar array. Structures no longer present at the Site include a lower landing area with a storage shed, landing deck, winch and concrete pad.

The objective of the previous HBMS and the current demolition HBMA and inventory was to identify the type and location of potential and confirmed hazardous building materials within the Site buildings.

This report is a compilation of the methodologies and findings of both the March 2013 HBMS and the current demolition HMBA and inventory for the Bacalhao Island Lightstation. For reporting purposes, the findings for the Site buildings and Site exterior are divided into separate sections within the report as follows:

Section	Report Outline	Site Area
1.0	Introduction	
2.0	Dwelling	Main Area
3.0	Equipment Building	Main Area
4.0	Tramway Storage Shed	Main Area
5.0	Videograph Building	Main Area
6.0	Light Tower	Light Tower Area
7.0	Solar Shed 1	Light Tower Area
8.0	Solar Shed 2	Satellite Solar Array Area
9.0	Site Exterior	All Areas
10.0	Closure and Limitations	

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

AMEC Environment & Infrastructure, a division of AMEC Americas Limited (AMEC), was retained by Public Works and Government Services Canada (PWGSC), on behalf of the Canadian Coast Guard (CCG), Fisheries and Oceans Canada (DFO), to conduct a Hazardous Building Materials Assessment (HBMA) for the structures slated for demolition at the Bacalhao Island Lightstation located on Bachalhao Island, Newfoundland and Labrador (NL), herein referred to as the "Site" (refer to Figures 1.1 and 1.2, Appendix A1 and Photos 1 to 6, Appendix B1). In addition to the demolition HBMA, an inventory of all items within the structures and around the Site was also required.

AMEC previously completed a Hazardous Building Materials Survey (HBMS) of the Bacalhao Island Lightstation in March 2013. The demolition HBMA was requested as follow-up to the March 2013 HBMS to provide PWGSC and DFO/CCG with an evaluation of known and potential hazardous building materials for structures at the Site that are slated for demolition.

1.1 SITE DESCRIPTION

The Site is a DFO Lightstation located on the southern end of Bacalhao Island, approximately 2 kilometers (km) northwest of Herring Islands and near the northern end of New World Island, in Notre Dame Bay, NL (refer to Figure 1.1, Appendix A1). The lightstation was established in 1894 and the fog alarm was installed in 1963. The Site is accessible by boat or helicopter. The Site is currently used as an active Lightstation with an automated light and fog horn. The Site is not staffed by DFO/CCG on a fulltime basis; DFO/CCG employees visit the Site on a regular basis for inspections and maintenance.

The Site buildings are currently located on three separate areas of the Site: the main area, the light tower area and the satellite solar array area (refer to Figure 1.2, Appendix A1). The main area contains a dwelling, a tramway storage shed, a helicopter pad, a videograph building, an equipment building, a fog horn and a 64 panel solar array (refer to Photos 1 and 2, Appendix B1). The light tower area contains a light tower with an attached shed, solar shed 1 and a seven (7) panel solar array (refer to Photos 3 and 4, Appendix B1). The satellite solar array area contains solar shed 2 and a 30 panel solar array (refer to Photo 5, Appendix B1). Structures no longer present at the Site include a lower landing area with a storage shed, landing deck, winch and concrete pad (refer to Figure 1.2, Appendix A1 and Photo 6, Appendix B1).

1.2 REPORT STRUCTURE

This report is a compilation of the methodologies and findings of both the March 2013 HBMS and the current demolition HMBA and inventory for the Bacalhao Island Lightstation. For reporting purposes, the findings for the Site buildings and Site exterior are divided into separate sections within the report as follows:

- Section 1.0: Introduction
- Section 2.0: Dwelling
- Section 3.0: Equipment Building
- Section 4.0: Tramway Storage Shed
- Section 5.0: Videograph Building
- Section 6.0: Light Tower
- Section 7.0: Solar Shed 1
- Section 8.0: Solar Shed 2
- Section 9.0: Site Exterior
- Section 10.0: Closure and Limitations

1.3 OBJECTIVES

The objective of the previous HBMS and the current demolition HBMA and inventory was to identify the type and location of potential and confirmed hazardous building materials within the Site buildings.

1.3.1 Scope of Work - Previous HBMS

The scope of work for the previous HBMS, as per AMEC Proposal Number P3884 (*Proposal for Professional Consulting Services, Hazardous Building Materials Survey, Seven Remote Light Station Properties, Bacalhao Island, NL*), included:

- Conducting a walk-through inspection of the Site buildings to identify the potential and/or actual presence of hazardous building materials including:
    - Asbestos-Containing Materials (ACMs)
    - Lead-based paint (LBP);
    - Mercury-based paint (MBP);
    - Polychlorinated Biphenyls (PCB) based paint;
    - Urea formaldehyde foam insulation (UFFI);
    - Sources of ozone depleting substances (ODSs); and
    - Other potentially hazardous building materials.
- Inspecting the Site buildings for evidence of areas that are impacted by suspected visible mould growth (SVG). If suspected mould is present, sampling and laboratory testing of the suspected mould growth to confirm the presence of mould.
- Sampling and laboratory testing of suspected ACMs to confirm the presence or absence of asbestos fibres.

