

Small Craft Harbours
Basin and Channel Redredging
Pleasant Bay
Inverness County, Nova Scotia

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APPENDIX A - Marine Sediment Sampling Program, Pleasant Bay
Small Craft Harbour, Pleasant Bay, Nova Scotia
Final Report - October 2014

Small Craft Harbours
Basin and Channel Redredging
Pleasant Bay
Inverness County, Nova Scotia

List of Drawings

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PART 1 - GENERAL

- 1.1 Scope .1 The work covered under this contract consists of the furnishing of all plant, labour, equipment and material for basin and channel redredging at Pleasant Bay, Inverness County, Nova Scotia, in accordance with specifications and accompanying drawings and subject to all terms and conditions of contract.
- 1.2 Site Examination .1 All parties tendering should visit the site of the work prior to submission of tenders and make themselves thoroughly acquainted with site conditions, conditions of existing objects to be removed, tides, degree of exposure and all information necessary for the proper carrying out of the work covered by the drawings and this Specification. Submission of Tender will be deemed that Contractor is conversant with site conditions.
- .2 The *Departmental Representative* will give no consideration whatsoever to any claim by the Contractor resulting from failure to have made all the necessary investigations prior to tendering.
- 1.3 Documents Required .1 Maintain at job site, one copy each of following:
- .1 Contract drawings;
 - .2 Specifications;
 - .3 Addenda;
 - .4 Reviewed shop drawings/submissions;
 - .5 Change orders;
 - .6 Other modifications to Contract;
 - .7 Field test reports;
 - .8 Copy of approved work schedule; and
 - .9 Manufacturer's installation and application instructions.
- 1.4 Work Schedule and Completion Dates .1 All work must be completed by December 30, 2019.

- .2 Prepare and submit to the *Departmental Representative* within 5 days of notification of Contract award, one copy of the construction schedule in the form of a bar chart showing the dates for commencement and completion of each major activity of the work, including the work of subcontractors; dates for submissions, review and return of shop drawings, etc.; the dates of Substantial and Final Completion; and intended man hours of labour and equipment for each major item of work. If the schedule as submitted is unacceptable in any way, submit without delay a revised schedule satisfactory to the *Departmental Representative*.
- .3 The *Departmental Representative* is to notify the Contractor in writing of acceptance of the Construction Schedule. Comply with the Construction Schedule at all times. If, for any reason, the Construction Schedule is not followed, immediately notify the *Departmental Representative* of the change and submit a revised schedule for acceptance. Upon written acceptance by the *Departmental Representative*, this schedule will become the Construction Schedule.
- .4 Whenever required, give further written particulars concerning this schedule. The submission to and acceptance by the *Departmental Representative* of the Contractor's Construction Schedule or the furnishing of details and particulars thereto will not relieve the Contractor of any duties and responsibilities under the Contract.
- 1.5 Measurement Responsibilities .1 Notify *Departmental Representative* sufficiently in advance of operations to permit required measurements for payment purposes.

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- 1.6 Contractor's Use of Site
- .1 The Contractor will not be permitted to use any existing wharf structures at the harbour for loading or offloading equipment or as a platform for loading or offloading dredge material.
 - .2 Co-operate with users of existing facilities. Should interference's occur, take directions from *Departmental Representative*.
 - .3 Do not unreasonably encumber site with materials or equipment.
 - .4 Move stored products or equipment which interfere with operations of *Departmental Representative* or other Contractors.
 - .5 Obtain and pay for use of additional storage or work areas needed for operations.
 - .6 Comply with all regulations and authorities having jurisdiction over the work, whether on land or on water.
 - .7 Ensure no damage occurs to existing structures as a result of operations. Any said damage will be repaired at Contractor's expense.
 - .8 Provide temporary barriers and warning signs in location where work is adjacent to areas used by public.
- 1.7 Codes and Standards
- .1 Perform work in accordance with National Building Code of Canada (NBC) and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements will apply.
 - .2 Meet or exceed requirements of specified standards, codes and referenced documents. When a standard or code is outdated, the latest edition will supersede the referenced date.

- .3 Observe and enforce construction safety measures by Canadian Construction Safety Code and Construction Safety Code of Nova Scotia. In the event of conflict between any provisions of above authorities the most stringent provision will apply.
- 1.8 Project Meetings .1 *Departmental Representative* will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.
- 1.9 Setting Out of Work .1 Do all detail surveys necessary for the work, including locating and maintaining working points, and establishing lines and elevations. Perform all layout work, and carefully preserve benchmarks, reference points and stakes.
- .2 Provide such masts, scaffolds, batter boards, lines, straight edges, templates and other devices as may be necessary to facilitate layout, construction and inspection of the work. Whenever necessary, suspend work for such reasonable time as may be necessary to permit the *Departmental Representative* to check or inspect any portion of the Work. The Contractor will not be allowed any extra compensation or time for completion because of this suspension of work.
- .3 Elevations for the various grades and features of the specified works to be referenced and properly related to a benchmark, which will be approved by the *Departmental Representative*.
- .4 Verify all grades, lines, levels, and dimensions shown on the drawings and report any errors or inconsistencies to the *Departmental Representative* before commencing work. Provide and maintain well-built batterboards at all points to facilitate the progress of the work. Establish all other grades, lines, levels required to facilitate the work.

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- 1.9 Existing Services
- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to pedestrian and vehicular traffic.
 - .2 Before commencing work, establish location and extent of service lines in area of work and notify *Departmental Representative* of findings.
 - .3 Submit schedule to and obtain acceptance from *Departmental Representative* for any shut down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
 - .4 Where unknown services are encountered, immediately advise *Departmental Representative* and confirm findings in writing.
- 1.10 Contract Documents
- .1 Contract Drawings:
 - .1 The drawings for the Work consist of all drawings listed in these "Plans And Specifications" and any additional drawings issued at a later date by the *Departmental Representative*.
 - .2 *Departmental Representative* may furnish additional drawings to assist in proper execution of work. These drawings will be issued for clarification only. Such drawings will have same meaning and intent as if they were included with plans referred to in Contract Documents.
 - .3 The drawings indicate the extent and general dimensions of the work. Make all necessary measurements to ensure that the result of the work is in accordance with the intent.
 - .4 Verify all existing conditions in field prior to proceeding with work.

- .2 Contract Specifications:
 - .1 The general requirements and technical specifications are written solely for the General Contractor. They are organized into the NMS format of separate divisions and sections.
 - .2 Specification language is of the 'Short Form type' for example, where the word "provide" occurs, interpret it to mean "the Contractor shall furnish all labour, material and equipment necessary to complete the work".
 - .3 This Specification and accompanying drawings are intended to describe and provide for a finished project. They are intended to be complementary, and what is called for by either will be as binding as if called for by both. The Contractor shall understand that the work herein described will be complete in every detail, notwithstanding that every item necessarily involved is not particularly mentioned, and Contractor will be held to provide all labour, materials and equipment necessary for the entire completion of the work and will not avail himself of any errors or omissions.

- 1.11 Permits and Regulations
 - .1 All federal and provincial permits and approvals under the Fisheries Act, Navigation Protection Act and Beaches Act required for the work are obtained by Fisheries and Oceans Canada.
 - .2 Comply with all by-laws, ordinances and regulations of all authorities having jurisdiction.
 - .3 Pay for any Municipal permits.

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- 1.12 Record of Construction
- .1 As work progresses, maintain accurate records to show all deviations from the contract drawings, with particular reference to work which will be concealed. Prior to the inspection of the work for the issuance of the Final Certificate of Completion, provide the *Departmental Representative* with one set of white prints of the drawings with all deviations shown neatly thereon and an electronic version in Autocad.
 - .2 Provide "as built" cross sections of any excavation, or fill work.
- 1.13 Payment
- .1 Payment for all work under this contract to be according to the Contract.
 - .2 No separate payment will be made for work specified under any sections of Specification under Division 01. The cost of this work is to be considered as overhead and to be included in the lump sum of the Contract.
 - .3 Dimensional changes as directed by the *Departmental Representative* to suit existing conditions, but not resulting in additional work or materials, will not be considered as extra to the Contract.
- 1.15 Maintenance of Shipping
- .1 Liaise with the local port officials to coordinate activities such that any interference is minimized.
- 1.16 Cooperation & Assistance to Departmental Representative
- .1 Co-operate with *Departmental Representative* on inspection of work.
 - .2 Provide assistance when requested.
 - .3 Provide small motor boat with operator and sounding chain for *Departmental Representative's* use when requested.
- 1.17 Datum
- .1 The datum referred to in this Specification is Chart Datum. Chart Datum is, by International Agreement a plane

below which the tide will seldom fall. The Canadian Hydrographic Service has adopted the plane of the lowest normal tide (L.N.T.) as Chart Datum. As the rise, fall, and range of tides varies daily, the Canadian Tide and Current Tables, as issued by the Canadian Hydrographic Service, should be consulted for tidal predictions and other tidal information relating to the work.

- .2 Datum used for this project is PWC Bench Mark TPM at elevation +3.304 m above Chart Datum (top of concrete wheelguard) as indicated on the Site Plan.
- 1.18 Contractor's Representative
 - .1 Continuously maintain on the site an authorized representative to whom communication may be addressed and who will be competent to speak for the Contractor in discussing work methods.
- 1.19 Workers Compensation
 - .1 Contractor and all sub-contractors must be registered under the Workers Compensation Act and provide evidence of good standing.
 - .2 At completion of Contract and before final payment is made, the Contractor will present to the *Departmental Representative* a Letter of Certification from the Workers Compensation Board, showing that all required assessments are paid in connection with all trades.
- 1.20 Laws, Standards Taxes and Fees
 - .1 Comply with all laws and standards governing all or any part of the work, pay all applicable taxes and pay for all permits and certificates required in respect of the execution of the work. Where variances exist between the requirements of agencies governing all or any part of the work, the most restrictive will govern, but in no instance will the standards established by the drawings and this Specification, which exceed such requirements, be reduced.

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| 1.21 | <u>Protection and Repair</u> | .1 | Take appropriate measures to protect exiting infrastructure and services. |
| | | .2 | Do not operate tracked equipment on concrete surfaces without suitable protection. |
| | | .3 | Repair any damage resulting from operations under this contract. |
| 1.22 | <u>Location of Equipment and Fixtures</u> | .1 | Location of equipment, fixtures or any appurtenances indicated are to be considered approximate. |
| 1.23 | <u>Inspection and Testing</u> | .1 | The <i>Departmental Representative</i> may employ an Inspector and/or Testing Company to ensure work conforms with contract. |
| 1.24 | <u>Disposal of Debris</u> | .1 | Debris, including construction materials not incorporated in the work, oil products and containers, and other materials of this nature will be disposed of in suitable locations off the site. This includes costs of disposing of contaminated materials such as creosote treated timber. Disposal is the responsibility of the Contractor. |
| | | .2 | Material from the work will not be permitted to go adrift or otherwise become a menace to navigation. |
| 1.25 | <u>Existing Soils Condition</u> | .1 | Any information pertaining to soils and all boreholes logs are furnished by the <i>Departmental Representative</i> as a matter of general information only and borehole descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those described by the boreholes themselves. |
| 1.26 | <u>Relics and Antiquities</u> | .1 | Protect relics, antiquities, items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during course of work. |

- .2 Give immediate notice to *Departmental Representative* and await written instructions before proceeding with work in this area.
- .3 Relics, antiquities and items of historical or scientific interest remain Her Majesty's property.
- 1.27 Temporary
Navigation Buoy
- .1 The Contractor is to maintain temporary buoys as required to mark any obstructions as construction proceeds. All buoys are to meet the requirements of Canadian Coast Guard Standard TP968 and be equipped with radar reflectors.
<http://www.ccg-gcc.gc.ca/folios/00020/docs/CanadianAidsNavigationSystem2011-eng.pdf>
- .2 The Contractor shall coordinate the buoy installation with the local harbour authority.
- .3 The Contractor is responsible for all costs associated with the supply, installation and removal of all temporary navigational buoys.

-----END of SECTION-----

PART 1 - PROJECT PARTICULARS

- 1.1 Description of Work .1 In general, the work under this contract includes but will not necessarily be limited to:
- .1 Construction of an engineered containment cell.
 - .2 Dredging of the basin and channel to the grades and limits indicated on the plan and disposal of dredge material into containment cell.

Part 2 - PROJECT MEASUREMENT

- 2.1 General .1 The unit and lump sum prices for all items herein shall be full compensation for the work of the Item and shall include the cost of furnishing all labour, materials, tools, construction utilities and equipment necessary to complete the work in accordance with the Contract, Drawings and Specifications, and shall cover all costs of surety, management, supervision, labour, materials, plant and services, security provisions, and all operations and allowances customary and necessary to complete each item and the Contract as a whole notwithstanding the fact that not every such necessary operation is mentioned or included specifically for measurement.
- 2.2 Measurement for Payment .1 **LUMP SUM ITEMS: The following items are to be measured separately for costing purposes,**

Division 1

Departmental Representative's Site Office:
All work associated with the supply, maintenance, and removal from site of the *Departmental Representative's site office* per Section 01 51 00 of the Specification will constitute a lump sum for measurement

purposes.

Mobilization and Demobilization of construction equipment to and from the site will be measured for payment by the lump sum.

Division 31

Sitework, Demolition, and Removals will be measured for payment by the lump sum.

Division 35

Designated Disposal Site: All costs associated with the designated disposal site including site preparation, berm construction using insitu and/or imported materials, access road preparation, access road maintenance, and access road reinstatement following completion of the work will be measured for payment by the lump sum

- .2 UNIT PRICE ITEMS: The following items outline the unit of measurement for unit price items as indicated in the tender documents:**

Division 35

Dredging of Class "B" material from basin and channel will be measured for payment by the cubic meter place measurement (cmpm) of material removed. The method of calculation and the quantity of material removed from measurement for payment will be determined by the Departmental Representative.

-----END of SECTION-----

PART 1 - GENERAL

1.1 General

- .1 Submit to *Departmental Representative*, for review, shop drawings, product data, samples and other information specified.
- .2 Until submission is reviewed, work involving relevant product may not proceed.

1.2 Shop Drawings

- .1 Drawings to be originals prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate appropriate portion of work; showing fabrication, layout, setting or erection details as specified in appropriate Sections.
- .2 Identify details by reference to sheet and detail numbers shown on Contract Drawings.
- .3 Maximum sheet size 860 X 1120 mm.
- .4 Reproductions for submissions: opaque diazo prints.

1.3 Product Data

- .1 Certain Specification Sections specify that manufacturer's standard schematic drawings, catalogue sheets, diagrams schedules, performance charts, illustrations and other standard descriptive data will be accepted in lieu of shop drawings.

1.4 Samples

- .1 Submit samples in sizes and quantities specified.
- .2 Construct field samples and mock-ups at locations acceptable to *Departmental Representative*.
- .3 Accepted samples will become standards of workmanship and material against which, installed work will be checked on project.

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- 1.5 Miscellaneous Data .1 Provide certificates, methodologies, designs and test results as required.
- 1.6 Coordination of Submissions .1 Review shop drawings, product data, samples and miscellaneous data prior to submission.
- .2 Verify:
.1 Field Measurements;
.2 Field Construction Criteria; and
.3 Catalogue numbers and similar data.
- .3 Coordinate each submission with requirements of work and Contract documents. Individual submissions will not be reviewed until all related information is available.
- .4 Contractor's responsibility for errors and omissions in submission is not relieved by *Departmental Representative's* review of submissions.
- .5 Contractor's responsibility for deviations in submission from requirements in Contract documents is not relieved by *Departmental Representative's* review of submission, unless *Departmental Representative* gives written acceptance of specified deviations.
- .6 Notify *Departmental Representative*, in writing at time of submission, of deviations from requirements of Contract documents stating reasons for deviations.
- .7 After *Departmental Representative's* review, distribute copies.
- 1.7 Submission Requirements .1 Schedule submissions at least 14 days before dates reviewed submissions will be needed.
- .2 Submit number of copies of shop drawings, product data which Contractor requires

for distribution, plus 2 copies which will be retained by *Departmental Representative*.

- .3 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample submitted.
 - .5 Other pertinent data.

- .4 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Contractor
 - .2 Sub-Contractor
 - .3 Supplier
 - .4 Manufacturer
 - .5 Separate detailer when pertinent
 - .4 Identification of product or material.
 - .5 Relation to adjacent structure or materials.
 - .6 Field dimensions, clearly identified as such.
 - .7 Specification Section Number.
 - .8 Applicable standards, such as CSA or CGSB numbers.
 - .9 Contractor's stamp, initialled or signed, certifying review of submission, verification of field measurements and compliance with Contract documents.

1.8 Shop Drawings
Review

- .1 The review of shop drawings by Fisheries and Oceans Canada or its authorized consultant is for the sole purpose of ascertaining conformance with the general concept. This review shall not mean that Public Works and Government Services Canada approves the detail design inherent in the shop drawings,

responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and contract documents. Without restricting the generality of the foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of the work of all sub-trades.

1.9 Other Reviews

- .1 As for shop drawings above, other reviews are for the sole purpose of ascertaining conformance with the general concept.

-----END of SECTION-----

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- 1.1 Related Work
 - .1 Section 01 35 24: Special Procedures on Fire Safety Requirements

 - 1.2 Definitions
 - .1 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

 - .2 Competent Person: means a person who is:
 - .1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;
 - .2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;
 - .3 Knowledgeable about potential or actual danger to health or safety associated with the Work.

 - .3 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.

 - .4 PPE: Personal Protective Equipment

 - .5 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.

 - 1.3 Submittals
 - .1 Make submittals in accordance with Section 01 33 00.

 - .2 Submit site-specific Health and Safety Plan prior to commencement of Work.
 - .1 Submit within 5 work days of notification of Bid Acceptance. Provide 2 copies.
 - .2 *Departmental Representative* will review Health and Safety Plan and

- provide comments.
- .3 Revise the Plan as appropriate and resubmit within 5 work days after receipt of comments.
- .4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.
- .5 Submit revisions and updates made to the Plan during the course of Work.
- .3 Submit name of designated Health & Safety Site Representative and support documentation specified in the Safety Plan.
- .4 Submit compliance certificates and other permits obtained.
- .5 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other department of labour organization.
 - .1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.
- .6 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .7 Submit copies of incident reports.
- .8 Submit WHMIS MSDS - Material Safety Data Sheets.
- 1.4 Compliance Requirements
 - .1 Comply with Occupational Health and Safety Act for Province of Nova Scotia, and Regulations made pursuant to the Act.
 - .2 Comply with Canada Labour Code - Part II (entitled Occupational Health and Safety) and the Canada Occupational Health and Safety Regulations (COSH) as well as any

other regulations made pursuant to the Act.

- .1 The Canada Labour Code can be viewed at: <http://laws-lois.justice.gc.ca/eng/>
- .2 COSH can be viewed at: <http://laws-lois.justice.gc.ca/eng/regulations/SOR-86-304/index.html>
- .3 A copy may be obtained at: Canadian Government Publishing Public Works & Government Services Canada
Ottawa, Ontario, K1A 0S9 Tel: (819) 956-4800 (1-800-635-7943)
Publication No. L31-85/2000 E or F)
- .3 Treasury Board of Canada Secretariat (TBS):
 - .1 Treasury Board, Fire Protection Standard April 1, 2010
www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=17316§ion=text
- .4 Canadian Standards Association (CSA):
 - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .5 Observe construction safety measures of:
 - .1 Part 8 of National Building Code
 - .2 Municipal by-laws and ordinances.
- .6 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.
- .7 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.
- .8 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

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- 1.5 Responsibility
- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons and environment adjacent to the site to extent that they may be affected by conduct of Work.
 - .2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.
- 1.6 Site Control and Access
- .1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.
 - .1 Departmental Representative will provide names of those persons authorized by Departmental Representative to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.
 - .2 Isolate Work Site from other areas of the premises by use of appropriate means.
 - .1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment.
 - .2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.