- Sampling and laboratory testing of paint to determine the concentrations of lead, mercury and PCBs.
- Inspecting all thermostats to assess the presence/absence of mercury-containing switches.
- Inspecting all accessible fluorescent lights (if present) for PCB-containing light ballasts.
- Preparing a written report documenting the methodologies and findings of the HBMS.

The findings of the investigation were based on the interpretation of data from the areas investigated and analytical results pertaining to specific samples collected and tested. It is possible that materials exist that could not be reasonably identified within the scope of the work or which were not apparent or accessible during the Site visit. Intrusive cavity inspections to investigate the presence or absence of hazardous buildings materials were not performed.

1.3.2 Scope of Work – Demolition HBMA and Inventory

The scope of work for the demolition HBMA and inventory, as per AMEC Proposal Number P4100 (*Proposal for Professional Consulting Services, Demolition Hazardous Building Materials Assessment and Inventory, Bacalhao Island Lightstation (DFRP 01407), Bacalhao Island, NL*), included:

- Reviewing the HBMS previously completed at the Site to determine any data gaps and additional sampling requirements.
- Conducting a visual inspection of the Site and completing a detailed inventory to document all items within the structures and around the Site.
- Collecting detailed photographs and videos of structures and inventory items at the Site.
- Identifying any known hazards (i.e. dilapidated walkways or wharf structures; locations of suspected visible mould growth, etc.) observed at the Site and reporting these hazards to PWGSC upon completion of the Site visit.
- Obtaining access to any secured Site buildings and/or structures at the Site.
- Inspecting potentially hazardous building materials at the Site buildings (i.e., ACMs, LBP, MBP, PCB based paint, UFFI, ODSs, etc.).
- Documenting the location of any ODSs, Federal Halocarbons and petroleum storage tanks identified during the assessment.
- Performing intrusive cavity inspections to attempt to identify any hidden and potentially hazardous building materials that may be concealed by walls and/or ceiling systems.
- Sampling and laboratory testing of suspected hazardous materials (i.e., ACMs, LBP, MBP, PCB based paint, UFFI, etc.) identified through the data gap analysis.
- Inspecting all thermostats to assess the presence/absence of mercury-containing switches.
- Prior to leaving the Site, repairing and/or securing any entry points used during the Site assessment to access the Site buildings and/or structures at the Site.

- Preparing a written report documenting the methodologies and findings of the demolition HBMA as well as the findings of the previous HBMS.

The original scope of work included inspecting fluorescent lights (if present) for PCB–containing light ballasts; however, due to safety concerns at the time of the investigation the light ballast visual inspection was not performed.

Buildings/structures that were to be assessed as part of the demolition HBMA included:

Main Area

- Dwelling (Lightkeeper's Residence)
- Equipment Building
- Tramway Storage Shed and Tramway
- Various Timber Stairs/Walkways, Concrete Pads/Old Foundations and Wood Fencing

Light Tower Area

- Light Tower
- Concrete Foundations/Ruins

Lower Landing Area

- Winch and Spar and Boom
- Landing Deck, Platform and Stairs
- Storage Building Foundation/Ruins

Due to inclement weather conditions (i.e. fog bank) encountered at the time of the investigation and limited access (i.e. trail overgrown with vegetation) to the lower landing site, this area of the Bacalhao Island Lightstation was not accessed by AMEC.

The findings of the investigation were based on the interpretation of data from the areas investigated and analytical results pertaining to specific samples collected and tested. It is possible that materials exist that could not be reasonably identified within the scope of the work or which were not apparent or accessible during the Site visit.

1.4 ENVIRONMENTAL REGULATORY FRAMEWORK

The federal and provincial governments in Canada have prepared and/or adopted numerous acts (and amendments), regulations (and amendments), guidelines, policies, and procedures related to the protection of the environment and the investigation of sites containing hazardous building materials including the following:

- Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines
  - Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health
- CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products
- Canadian Environmental Protection Act (1999, C. 33)
  - PCB Waste Export Regulations (SOR/97-109)
  - PCB Regulations (SOR/2008-273)
  - Regulations Amending the PCB Regulations (SOR/2010-57)
  - Interprovincial Movement of Hazardous Waste Regulations (SOR/2002-301)
  - Federal Halocarbon Regulations (SOR/2003-289)
  - Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149)
  - Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197)
- Federal Hazardous Products Act (R.S., 1985, c. H-3)
  - Surface Coating Materials Regulations (SOR/2005-109)
  - Regulations Amending the Surface Coating Materials Regulations (SOR/2010-224)
- Federal Transportation of Dangerous Goods Act (1992, c. 34)
  - Transportation of Dangerous Goods Regulations (SOR/2012-245)
- Health Canada Guidelines for Canadian Drinking Water Quality (Summary Table, 2012)
- National Plumbing Code of Canada (National Research Council Canada)
- NL Environmental Protection Act (SNL2002 cE-14.2)
  - Storage of PCB Wastes Regulations (61/03)
  - Halocarbon Regulations (41/05)
- NL Dangerous Goods Transportation Act (RSNL1990 Chapter D-1)
  - Dangerous Goods Transportation Regulations (5/96)
- NL Department of Environment, Pollution Prevention Division, Guidance Document: Leachable Toxic Waste, Testing and Disposal (2003, GD-PPD-26.1)
- NL Department of Environment and Conservation, Guidance Document for the Management of Impacted Sites (2005, Version 1.01)
- NL Occupational Health and Safety Act (RSNL1990 Chapter O-3)
  - Occupational Health and Safety Regulations (5/12)
  - Asbestos Abatement Regulations (111/98)

AMEC has considered the above documents in conducting this HBMA.

1.4.1 Selection of Guidelines/Standards

Based on the past and projected future Site use activities, the Site is considered to be zoned commercial.

1.4.1.1 Asbestos-Containing Materials

Analytical results for asbestos in building materials were compared to the NL Asbestos Abatement Regulations (111/98) under the Occupational Health and Safety Act. Under these regulations, materials containing greater than 1% asbestos by dry weight are considered to be ACMs and should be managed in accordance with the applicable regulations.

1.4.1.2 Lead in Paint

Analytical results for lead in paint were compared to the current and former Federal Hazardous Products Act (HPA) criteria of 90 mg/kg and 5,000 mg/kg, respectively. Under the Act, the lead content limit was reduced from 5,000 mg/kg to 600 mg/kg in 2005 for surface coating materials used in or around the home or other premises where children may become exposed. In 2010, the lead content limit was further reduced from 600 mg/kg to 90 mg/kg.

In order to determine disposal options, should disposal be required, the former Federal HPA criterion of 5,000 mg/kg lead in paint is typically used as a Provincial disposal guideline to determine whether or not the paint chip samples would be submitted for leachate analysis. Paint chip samples that contain less than 5,000 mg/kg are not likely to be leachable and therefore may be disposed of at an approved landfill facility, pending landfill and regulatory approval. Paint samples with lead concentrations in excess of 5,000 mg/kg should be subjected to leachability testing. The NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1) guideline of 5.00 mg/L lead should be used to assess the results of the leachability testing to determine disposal options for any lead-containing paint to be removed during any disturbance, demolition or renovation activities at the Site buildings.

1.4.1.3 Mercury in Paint

Analytical results for mercury in paint were compared to the Federal HPA criterion. The maximum acceptable concentration of mercury in paint, under the HPA, is 0.001 percent (equivalent to 10 mg/kg) in or around the home or other premises where children or pregnant women may become exposed.

In order to determine disposal options, should disposal be required, concentrations of mercury in paint were also compared to the CCME Canadian Soil Quality Guidelines (CSQG) for mercury in soil at a commercial site (24 mg/kg). The CCME CSGQ for mercury in soil is typically used as a Provincial disposal guideline to determine whether or not the paint chip samples would be submitted for leachate analysis. Paint samples with a mercury concentration

of less than 24 mg/kg are not likely to be leachable and therefore may be disposed of at an approved landfill facility, pending landfill and regulatory approval. Paint samples with a mercury concentration exceeding 24 mg/kg should be subjected to leachability testing. The NL Department of Environment, 2003 Guidance Document for Leachable Toxic Waste, Testing and Disposal (GD-PPD-26.1) guideline of 0.10 mg/L mercury should be used to assess the results of the leachability testing to determine disposal options for any mercury-containing paint to be removed during any disturbance, demolition or renovation activities at the Site buildings.

1.4.1.4 PCBs in Paint

Analytical results for PCBs in paint were compared to the CCME CSQG of 33 mg/kg for PCBs in soil at a commercial site. The Federal HPA does not include any assessment criteria for PCBs in paint.

In order to determine disposal options, concentrations of PCBs in paint were also compared to the criterion for PCB solid (50 mg/kg) provided in the provincial guidance document for leachable toxic waste (GD-PPD-26.1) and the Federal Transportation of Dangerous Goods (TDG) Regulations.