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- 1.10 Hazard Assessments
- .1 Perform site-specific health and safety hazard assessment of the Work and its site.
 - .2 Carryout initial assessment prior to commencement of Work with further assessments as needed during progress of work, including when new trades and subcontractors arrive on site.
 - .3 Record results and address in Health and Safety Plan.
 - .4 Keep documentation on site for entire duration of the Work.
- 1.11 Project/Site Conditions
- .1 Following are potential health, environmental and safety hazards at the site for which Work may involve contact with:
 - .1 There are no known hazardous and controlled products stored on site.
 - .2 There are no known hazardous substances or contaminated materials.
 - .3 The following are known or potential project related safety hazards at site:
 - .1 The work under this contract involves heavy equipment in a marine environment (in adverse weather conditions (e.g. wind, wave agitation, ice, etc.)
 - .2 Overhead and underground electrical lines at the site.
 - .4 Facility on-going operations:
 - .1 On-going vessel traffic at the harbour (dredge site) and vehicle traffic on the wharf and service area around the disposal site.
 - .2 Vehicle traffic enroute to the disposal site and an the disposal site with trucks turning and backing up to dump.
 - .2 Above items shall not be construed as being complete and inclusive of potential

health and safety hazards encountered during Work.

- .3 Include above items in the hazard assessment of the Work.
- .4 MSDS Data sheets of pertinent hazardous and controlled products stored on site can be obtained from Departmental Representative.

1.12 Meetings

- .1 Attend pre-construction health and safety meeting, convened and chaired by Departmental Representative, prior to commencement of Work, at time, date and location determined by Departmental Representative. Ensure attendance of:
 - .1 Superintendent of Work
 - .2 Designated Health & Safety Site Representative
 - .3 Subcontractors
- .2 Conduct regularly scheduled tool box and safety meetings during the Work in conformance with Occupational Health and Safety regulations.
- .3 Keep documents on site.

1.13 Health and Safety Plan

- .1 Prior to commencement of Work, develop written Health and Safety Plan specific to the Work. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.
- .2 Health and Safety Plan shall include the following components:
 - .1 List of health risks and safety hazards identified by hazard assessment.
 - .2 Control measures used to mitigate risks and hazards identified.
 - .3 On-site Contingency and Emergency Response Plan as specified below.
 - .4 On-site Communication Plan as specified below.
 - .5 Name of Contractor's designated

- Health & Safety Site Representative and information showing proof of his/her competence and reporting relationship in Contractor's company.
- .6 Names, competence and reporting relationship of other supervisory personnel used in the Work for occupational health and safety purposes.
- .3 On-site Contingency and Emergency Response Plan shall include:
- .1 Operational procedures, evacuation measures and communication process to be implemented in the event of an emergency.
 - .2 Evacuation Plan: site and floor plan layouts showing escape routes, marshalling areas. Details on alarm notification methods, fire drills, location of fire-fighting equipment and other related data.
 - .3 Name, duties and responsibilities of persons designated as Emergency Warden(s) and deputies.
 - .4 Emergency Contacts: name and telephone number of officials from:
 - .1 General Contractor and subcontractors.
 - .2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.
 - .3 Local emergency resource organizations.
 - .5 Harmonize Plan with Facility's Emergency Response and Evacuation Plan. Departmental Representative will provide pertinent data including name of PWGSC and Facility Management contacts.
- .4 On-site Communication Plan:
- .1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.
 - .2 List of critical work activities to

be communicated with Facility Manager which have a risk of endangering health and safety of Facility users.

- .5 Address all activities of the Work including those of subcontractors.
- .6 Review Health and Safety Plan regularly during the Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at Work Site.
- .7 Departmental Representative will respond in writing, where deficiencies or concerns are noted and may request re-submission of the Plan with correction of deficiencies or concerns.
- .8 Post copy of the Plan, and updates, prominently on Work Site.

1.14 Safety Supervision

- .1 Employ Health & Safety Site Representative responsible for daily supervision of health and safety of the Work.
- .2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority to:
 - .1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work.
 - .2 Monitor and enforce Contractor's site-specific Health and Safety Plan.
 - .3 Conduct site safety orientation session to persons granted access to Work Site.
 - .4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.
 - .5 Stop the Work as deemed necessary for

reasons of health and safety.

- .3 Health & Safety Site Representative must:
 - .1 Be qualified and competent person in occupational health and safety.
 - .2 Have site-related working experience specific to activities of the Work.
 - .3 Be on Work Site at all times during execution of the Work.
- .4 All supervisory personnel assigned to the Work shall also be competent persons.
- .5 Inspections:
 - .1 Conduct regularly scheduled safety inspections of the Work on a minimum bi-weekly basis. Record deficiencies and remedial action taken. Follow-up and ensure corrective measures are taken.
- .6 Cooperate with Facility's Occupational Health and Safety representative should one be designated by Departmental Representative.
- .7 Keep inspection reports and supervision related documentation on site.

1.15 Training

- .1 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task.
- .2 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.
- .3 When unforeseen or peculiar safety-related hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise *Departmental Representative* verbally and in writing.

1.16 Minimum Site
Safety Rules

- .1 Notwithstanding requirement to abide by federal and provincial health and safety regulations; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:
 - .1 Wear appropriate PPE pertinent to the Work or assigned task; minimum being hard hat, safety footwear, safety glasses and hearing protection.
 - .2 Immediately report unsafe condition at site, near-miss accident, injury and damage.
 - .3 Maintain site and storage areas in a tidy condition free of hazards causing injury.
 - .4 Obey warning signs and safety tags.
- .2 Brief persons of disciplinary protocols to be taken for non-compliance.

1.17 Correction of
Non-Compliance

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.

1.18 Incident Reporting

- .1 Investigate and report the following incidents to Departmental Representative:
 - .1 Incidents requiring notification to Provincial Department of Occupational Safety and Health, Workers Compensation Board or to other regulatory Agency.
 - .2 Medical aid injuries.
 - .3 Property damage in excess of \$10,000.00,

- .4 Interruptions to Facility operations resulting in an operational lost to a Federal department in excess of \$5,000.00.
- .2 Submit report in writing.
- 1.19 Hazardous Products
 - .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).
 - .2 Keep MSDS data sheets for all products delivered to site.
 - .1 Post on site.
 - .2 Submit copy to Departmental Representative.
- 1.20 Blasting
 - .1 Blasting or other use of explosives is not permitted on site without prior receipt of written permission and instructions from Departmental Representative.
- 1.21 Powder Actuated Devices
 - .1 Use powder actuated fastening devices only after receipt of written permission from *Departmental Representative*.
- 1.22 Confined Spaces
 - .1 Abide by occupational health and safety regulations regarding work in confined spaces.
- 1.23 Site Records
 - .1 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.
 - .2 Upon request, make available to Departmental Representative or authorized Safety Officer for inspection.
- 1.24 Posting of Documents
 - .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Work Site in accordance with Acts and Regulations of Province having jurisdiction.

- .2 Post other documents as specified herein,
including:
 - .1 Site specific Health and Safety Plan
 - .2 WHMIS data sheets

-----END of SECTION-----

PART 1 - GENERAL

- 1.1 Section Includes
 - .1 Fire Safety Requirements.
 - .2 Hot Work Permit.
- 1.2 Related Work
 - .1 Section 01 35 29 Health and Safety Requirements
 - .2 Section 01 33 00 Submissions / Shop Drawings
- 1.3 References
 - .1 FCC No. 301-June 1982 Standard for Construction Operations.
 - .2 FCC No. 302-June 1982 Standard for Welding and Cutting.
- 1.4 Definitions
 - .1 Hot Work defined as:
 - .1 Welding work.
 - .2 Cutting of materials by use of torch or other open flame devices.
 - .3 Grinding with equipment, which produces sparks.
 - .4 Use of open flame torches.
- 1.5 Submittals
 - .1 Submit copy of Hot Work Procedures, to *Departmental Representative* for review, within 14 calendar days after contract award.
 - .2 Include sample of Hot Work Permit.
 - .3 Submit above documents in accordance with the submittal - general requirements specified in Section 01 33 00.
- 1.6 Fire Safety & Hot Work Requirement
 - .1 Implement and follow fire safety measures during Work. Comply with following:
 - .1 National Fire Code, 1995
 - .2 Fire Protection Standards FCC 301, Standard for Construction Operations and FCC 302, Standard for Welding and Cutting as issued by the Fire Protection Services of Human Resources Development Canada.
 - .3 Federal and Provincial Occupational

Health and Safety Acts and
Regulations as specified in section
01 35 29.

- .2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, *Departmental Representative* will advise on the course of action to be followed.
- .3 Hot Work Requirements:
 - .1 Obtain *Departmental Representative's* written Authorization to Proceed for the performance of Hot Work on site as may be required in the course of Work.
 - .2 To obtain authorization submit to *Departmental Representative* for review:
 - .1 Contractor's Hot Work Procedures to be followed on site in accordance with clause 1.8 below.
 - .2 Type of work and frequency of situations which will require Hot Work.
 - .3 Upon confirmation that effective fire safety measures will be implemented for hot work, *Departmental Representative* will grant Authorization to Proceed.
 - .4 In most cases, *Departmental Representative* will issue only one written authorization covering the entire construction project and duration of work. However in some cases, depending on the nature or phasing of work, the quantity of various trades needing to perform welding and cutting on site, or other deemed situation, *Departmental Representative* might designate

certain portions of the work as separate entities, each entity requiring individual written authorization to proceed. Follow *Departmental Representative's* directives in this regard.

- .4 Do not perform any Hot Work until receipt of *Departmental Representative's* written Authorization to Proceed.
- 1.7 Conformance
 - .1 Ensure that Hot Work Procedures, as established for project and agreed upon with *Departmental Representative*, are stringently followed. Enforce use and compliance by all workers.
 - .2 Brief all workers and subcontractors on Hot Work Procedures and Permit system.
- 1.8 Hot Work Procedures
 - .1 Develop Hot Work Procedures, to be followed when Hot Work is required as part of the work.
 - .2 Describe safe work practices and sequence of activities to be followed on site by Contractor and workers to minimize the potential occurrence of a fire resulting from Hot Work.
 - .3 Hot Work Procedures to include:
 - .1 Requirement to perform hazard assessment of the site or immediate work area, based on type and extent of Hot Work required, in accordance with Hazard Assessment and Safety Plan requirements of section 01 35 29. Carryout hazard assessment for each hot work event.
 - .2 Use of a Hot Work Permit system, issued by an authorized person in Contractor's employ, for each event when Hot Work is required, granting permission to carryout hot work.
 - .3 Provision of a designated person(s) to carry out a Fire Safety Watch for

a minimum of 30 minutes immediately upon completion of the hot work.

- .4 Procedures to comply with fire safety codes and standards specified herein and occupational health and safety regulations specified in section 01 35 29.
- .5 Generic procedures, if used, must be edited, supplemented with pertinent information and tailored to reflect specific project conditions. Clearly label as being the Hot Work Procedures applicable to this contract.
- .6 Include within Procedures the step by step process on how to prepare and issue the Hot Work Permit.
- .7 Hot Work Procedures to be in typewritten format, listing step by step procedures and worker instructions, clearly establishing and allocating responsibilities of:
 - .1 Worker(s),
 - .2 Designated person authorized to issue the Hot Work Permit,
 - .3 Fire Safety Watcher,
 - .4 Subcontractors and Contractor.

1.9 Hot Work Permit

- .1 Develop "Hot Work Permit" form in typewritten format.
- .2 Hot Work Permit form to include, as a minimum, the following data:
 - .1 Project name and project number;
 - .2 Building name, address and specific floor, room or area where hot work will be performed;
 - .3 Date when Permit issued;
 - .4 Description on type of hot work to be carried out;
 - .5 Special precautions required, including type of fire extinguisher required;
 - .6 Name and signature of authorized

- person, designated by Contractor, to issue the Permit;
- .7 Name of worker(s) (clearly printed) to which the Permit is being issued;
 - .8 Time duration of Permit (not to exceed 8 hours) indicating "Start" time & date and "Completion" time & date when Hot Work Permit will be in effect;
 - .9 Worker signature with date and time when hot work terminated;
 - .10 Specified period of time requiring Safety Watch;
 - .11 Name and signature of person designated as Fire Safety Watcher, complete with time & date when safety watch terminated, certifying that the surrounding area was under his continual watch and inspection for the minimum time period specified in Permit and commenced immediately upon the completion of Hot Work.
- .3 Industry Standard forms shall only be used if all data specified above is included on form.
- .4 Each Hot Work Permit to be completed in full and signed as follows:
- .1 Authorized person issuing Permit before hot work commences;
 - .2 Worker(s) upon completion of Hot Work;
 - .3 Fire Safety Watcher upon termination of safety watch and;
 - .4 Returned to Contractor's Site Superintendent for safe keeping.

1.10 Documents on Site

- .1 Keep Hot Work Permits and Hazard Assessment documentation on site for duration of Work.
- .2 Upon request, make available to *Departmental Representative* or to authorized safety representative for inspection.

-----END of SECTION-----

Part 1 - GENERAL

1.1 References

- .1 Canada Shipping Act, Transport Canada, 2001, amended 2013-12-01
- .2 Canadian Coast Guard Regulations, Fisheries and Oceans Canada
- .3 Canadian Environmental Assessment Act, 2012, amended 2013-11-25
- .4 Canadian Environmental Protection Act, 1999, amended on 2014-03-28
- .5 Fisheries Act, 1985, Fisheries and Oceans Canada, amended 2013-11-25
- .6 Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters, 1998
- .7 Migratory Birds Convention Act, 1994, Environment Canada, amended 2010-12-10
- .8 Navigation Protection Act, 1985. Transport Canada, amended 2014-04-01
- .9 Nova Scotia - Environment Act
- .10 Species at Risk Act, 2002, amended 2013-03-08
- .11 The Federal Policy on Wetland Conservation, 1991, Environment Canada
- .12 Transportation of Dangerous Goods Act, 1992, Transport Canada, amended 2009-06-16
- .13 Workplace Hazardous Materials Information System, Health Canada.

1.3 Definitions

- .1 Archaeological Resources: all tangible evidence of human activity that is of historical, cultural or scientific interest. Examples include features, structures, archaeological objects or remains at or from an archaeological site, or an object recorded as an isolated

archaeological find.

- .2 Buffer zone: a vegetated land that protects watercourses from adjacent land uses. It refers to the land adjacent to watercourses, such as streams, rivers, lakes, ponds, oceans, and wetlands, including the floodplain and the transitional lands between the watercourse and the drier upland areas.
- .3 Deleterious substance: (a) any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or (b) any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water.
- .4 Fish habitat: spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes.
- .5 Hazardous material: product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.

- .6 Invasive or alien species: refers to a species or subspecies introduced outside its normal distribution whose establishment and spread threaten ecosystems, habitats or species with economic or environmental harm.
 - .7 Navigable water: a canal and any other body of water created or altered as a result of the construction of any work.
 - .8 Surface watercourse: refers to the bed and shore of a river, stream, lake, creek, pond, marsh, estuary or salt-water body that contains water for at least part of each year.
 - .9 Wetlands: land where the water table is at, near or above the surface or which is saturated for a long enough period to promote such features as wet-altered soils and water tolerant vegetation. Wetlands include organic wetlands or "peatlands," and mineral wetlands or mineral soil areas that are influenced by excess water but produce little or no peat.
- 1.4 Transportation
- .1 Transport hazardous materials and hazardous waste in compliance with the *Transportation of Dangerous Goods Act*.
 - .2 Eliminate free board spillage when excavating, loading and hauling dredge material.
 - .3 Do not overload trucks when hauling excavated material.
 - .4 Trucks hauling excavated material to have watertight boxes.
 - .5 Maintain trucks clean and free of mud, dirt and other foreign matter.
 - .6 Secure contents against spillage. Avoid potential release of contents and of any

foreign matter onto highways, roads and access routes used for the work. Immediately clean any ground spills and soils to extent as directed by authority having jurisdiction.

- .7 Prior to commencement of work, advise and seek approval from the *Departmental Representative* of the existing roads and temporary routes / roads proposed to be used to access work areas and to haul material to and from the site.
- .8 Construction material and debris is not to become waterborne.
- .9 Any tools, equipment, vehicles, temporary structures or parts thereof used or maintained for the purpose of building or placing a work in navigable water are not to remain in place after the completion of the project.
- .10. Vessels are to be permitted safe access through the worksite at all times, and assisted as necessary.
- .11 All materials and equipment used in construction must be marked in accordance with the Collision Regulations of the *Canada Shipping Act, 2001* when located on the waterway.
- .12 Advise the Canadian Coast Guard, Marine Communication and Traffic Services (MCTS) at (902)564-7751 or toll free at 1-800-686-8676 sufficiently in advance of commencement of work or when deploying or removing site markings in order to allow for appropriate Notices to Shipping/Mariners action.

1.5 Temporary Causeways and Access Roads .1

It will be the Contractor's responsibility to gain access to the dredge area. The construction and removal of temporary causeways and access roads will be at the Contactor's expense and

will be removed immediately after clearance of the dredge area.

- .2 It will be the contractor's responsibility to identify a location for the disposal of all material imported by the Contractor for the construction of temporary causeways and access roads.
- .3 All material used for construction of temporary causeways and access roads must be clean and free from excessive fines, organics, debris and non-toxic (i.e., free of fuel, oil, grease and/or any other contaminants), non-ore bearing and from a provincially approved non-water source.
- .4 Material is to be screened, if required, to ensure that no fines or stones less than 0.2 kilograms are placed in the work. Gradation of the material to be imported for the construction of the causeways, roads etc. shall be within the following limits:

IMPERIAL SIZE	METRIC SIZE	PERCENT PASSING
18"	450 mm	100
8"	200 mm	44 - 75
4"	100 mm	24 - 50
2"	50 mm	7 - 14

- .5 Heavy machinery and equipment must be operated from a dry platform only. Temporary causeways and access roads shall be constructed at an elevation such that machinery and equipment is operating completely out of the water at all stages of the tide. If tidal work is being carried out, machinery and equipment shall be relocated back to a suitable elevation to prevent operating in submerged waters.
- .6 The Contractor is to maintain temporary buoys to mark the position of the access

road including the outer toe as construction proceeds. All buoys are to meet requirements for the applicable Canadian Coast Guard standard and be equipped with radar reflectors.

1.5 Operation of Machinery

- .1 Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds.
- .2 Whenever possible, operate machinery on land above the high water mark in a manner that minimizes disturbance to the banks and bed of the water body.
- .3 Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water.
- .4 Do not perform cleaning and washdown within a 30 metre buffer zone of a wetland, watercourse or other identified environmentally sensitive area.