1.4.1.5 Mould

There are currently no regulations specifically covering exposure to mould and/or mould remediation practices in Canada. In addition, there are no occupational exposure limits that define acceptable levels of mould exposure without adverse health effects. However, Sections 4 and 42 of the NL Occupational Health and Safety Act and Regulations, respectively, states that an employer shall ensure, where it is reasonably practicable, the health, safety and welfare of his or her workers and that an employer shall monitor the use or presence of substances at the workplace that may be hazardous to the health and safety of workers. This includes exposure to moulds and other biological matter. Two Canadian guidelines have recently been published that outline mould abatement. These documents were published by the Canadian Construction Association (CCA) and the Environmental Abatement Council of Ontario (EACO). Since there are no clear regulatory limits for determining an acceptable exposure limit to moulds, there is no numerical guideline for determining safe or unsafe concentrations of surface mould growth. Therefore, interpretation of sampling results is subjective. The guidelines listed below were used to evaluate the visual assessment and sampling results for mould:

- *"Mould Guidelines for the Canadian Construction Industry."* Canadian Construction Association, 2004.
- *"Mould Abatement Guidelines."* Environmental Abatement Council of Ontario (EACO), 2010.

1.5 METHODOLOGY

Site inspection and sampling for the investigations were conducted by AMEC personnel on November 27, 2012 (previous HBMS) and August 27 and 28, 2013 (demolition HBMA and inventory).

1.5.1 Asbestos Sampling and Laboratory Analytical Program

Building materials suspected of containing asbestos were sampled by removing a 2.0 cm by 2.0 cm piece of material (where possible) and placing the sampled materials into Glad® or Ziploc® plastic bags.

Bulk building material samples were submitted to the EMSL Analytical Inc. (EMSL) laboratory located in Mississauga, Ontario for the analysis of asbestos using Polarized Light Microscopy (PLM) with dispersion staining. The analysis was conducted in accordance with the United States Environmental Protection Agency (USEPA) Method EPA 600/R-93/116 (Method for the Determination of Asbestos in Bulk Building Materials). EMSL is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) and the American Industrial Hygiene Association (AIHA) for bulk asbestos fibre analysis by PLM.

1.5.2 Paint Sampling and Laboratory Analytical Program

Paint samples were collected from painted surfaces by cutting and scraping areas of flaking paint using clean knives and scrapers. Samples were collected down to bare substrate (e.g., drywall, concrete and wood). A minimum of five grams (where possible) of paint was obtained from each sampling location and stored in Glad® or Ziploc® plastic bags.

Paint samples were submitted to the Maxxam Analytics Inc. (Maxxam) laboratory located in Bedford, Nova Scotia for the analysis of lead, mercury and PCB content. The analysis was conducted in accordance with the EPA 6020A, method analysis for metals using inductively coupled plasma – mass spectrometry (ICP-MS). Based on the findings of the analytical program, paint samples were analyzed for lead and mercury leachate using the Toxicity Characteristic Leaching Program (TCLP), as required. Maxxam is accredited under the Standards Council of Canada (SCC) to perform analysis of lead and mercury in paint samples.

1.5.3 Inspection for Urea Formaldehyde Foam Insulation (UFFI)

According to the USEPA and the US Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR), formaldehyde is a colourless, pungent-smelling gas that is commonly used in some manufactured building materials and household products such as particleboard, medium density fibreboard, fibreglass, plywood, carpets, fabrics, urea-formaldehyde resins, paints, paper, fertilizer, food preservatives, antiseptics, medicines and cosmetics. These agencies also state, that as a by-product of combustion, formaldehyde may also be released to indoor air environments by means of un-vented wood and fuel-burning appliances and tobacco smoke. According to the Canada Mortgage and

Housing Corporation (CMHC), new carpets and composite wood products used in the present-day construction of buildings have the potential to increase the levels of formaldehyde in indoor air and are deemed to be the most likely sources of high formaldehyde levels in these newer and well-sealed buildings.

UFFI is a thermal insulation material that is pumped into interstitial spaces between the walls of buildings where it hardens to form a solid layer of insulation. UFFI is comprised of a cured mixture of urea-formaldehyde resin and compressed air. The sale and installation of UFFI was banned for health-related reasons in 1980 because of the formation of formaldehyde gas which is released from the UFFI to the building interior.

1.5.4 Inspection for Suspected Visible Mould Growth (SVG)

Mould spores are present in all indoor environments and cannot be completely eliminated. Cellulose based building materials provide a nutrient base for many mould species; however, mould cannot grow unless an adequate amount of excess moisture is present.

The focus of the visual inspection included, but was not limited to, searching for visible signs of water staining, water damage, excess moisture, and/or infiltration; and signs of SVG and/or staining. In this report, the term SVG refers to a smearable discoloration of surfaces differing from that of the natural substrate with observable fungal characteristics based on our experience evaluating similar building types. Bulk material samples were collected from areas of SVG to confirm the presence of mould growth.

Mould samples were collected by removing a 2.0 cm by 2.0 cm piece of material (where possible) from the area of SVG. The samples were stored in Glad® or Ziploc® plastic bags and labeled.

Suspected mould samples were submitted to EMC Scientific (EMC) laboratory located in Mississauga, Ontario for direct microscopic examination of mould to the genus level. EMC is an American Industrial Hygiene Association Environmental Microbiology Proficiency Analytical Testing (AIHA EMPAT) program participant.

1.5.5 Inspection of Thermostats for Mercury-Containing Switches

Thermostats identified within the Site buildings were visually inspected by removing the casings and checking for the presence of mercury-containing switches.

1.5.6 Inspection of Light Ballasts for PCBs

Light ballasts within accessible fluorescent light fixtures identified within the Site buildings were visually inspected during the previous HBMS for the presence or absence of PCB-containing dielectric fluid and condition by removing the light tubes and casings in the fixtures. The name of the manufacturer and manufacturer's code were recorded (where possible) and compared to Environment Canada's Environmental Protection Series Report (EPS 2/CC/2, August 1991).

The ballasts are classified as either non-PCB or potential-PCB.

1.5.7 Documentation of Potential Sources of ODSs and Halocarbons

Ozone depleting substances (ODSs) include any substances containing chlorofluorocarbon (CFC), hydrochlorofluorocarbon (HCFC), halon or any other material capable of destroying ozone in the atmosphere. ODSs have been used in rigid polyurethane foam and insulation, laminates, aerosols, air conditioners, freezers, chillers, fire extinguishers, cleaning solvents and for the sterilization of medical equipment. Federal regulations introduced in 1995 required the elimination of production and import of CFCs by January 1, 1996 (subject to certain essential uses) and a freeze on the production and import of HCFC-22 by January 1, 1996. These regulations also require the complete elimination of HCFC-22 by the year 2020. The NL Halocarbon Regulations (dated May 2005) required the elimination of halon in portable fire extinguishers effective June 1, 2005 and the elimination of halon in fire extinguishing systems by January 1, 2010.

Potential sources of ODSs identified within the Site buildings were documented during the Site investigation.

1.5.8 Documentation of On-Site Petroleum Storage Tanks

During the Site inspection, petroleum storage tanks were observed and documented.

1.5.9 Documentation of Other Potentially Hazardous Building Materials

During the Site inspection, other potentially hazardous building materials (e.g. mercury in lighting devices, lead in plumbing and/or batteries, silica in cementitious building materials, contaminants in chimney ash, etc.) were observed or suspected and documented.

1.5.10 Quality Assurance/Quality Control (QA/QC) Program

Laboratory blanks and Quality Control (QC) standard samples were analyzed to assess the reliability of the paint analyses. In order to minimize cross contamination during sampling, a field Quality Assurance/Quality Control (QA/QC) program was followed, which included the following measures:

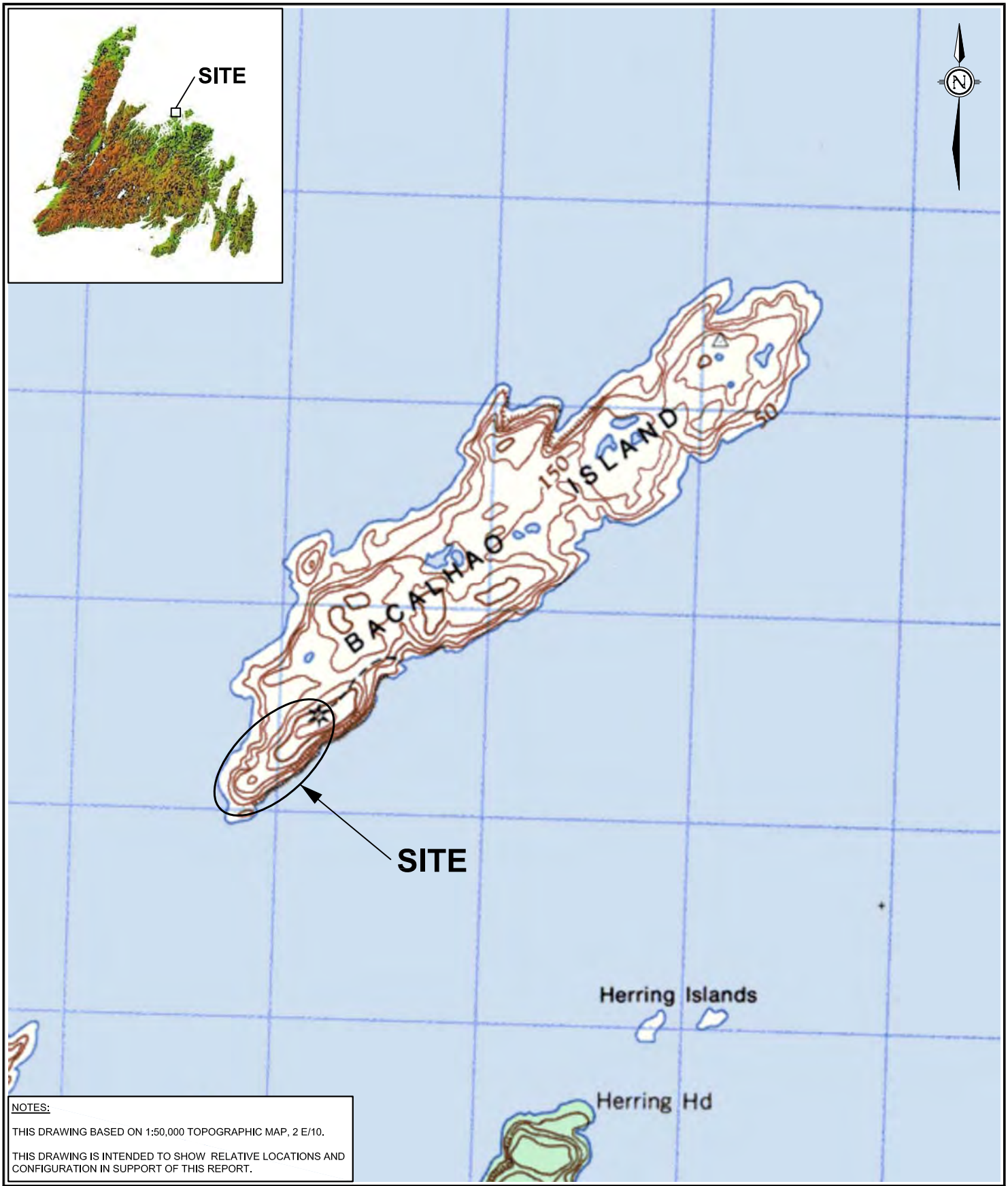
- Latex or nitrile gloves were worn during all sampling (new pair of gloves for each sample);
- All sampling equipment was thoroughly cleaned prior to sampling to ensure that samples were unaffected by cross-contamination from previous samples; and
- Each sample was photographed, given a unique sample ID and logged onto a chain of custody form before shipment to the laboratory.