1.5 Disposal of Dredged Material

- .1 Dredge material will be disposed of on land owned by Her Majesty in Right of Canada administered by Fisheries and Oceans Canada. The dredged material will be placed within the area identified on Sheet 3, the Designated Disposal Area Plan.
- .2 A Sediment Sampling Program (MSSP) report is included in **Appendix A**.
- .3 **Contractor will be responsible to hire a qualified professional to develop a Site Management Plan (SMP) for the disposal site and an Engineer Stamped Design Plan.** The Contractor shall use existing in-situ and/or imported material to construct the berm of sufficient size to accommodate all dredge material including material as a result of over dredging. As a minimum,

the SMP will have the following elements:

- .1 Description of the approach for land-based management of the sediments including berms, settling ponds, etc.
 - .2 Description of approach for managing potential impacts to the local environment including silt curtains, sediment fencing, hay bales, treatment, etc.
 - .3 Engineer Stamped Design Plan identifying disposal location and key site features including proposed layout of berms, ponds and environmental controls.
 - .4 As a minimum the dredged sediment containment area must consist of an earthen berm placed a minimum of 10 meters from the river bank of the adjacent Grande Anse River
- .4 The contractor will be responsible to construct berms to contain the disposed dredge material including any required settling ponds or other controls. The level of effort and details will depend on the site and the contractor will be required to describe the level of effort in the SMP. The contractor will not be permitted to transport any dredge spoils to the disposal location until the SMP is accepted by the *Departmental Representative*.
- .5 Place and spread dredge material at the disposal site in a uniform and well graded manner. Minimize height and slopes of the disposed material. Match slopes and contours of the existing surrounding terrain as much as possible.
- .6 Control runoff of water containing suspended materials or other harmful substances in accordance with requirements of all federal, provincial and municipal authorities having jurisdiction.

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- .7 Hydraulic (Suction) Dredging
 - .1 Routinely inspect pipe for any potential breach in the sediment train and keep in good leak free condition at all time.
 - .2 Should leakage occur along the pipeline immediately cease dredging operations and repair leak.

 - 1.6 Containment and Spill Management
 - .1 Comply with Federal (*CEPA Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations*) and Provincial regulations, codes, standards and guidelines for the storage of fuel and allied petroleum products on site.
 - .2 Do not dump petroleum products or any other deleterious substances on ground or in the water.
 - .3 Be diligent and take all necessary precautions to avoid spills and contaminate the soil and water (both surface and subsurface) when handling petroleum products on site and during fueling and servicing of vehicles and equipment.
 - .4 Maintain on site appropriate emergency spill response equipment consisting of at least one 250-litre (55 gallon) overpack spill kit for containment and cleanup of spills.
 - .5 Maintain vehicles and equipment in good working order to prevent leaks on site.
 - .6 In the event of a petroleum spill, immediately notify the *Departmental Representative* and the Canadian Coast Guard (CCG) at 1-800-565-1633 (24 hour report line). Perform cleanup in accordance with all regulations and procedures stipulated by authority having jurisdiction.

- .7 Materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals are not to enter the watercourse.
 - .8 All equipment to be used in or over the marine environment is to be free from leaks or coatings of hydrocarbon-based fluids and/or lubricants harmful to the environment. Hoses and tanks are to be inspected on a regular basis to prevent fractures and breaks.
 - .9 Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance. In the event of a petroleum spill immediately notify the Canadian Coast Guard (CCG) at 1-800-565-1633 (24 hour reporting line and the *Departmental Representative*. Perform cleanup in accordance with all regulations and procedures stipulated by authorities having jurisdiction.
- 1.7 Hazardous Material Handling
- .1 Store and handle hazardous materials in accordance with applicable federal and provincial regulations, codes, standards and guidelines. Store in location that will prevent spillage into the environment.
 - .2 Label containers to WHMIS requirements and keep MSDS data sheets on site for all hazardous materials.
 - .3 Maintain inventory of hazardous materials and hazardous waste stored on site. List items by product name, quantity and date when stored.
 - .4 Store and handle flammable and combustible materials in accordance with National Fire Code.

- 1.8 Disposal of Wastes .1 Do not bury rubbish, construction and demolition debris (i.e., concrete, creosote timbers, steel, impacted soil materials etc.) and waste materials on site.
- .2 The disposal of excavated and/or dredged material will be in the on-site containment cell located on the harbour property on lands of Fisheries and Oceans Canada. All material disposed in the containment cell shall be free to debris such as timber, rubber tires, bottles, cans or any other litter. The Contractor will be required remove any debris and level the material upon completion of disposal activities as directed by the Departmental Representative
- .3 Construction material and debris are not allowed to become waterborne.
- .4 Dispose and recycle construction and demolition debris and waste materials in accordance with provincial waste management regulations.
- .5 Do not dispose of hazardous waste, volatile materials (such as mineral spirits, paints, thinners etc.) and petroleum products into waterways, storm sewers or in waste landfill sites.
- .6 Dispose of hazardous waste in accordance with applicable federal and provincial, regulations, codes, standards and guidelines.
- .7 Daily clean-up of floating or sinking construction materials, litter, and other debris arising from the work site will be conducted to ensure protection of the marine environment. Any construction debris/ material that enters the marine environment should be removed immediately and be disposed of in a provincially approved manner.

- 1.9 Water Quality
- .1 Any rock and fill material that will be used for the project must be free of excessive fines, clean, non-ore bearing, non-toxic material (i.e., free from fuels, oil, grease and/or contaminants) from an approved non-watercourse, and approved for use in marine infilling projects.
 - .3 Conduct dredging and excavation operations in such a manner to limit turbidity and reduce sediment suspension in the water to an absolute minimum at all times:
 - .1 Maintain appropriate production speed and momentum of the excavation equipment. Make adjustments as required and as approved by *Departmental Representative*.
 - .2 Strategically position excavation equipment and haul vehicles to avoid over the water swings of finer excavated material whenever possible.
 - .3 No bottom stockpiling, dragging or side casting of material during dredging operations.
 - .4 Avoid working when weather conditions are unfavourable to prevent further dispersion of suspended sediments
 - .2 Where required, install effective sediment control measures before starting work to prevent the entry or re-suspension of sediment in the water body. Inspect sediment control measures regularly to ensure they are functioning properly, and make all necessary repairs if any damage occurs. Upon completion of use, remove these control measures in a way that prevents the escape of settled sediment.
 - .3 Contractor is responsible to hire/appoint a qualified professional to develop and implement a Water Quality Monitoring (WQM) program for the watercourse adjacent to the Work site.

The WQM Program must include a fixed collection point from which data shall be collected within 100 meters from the work area while in-water works are being conducted and the equipment is operating, and a fixed background collection point at least 500 meters from the project site in a undisturbed area and up-current from any sediment movement. Sample results must be recorded and submitted to the Departmental Representative 2 times per day while in-water works are being conducted.

Turbidity level shall not exceed 8 Nephelometric Turbidity Units (NTUs) above background levels within 100 m from the nearest edge of the work area over a 24 hour period when background levels are between 8 and 80 NTU. Turbidity levels shall not increase more than 10% above background levels within 100 m from the nearest edge of the work area when background is >80 NTU. If turbidity exceeds limits, Contractor shall cease work immediately. The *Departmental Representative* and Fisheries & Oceans Canada - Fisheries Protection Program (FPP) biologist must be contacted to determine what adaptive measures shall be employed including additional operational and engineering controls (e.g. changes in methodology, silt curtains, etc.).

- .5 Where work may affect water quality, schedule work in cooperation with the Harbour Authority as directed by *Departmental Representative* to minimize interference and impact on harbour users.
- .6 Weather conditions are to be assessed on a daily basis to determine the potential risk of extreme weather in the project area. Avoid work during periods which Environment and Climate Change Canada (ECCC) has issued rainfall or wave warning for the work area that may increase erosion and/or sedimentation.

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- 1.10 Socioeconomic Restrictions
- .1 Abide by municipal and provincial regulations for any restrictions on work performed during the night time and with flood lighting of the site. Obtain applicable permits.
 - .2 Place flood lights in opposite direction of adjacent residential and business areas.
 - .3 Work equipment and machinery must be equipped with purposely designed mufflers to reduce noise on site to lowest possible level. Maintain mufflers in good operating condition at all times.
 - .4 The Contractor will coordinate with the local Harbour Authority prior to commencement of the project activities such that the schedule with the least possible conflicts will be implemented.
- 1.11 Fish Protection
- .1 Avoid wet, windy and rainy periods that may increase erosion and sedimentation.
 - .2 Ensure that all in-water activities, or associated in-water structures, do not interfere with fish passage, constrict the channel width, or reduce flows.
 - .3 Screen any water intakes or outlet pipes to prevent entrainment or impingement of fish. Entrainment occurs when a fish is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish is held in contact with the intake screen and is unable to free itself.
 - .4 Be aware of the risk for contamination of the fish habitat at the site as a result of alien species being introduced in the water. To minimize the possibility of fish habitat contamination and the spread of aquatic invasive species, all construction equipment which will be immersed into the water of a watercourse,

or has the possibility of coming into contact with such water during the course of the work, must be cleaned and washed to ensure that they are free of marine growth and alien species prior to mobilization to the site.

- .1 Equipment shall include boats, barges, cranes, excavators, pumps, pipe lines and other all miscellaneous tools and equipment previously used in a marine environment.
- .2 Cleaning and washing of equipment shall be performed immediately upon their arrival at the site and before use in or over the body of water.
- .3 Conduct cleaning and washing operations as follows:
 - .1 Scrape and remove heavy accumulation of mud and dispose appropriately.
 - .2 Wash all surfaces of equipment by use of a pressurized fresh water supply.
 - .3 Immediately follow with application of a heavy sprayed coating of undiluted vinegar or other environmentally approved cleaning agent to thoroughly remove all plant matter, animals and sediments.
 - .4 Check and remove all plant, animal and sediment matter from all bilges and filters.
 - .5 Drain standing water from equipment and let fully dry before use.
 - .6 Upon removal from the water, drain standing water from equipment and let fully dry before removal off the site.

- 1.12 Bird and Bird
Habitat
- .1 Become knowledgeable with and abide by the *Migratory Birds Convention Act (MBCA)* in regards to the protection of migratory birds, their eggs, nests and their young encountered on site and in the vicinity.
 - .2 Minimize disturbance to all birds on site and adjacent areas during the entire course of the Work.
 - .3 Do not approach concentrations of seabirds, waterfowl and shorebirds when anchoring equipment, accessing wharves or ferrying supplies.
 - .4 During night time work, position flood lights in opposite direction of nearby bird nesting habitat.
 - .5 Do not use beaches, dunes and other natural previously undisturbed areas of the site to conduct work unless specifically approved by the *Departmental Representative*.
 - .6 Should nests of migratory birds in wetlands be encountered during work, immediately notify *Departmental Representative* for directives to be followed.
 - .1 Do not disturb nest site and neighbouring vegetation until nesting is completed.
 - .2 Minimize work immediately adjacent to such areas until nesting is completed.
 - .3 Protect these areas by following recommendations of Canadian Wildlife Service.
 - .7 All machinery must be well muffled. If necessary, trucks may be required to avoid the use of "hammer" braking along specific sections of the route.

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- 1.13 Species at Risk and Marine Mammals
- .1 Maintain periodic visual surveys for leatherback sea turtles and marine mammals in and around the project area.
 - .2 A safety zone for leatherback sea turtles and marine mammals must be established at the work site. The safety zone shall consist of a circle with a radius of at least 500 meters as measured from the centre of the work site.
 - .1 If marine mammals are observed within the safety zone while in-water activities are underway, all activities must cease until the marine mammals leave the safety zone and are not observed within the safety zone for a minimum period of 30 minutes.
 - .2 Work may start or restart if marine mammals are not observed within the safety zone within the 30 minute period.
 - .3 Regular watch of the safety zone shall occur at all other times.
- 1.14 Air Quality
- .1 Keep airborne dust and dirt resulting from the work on site to an absolute minimum.
 - .2 Dust suppression by the application of water must be employed, when required. Apply dust control measures to roads, parking lots and work areas. The *Departmental Representative* shall determine locations where water is to be applied, the amount of water to be applied, and the times at which it shall be applied. Waste oil must not to be used for dust control under any circumstances.
 - .3 Spray surfaces with water or other environmentally approved product. Use purposely suited equipment or machinery and apply in sufficient quantity and frequency to provide effective result and continued dust control during the entire course of the work.

- .4 Do not use oil or any other petroleum products for dust control.
- 1.15 Fires
 - .1 Fires and burning of rubbish on site is not permitted.
- 1.16 Archaeological
 - .1 All construction personnel are responsible for reporting any unusual materials unearthed during construction to the construction supervisor. If the find is believed to be an archaeological resource, the Construction Supervisor will immediately stop work in the vicinity of the find and notify the Departmental Representative.
 - .2 If an archaeological and / or historically significant item is discovered during the work activities, work in the area will be stopped immediately and the Departmental representative will be contacted as well as the provincial Archaeological Services unit.
 - a) Nova Scotia - NS Department of Communities, Culture and Heritage, Special Places Program, telephone: (902) 424-6475.
 - .3 Work can only resume in the vicinity of the find when authorized by the Departmental Representative and Construction Supervisor, after approval has been granted by the Nova Scotia Department of Communities, Culture and Heritage.
 - .4 In the event of the discovery of human remains of evidence of burials, excavation work will immediately cease and nearest law enforcement agency will be contacted immediately by the Departmental Representative and/or the Construction Supervisor.

PART 1 - GENERAL

- 1.1 Access
- .1 Provide and maintain adequate access to project site.
 - .2 If authorized to use existing roads or structures for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads.
 - .3 The contractor is to maintain full access to the work site. Should a court injunction be required ordering a person or group to refrain from impeding access to the site, such as a demonstration, picketing or union action, then obtaining the injunction and any associated costs will be considered incidental to this contract. Any delays associated with such activity will be considered incidental to this contract.
- 1.2 Contractor's Site Office
- .1 Establish on the site of the work and keep open at all times during the execution of the work an office where all letters, orders, notices and other communications may be received or acknowledged either by the Contractor or his authorized agent or representative. Provide a telephone in the office.
 - .2 Keep one up-to-date copy of contract documents, bulletins and other materials as specified under Section 01 10 10.
- 1.3 Departmental Representative's Site Office
- .1 Provide temporary office for sole use of *Departmental Representative*, complete with heat and lights. Insulated office required during October to May. Locate on or adjacent to site.
 - .2 Inside dimensions minimum 5 m long x 3 m wide x 2.4 m high, with floor 0.3 m above grade, complete with 4-50% opening windows and one lockable door.

- .3 Arrange and pay for telephone and Wifi installation and service in *Departmental Representative's* office for the *Departmental Representative's* exclusive use. Long distance calls placed on this phone by the *Departmental Representative* will be paid for by *Departmental Representative*.
- .4 Washroom facilities not required in the office. Provide outside sanitary facilities to approval.
- .5 Equip office with six chairs, flat 1200 X 2400 X 25 table with writing surface and 4 drawer lockable filing cabinet.
- .6 Maintain in clean condition.
- 1.4 Storage Sheds
 - .1 Provide adequate weather tight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.
 - .2 Contractor to make his own arrangements for on-site storage areas.
- 1.5 Sanitary Facilities
 - .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
 - .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
- 1.6 Parking
 - .1 Contractor to make own arrangements to provide parking space for work force.
- 1.7 Power
 - .1 Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.
 - 2 Install temporary facilities for power such as poles, lines and cables to approval of local electric utility.

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- 1.8 Water Supply .1 Arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.

 - 1.9 Barricades .1 Provide and maintain sufficient barricades, fencing, notices, warning signs, light signals, etc. for the protection of adjoining property and to warn others and workmen engaged on the job of the dangers caused by the work.

.2 Types and location of barricades, etc. to be in accordance with local regulations and to the satisfaction of *Departmental Representative*.

.3 The presence of such barricades, lights, etc. shall not relieve the Contractor of the responsibility for any damages.

 - 1.10 Security .1 Contractor to make his own arrangements for security of his equipment, materials, damages resulting from fire and theft.

 - 1.11 Site Signs and Notices .1 Only Project Identification and Consultant/ Contractor signboards and notices for safety or instruction are permitted on site.

.2 Format, location and quantity of site signs and notices to be accepted by *Departmental Representative*.

.3 Signs and notices for safety or instruction to be in English and French languages, or commonly understood graphic symbols.

1.12 Removal of
Temporary
Facilities

- .1 Remove temporary facilities from site when directed by *Departmental Representative*.
- .2 If project is closed down for a period of time, keep temporary facilities operational until no longer required by *Departmental Representative*.

-----END of SECTION-----

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- 1.1 General
- .1 Use new material and equipment unless otherwise specified.
 - .2 Submit following information for any or all materials and products proposed for supply within 7 days of request by *Departmental Representative*:
 - .1 name and address of manufacturer
 - .2 trade name, model and catalogue number
 - .3 performance, descriptive and test data
 - .4 manufacturer's installation or application instructions
 - .5 evidence of arrangements to procure.
 - .3 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.
 - .4 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.
- 1.2 Manufacturer's Instructions
- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
 - .2 Notify *Departmental Representative* in writing of any conflict between these specifications and manufacturer's instructions. *Departmental Representative* will designate which document is to be followed.
- 1.3 Delivery and Storage
- .1 Deliver, store and maintain packaged material and equipment with manufacturer's seal and labels intact.
 - .2 Prevent damage, adulteration and soiling of material and equipment during delivery, handling and storage. Immediately remove rejected material and

equipment from site.

- .3 Store material and equipment in accordance with supplier's instructions.

1.4 Conformance

- .1 When material or equipment is specified by standard or performance specifications, upon request of *Departmental Representative*, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.5 Substitution

- .1 Proposals for substitution may be submitted only after award of Contract. Such requests must include statements of respective costs of items originally specified and proposed substitutions.
- .2 Proposals will be considered by *Departmental Representative* if:
 - .1 Products selected by tenderer from those specified, are not available, or
 - .2 Delivery date of products from those specified would unduly delay completion of Contract, or
 - .3 Alternative products to those specified, which are brought to attention of, and considered by *Departmental Representative* as equivalent to those specified and will result in a credit to Contract amount.
- .3 Should proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on project. Pay for design or drawing changes required as result of substitution.
- .4 Amounts of all credits arising from approval of substitutions will be

determined by *Departmental Representative* and Contract price will be reduced accordingly. No substitutions will be permitted without prior written approval of *Departmental Representative*.

.5 Owner reserves the right for acceptance or rejection of substitution of materials.

1.6 Construction Equipment and Plant

.1 On request, prove to the satisfaction of *Departmental Representative* that the construction equipment and plant are adequate to manufacture, transport, place and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.

.2 Maintain construction equipment and plant in good operating order.

1.7 Damaged and Rejected Materials

.1 Immediately replace, repair or otherwise make good any material damaged, broken or defaced during construction to the satisfaction of *Departmental Representative*.

.2 Remove rejected materials from site.

-----END of SECTION-----

PART 1 - GENERAL

- 1.1 Record Drawings
- .1 *Departmental Representative* will provide two sets of white prints for record drawing purposes.
 - .2 Maintain project record drawings and accurately record deviations from contract documents caused by site conditions and changes ordered by *Departmental Representative*.
 - .3 Mark changes in red coloured ink.
 - .4 Record following information:
 - .1 Elevations of various elements in relation to Chart Datum.
 - .2 Field changes in dimensions and details.
 - .3 Changes made by Change Order.
 - .5 At completion of project and prior to final inspection, neatly transfer notations to second set and submit both sets to *Departmental Representative*. An electronic Autocad versions of the Record Drawings to be submitted to *Departmental Representative*

-----END of SECTION-----

PART 1 - GENERAL

- 1.1 General
 - .1 Conduct cleaning and disposal operations to comply with ordinances and laws.
 - .2 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
 - .3 Prevent accumulation of waste which create hazardous conditions.
- 1.2 Cleaning During Construction
 - .1 Maintain the work, at least on a daily basis free from accumulations of waste material and debris.
 - .2 Provide on-site containers for collection of waste materials, and debris.
 - .3 Remove all waste and debris from site.
 - .4 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet concrete or newly painted surfaces.
- 1.3 Final Cleaning
 - .1 In preparation for acceptance of the project on an interim or final certificate of completion perform final cleaning.
 - .2 Remove grease, dust, dirt, stains, and other foreign materials from finished surface.
 - .3 Remove surplus materials, rubbish, tools and equipment.

-----END of SECTION-----

PART 1 - GENERAL

1.1 Administrative
Requirements

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor to conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify *Departmental Representative* in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request *Departmental Representative* inspection.
 - .2 *Departmental Representative* Inspection:
 - .1 *Departmental Representative* and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Equipment and systems: tested, adjusted and balanced and fully operational.
 - .4 Operation of systems: demonstrated to Owner's personnel.
 - .5 Work: complete and ready for final inspection.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by *Departmental Representative*, and Contractor.
 - .2 When Work incomplete according to *Departmental Representative*,

complete outstanding items and
request re-inspection.

-----END of SECTION-----

PART 1 - GENERAL

- 1.1 Description of Work .1 This Section includes but is not limited to the following:
- .1 All normal removals as required to complete the work. All items to be verified by a site visit prior to submission of a tender.
- 1.2 Related Work 1 Refer to other specification sections for related information.
- .2 Refer to **Section 01 33 00** for Shop Drawing/Submission requirements.
- 1.3 Submissions .1 Methodology:
- .1 When requested provide methodology for carrying out the work
 - .2 Provide submission in accordance with **Section 01 33 00**.
- 1.4 Protection .1 Prevent movement, settlement or damage of adjacent structures. Provided bracing and shoring as required. In event of damage, immediately replace such items or make repairs to approval of *Departmental Representative* and at no additional cost to *Departmental Representative*.
- .2 Prevent debris from going adrift and becoming a menace to navigation.
 - .3 All damage to existing structures, roadways, pipelines, electrical systems not specified for removal to be repaired at the Contractor's cost to the satisfaction of the *Departmental Representative*.
- 1.5 Measurement for Payment .1 Sitework, demolition and removals will be measured in accordance with **Section 01 29 00**.
- PART 2 - PRODUCTS Not applicable.

PART 3 - EXECUTION

- 3.1 Preparation
- .1 Inspect site and verify with *Departmental Representative* items designated for removal and items to be preserved.
 - .2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.
 - .3 Provide temporary power and lighting as shown on the plan or as required by the *Departmental Representative*.
- 3.2 Removal
- .1 Remove all items as indicated.
 - .2 Do not disturb adjacent structures designated to remain in place.
 - .3 At end of each day's work, leave work in safe condition so no part is in danger of toppling or falling.
- 3.3 Disposal of Material
- .1 All excavated material, not to be reused, is to be disposed of off site.
 - .2 Material to be transported and disposed of in an environmentally acceptable manner to the satisfaction of the *Departmental Representative*, and in accordance with any local, Municipal, Provincial and Federal restrictions and regulations.
- 3.4 Restoration
- .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.
 - .2 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work. Match condition of adjacent, undisturbed areas.

PART 1 GENERAL

- 1.1 Description
- .1 The site of the work is Pleasant Bay, Inverness County, Nova Scotia, with disposal on lands of Her Majesty in Right of Canada. Area to be dredged, and location of disposal site are shown on the plan.
 - .2 This section specifies requirements for excavating underwater materials in areas and to dimensions and coordinates indicated on plan, and for transporting and disposing of excavated materials to specified locations.
- 1.2 Related Work
- .1 Refer to **Environmental Protection Procedures for Marine Work - Section 01 35 44** for related information.
- 1.3 Definitions
- .1 Dredging: excavating, transporting and disposing of underwater materials as specified.
 - .2 Class "A" Material: boulders or concrete debris with each unit containing 3.0 cubic metres or more, and solid rock requiring drilling and blasting or hydraulic splitting to loosen.
 - .3 Obstruction: material other than Class "A", having individual volumes of 3.0 cubic metres or more.
 - .4 Class "B" Material: loose or shale rock, sand, quick sand, mud, shingle, clay and sand, gumbo, hardpan, clay, marine clay, clay sizes, marine silt, silt and gravel, gravel, cobbles, boulders, marine shells, or any other materials not defined under Class "A" material.
 - .5 Debris: pieces of wood, wood chips, bark, logs, submerged logs, tree branches, vehicle tires, concrete, steel cable,

- steel chain, wire rope, scrap steel, etc.
- .6 CPM: cubic metres place measure.
 - .7 Grade: plane or planes above which all material is to be dredged.
 - .8 Estimated Quantity: volume in cubic metres (CPM) of material calculated to be above dredge grade and within side slopes, unless otherwise specified.
 - .9 U.T.M. Coordinates: Universal Transverse Mercator plan rectangular grid system to be used for all horizontal control of dredging operations as indicated on plan. (NAD 83)
 - .10 Matrix Block: each block area is presented as a number of 1.2 X 3.0 m long blocks. Dependent on the position of the sounding a block may have 1 to 4 sounding contained within it. A blank Matrix Block will indicate that no sounding was registered for that matrix.
 - .11 Minimum Mode: a mode of operation of hydrographic survey equipment where the minimum sounding over the length of travel between position updates will be retained in memory.
 - .12 Least of Minimum Plan: a hydrographic survey plan in which the least sounding in that matrix block is plotted.
 - .13 Instantaneous Mode: a mode of operation of hydrographic survey equipment where only the sounding observed at a predetermined distance interval is retained in memory.
 - .14 Average of Instantaneous Plan: a hydrographic survey plan in which the average of instantaneous soundings in that matrix block is plotted.

- .15 Side Slope: inclined surface or plane from grade at side limit of dredging area to intersect original ground line outside of side limit and to be expressed as a ratio of horizontal to vertical. All material above side slopes is to be dredged.
 - .16 Cleared Area: a dredge area that has been accepted by the *Departmental Representative* as complying with plans and specifications and all material removed to grade.
 - .17 Box Cut: dredging and letting the side of the excavation collapse, where possible, to an equilibrium slope.
 - .18 Chart Datum: by international agreement, a plane below which the tide will seldom fall. The Canadian Hydrographic Services has adopted the plane of Lowest Normal Tide (LNT) as Chart Datum. As the rise, fall and ranges of tides varies daily, The Canadian Hydrographic Services should be consulted for tidal prediction and other tidal information relating to the work.
 - .19 CEPA: Canadian Environmental Protection Act.
 - .20 Dredging Area: a rectangle or polygon, defined by coordinates in which dredging is to take place.
- 1.4 Location
- .1 Contract drawings indicate those areas which require dredging at the time of the most recent surveys. Actual extent of dredging within the areas may vary slightly from those indicated on the drawings.

1.5 Schedule of Work

- .1 Submit to *Departmental Representative*, within 5 working days after award of Contract, a schedule of work including time periods during which each operation involved in the work will be undertaken. Also submit an estimated monthly dredging production of material in cubic metres for each operation. At the time of submission of the schedule meet with the *Departmental Representative* to review the schedule.
- .2 Adhere to the schedule and take immediate action to correct any slippage by effectively altering existing dredging operations or mobilizing other equipment. The *Departmental Representative* is to be notified of the corrective action to be taken.

1.6 Interference to Navigation

- .1 Be familiar with activities at dredging sites and vessel movements in areas affected by dredging operations.
- .2 Plan and execute work in a manner that will not impede navigation including movement of vessels in the channel and basin or any other boat traffic at adjacent wharves in the harbour.
- .3 Plan and execute work in a manner that will not interfere with activities at wharf sites, or access to wharves by land or water.
- .4 The *Departmental Representative* or owner will not be responsible for loss of time, equipment, material or any other charges related to interference with vessels in the harbour, weather conditions, or due to other Contractor's operations.
- .5 Prior to any removal/reinstallation of any navigational aids/buoys, contact Canadian Coast Guard in Charlottetown at 1-902-566-7936,

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- .6 Keep Canadian Coast Guard informed of dredging operations, in order that necessary Notices to Shipping can be issued.
- .7 Be responsible for damage to buoys or other navigation markers cause by dredging operations. If such occurs, notify Canadian Coast Guard. Assume responsibility for replacement or repairs.
- 1.7 Interface to Fishery Operations and Damage to Fishing Gear
- .1 Become familiar with fishery activities. Clearly mark dredging area, disposal areas and routes to and from dredging and disposal areas during periods when fishing gear is set in areas adjacent to dredging operations with "Cautionary Buoys" in accordance with Coast Guard Standard TP968.
- (<http://www.ccg-gcc.gc.ca/folios/00020/docs/CanadianAidsNavigationSystem2011-eng.pdf>)
- All buoys must be coloured cautionary yellow - CGSB # 505-108, and be equipped with radar reflectors.
- Be responsible for all costs associated with the supply, installation and removal of all necessary temporary aids. The Contractor will receive approval from the District Fisheries Officer for the location of the buoys, upon review and acceptance of temporary aids by the *Departmental Representative*.
- Keep Canadian Coast Guard informed of buoyed corridors in order that necessary Notices to Shipping can be issued
- .2 Execute the work to ensure damage does not occur to fishing gear and interference to fishing operations is minimized by conducting operations within

the areas so marked.

- .3 Be responsible for damage to fishing gear outside marked areas, if as a result of dredging activities, and if damage occurs, assume responsibility for replacement or repair costs and cost of lost fishing opportunity.
- 1.8 Requirements of Regulatory Agencies
- .1 Perform work in accordance with municipal, provincial and/or national codes relating to the project. In any case of conflict or discrepancy, the more stringent requirements will apply.
 - .2 Meet or exceed requirements of specified standards, codes and referenced documents.
 - .3 Mark floating equipment with lights in accordance with Regulations for the Prevention of Collisions, as required by Transport Canada.
 - .4 Contractor will be required to obtain prior approval from applicable regulatory agencies for any dredging outside specified dredging limits.
- 1.9 Floating Plant
- .1 Dredges or other floating plant to be used in the performance of the Work must be on Canadian or European Union member state registry, having in the latter case been granted a temporary license under the Coasting Trade Act. For dredges or other floating plant that are not of Canadian or European Union member state make or manufacture, the Bidder must obtain a certificate of qualification from Industry Canada and this certificate must accompany the bid. Plant so qualified by Industry Canada may be accepted on this project.
- 1.10 Datum
- .1 Horizontal Datum: All horizontal coordinates used in this specification and contract drawings are in metres

referenced to U.T.M. projection based on the North American Datum, 1983, (NAD83, Zone 19). Survey control monuments and their coordinate values are shown on Plan. Additional coordinate monument locations and values can be obtained from the appropriate Land Registration and Information Services department.

.2 Vertical Datum: All elevations and soundings used in this specification and contract drawings are in metres referenced to Chart Datum. For purposes of this contract see Section 3.1.6 for tidal data information.

1.11 Site Information

.1 Results of the most recent soundings are included on the drawings. This pre-tender data is made available for tendering purposes only. It should be noted that this information may differ from present site conditions.

.2 It is anticipated that the following materials will be encountered within the dredging limits, but are not limited to:

Class "B" Materials in all areas

.3 The Contractor shall take the necessary steps to become fully familiar with potential inclement weather and sea conditions in this area.

.4 The Contractor will be responsible for making his own interpretation of soil conditions.

1.12 Dredging Equipment

.1 Provide suitable lighting on the dredge for free movement of *Departmental Representative* to inspect work in progress during night dredging operations. Lighting to illuminate all walkways, ladders etc. to safely permit inspection of dredging operation.

.2 The physical description of materials, as

described in **Appendix A** (grain size table of Marine Sediment Sampling Program), is based on small samples and is not necessarily indicative of the overall soil conditions.

- .3 On request, prove to the satisfaction of the *Departmental Representative* that the dredging equipment and plant are adequate to finish the work to quality, time and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.
- .4 Contractor shall be responsible for ensuring that equipment can access and function at the disposal site.

1.13 Survey Requirements

- .1 The Contractor shall provide, at his expense, a survey vessel, equipment and crew to set up and maintain survey control for the location of the dredge and dredge limits and to sound areas immediately after dredging to verify that grade depth has been attained. Areas are to be sounded with adequate coverage to provide a bathymetric printout of at least a 5 metre spacing on a UTM grid to the approval of the *Departmental Representative*. A copy of the Contractor's positioning and sounding records shall be provided to the *Departmental Representative*.

1.14 Sequence of Acceptable Work

- .1 Pre-dredge and post-dredge surveys will be conducted by PWGSC using electronic survey equipment sounding in the instantaneous mode. Sounder will be the Ross sounder sweep system using a 190-210 kHz transducer frequency positioned by DGPS Trimble R7 system. The results will be shown on survey plan at scale of 1:500 plotting average of instantaneous depths. Other survey procedures may be approved by the *Departmental Representative*.

- .2 A pre-dredge survey will be carried out by the *Departmental Representative* prior to commencement of dredging work by the contractor. The dredge limits may be revised by the *Departmental Representative* to accommodate the changes in bathymetry that may have occurred between the pre-dredge survey and the initial tender survey. Revision of the cubic metre quantity will take place accordingly if the dredge limits are revised.
- .3 No area will be dredged prior to *Departmental Representative* and Contractor's mutual acceptance of the pre-dredge survey for that area.
- .4 Post-dredge survey will be undertaken by the Contractor upon completion of dredging of all areas identified in pre-dredge survey. Submit results as indicated in item 1.14 above. Only when this survey shows that all soundings are at or below grade that the *Departmental Representative* will do a post-dredge survey. The survey will use the same type of equipment as used in the pre-dredge survey. It will be subject to weather conditions and the availability of functional survey equipment. The survey will confirm if dredging is completed as specified. Survey will be by electronic sweep equipment sounding in instantaneous mode. Survey plan at 1:500 scale plotting the average of instantaneous depths obtained in this survey will identify areas requiring reworking to obtain the dredge grade depths where indicated on the plan.

The Contractor will redredge as necessary to remove all material within the dredge areas which is found to be above the average of instantaneous elevations as specified on post dredge survey drawings.

- 1.15 Measurement for Payment
- .5 All additional surveys require to clear the dredge area will be undertaken by the *Departmental Representative* at Contractor's cost.
 - .6 All surveys will be performed to Canadian Hydrographic Service Standards.
 - .1 Dredging and removals will be measured in accordance with Section 01 29 00.
 - .2 The dredge areas are defined by coordinates and dimensions, as shown on the drawings.
 - .3 For the purpose of quantity computation, existing seabed elevation will be represented by and "Average of Instantaneous" sounding for each matrix block of the pre-dredge survey performed by the *Departmental Representative* as soon as practical after contract award. Post dredging elevations for quantity computations will be: (1) grade, or (2) the "Average of Instantaneous" sounding for each matrix block of the post-dredge survey, whichever is shallower. The method of calculation and the quantity of material removed for measurement for payment will be determined by the *Departmental Representative*.
 - .4 No payment will be made for the Contractor's survey vessel, equipment and crew or diving services.
 - .5 All operations in connection with the field positioning of dredging equipment will be considered incidental to the work and will not be measured separately for payment.
 - .6 Payment for dredging shall include the disposal of dredge material, at the designated land disposal site, and in manners specified.

- .7 There will be no additional payment for temporary structures used in dredging operations.
- .8 There will be no additional payment for delays caused by fishing seasons.
- .9 There will be no additional payment for delays caused by vessel traffic.
- .10 There will be no additional payment for down time, mechanical or weather-related.
- .11 There will be no additional payment for delays caused by navigational buoys in dredge areas.
- .12 Once designated areas have been dredged and cleared, all subsequent infilling shall be deemed as additional to the contract if removal is required.
- .13 Removal of material infilling during dredging will not be measured separately for payment.
- .14 There will be no additional payment for land disposal of debris not suitable for the disposal site.
- .15 There will be no additional payment for berthing or mooring facilities for the dredge plant or any other floating equipment.
- .16 The entire area of each site, at all sites, as shown on the plan, shall be fully covered during dredging.
- .17 There will be no additional payment for delays or changes in dredging methods required as a result of water quality monitoring results.

Part 3 - EXECUTION

3.1 General

- .1 The Contractor shall do the following in executing the work.
 - .1 Mark floating equipment with lights in accordance with International Rules of Road and maintain a radio watch on board.
 - .2 Place and maintain buoys, ranges, markers and lights required to define work. The *Departmental Representative* will provide the coordinate values for all dredge limits on the drawings.
 - .3 Maintain and lay out work from bench marks and control points as shown on Plan and noted in the Specifications. Any additional control points and tidal reference stations required to control dredging operations are the responsibility of the Contractor. The Contractor is to maintain these control points and tidal reference stations for the duration of the project and at the Contractor's cost.

Obtain owner's permission, in writing, to establish layout monuments and erect targets on private property and pay all associated rental costs. Provide access to layout monuments for departmental survey crews. Any damage to private property will be made good by the Contractor to the satisfaction of the *Departmental Representative* at no cost to the owner.
 - .4 For accurate dredge control, the Contractor is to provide and maintain on the dredge electronic position fixing and distance

measuring equipment with associated computer software capable of providing a printout showing dredge position. Equipment is to provide a continuous coordinated position of the dredge in the U.T.M. Coordinate Grid System with an accuracy of ± 3.0 metres or less.

- .5 All survey equipment provided on the dredge by the Contractor is to be made accessible to the *Departmental Representative* for his use.
- .6 Establish accurately and maintain water level gauges or tide boards in order that proper depth of dredging can be determined. Locate gauges so as to be clearly visible at all times.

The Contractor is to provide a tidal monitoring system to read and record the tide level at a maximum of 15 minute intervals. These records are to be made available for the inspection and use of the *Departmental Representative*. If using an electronic tide gauge, the Contractor must check the accuracy of the gauge daily. The gauge must be accurate to ± 2 cm. The monitoring system is to be approved by the *Departmental Representative*.

- .7 Dredge areas to grade depths below Chart Datum where indicated on the drawing.
- .8 Dredge all side slopes to two horizontal to one vertical unless otherwise noted.
- .9 Remove all materials above specified grade depth and side slopes, within limits indicated. Material removed from below grade depth or outside specified area or side slope is not part of work and will not be measured.
- .10 Remove shoaling which occurs as a

- result of the work at no expense to *Departmental Representative*.
- .11 Remove material cast over on to surrounding area and dispose of it as dredged material at Contractor's expense. Casting over of material is not permissible unless authorized by the *Departmental Representative*.
 - .12 The Contractor is responsible for the removal of infilling in dredge areas which occurs prior to acceptance by the *Departmental Representative*.
 - .13 Immediately notify the *Departmental Representative* upon encountering any object which might be classified as an obstruction. By-pass the object, after clearly marking its location by coordinates and continue work.
 - .14 It will be the Contractor's responsibility to gain access to the dredge area. The construction of causeways, roads, etc., will be at the Contractor's expense and will be removed at the completion of the project. Any derricks, power lines, etc., which will require removal will be done so at the Contractor's expense and will be replaced to satisfaction of the *Departmental Representative*. Contractor to advise *Departmental Representative* of his proposed method to carry out dredging and disposal of the material.
 - .15 Provide dump scows capable of maintaining dredge materials within hoppers until delivery to disposal site. The *Departmental Representative* has the right to order removal of dump scows from the site where leakage from the dump scows is deemed to be excessive.
 - .16 Arrange and pay for berthing and mooring facilities for dredge plant

and other floating equipment.

- 3.2 Encountering Class "A" Material .1 Identify areas where Class "A" material is encountered above specified dredge grade, work equipment, which may require the use of toothed buckets, over areas to remove all Class "B" material, until *Departmental Representative* is satisfied that further removal cannot be accomplished without blasting. Immediately identify these areas with UTM coordinates, and provide information to *Departmental Representative*.
- 3.3 Rock Removal .1 If rock or boulders are to be removed by blasting, submit to *Departmental Representative* for review, two weeks before removal, details of proposed blasting operations showing types and quantities of explosives, loading charges and patterns, type of caps, blasting techniques, blast protection measures, time of blasting and other pertinent details. Submit subsequent charges to *Departmental Representative* before proceeding.
- 3.4 Existing Navigation Buoys .1 The Contractor will make arrangements with Transport Canada for the removal and reinstallation of the existing buoys, as required to carry out the dredging operations.
- 3.5 Disposal of Dredge Materials .1 Refer to **Environmental Protection Procedures for Marine Work - Section 01 35 44** for related information.
- The Contractor shall dispose of dredged material by depositing in the disposal area as identified in **Section 01 35 44** and in such a manner as approved by *Departmental Representative*.
- .2 The Contractor will only utilize a route to the dredge disposal site that is approved by the landowner and will be

responsible to maintain the access in good condition during the dredging period. Depending on the condition of the access road it may be necessary to haul in suitable material to maintain the road. The access road to the site is to be left in good condition at the conclusion of the dredging operations.