The laboratories utilized have extensive QA/QC programs in place to ensure that reliable results are consistently obtained. Specific laboratory QA/QC measures include:

- Chain of Custody and sample integrity inspection;
- Strict documentation control and files;
- Trained personnel prepare and analyze samples according to Standard Operating Procedures;
- All analytical methods are based on accepted procedures and are fully validated prior to use;
- Precision is monitored by performing replicate analysis of samples;
- Accuracy is verified by analyzing spiked samples and reference materials;
- Instrument calibration integrity is ensured by analyzing calibration check standards within each run sequence;
- Extensive use is made of reference material for routine procedure evaluation;
- Highest available purity analytical standards;
- Predefined analytical sequences ensure all results are traceable to calibration and QC data;
- Hard copy reports displaying all of the required data are generated for each instrument;
- Analytical results are determined only from instrument responses that fall within the calibration range;
- Acceptable QC performance must be demonstrated prior to data authorization;
- On-going method and instrument performance records are maintained for all analysis; and,
- A full-time QA Scientist evaluates the QA program on an on-going basis.

APPENDIX A1

FIGURES



NOTES:

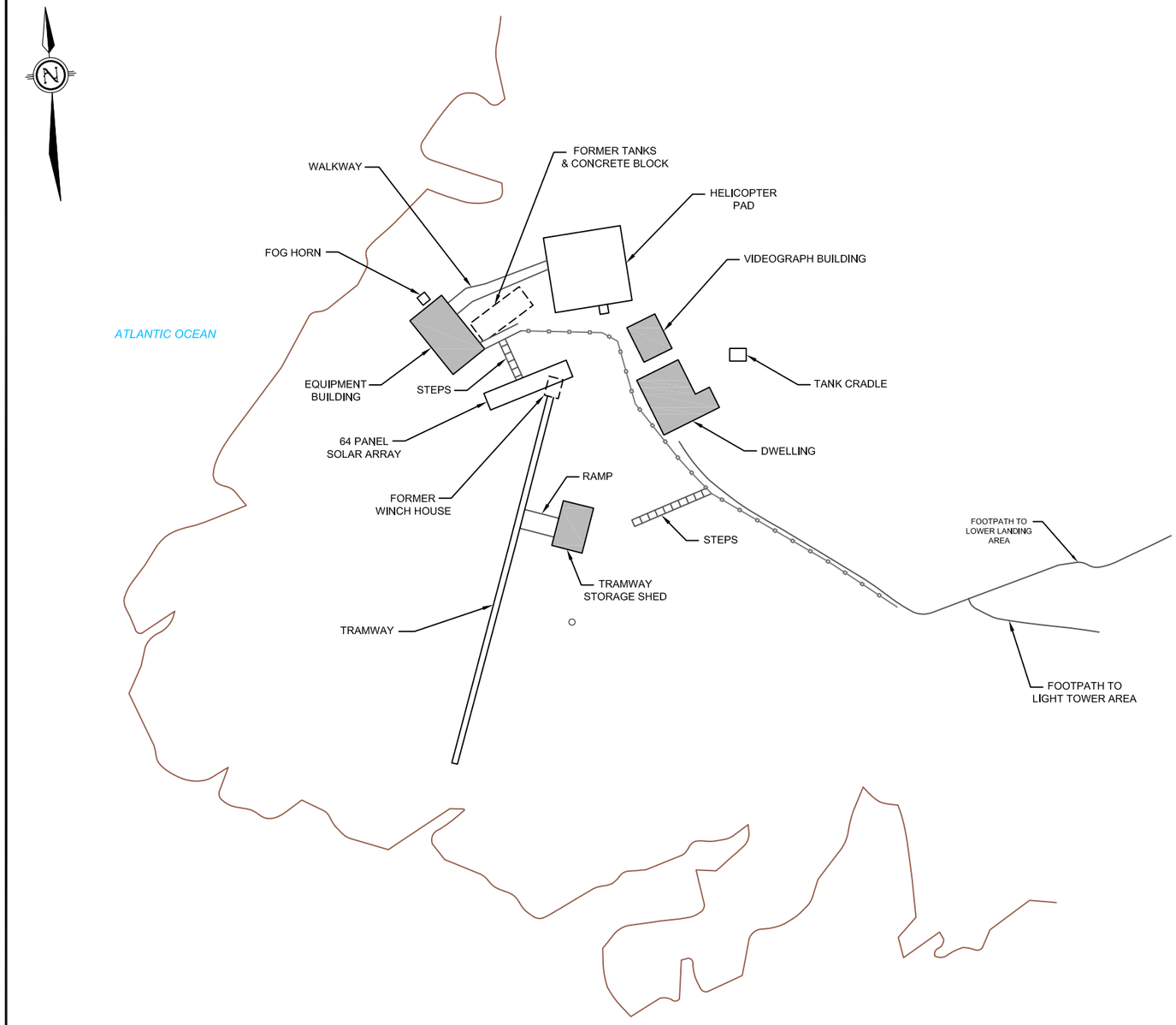
THIS DRAWING BASED ON 1:50,000 TOPOGRAPHIC MAP, 2 E/10.

THIS DRAWING IS INTENDED TO SHOW RELATIVE LOCATIONS AND CONFIGURATION IN SUPPORT OF THIS REPORT.

amec

Public Works and Government Services Canada | Travaux publics et Services gouvernementaux Canada

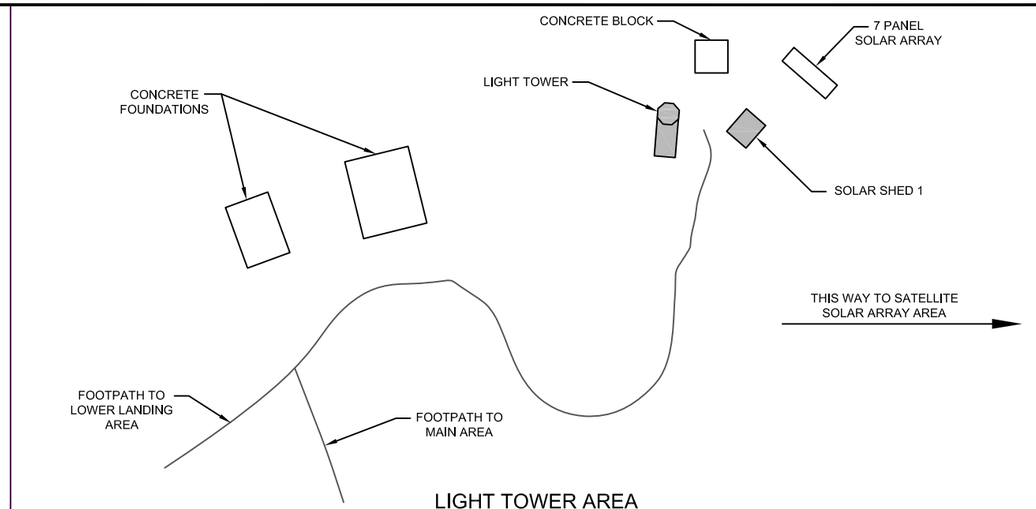
Date: February 2014	Project: DEMOLITION HAZARDOUS BUILDING MATERIALS ASSESSMENT AND INVENTORY, BACALHAO ISLAND LIGHTSTATION, BACALHAO ISLAND, NL		
Drawn by: H. Ryan	Title: SITE LOCATION PLAN		
Approved by: L. Wiseman	Scale: 1:25,000	Project No.: TF13076513	Figure No.: 1.1