- .3 Subject to the time of year and water content of the dredged material, the Contractor will be required to leave the disposal site in good condition and to the satisfaction of the *Departmental Representative* prior to demobilizing from the site.
- .4 All materials deposited on private or public roads or properties in vicinity of site or as a result of trucking material to dump site will be removed by the Contractor to satisfaction of owners involved at no additional cost.
- .5 The Contractor shall ensure that trucks used in the transportation of dredge material are roadworthy and have tight fitting gates to prevent spills on the road. Trucks not meeting this criteria may be removed from the project by the *Departmental Representative*.
- .6 Timber, logs and cable must not be disposed of at the dredge disposal site. This debris must be disposed of ashore at an appropriate landfill other than the containment facility. This debris and its disposal will not be measured for payment but is incidental to dredging.
- .7 Ocean disposal of dredge material is not permitted.
- .1 Use extreme care when dredging adjacent to existing structures. Any damage to these structures caused by dredging closer than specified to be repaired at

3.6 Operation in
Vicinity of
Structures

Contractor's expense. In completing repairs, new materials are to be used. All materials and work performed to be approved by the *Departmental Representative*.

- .2 Do not dredge material from areas lying within 1.5 metres of existing structures, unless authorized in writing by the *Departmental Representative*.
- .3 The use of the public wharves will be permitted for dredging operations including offloading, however the Contractor must take all precautions to prevent damage to the structure. Any damage to the wharf resulting from the Contractor's operations will be repairs at Contractor's expense.

- 3.7 Cooperation and Assistance to Departmental Representative
- .1 Cooperate with *Departmental Representative* on inspection work and provide assistance requested.
 - .2 On request of *Departmental Representative*, furnish use of such boats, equipment, labour and materials forming ordinary and usual part of dredging plant as may be reasonably necessary to inspect and monitor work. Provide approved duty boat to transport inspectors to and from dredge, at beginning and end of each inspection shift. Inspection shifts will be 8 hours in duration. The duty boat must be of adequate size and power to operate safely in conditions encountered. It must be fitted with a sufficient number of approved life jackets and hard hats for inspection staff.
 - .3 Provide *Departmental Representative* or inspector with copies of, or access to, daily records of dredging activity, including areas dredged, type of material, scow measure of material dredged (daily and accumulated), hours of dredging, hours and reasons for downtime, and other information regarding dredging and disposal as requested by the *Departmental Representative*.

-----END of SECTION-----



**SNS-CRA-08/14
MARINE SEDIMENT SAMPLING PROGRAM
PLEASANT BAY SMALL CRAFT HARBOUR
PLEASANT BAY, NOVA SCOTIA**

FINAL REPORT

Submitted to:
Public Works and Government Services Canada
1713 Bedford Row
Halifax, Nova Scotia
B3J 3C9

Submitted by:
Conestoga-Rovers & Associates Ltd.
45 Akerley Boulevard
Dartmouth, Nova Scotia
B3B 1J7

October 2014

088617

October 2, 2014

Mr. Troy Young
Public Works and Government Services Canada
1713 Bedford Row
Halifax, Nova Scotia
B3J 3C9

Dear Mr. Young:

**Re: Marine Sediment Sampling Program
Pleasant Bay Small Craft Harbour
Fisheries and Oceans Canada – Small Craft Harbours**

Conestoga-Rovers & Associates Ltd. (CRA) is pleased to submit this report for the Marine Sediment Sampling Program conducted in August 2014 at the Pleasant Bay Small Craft Harbour in Pleasant Bay, Inverness County, Nova Scotia. CRA welcomes the opportunity to discuss the program or answer any questions regarding this report.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES



Peter Oram, P.Geo.



Amanda Facey, B.Sc.

EXECUTIVE SUMMARY

Four sediment samples were collected by a diver at the Pleasant Bay Small Craft Harbour. The samples were submitted to Maxxam Analytics for detailed analyses. Results were compared to the Canadian Environmental Protection Act (CEPA) Disposal at Sea Regulations, Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the Protection of Environmental and Human Health in agricultural, residential/parkland, commercial, and industrial applications, Atlantic Risk-based Corrective Action (RBCA) for Petroleum Impacted Sites in Atlantic Canada Version 3 Tier I Risk-based Screening Levels (RBSLs) for soil, and the Nova Scotia (NS) Guidelines for Disposal of Contaminated Solids in Landfills. Leachate results were compared to Health Canada's Guidelines for Canadian Drinking Water Quality and CCME Water Quality Guidelines.

Table ES1 Exceedance Table

Guideline/Parameter	Sample ID			
	SED-1	SED-2	SED-3	SED-4
CEPA	•	-	-	-
CCME SQGs				
PAHs	•	•	•	-
Metals	•	•	•	-
PCBs	-	-	-	-
DDT	-	-	-	-
Atlantic RBCA Version 3 Tier 1 RBSLs	•	•	•	-
NS Guidelines for Disposal of Contaminated Solids in Landfills	-	-	-	-

- Indicated an exceedance

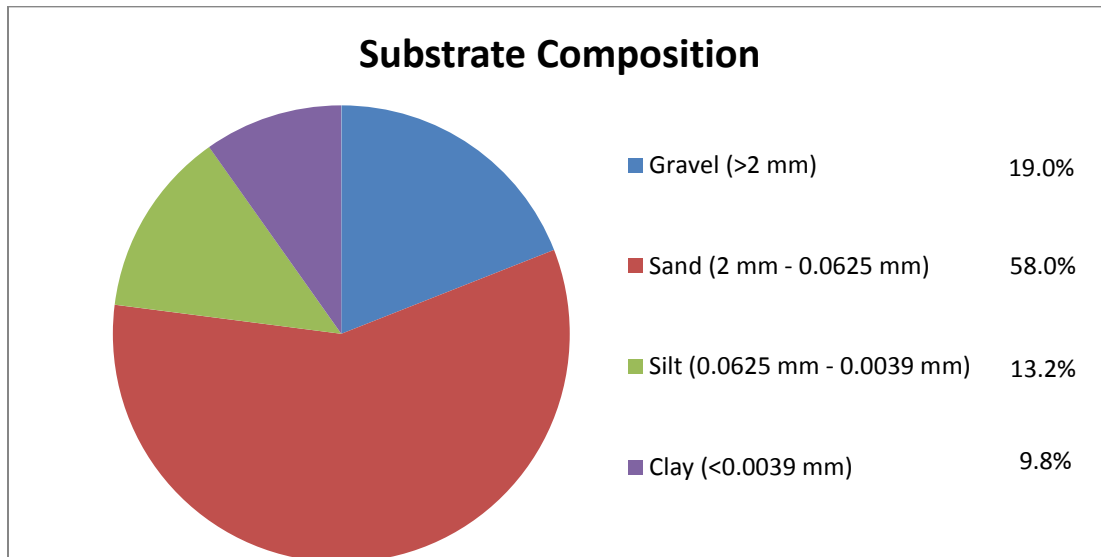


Figure ES1 Substrate Composition Averaged from Sampling Locations within Proposed Dredging Area

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Public Works and Government Services Canada
Marine Sediment Sampling Program
Pleasant Bay Small Craft Harbour
October 2, 2014



LIST OF APPENDICES

Appendix A	MSSP Field Report and Photo Log
Appendix B	Analytical Summary Tables
Appendix C	QA/QC, COC, and Laboratory Certificates of Analyses
Appendix D	Limitations

1.0 INTRODUCTION

At the request of Public Works and Government Services Canada (PWGSC), four (4) stations were sampled within the footprint of the proposed dredging area at the Pleasant Bay Fisheries and Oceans Canada Small Craft Harbour (DFO SCH) on August 20, 2014.

2.0 SCOPE AND METHODOLOGY

2.1 Site Plan

A random approach was implemented to determine the location of sampling stations in the proposed dredging area of the SCH. The unstratified area was divided into numbered square blocks of at least 30 cells that are spatially representative of the dredge area. The Excel RANDBETWEEN function was then used to generate numbers that represent the numbered cells and, subsequently, the sampling locations within the proposed dredge area (Figure 2.1).

A detailed program design was prepared by Conestoga-Rovers & Associates Limited (CRA) and submitted to PWGSC on July 23, 2014 for review and approval prior to field program implementation. The field program was scheduled upon acceptance of the design and scheduling the diver.

Sample collection, preparation, and analyses were conducted in accordance with Environment Canada's publication Guidance Document on *Collection and Preparation of Sediments for Physicochemical Characterization and Biological Testing*, December 1994. Connors Diving Services Limited was retained to collect the sediment samples. The sample collection field program was completed in accordance with guidelines defined by provincial Workplace Health and Safety Regulations.

2.2 Sample Collection

The marine sediment samples were collected by a diver. A handheld Topcon GMS-2 global positioning system was used to georeference the sampling location coordinates that were derived prior to field program initiation. Sample station coordinates are listed in Table 2.1. Marine Sediment Sampling Program (MSSP) field notes that were completed in the field during the sampling program are provided in Appendix A.

The weather during the field program was rain and wind, and the temperature was approximately 15°C. The water was relatively calm in the harbour, but rough in the entrance to the harbour (*i.e.*, between the breakwaters). Site conditions resulted in a change to the proposed sample location of SED-4. Due to the high waves in the area where SED-4 was originally proposed, the sample location was moved southeast, further into the harbour, for the safety of the diver and his support team in the boat.

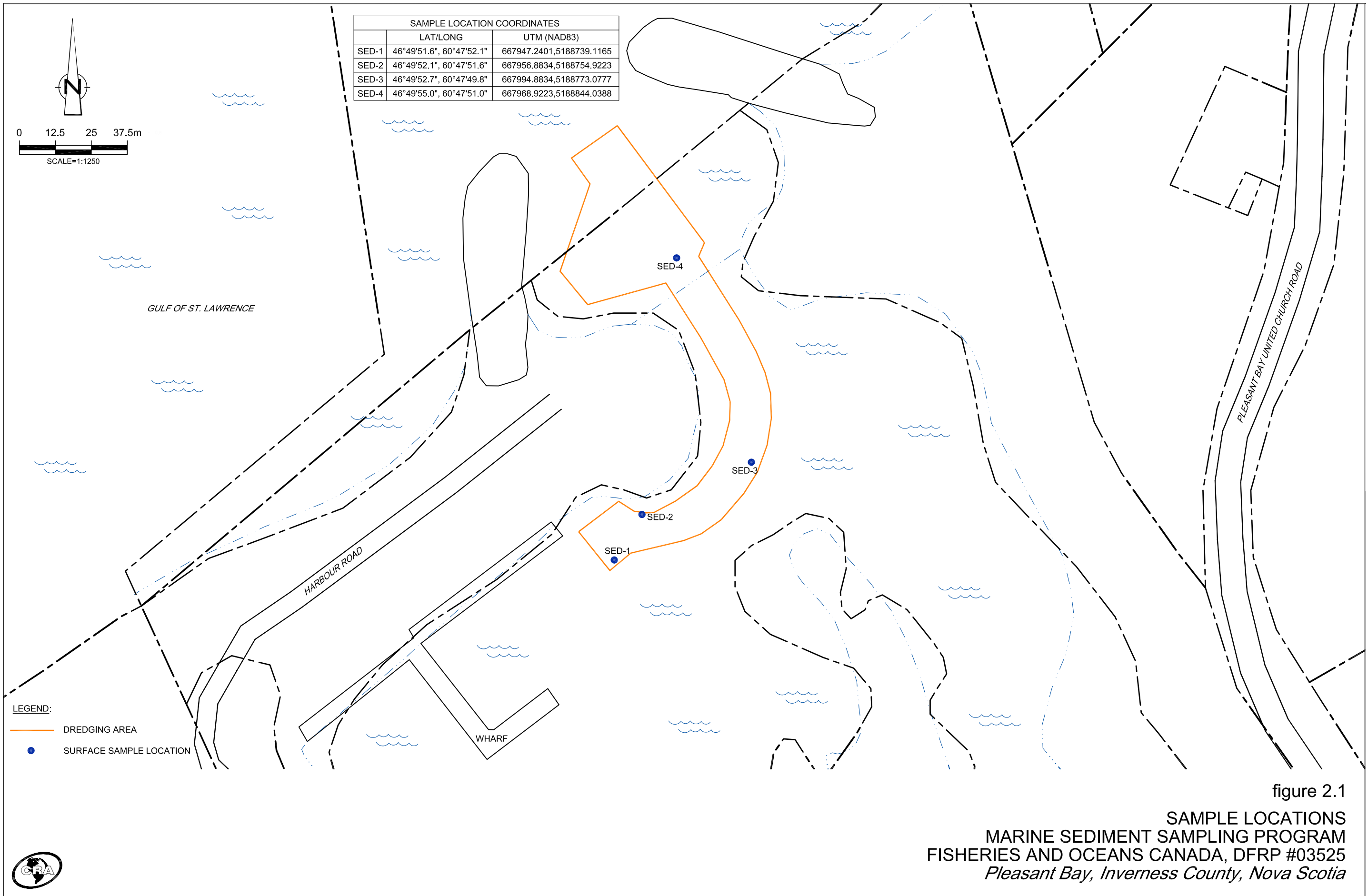


figure 2.1
 SAMPLE LOCATIONS
 MARINE SEDIMENT SAMPLING PROGRAM
 FISHERIES AND OCEANS CANADA, DFRP #03525
 Pleasant Bay, Inverness County, Nova Scotia





Samples SED-1, SED-2, and SED-3 contained dead plant litter. SED-2 and SED-3 contained a large amount of leaves and sticks. Pleasant Bay Harbour is located at the mouth of the Grande Anse River. Materials, including plant material, would be carried downstream and deposited in the harbour. No fauna or live marine flora were observed in the field, and the photos taken by the diver did not show any fauna or live marine flora. Photos of the sample locations are included in Appendix A.

In order to facilitate the determination of all disposal options, the sample analytical results were compared to the following:

- Canadian Environmental Protection Act (CEPA) Disposal at Sea Regulations – Lower Level;
- Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the Protection of Environmental and Human Health in agricultural, residential/parkland, commercial, and industrial applications;
- Atlantic Risk-based Corrective Action (RBCA) for Petroleum Impacted Sites in Atlantic Canada Version 3 Tier I Risk-based Screening Levels (RBSLs); and
- Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills.

Leachate results were compared to the following:

- Health Canada’s Guidelines for Canadian Drinking Water Quality (GCDWQ); and
- CCME Water Quality Guidelines (WQGs).

The following guidelines have been provided for reference:

- CCME Sediment Quality Guidelines Interim Sediment Quality Guidelines; and
- CCME Sediment Quality Guidelines Probable Effect Levels for the Protection of Marine Aquatic Life.

Table 2.1 Sample Coordinates

Sample ID	Sample Coordinates (decimal degrees, NAD 83)	
SED-1	46.831	60.797805
SED-2	46.831138	60.797666
SED-3	46.831305	60.797166
SED-4	46.831944	60.7975

3.0 ANALYTICAL RESULTS

The analytical results of the marine sediment samples collected and analyzed from Pleasant Bay SCH are summarized in Tables B.1 to B.5 (Appendix B) and discussed below.

Based on a review of the initial analytical results, it was decided through consultation with PWGSC that SED-1 and SED-2 should undergo additional leachate analyses (Synthetic Precipitation Leaching Procedure [SPLP]) for their exceedances of the CCME SQGs and

Atlantic RBCA RBSLs. SPLP analyses were done on both samples for PAHs, boron, and total petroleum hydrocarbons (TPH). SPLP leachate results from these analyses were compared against Health Canada's GCDWQ and CCME WQGs.

It is also of note that for the PAHs and metals results, only those parameters for which there are established regulatory guidelines or those used in calculations are included in the tables. The complete set of analytical results, including laboratory quality assurance/quality control (QA/QC) and Certificates of Analyses for all parameters tested are provided in Appendix C.

3.1 PAH Concentrations

Total PAH levels are regulated at a value of less than or equal to 2.5 milligrams per kilogram (mg/kg) under CEPA in order to meet Disposal at Sea Regulations. The CCME SQGs for the Protection of Environmental and Human Health stipulate guideline values for individual PAH compounds as well as the sum of individual PAH compounds for the calculation of index of additive cancer risk (IACR). PAH concentrations have also been compared to the Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills. A summary of the results compared to each of the referenced guidelines is provided in the following subsections:

CEPA Ocean Disposal

All four samples were below the CEPA lower level screening criterion for total PAHs (Table B.1).

CCME SQGs – Human Health (Potable Water)

SED-1 and SED-2 exceeded the CCME IACR (drinking water check) value of 1.0 mg/kg (concentrations – 2.21 and 1.02 mg/kg, respectively) or the CCME SQG for the Protection of Human Health (potable water) for all land use scenarios (Table B.1).

CCME SQGs – Human Health (Direct Contact)

Guidance provided in the CCME SQGs for the Protection of Environmental and Human Health (2010) indicates that for soil contaminated by coal tar or creosote mixtures, the calculated Benzo(a)pyrene total potency equivalent (B(a)P TPE) concentration for soil samples should be multiplied by an uncertainty factor of three prior to comparison with the SQGs for the Protection of Human Health (direct contact) to account for carcinogenic potential of alkylated and other PAHs present for which a potency equivalence factor does not currently exist, but which are likely to contribute to mixture carcinogenic potential.

Analytical results from the open flame ionization detector scan revealed that creosote was not detected in the four samples analyzed. Results of the four samples (SED-1 0.12 mg/kg, SED-2 0.07 mg/kg, SED-3 0.02 mg/kg, SED-4 0.01 mg/kg) fell below the CCME SQG for the Protection of Human Health (direct contact) for the agricultural, residential/parkland, commercial, and industrial value of 5.3 mg/kg (Table B.1).

CCME SQGs – Environmental Health (Soil Contact, Soil and Food Ingestion, and Freshwater Life)

No samples exceeded the CCME SQGs for the Protection of Environmental Health - soil contact or soil and food ingestion. SED-1 and SED-3 exceeded the CCME SQGs for the Protection of Environmental Health – freshwater life for all land use scenarios (Table B.1).

SED-1 and SED-2 exceeded the Interim Soil Quality Criteria for agricultural land use. (Table B.1).

Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills

No samples exceeded the Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills (Table B.1).

CCME WQGs – Aquatic Life (Freshwater and Marine)

SED-1 and SED-2 were analyzed for leachate. Both samples exceeded CCME WQG for the Protection of Aquatic Life in freshwater environments for anthracene. The RDLs for fluoranthene and pyrene were elevated due to detected levels in the leachate blank, resulting in the RDLs for these parameters being above the guidelines. No exceedances of the CCME WQGs for the Protection of Aquatic Life in marine environments were noted (Table B.1b).

Health Canada GCDWQ Maximum Acceptable Concentration (MAC) and Aesthetic Objective (AO)

SED-1 and SED-2 were analyzed for leachate. Concentrations in both samples were below Health Canada's GCDWQ MAC for benzo(a)pyrene (Table B.1b).

3.2 Metal Concentrations

Sample results were compared to the established CEPA Disposal at Sea Regulations screening criteria. The results were also compared to the CCME SQGs for agricultural, residential/parkland, commercial, and industrial applications for land disposal, and the Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills.

SED-1 exceeded the CEPA lower level screening criterion for cadmium (guideline – 0.6 mg/kg, concentration – 0.73 mg/kg) (Table B.2).

SED-1 exceeded the CCME SQG for molybdenum for agricultural land use (guideline – 5 mg/kg, concentration - 7 mg/kg) and SED-1, SED-2, and SED-3 exceeded the agricultural guideline for hot water soluble boron (guideline – 2 mg/kg, concentrations – 37, 26, and 17 mg/kg, respectively), (Table B.2).

No samples exceeded the Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills (Table B.2).

CCME WQGs – Aquatic Life (Freshwater and Marine)

Leachate analysis of SED-1 and SED-2 for boron did not exceed the CCME WQG for the Protection of Aquatic Life - freshwater (Table B.2b).

Health Canada GCDWQ MAC and AO

Leachate analysis of SED-1 and SED-2 for boron did not exceed the Health Canada GCDWQ MAC (Tables B.2b).

3.3 Petroleum Hydrocarbon Concentrations

Although no guidelines for petroleum hydrocarbons currently exist for marine sediment, the analytical benzene, toluene, ethylbenzene, and xylene (BTEX) results of the four samples collected were compared to the Atlantic RBCA Version 3 Tier 1 RBSLs, CCME SQGs for various land use applications, and the Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills. Silica gel clean-up was requested and completed prior to analysis.

Modified TPH values reflect the sum of the individual carbon fractions that resembles gasoline, diesel #2, and lube oil. Based on the resemblance results provided by the laboratory, the analytical results for modified TPH were compared against the corresponding Atlantic RBCA Version 3 Tier 1 RBSLs.

Carbon fractions in the F2 range were reported below laboratory detection limits for all of the samples. Carbon fractions in the F1 and F3 range had detectable concentrations. All samples reached baseline at C32 (Table B.3).

BTEX was not detected in any of the samples (Table B.3).

The modified TPH values exceeded the Atlantic RBCA Version 3 Tier 1 RBSLs in SED-1, SED-2, and SED-3 for residential, coarse-grained, potable and non-potable scenarios (Table B.3).

CCME WQGs – Aquatic Life (Freshwater and Marine)

SED-1 and SED-2 were analyzed for TPH leachate. There are no CCME WQGs for the Protection of Aquatic Life, freshwater or marine, for TPH (Table B.3b).

Health Canada GCDWQ MAC and AO

There are no GCDWQ MACs or AOs for TPH (Table B.3b).

3.4 PCB Concentrations

Total PCB values are regulated at a value of less than or equal to 0.1 mg/kg under CEPA in order to meet Disposal at Sea Regulations. The CCME SQGs for PCBs in agricultural, residential/parkland, and commercial and industrial applications are regulated at values of 0.5, 1.3, and 33.0 mg/kg, respectively.

All of the samples had non-detectable concentrations of PCBs; however, due to high moisture content in the samples, the reportable detection limits (RDLs) for SED-1 and SED-2 were elevated above the CEPA screening criterion for total PCBs. Some RDLs for SED-1, SED-2, and SED-3 were elevated above some of the CCME Sediment Quality Guidelines (provided for reference) (Table B.4).

3.5 DDT Concentrations

Total DDT, which refers to the sum of DDE, DDD, and DDT concentrations, is regulated under the CCME SQGs for agricultural, residential/parkland, and commercial and industrial applications at values of 0.7, 0.7, and 12 mg/kg, respectively.

All of the samples had non-detectable concentrations of DDT; however, due to high moisture content in the samples, the RDLs for all of the samples were elevated above some of the CCME Sediment Quality Guidelines (provided for reference) (Table B.4).

3.6 Carbon Content

The four samples showed total carbon contents ranging from 0.9 to 62 grams per kilogram (g/kg). Total organic carbon ranged from 0.31 to 63 g/kg, while total inorganic carbon ranged from 0.58 to 22 g/kg (Table B.5).

3.7 Grain Size Distribution

Sediment composition is described in Figure 3.1 and Table 3.1 below based on results from Maxxam. Figure 3.1 illustrates the overall substrate composition from all sampling locations expressed as percentages to show the average grain size distribution within the proposed dredge area. Table 3.1 breaks down the sediment composition at each sampling location.

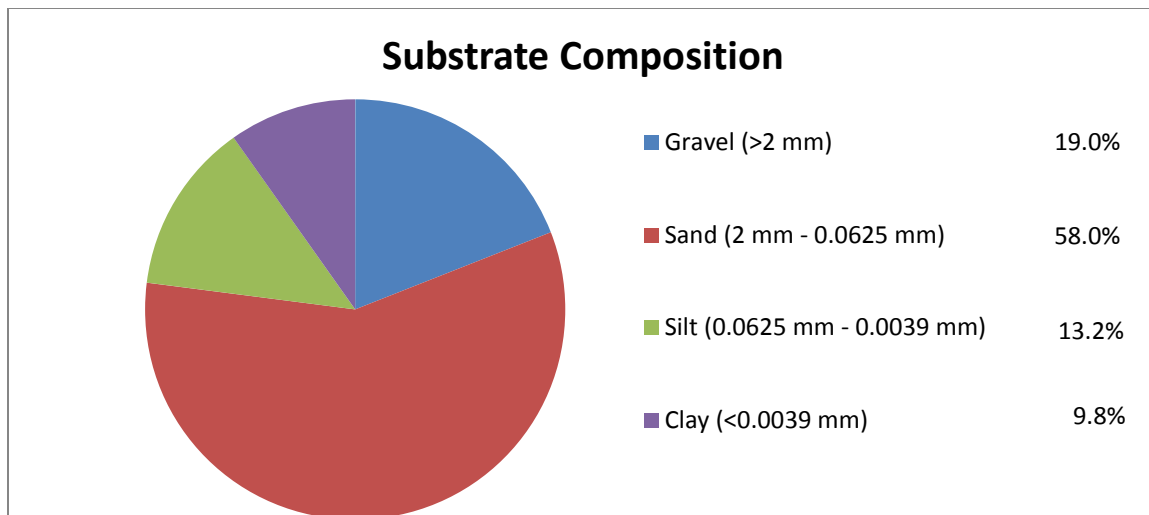


Figure 3.1 Substrate Composition Summarized From Sampling Locations within Proposed Dredging Area

Table 3.1 Dominant Sediment Types at Each Sample Location

Sediment Distribution				
Sample ID	Primary Substrate	Secondary Substrate	Tertiary Substrate	Quaternary Substrate
SED-1	Sand	Silt	Clay	Gravel
SED-2	Sand	Silt	Clay	Gravel
SED-3	Sand	Silt	Clay	Gravel
SED-4	Gravel	Sand	Clay	Silt

4.0 QUALITY ASSURANCE/QUALITY CONTROL

All samples collected were labelled on site using a waterproof marker with the date, sample site identifier, and sample identification. The samples were placed upright on ice inside a cooler for safe storage and transport, and were hand-delivered to the laboratory following program completion. A copy of the chain of custody (COC) that accompanied the samples is provided in Appendix C. Additional samples were collected to safeguard against loss or damage during transport, and will be stored and refrigerated until the final report is received by PWGSC.

Sample collection, preparation, and analyses followed guidance provided in the afore-referenced Environment Canada document. Samples were analyzed by an accredited laboratory with CALA and/or ISO/IEC 17025 and is certified by the Standards Council of Canada for each selected chemical analyses of this program. The complete set of analytical results, including laboratory QA/QC and certificates of analyses for all parameters tested, are provided in Appendix C.

The laboratory undertakes internal duplicate analyses for QA/QC purposes. Laboratory duplicate analyses were performed for total carbon, hot water soluble boron, leachable TPH, and BTEX to meet internal QA/QC objectives for the Pleasant Bay SCH samples submitted. No discrepancies were noted by the laboratory for the analyses performed.

To assess the quality of the analytical data, a review of the internal laboratory QA/QC results was completed and included a review of laboratory duplicate analyses, method blanks, surrogates, spike samples, and QA/QC standards. The following information applicable to this MSSP report's findings was noted:

- Recovery for gravel, sand, and silt is outside the control limits. The overall quality control for this analysis meets acceptability criteria.
- The matrix spike recovery for chromium VI was below the lower control limit. This may be due in part to the reducing environment of the sample. The matrix spike was reanalyzed to confirm result.
- The matrix spike results for leachable dibenz(a,h)anthracene were outside the acceptance limit. There was insufficient sample for repeat analysis.
- The RDL for boron is greater than the Nova Scotia Guideline for Disposal of Contaminated Solids in Landfills.

- Organochlorine pesticide analysis RDLs were adjusted for high moisture content in the samples and/or matrix interferences. Some of the RDLs were elevated above some of the CCME Sediment Quality Guidelines, which are only provided for reference.
- PCB analysis RDLs were adjusted for high moisture content in the samples. The RDLs for SED-1 and SED-2 were above the CEPA screening criterion.
- Leachable fluoranthene, phenanthrene, and pyrene had elevated RDLs due to detected levels in the leachate blank. The RDLs for fluoranthene and pyrene are above the CCME WQGs for the protection of freshwater life.

A senior CRA reviewer has reviewed this report prior to its release. The limitations of this document are provided in Appendix D.

5.0 CONCLUSION

The analytical results of the four sediment samples from the Pleasant Bay DFO SCH indicate that three of the four samples exceeded various screening levels and/or guidelines. The CEPA screening criterion was exceeded by SED-1 (cadmium). CCME SQGs for freshwater life were exceeded by SED-1 and SED-3 (phenanthrene and/or naphthalene). The CCME Interim Soil Quality Criteria for agricultural land use were exceeded by SED-1 and SED-2 (benzo(a)anthracene, benzo(b)fluoranthene and/or pyrene). SED-1 and SED-2 also exceeded the CCME SQG for potable water (index of additive cancer risk). The CCME SQG for agricultural land use was exceeded by SED-1, SED-2, and SED-3 (hot water soluble boron and/or molybdenum). SED-1, SED-2, and SED-3 exceeded the Atlantic RBCA Tier I RBSLs for residential land use. The CCME WQG for freshwater life was exceeded by SED-1 and SED-2 (leachable anthracene). Carbon content was predominantly organic. The overall composition of SED-1, SED-2, and SED-3 was sand with lower amounts of silt and clay. SED-4 was predominantly gravel with a smaller amount of sand.

6.0 CLOSING

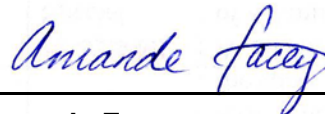
This document has been prepared and reviewed by the following people:

Reviewed by:



Peter Oram
Project Manager

Prepared by:



Amanda Facey
Project Coordinator



**CONESTOGA-ROVERS
& ASSOCIATES**

**APPENDIX A
MSSP Field Report
and
Photo Log**

MSSP FIELD REPORT

Site: Pleasant Bay SCH	Location: Pleasant Bay, Inverness Co.	Date: 20 Aug 2014	
Sample Collector: Connors Diving		Time: 1:20 pm	
Recorder: Amanda Facey		Average Water Temperature (°C):	
Collection Device: Bucket	Type of Vessel: Zodiac		

Site Description		
Air Temperature: 15 <input checked="" type="checkbox"/> °C <input type="checkbox"/> °F	Weather: Rain, wind	Photographs Taken: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Site Conditions: Water calm within harbour, very rough between breakwaters		
Observations:		

Sample Data					
Sample ID	Sediment Description ¹	Odour ²	Grab Depth (cm)	Flora/Fauna	Latitude and Longitude ³
SED-1	black, organics	strong sulfur	10-15	—	46.831 60.797805
SED-2	black, high organics	slight sulfur	10-15	—	46.83138 60.797666
SED-3	black, high organics	slight sulfur	10-15	—	46.831305 60.797166
SED-4	gravel	none	10-15	—	46.831944 60.7975

Additional Comments
SED-1, 2, 3 → high organics - harbour is at the mouth of a river; sticks, leaves, etc. would be deposited in the harbour from the river.
SED-4 → location had to be moved southeast (further into harbour) due to high waves/rough water at proposed location. Unsafe for diver at original location

Notes:
1. Sediment colour, gradient type, sediment type, texture and consistency, colour, presence of biota
2. Degree of odour (strong, slight, none)
3. Decimal degrees (DDD.dddd)



Photo 1: SED-1 – dead plant litter.

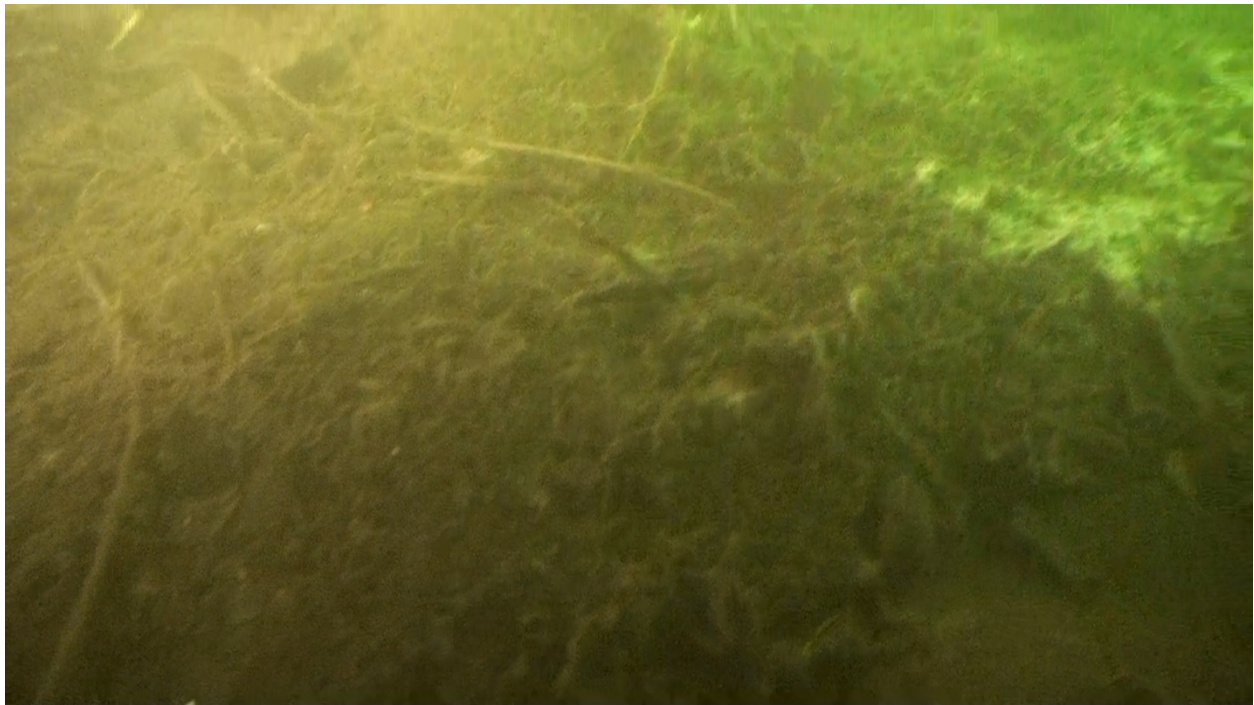


Photo 2: SED-2 – dead plant litter.



Photo 3: SED-3 – dead plant litter.



Photo 4: SED-4 – rocks, minimal dead plant litter.



**CONESTOGA-ROVERS
& ASSOCIATES**

APPENDIX B
Analytical Summary Tables

Table B.1. PAH Results for Marine Sediments - Pleasant Bay DFO-SCH, Inverness County, Nova Scotia

Parameter	RDL	B(a)P PEF	Units	Sample Identification and Date				CEPA Disposal at Sea Guidelines	CCME Sediment Quality Guidelines		CCME Soil Quality Guidelines									NS Landfill Guidelines
				SED-1	SED-2	SED-3	SED-4		Interim Sediment Quality Guidelines	Marine and Estuarine Probable Effects Levels	Human Health		Environmental Health			Interim Soil Quality Criteria				
				August 20, 2014							Potable Water	Direct Contact	Soil Contact		Soil and Food Ingestion	Freshwater Life	Agricultural Use	Residential/Parkland Land Uses	Commercial, Industrial Land Uses	
Polycyclic Aromatic Hydrocarbon (PAH) Results																				
1-Methylnaphthalene	0.0050			0.0052	<0.0050	<0.0050	<0.0050	-	-	-	-	-	-	-	-	-	-	-	-	10
2-Methylnaphthalene	0.0050			<0.0050	0.0097	<0.0050	<0.0050	-	0.0202	0.201	-	-	-	-	-	-	-	-	-	10
Acenaphthene	0.0050			0.024	0.018	0.013	<0.0050	-	0.00671	0.0889	-	-	-	21.5	0.28	-	-	-	-	10
Acenaphthylene	0.0050			<0.0050	<0.0050	<0.0050	<0.0050	-	0.00587	0.128	-	-	-	-	320	-	-	-	-	10
Anthracene	0.0050			0.081	0.070	0.024	<0.0050	-	0.0469	0.245	-	-	2.5	32	61.5	-	-	-	-	10
Benzo(a)anthracene	0.0050	0.1		0.14 (8)	0.060	0.020	<0.0050	-	0.0748	0.693	-	-	-	6.2	-	0.1	1	10	10	
Benzo(a)pyrene	0.0050	1		0.063	0.040	0.011	<0.0050	-	0.0888	0.763	-	-	20	72	0.6	8800	0.7	0.7	1.4	10
Benzo(b)fluoranthene	0.0050	0.1		0.13 (8)	0.052	0.018	<0.0050	-	-	-	-	-	-	6.2	-	0.1	1	10	10	
Benzo(g,h,i)perylene	0.0050	0.01		0.031	0.021	<0.0050	<0.0050	-	-	-	-	-	-	-	-	-	-	-	-	10
Benzo(j)fluoranthene	0.0050	0.1		0.058	0.033	<0.0050	<0.0050	-	-	-	-	-	-	-	-	-	-	-	-	10
Benzo(k)fluoranthene	0.0050	0.1		0.054	0.024	<0.0050	<0.0050	-	-	-	-	-	-	6.2	-	0.1	1	10	10	
Chrysene	0.0050	0.01	mg/kg	0.15	0.066	0.029	<0.0050	-	0.108	0.846	-	-	-	6.2	-	-	-	-	-	10
Dibenz(a,h)anthracene	0.0050	1		<0.0050	<0.0050	<0.0050	<0.0050	-	0.00622	0.135	-	-	-	-	-	0.1	1	10	10	
Fluoranthene	0.0050			0.65	0.27	0.15	<0.0050	-	0.113	1.494	-	-	50	180	15.4	-	-	-	-	10
Fluorene	0.0050			0.039	0.039	0.024	<0.0050	-	0.0212	0.144	-	-	-	15.4	0.25	-	-	-	-	10
Indeno(1,2,3-cd)pyrene	0.0050	0.1		0.031	0.020	<0.0050	<0.0050	-	-	-	-	-	-	-	-	0.1	1	10	10	
Naphthalene	0.0050			0.011	<0.0050	0.022 (7)	<0.0050	-	0.0346	0.391	-	-	-	8.8	0.013	0.6	0.6	22	10	
Perylene	0.0050			0.51	0.098	0.081	<0.0050	-	-	-	-	-	-	-	-	-	-	-	-	10
Phenanthrene	0.0050			0.086 (7)	0.043	0.094 (7)	<0.0050	-	0.0867	0.544	-	-	-	43	0.046	0.1	5	50	10	
Pyrene	0.0050			0.23 (8)	0.17 (8)	0.090	<0.0050	-	0.153	1.398	-	-	-	7.7	-	0.1	10	100	10	
Total PAH				2.29	1.03	0.58	0.00	2.5	-	-	-	-	-	-	-	-	-	-	-	50
Index of Additive Cancer Risk				2.21	1.02	0.26	0.07	-	-	-	<1.0	-	-	-	-	-	-	-	-	-
B(a)P TPE (10 ⁻⁵)				0.12	0.07	0.02	0.01	-	-	-	-	5.3	-	-	-	-	-	-	-	-
Creosote or Coal Tar source suspected / known?				No*	No*	No*	No*	-	-	-	-	-	-	-	-	-	-	-	-	-
Uncertainty Factor Applied				NA	NA	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene TPE (10 ⁻⁵) with UF			mg/kg	NA	NA	NA	NA	-	-	-	-	5.3	-	-	-	-	-	-	-	-

CEPA = Canadian Environmental Protection Act - Disposal at Sea Regulations, September 9, 2009

CCME = Canadian Council of Ministers of the Environment - Sediment Quality Guidelines for the Protection of Aquatic Life (provided for reference)

CCME - Soil Quality Guidelines for the Protection of Environmental and Human Health, Polycyclic Aromatic Hydrocarbons 2010

NS Landfill Guidelines = Nova Scotia Environment and Labour - Guidelines for Disposal of Contaminated Solids in Landfills, March 22, 1992

Index of Additive Cancer Risk (potable water check) =

(([Benzo(a)anthracene]/0.33 mg-kg-1) + ([Chrysene]/2.1 mg-kg-1) + ([Benzo(b)fluoranthene]/0.16 mg-kg-1) + ([Benzo(a)pyrene]/0.37 mg-kg-1) + ([Indeno(1,2,3-cd)pyrene]/2.7 mg-kg-1) + ([Dibenz(a,h)anthracene]/0.23 mg-kg-1) + ([Benzo(g,h,i)perylene]/6.8 mg-kg-1)

B(a)P TPE = Benzo(a) Pyrene Total Potency Equivalents - the sum of estimated cancer potency relative to all B(a)P for all potentially carcinogenic substituted PAHs. The B(a)P TPE for a soil sample is calculated by multiplying the concentration of each PAH in the sample by its B(a)P PEF (Potency Equivalence Factor), as indicated above, and summing the products.