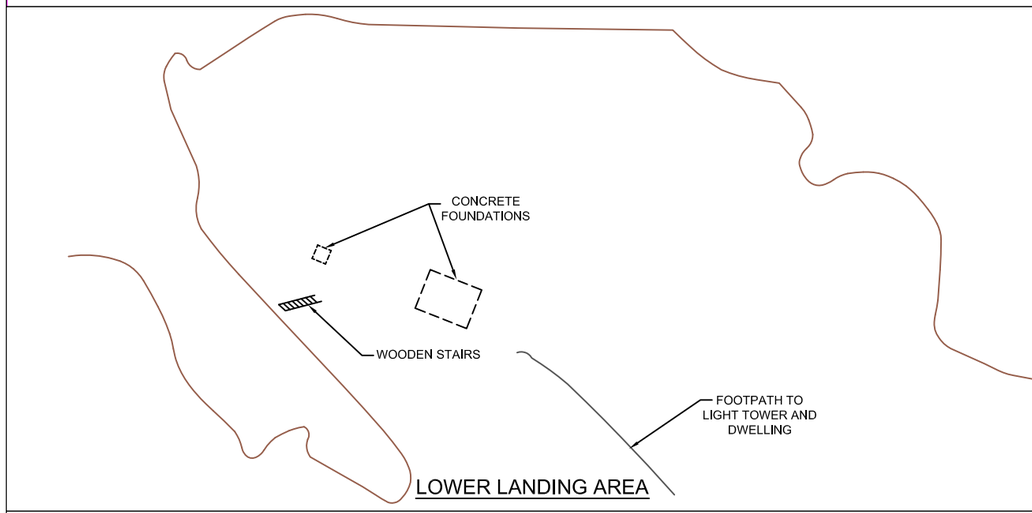
MAIN AREA

LEGEND:

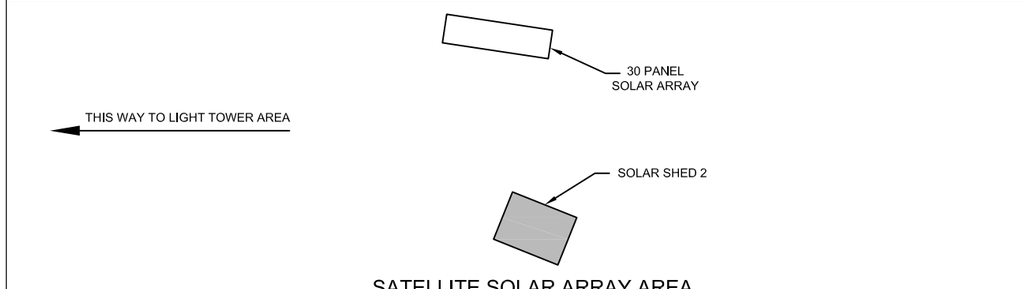
- APPROXIMATE SHORELINE
- BUILDING
- FORMER BUILDING OR STRUCTURE



LIGHT TOWER AREA



LOWER LANDING AREA



SATELLITE SOLAR ARRAY AREA

NOTE:

1. ALL DIMENSIONS ARE IN METRES.
2. DO NOT SCALE FROM FIGURE.
3. THIS FIGURE IS INTENDED TO SHOW RELATIVE LOCATIONS AND CONFIGURATION OF THE STUDY AREA IN SUPPORT OF THIS REPORT.
4. ALL LOCATIONS, DIMENSIONS, AND ORIENTATIONS ARE APPROXIMATE.
5. THIS FIGURE SHOULD NOT BE USED FOR PURPOSES OTHER THAN THOSE OUTLINED ABOVE.
6. THIS FIGURE CONTAINS INTELLECTUAL PROPERTY OF PUBLIC WORKS AND GOVERNMENT SERVICES CANADA AND MAY NOT BE REPRODUCED OR COPIED WITHOUT THEIR WRITTEN CONSENT.
7. THIS FIGURE WAS PRODUCED FROM FIGURES SUPPLIED BY PUBLIC WORKS AND GOVERNMENT SERVICES CANADA.

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

AMEC Environment & Infrastructure
133 Crosbie Road
St. John's, NL
A1B 4A5
709-722-7023

DWN BY: H. Ryan
CHK'D BY: L. Wiseman
SCALE: NTS

PROJECT: DEMOLITION HAZARDOUS BUILDING MATERIALS ASSESSMENT AND INVENTORY, BACALHAO ISLAND LIGHTSTATION BACALHAO ISLAND, NL

TITLE: SITE PLAN

DATE: February 2014
PROJECT No.: TF13076513
REV. No.: 0
FIGURE No.: 1.2

APPENDIX B1

PHOTOGRAPHIC RECORD

Photo 1: Aerial view of main area of Bacalhao Island Lightstation (Aug. 2013).

Photo 2: Aerial view of main area of Bacalhao Island Lightstation (Aug. 2013).

Photo 3: Aerial view of light tower area of Bacalhao Island Lightstation (Aug. 2013).

Photo 4: Aerial view of light tower area of Bacalhao Island Lightstation (Aug. 2013).

Photo 5: Aerial view of satellite solar array area (Nov. 2012).

Photo 6: Aerial view of lower landing area (Nov. 2012).