Where parameter is not detected, IACR and B(a)P TPE calculations use 1/2 the detection limit.

* Laboratory analysis indicated no presence of creosote.

RDL = reportable detection limit

- = no guideline

NA = not applicable

Exceedances are bolded:

- 1 CEPA
- 2 CCME Potable Water
- 3 CCME Direct Contact
- 4 CCME Soil Contact - Agricultural, Residential/Parkland
- 5 CCME Soil Contact - Commercial, Industrial
- 6 CCME Soil and Food Ingestion
- 7 CCME Freshwater Life
- 8 Interim Soil Quality Criteria - Agricultural
- 9 Interim Soil Quality Criteria - Residential/Parkland
- 10 Interim Soil Quality Criteria - Commercial, Industrial
- 11 NS Landfill Guidelines

Table B.1b. PAH Results for the Leachate Samples (Synthetic Precipitation Leaching Procedure) - Pleasant Bay DFO-SCH, Inverness County, Nova Scotia

Parameter	RDL	Units	Sample Identification and Date		CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life		Health Canada Guidelines for Canadian Drinking Water Quality		Groundwater Source Values (Not Guidelines)
			SED-1	SED-2	Freshwater	Marine	Maximum Acceptable Concentration	Aesthetic Objective	
			August 20, 2014						
Leachable Polycyclic Aromatic Hydrocarbons (PAHs)									
Leachable 1-Methylnaphthalene	0.012	µg/L	<0.012	<0.012	-	-	-	-	-
Leachable 2-Methylnaphthalene	0.012		<0.012	<0.012	-	-	-	-	-
Leachable Acenaphthene	0.0060		0.032	0.049	5.8	-	-	-	-
Leachable Acenaphthylene	0.0060		<0.0060	<0.0060	-	-	-	-	-
Leachable Anthracene	0.0060		0.02 (1)	0.029 (1)	0.012	-	-	-	-
Leachable Benzo(a)anthracene	0.0060		<0.0060	<0.0060	0.018	-	-	-	0.1
Leachable Benzo(a)pyrene	0.0060		<0.0060	<0.0060	0.015	-	0.01	-	0.01
Leachable Benzo(b)fluoranthene	0.0060		<0.0060	<0.0060	-	-	-	-	0.1
Leachable Benzo(g,h,i)perylene	0.0060		<0.0060	<0.0060	-	-	-	-	1
Leachable Benzo(j)fluoranthene	0.0060		<0.0060	<0.0060	-	-	-	-	0.1
Leachable Benzo(k)fluoranthene	0.0060		<0.0060	<0.0060	-	-	-	-	0.1
Leachable Chrysene	0.0060		<0.0060	<0.0060	-	-	-	-	1
Leachable Dibenz(a,h)anthracene	0.0060		<0.0060	<0.0060	-	-	-	-	0.01
Leachable Fluoranthene	0.050		<0.050*	<0.050*	0.04	-	-	-	-
Leachable Fluorene	0.0060		0.030	0.056	3	-	-	-	-
Leachable Indeno(1,2,3-cd)pyrene	0.0060		<0.0060	<0.0060	-	-	-	-	0.1
Leachable Naphthalene	0.023		<0.023	<0.023	1.1	1.4	-	-	-
Leachable Perylene	0.0060		0.010	<0.0060	-	-	-	-	-
Leachable Phenanthrene	0.060	<0.060	<0.060	0.4	-	-	-	-	
Leachable Pyrene	0.030	<0.030*	<0.030*	0.025	-	-	-	-	
IACR			0.76	0.76	-	-	-	-	

CCME = Canadian Council of Ministers of the Environment - Water Quality Guidelines for the Protection of Aquatic Life, long term

Health Canada - Guidelines for Canadian Drinking Water Quality, August 2012

IACR = Index of Additive Cancer Risk - calculated by dividing the leachate concentration of each carcinogenic PAH (numerator) by (Health Canada's Guidelines for Canadian Drinking Water Quality guideline for benzo(a)pyrene divided by the CCME potency equivalence factor for each of the parameters [Groundwater Source Values]) (denominator) and summing the products

Where parameter is not detected, the IACR calculations use 1/2 the detection limit.

RDL - reportable detection limit

* = RDL greater than guideline

- = no guideline

Exceedances are bolded:

1 CCME Freshwater

2 CCME Marine

3 Health Canada Maximum Acceptable Concentration

Table B.2. Metal Concentrations for Marine Sediments - Pleasant Bay DFO-SCH, Inverness County, Nova Scotia

Parameter	RDL	Units	Sample Identification and Date				CEPA Disposal at Sea Guidelines	CCME Sediment Quality Guidelines		CCME Soil Quality Guidelines				NS Landfill Guidelines
			SED-1	SED-2	SED-3	SED-4		Interim Sediment Quality Guidelines	Marine and Estuarine Probable Effects Levels	Agricultural	Residential/Parkland	Commercial	Industrial	
			August 20, 2014											
Antimony (Sb)	2.0		<2.0	<2.0	<2.0	<2.0	-	-	-	20	20	40	40	40
Arsenic (As)	2.0		4.0	2.3	2.3	<2.0	-	7.24	41.6	12	12	12	12	50
Barium (Ba)	5.0		59	49	72	14	-	-	-	750	500	2000	2000	2000
Beryllium (Be)	2.0		<2.0	<2.0	<2.0	<2.0	-	-	-	4	4	8	8	8
Boron (B)	50		<50*	<50*	<50*	<50*	-	-	-	-	-	-	-	2
Soluble (Hot Water) Boron (B)	0.30		37 (2)	26 (2)	17 (2)	0.88	-	-	-	2	-	-	-	-
Cadmium (Cd)	0.30		0.73 (1)	0.41	<0.30	<0.30	0.6	0.7	4.2	1.4	10	22	22	20
Chromium (VI)	0.2		<0.2	<0.2	<0.2	<0.2	-	-	-	0.4	0.4	1.4	1.4	8
Chromium (Cr)	2.0		22	18	18	5.5	-	52.3	160	64	64	87	87	800
Cobalt (Co)	1.0		7.7	5.7	6.9	2.0	-	-	-	40	50	300	300	300
Copper (Cu)	2.0		22	14	13	3.1	-	18.7	108	63	63	91	91	500
Lead (Pb)	0.50		17	10	12	3.5	-	30.2	112	70	140	260	600	1000
Mercury (Hg)	0.01		0.013	<0.010	<0.010	<0.010	0.75	0.13	0.7	6.6	6.6	24	50	10
Molybdenum (Mo)	2.0		7 (2)	3.2	<2.0	<2.0	-	-	-	5	10	40	40	40
Nickel (Ni)	2.0		18	14	14	4.3	-	-	-	50	50	50	50	500
Selenium (Se)	1.0		<1.0	<1.0	<1.0	<1.0	-	-	-	1	1	2.9	2.9	10
Silver (Ag)	0.50		<0.50	<0.50	<0.50	<0.50	-	-	-	20	20	40	40	40
Thallium (Tl)	0.10		0.31	0.20	0.24	<0.10	-	-	-	1	1	1	1	1
Tin (Sn)	2.0		<2.0	<2.0	<2.0	<2.0	-	-	-	5	50	300	300	300
Uranium (U)	0.10		5.2	2.3	2.4	0.50	-	-	-	23	23	33	300	-
Vanadium (V)	2.0		32	25	29	9.7	-	-	-	130	130	130	130	200
Zinc (Zn)	5.0		110	77	86	24	-	124	271	200	200	360	360	1500

CEPA = Canadian Environmental Protection Act - Disposal at Sea Regulations, September 9, 2009

CCME = Canadian Council of Ministers of the Environment - Sediment Quality Guidelines for the Protection of Aquatic Life (provided for reference)

CCME - Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health

NS Landfill Guidelines = Nova Scotia Environment and Labour - Guidelines for Disposal of Contaminated Solids in Landfills, March 22, 1992

RDL = reportable detection limit

* = RDL greater than guideline

- = no guideline available

Exceedances are bolded:

1 CEPA

2 CCME Agricultural

3 CCME Residential/Parkland

4 CCME Commercial

5 CCME Industrial

6 NS Landfill Guidelines

Table B.2b. Metal Concentrations in the Leachate Samples (Synthetic Precipitation Leaching Procedure) - Pleasant Bay DFO-SCH, Inverness County, Nova Scotia

Parameter	RDL	Units	Sample Identification and Date		CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life		Health Canada Guidelines for Canadian Drinking Water Quality	
			SED-1	SED-2	Freshwater	Marine	Maximum Acceptable Concentration	Aesthetic Objective
			August 20, 2014					
Leachable Metals								
Leachable Boron (B)	500	µg/L	600	650	1500	-	5000	-

CCME = Canadian Council of Ministers of the Environment - Water Quality Guidelines for the Protection of Aquatic Life, long term

Health Canada - Guidelines for Canadian Drinking Water Quality, August 2012

RDL = reportable detection limit

- = no guideline

Exceedances are bolded:

1 CCME Freshwater

2 Health Canada Maximum Acceptable Concentration

Table B.3. BTEX/TPH Concentrations for Marine Sediments - Pleasant Bay DFO-SCH, Inverness County, Nova Scotia

Sample ID	Date	Units	BTEX Concentrations				Petroleum Hydrocarbon Fraction Concentrations				Resemblance
			Benzene	Toluene	Ethylbenzene	Xylenes	F1 (C6-C10)	F2 (>C10-C16)	F3 (>C16-<C32)	Modified TPH (Total TPH Less BTEX)	
SED-1	August 20, 2014	mg/kg	<0.0050	<0.025	<0.010	<0.050	<2.5	<10	160	160	Unidentified compound(s) in lube oil range. Lube oil fraction.
SED-2			<0.0050	<0.025	<0.010	<0.050	<2.5	<10	156	160	Unidentified compound(s) in fuel / lube range.
SED-3			<0.0050	<0.025	<0.010	<0.050	8.1	<10	77	85	Lube oil fraction.
SED-4			<0.0050	<0.025	<0.010	<0.050	<2.5	<10	<18	<15	NA
RDL			0.0050	0.025	0.010	0.050	2.5	10	18	15	
Reached Baseline at C32			Yes								
Atlantic RBCA Tier I RBSLs for Soil											
Residential	Potable	Coarse-grained	0.042	0.35	0.65	8.8	-	-	-	Gas 74 / Diesel 270 / Oil 1100	-
		Fine-grained	0.094	0.74	0.13	22	-	-	-	Gas 1900 / Diesel 4700 / Oil 10000	-
	Non-potable	Coarse-grained	0.099	77	30	8.8	-	-	-	Gas 74 / Diesel 270 / Oil 1100	-
		Fine-grained	2.3	10000	9300	210	-	-	-	Gas 2100 / Diesel 8600 / Oil 10000	-
Commercial	Potable	Coarse-grained	0.042	0.35	0.065	11	-	-	-	Gas 870 / Diesel 1800 / Oil 10000	-
		Fine-grained	0.094	0.74	0.13	22	-	-	-	Gas 1900 / Diesel 4700 / Oil 10000	-
	Non-potable	Coarse-grained	2.5	10000	10000	110	-	-	-	Gas 870 / Diesel 4000 / Oil 10000	-
		Fine-grained	33	10000	10000	10000	-	-	-	Gas 10000 / Diesel 10000 / Oil 10000	-
CCME Soil Quality Guidelines											
Agricultural Land Use	Surface	Coarse Soil	0.03	0.37	0.082	11	-	-	-	-	-
		Fine Soil	0.0068	0.08	0.018	2.4	-	-	-	-	-
	Subsoil	Coarse Soil	0.03	0.37	0.082	11	-	-	-	-	-
		Fine Soil	0.0068	0.08	0.018	2.4	-	-	-	-	-
Residential/ Parkland Use	Surface	Coarse Soil	0.03	0.37	0.082	11	-	-	-	-	-
		Fine Soil	0.0068	0.08	0.018	2.4	-	-	-	-	-
	Subsoil	Coarse Soil	0.03	0.37	0.082	11	-	-	-	-	-
		Fine Soil	0.0068	0.08	0.018	2.4	-	-	-	-	-
Commercial/ Industrial Land Use	Surface	Coarse Soil	0.03	0.37	0.082	11	-	-	-	-	-
		Fine Soil	0.0068	0.08	0.018	2.4	-	-	-	-	-
	Subsoil	Coarse Soil	0.03	0.37	0.082	11	-	-	-	-	-
		Fine Soil	0.0068	0.08	0.018	2.4	-	-	-	-	-
NS Landfill Guidelines			5	30	50	50	-	-	-	-	-

Silica gel clean-up performed prior to analysis.

Atlantic RBCA = Atlantic Risk-based Corrective Action for Petroleum Impacted Sites in Atlantic Canada - Version 3.0, User Guidance, Table 4a (Appendix 3) - Tier I Risk-Based Screening Levels for Soil, July 2012

CCME = Canadian Council of Ministers of the Environment - Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health

NS Landfill Disposal = Nova Scotia Environment and Labour - Guidelines for Disposal of Contaminated Solids in Landfills, March 22, 1992

RDL = reportable detection limit

- = no guideline

NA = not applicable

Exceedances are bolded:

Atlantic RBCA exceedances

No CCME exceedances

No NS Landfill Guidelines exceedances

Table B.3b. BTEX-TPH Leachate Samples (Synthetic Precipitation Leaching Procedure) - Pleasant Bay DFO-SCH, Inverness County, Nova Scotia

Parameter	RDL	Units	Sample Identification and Date		CCME Water Quality Guidelines for the Protection of Aquatic Life		Health Canada Guidelines Canadian for Drinking Water Quality		Atlantic RBCA								
			SED-1	SED-2	Freshwater	Marine	Maximum Acceptable Concentration	Aesthetic Objective	Residential Potable - Coarse Grained Soils	Residential Potable - Fine Grained Soils	Residential Non-Potable - Coarse Grained Soils	Residential Non-Potable - Fine Grained Soils	Commercial Potable - Coarse Grained Soils	Commercial Potable - Fine Grained Soils	Commercial Non-Potable - Coarse Grained Soils	Commercial Non-Potable - Fine Grained Soils	
			August 20, 2014														
Leachable BTEX-TPH																	
Leachable >C10-C16 Hydrocarbons	0.20	mg/L	<0.20	<0.20	-	-	-	-	-	-	-	-	-	-	-	-	
Leachable >C16-C21 Hydrocarbons	0.20		<0.20	<0.20	-	-	-	-	-	-	-	-	-	-	-	-	-
Leachable >C21-<C32 Hydrocarbons	0.50		<0.50	<0.50	-	-	-	-	-	-	-	-	-	-	-	-	-

Health Canada - Guidelines for Canadian Drinking Water Quality, August 2012

CCME = Canadian Council of Ministers of the Environment - Water Quality Guidelines for the Protection of Aquatic Life, long term

Atlantic RBCA = Atlantic Risk-based Corrective Action for Petroleum Impacted Sites in Atlantic Canada - Version 3.0, User Guidance, Table 4a (Appendix 3) - Tier I Risk-Based Screening Levels for Soil, July 2012

RDL = reportable detection limit

- = no guideline

Table B.4. PCB and DDT Analytical Results for Marine Sediments - Pleasant Bay DFO-SCH, Inverness County, Nova Scotia

Parameter	RDL	Units	Sample Identification and Date				CEPA Disposal at Sea Guidelines	CCME Sediment Quality Guidelines		CCME Soil Quality Guidelines		
			SED-1	SED-2	SED-3	SED-4		Interim Sediment Quality Guidelines	Marine and Estuarine Probable Effects Levels	Agricultural	Residential/ Parkland	Commercial, Industrial
			August 20, 2014									
Polychlorinated Biphenyl (PCB) Results												
Aroclor 1016	0.015	mg/kg	<0.05	<0.25	<0.060	<0.015	-	-	-	-	-	-
Aroclor 1221	0.015		<0.05	<0.25	<0.060	<0.015	-	-	-	-	-	-
Aroclor 1232	0.015		<0.05	<0.25	<0.060	<0.015	-	-	-	-	-	-
Aroclor 1242	0.015		<0.05	<0.25	<0.060	<0.015	-	-	-	-	-	-
Aroclor 1248	0.015		<0.05	<0.25	<0.060	<0.015	-	-	-	-	-	-
Aroclor 1254	0.015		<0.10	<0.05	<0.030	<0.015	-	0.0633	0.709	-	-	-
Aroclor 1260	0.015		<0.10	<0.05	<0.030	<0.015	-	-	-	-	-	-
Aroclor 1262	0.015		<0.10	<0.05	<0.030	<0.015	-	-	-	-	-	-
Aroclor 1268	0.015		<0.10	<0.05	<0.030	<0.015	-	-	-	-	-	-
Total PCB Concentration	0.015		<0.5*	<0.25*	<0.060	<0.015	0.1	0.022	0.189	0.5	1.3	33
Dichloro-Diphenyl-Trichloroethane (DDT) Results												
DDT+ Metabolites	0.002	mg/kg	<0.007	<0.004	<0.004	<0.002	-	-	-	-	-	-
o,p-DDD + p,p-DDD	0.002		<0.007	<0.004	<0.004	<0.002	-	0.00122	0.00781	-	-	-
o,p-DDE + p,p-DDE	0.002		<0.007	<0.004	<0.004	<0.002	-	0.00207	0.374	-	-	-
o,p-DDT + p,p-DDT	0.002		<0.007	<0.004	<0.004	<0.002	-	0.00119	0.00477	-	-	-
o,p-DDD	0.002		<0.007	<0.004	<0.004	<0.002	-	-	-	-	-	-
p,p-DDD	0.002		<0.007	<0.004	<0.004	<0.002	-	-	-	-	-	-
o,p-DDE	0.002		<0.007	<0.004	<0.004	<0.002	-	-	-	-	-	-
p,p-DDE	0.002		<0.007	<0.004	<0.004	<0.002	-	-	-	-	-	-
o,p-DDT	0.002		<0.007	<0.004	<0.004	<0.002	-	-	-	-	-	-
p,p-DDT	0.002		<0.007	<0.004	<0.004	<0.002	-	-	-	-	-	-
Total DDT (calculated)			0	0	0	0	-	-	-	0.7	0.7	12

CEPA = Canadian Environmental Protection Act - Disposal at Sea Regulations. September 9, 2009

CCME = Canadian Council of Ministers of the Environment - Sediment Quality Guidelines for the Protection of Aquatic Life (provided for reference)

CCME - Soil Quality Guidelines for the Protection of Environmental and Human Health

RDL - reportable detection limit

* = RDL greater than guideline

- = no guideline available

Total DDT = sum of op-DDD + pp-DDD + op-DDE + pp-DDE + op-DDT + pp-DDT (DDT + metabolites). Non-detected component parameters treated as zero for total DDT calculation. Calculation method provided by Maxxam Analytics.

Exceedances are bolded:

No CEPA exceedances

No CCME exceedances

Table B.5. TIC,TOC and Grain Size Analytical Results for Marine Sediments - Pleasant Bay DFO-SCH, Inverness County, Nova Scotia

Parameter	RDL	Units	Sample Identification and Date			
			SED-1	SED-2	SED-3	SED-4
			August 20, 2014			
Grain Size Results						
< -1 Phi (2 mm)	0.10	%	99	91	97	37
< 0 Phi (1 mm)	0.10		97	78	94	16
< +1 Phi (0.5 mm)	0.10		91	67	87	4.4
< +2 Phi (0.25 mm)	0.10		85	55	75	2.8
< +3 Phi (0.12 mm)	0.10		69	36	45	2.1
< +4 Phi (0.062 mm)	0.10		48	23	19	1.8
< +5 Phi (0.031 mm)	0.10		39	19	16	1.8
< +6 Phi (0.016 mm)	0.10		28	15	12	1.8
< +7 Phi (0.0078 mm)	0.10		20	12	9.4	1.3
< +8 Phi (0.0039 mm)	0.10		18	11	9	1.2
< +9 Phi (0.0020 mm)	0.10		15	9.1	8.1	1.2
Gravel	0.10		0.94	9.2	2.9	63
Sand	0.10		51	68	78	35
Silt	0.10		30	12	10	0.6
Clay	0.10		18	11	9	1.2
Other						
Total Inorganic Carbon (C)	1.6	g/kg	<1.0	14	22	0.58
Organic Carbon (TOC)	1.6	g/kg	63	25	18	0.31
Total Carbon-combustion IR	1.20	g/kg	62	39	40	0.9
Moisture	1	%	71	44	49	11



APPENDIX C
QA/QC, COC, and Laboratory Certificates of Analyses

Your Project #: 088617
Site Location: PLEASANT BAY SCH
Your C.O.C. #: B 66180

Attention:Amanda Facey

Conestoga-Rovers and Associates Ltd
45 Akerley Blvd
Dartmouth , NS
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Report Date: 2014/09/29

Version: 4 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B4F3858

Received: 2014/08/22, 10:38

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Boron Solid MS - Hot Water Soluble	4	2014/08/28	2014/08/28	ATL SOP 00058	EPA 6020A R1 m
Hexavalent Chromium in Soil by IC (1, 2)	4	2014/08/28	2014/08/29	CAM SOP-00436	EPA 3060/7199 m
TEH in Leachate (PIRI)	2	2014/09/23	2014/09/24	ATL SOP-00113	Atl. PIRI v3 m
TEH in Soil (PIRI) (2)	1	2014/08/28	2014/09/02	ATL SOP 00111	Atl. PIRI v3 m
TEH in Soil (PIRI) (2)	1	2014/08/29	2014/08/29	ATL SOP 00111	Atl. PIRI v3 m
TEH in Soil (PIRI) (2)	2	2014/08/29	2014/09/02	ATL SOP 00111	Atl. PIRI v3 m
Mercury (CVAA)	4	2014/09/02	2014/09/03	ATL SOP 00026	EPA 245.5 m
Metals Leach, SPLP Extraction	2	2014/09/24	2014/09/25	ATL SOP 00058	EPA 6020A R1 m
Metals Solids Acid Extr. ICPMS	4	2014/08/28	2014/08/28	ATL SOP 00058	EPA 6020A R1 m
Moisture	4	N/A	2014/08/27	ATL SOP 00001	OMOE Handbook 1983 m
OC Pesticides (Selected) & PCB (1, 3)	3	2014/08/28	2014/09/10	CAM SOP-00307	SW846 8081, 8082
OC Pesticides (Selected) & PCB (1, 3)	1	2014/08/30	2014/09/10	CAM SOP-00307	SW846 8081, 8082
OC Pesticides Summed Parameters (1)	4	N/A	2014/08/27	CAM SOP-00307	EPA 8081/8082 m
PAH in Leachates GC/MS (Low Level)	2	2014/09/25	2014/09/27	ATL SOP 00103	EPA 8270D m
PAH in sediment by GC/MS (Low Level)	4	2014/08/28	2014/08/30	ATL SOP 00102	EPA 8270D m
VPH in Soil - Low Level	4	2014/08/25	2014/09/01	ATL SOP 00119	Atl. PIRI v3 m
Particle size in solids (pipette&sieve) (4)	4	N/A	2014/09/02	ATL SOP 00012	MSAMS 1978 m
SPLP Inorganic extraction - pH	2	N/A	2014/09/23	ATL SOP 00036	EPA 1312 m
SPLP Inorganic extraction - Weight	2	N/A	2014/09/23	ATL SOP 00036	EPA 1312 m
Total Carbon in Solids by Ind.	3	2014/08/27	2014/08/28	ATL SOP 00044/00045	LECO 203-601-224 m
Total Carbon in Solids by Ind.	1	2014/09/02	2014/09/03	ATL SOP 00044/00045	LECO 203-601-224 m
TIC in soil	4	2014/08/25	2014/08/29	ATL SOP 00044/00045	LECO 203-601-224 m
Total Organic Carbon in Soil	3	2014/08/28	2014/08/28	ATL SOP 00044/00045	LECO 203-601-224 m
Total Organic Carbon in Soil	1	2014/09/04	2014/09/04	ATL SOP 00044/00045	LECO 203-601-224 m
ModTPH (T1) Calc. for Soil (5)	3	N/A	2014/09/02	N/A	Atl. PIRI v3 m
ModTPH (T1) Calc. for Soil (5)	1	N/A	2014/09/03	N/A	Atl. PIRI v3 m

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your Project #: 088617
Site Location: PLEASANT BAY SCH
Your C.O.C. #: B 66180

Attention:Amanda Facey

Conestoga-Rovers and Associates Ltd
45 Akerley Blvd
Dartmouth , NS
B3B 1J7

Report Date: 2014/09/29

Version: 4 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B4F3858

Received: 2014/08/22, 10:38

- (1) This test was performed by Maxxam Analytics Mississauga
- (2) Soils are reported on a dry weight basis unless otherwise specified.
- (3) Chlordane (Total) = Alpha Chlordane + Gamma Chlordane
- (4) Note: Graphical representation of larger fractions (PHI-4, PHI -3 and PHI -2) not applicable unless these optional parameters are specifically requested.
- (5) New RDLs in effect due to release of NS Contaminated Sites Regulations. Reduced RDL based on MDL study performance. Low level analytical run checks being implemented.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Michelle Hill, Project Manager

Email: MHill@maxxam.ca

Phone# (902)420-0203 Ext:289

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B4F3858
Report Date: 2014/09/29

Conestoga-Rovers and Associates Ltd
Client Project #: 088617
Site Location: PLEASANT BAY SCH
Sampler Initials: AF

RESULTS OF ANALYSES OF SOIL

Maxxam ID		XG5687	XG5687			XG5688	XG5688		XG5689		
Sampling Date		2014/08/20	2014/08/20			2014/08/20	2014/08/20		2014/08/20		
COC Number		B 66180	B 66180			B 66180	B 66180		B 66180		
	Units	SED-1	SED-1 Lab-Dup	RDL	QC Batch	SED-2	SED-2 Lab-Dup	RDL	SED-3	RDL	QC Batch

Charge/Prep Analysis											
Sample Weight (as received)	g	50		N/A	3758491	50		N/A		N/A	3758491
Final pH	N/A	7.52		N/A	3758497	7.78		N/A		N/A	3758497

Inorganics											
Chromium (VI)	ug/g	<0.2		0.2	3729328	<0.2		0.2	<0.2	0.2	3729328
Total Inorganic Carbon (C)	g/kg	<1.0		1.0	3723989	14		0.80	22	1.0	3723989
Moisture	%	71		1.0	3724736	44		1.0	49	1.0	3724736
Organic Carbon (TOC)	g/kg	63		1.0	3735399	25		0.80	18	1.0	3728077
Total Carbon-combustion IR	g/kg	62	60	0.60	3732815	39	42	0.30	40	0.30	3726362
< -1 Phi (2 mm)	%	99		0.10	3727981	91		0.10	97	0.10	3727981
< 0 Phi (1 mm)	%	97		0.10	3727981	78		0.10	94	0.10	3727981
< +1 Phi (0.5 mm)	%	91		0.10	3727981	67		0.10	87	0.10	3727981
< +2 Phi (0.25 mm)	%	85		0.10	3727981	55		0.10	75	0.10	3727981
< +3 Phi (0.12 mm)	%	69		0.10	3727981	36		0.10	45	0.10	3727981
< +4 Phi (0.062 mm)	%	48		0.10	3727981	23		0.10	19	0.10	3727981
< +5 Phi (0.031 mm)	%	39		0.10	3727981	19		0.10	16	0.10	3727981
< +6 Phi (0.016 mm)	%	28		0.10	3727981	15		0.10	12	0.10	3727981
< +7 Phi (0.0078 mm)	%	20		0.10	3727981	12		0.10	9.4	0.10	3727981
< +8 Phi (0.0039 mm)	%	18		0.10	3727981	11		0.10	9.0	0.10	3727981
< +9 Phi (0.0020 mm)	%	15		0.10	3727981	9.1		0.10	8.1	0.10	3727981
Gravel	%	0.94		0.10	3727981	9.2		0.10	2.9	0.10	3727981
Sand	%	51		0.10	3727981	68		0.10	78	0.10	3727981
Silt	%	30		0.10	3727981	12		0.10	10	0.10	3727981
Clay	%	18		0.10	3727981	11		0.10	9.0	0.10	3727981

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam Job #: B4F3858
Report Date: 2014/09/29

Conestoga-Rovers and Associates Ltd
Client Project #: 088617
Site Location: PLEASANT BAY SCH
Sampler Initials: AF

RESULTS OF ANALYSES OF SOIL

Maxxam ID		XG5690		
Sampling Date		2014/08/20		
COC Number		B 66180		
	Units	SED-4	RDL	QC Batch
Inorganics				
Chromium (VI)	ug/g	<0.2	0.2	3729328
Total Inorganic Carbon (C)	g/kg	0.58	0.30	3723989
Moisture	%	11	1.0	3724736
Organic Carbon (TOC)	g/kg	0.31	0.20	3728077
Total Carbon-combustion IR	g/kg	0.90	0.30	3726362
< -1 Phi (2 mm)	%	37	0.10	3727981
< 0 Phi (1 mm)	%	16	0.10	3727981
< +1 Phi (0.5 mm)	%	4.4	0.10	3727981
< +2 Phi (0.25 mm)	%	2.8	0.10	3727981
< +3 Phi (0.12 mm)	%	2.1	0.10	3727981
< +4 Phi (0.062 mm)	%	1.8	0.10	3727981
< +5 Phi (0.031 mm)	%	1.8	0.10	3727981
< +6 Phi (0.016 mm)	%	1.8	0.10	3727981
< +7 Phi (0.0078 mm)	%	1.3	0.10	3727981
< +8 Phi (0.0039 mm)	%	1.2	0.10	3727981
< +9 Phi (0.0020 mm)	%	1.2	0.10	3727981
Gravel	%	63	0.10	3727981
Sand	%	35	0.10	3727981
Silt	%	0.60	0.10	3727981
Clay	%	1.2	0.10	3727981
RDL = Reportable Detection Limit				
QC Batch = Quality Control Batch				

Maxxam Job #: B4F3858
Report Date: 2014/09/29

Conestoga-Rovers and Associates Ltd
Client Project #: 088617
Site Location: PLEASANT BAY SCH
Sampler Initials: AF

MERCURY BY COLD VAPOUR AA (SOIL)

Maxxam ID		XG5687	XG5688	XG5689	XG5690		
Sampling Date		2014/08/20	2014/08/20	2014/08/20	2014/08/20		
COC Number		B 66180	B 66180	B 66180	B 66180		
	Units	SED-1	SED-2	SED-3	SED-4	RDL	QC Batch
Metals							
Mercury (Hg)	mg/kg	0.013	<0.010	<0.010	<0.010	0.010	3732722
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

Maxxam Job #: B4F3858
Report Date: 2014/09/29

Conestoga-Rovers and Associates Ltd
Client Project #: 088617
Site Location: PLEASANT BAY SCH
Sampler Initials: AF

ELEMENTS BY ICP/MS (SOIL)

Maxxam ID		XG5687	XG5688	XG5689		XG5690	XG5690		
Sampling Date		2014/08/20	2014/08/20	2014/08/20		2014/08/20	2014/08/20		
COC Number		B 66180	B 66180	B 66180		B 66180	B 66180		
	Units	SED-1	SED-2	SED-3	RDL	SED-4	SED-4 Lab-Dup	RDL	QC Batch
Metals									
Soluble (Hot Water) Boron (B)	mg/kg	37	26	17	3.0	0.88	1.1	0.30	3728369
Leachable Boron (B)	ug/L	600	650		500				3760050
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
Lab-Dup = Laboratory Initiated Duplicate									

Maxxam Job #: B4F3858
Report Date: 2014/09/29

Conestoga-Rovers and Associates Ltd
Client Project #: 088617
Site Location: PLEASANT BAY SCH
Sampler Initials: AF

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		XG5687	XG5688	XG5689	XG5690		
Sampling Date		2014/08/20	2014/08/20	2014/08/20	2014/08/20		
COC Number		B 66180	B 66180	B 66180	B 66180		
	Units	SED-1	SED-2	SED-3	SED-4	RDL	QC Batch
Metals							
Acid Extractable Aluminum (Al)	mg/kg	12000	8400	10000	3000	10	3727996
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	3727996
Acid Extractable Arsenic (As)	mg/kg	4.0	2.3	2.3	<2.0	2.0	3727996
Acid Extractable Barium (Ba)	mg/kg	59	49	72	14	5.0	3727996
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	3727996
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	3727996
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	<50	50	3727996
Acid Extractable Cadmium (Cd)	mg/kg	0.73	0.41	<0.30	<0.30	0.30	3727996
Acid Extractable Chromium (Cr)	mg/kg	22	18	18	5.5	2.0	3727996
Acid Extractable Cobalt (Co)	mg/kg	7.7	5.7	6.9	2.0	1.0	3727996
Acid Extractable Copper (Cu)	mg/kg	22	14	13	3.1	2.0	3727996
Acid Extractable Iron (Fe)	mg/kg	21000	17000	19000	7100	50	3727996
Acid Extractable Lead (Pb)	mg/kg	17	10	12	3.5	0.50	3727996
Acid Extractable Lithium (Li)	mg/kg	33	27	35	8.7	2.0	3727996
Acid Extractable Manganese (Mn)	mg/kg	320	260	330	130	2.0	3727996
Acid Extractable Molybdenum (Mo)	mg/kg	7.0	3.2	<2.0	<2.0	2.0	3727996
Acid Extractable Nickel (Ni)	mg/kg	18	14	14	4.3	2.0	3727996
Acid Extractable Rubidium (Rb)	mg/kg	17	16	22	4.6	2.0	3727996
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	<1.0	1.0	3727996
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	<0.50	0.50	3727996
Acid Extractable Strontium (Sr)	mg/kg	54	30	56	13	5.0	3727996
Acid Extractable Thallium (Tl)	mg/kg	0.31	0.20	0.24	<0.10	0.10	3727996
Acid Extractable Tin (Sn)	mg/kg	<2.0	<2.0	<2.0	<2.0	2.0	3727996
Acid Extractable Uranium (U)	mg/kg	5.2	2.3	2.4	0.50	0.10	3727996
Acid Extractable Vanadium (V)	mg/kg	32	25	29	9.7	2.0	3727996
Acid Extractable Zinc (Zn)	mg/kg	110	77	86	24	5.0	3727996
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

Maxxam Job #: B4F3858
Report Date: 2014/09/29

Conestoga-Rovers and Associates Ltd
Client Project #: 088617
Site Location: PLEASANT BAY SCH
Sampler Initials: AF

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		XG5687	XG5688	XG5689	XG5690		
Sampling Date		2014/08/20	2014/08/20	2014/08/20	2014/08/20		
COC Number		B 66180	B 66180	B 66180	B 66180		
	Units	SED-1	SED-2	SED-3	SED-4	RDL	QC Batch
Polyaromatic Hydrocarbons							
Leachable 1-Methylnaphthalene	ug/L	<0.012	<0.012			0.012	3761529
Leachable 2-Methylnaphthalene	ug/L	<0.012	<0.012			0.012	3761529
Leachable Acenaphthene	ug/L	0.032	0.049			0.0060	3761529
Leachable Acenaphthylene	ug/L	<0.0060	<0.0060			0.0060	3761529
Leachable Anthracene	ug/L	0.020	0.029			0.0060	3761529
Leachable Benzo(a)anthracene	ug/L	<0.0060	<0.0060			0.0060	3761529
Leachable Benzo(a)pyrene	ug/L	<0.0060	<0.0060			0.0060	3761529
Leachable Benzo(b)fluoranthene	ug/L	<0.0060	<0.0060			0.0060	3761529
Leachable Benzo(g,h,i)perylene	ug/L	<0.0060	<0.0060			0.0060	3761529
Leachable Benzo(j)fluoranthene	ug/L	<0.0060	<0.0060			0.0060	3761529
Leachable Benzo(k)fluoranthene	ug/L	<0.0060	<0.0060			0.0060	3761529
Leachable Chrysene	ug/L	<0.0060	<0.0060			0.0060	3761529
Leachable Dibenz(a,h)anthracene	ug/L	<0.0060	<0.0060			0.0060	3761529
Leachable Fluoranthene	ug/L	<0.050 (1)	<0.050 (1)			0.050	3761529
Leachable Fluorene	ug/L	0.030	0.056			0.0060	3761529
Leachable Indeno(1,2,3-cd)pyrene	ug/L	<0.0060	<0.0060			0.0060	3761529
Leachable Naphthalene	ug/L	<0.023	<0.023			0.023	3761529
Leachable Perylene	ug/L	0.010	<0.0060			0.0060	3761529
Leachable Phenanthrene	ug/L	<0.060 (1)	<0.060 (1)			0.060	3761529
Leachable Pyrene	ug/L	<0.030 (1)	<0.030 (1)			0.030	3761529
1-Methylnaphthalene	mg/kg	0.0052	<0.0050	<0.0050	<0.0050	0.0050	3728104
2-Methylnaphthalene	mg/kg	<0.0050	0.0097	<0.0050	<0.0050	0.0050	3728104
Acenaphthene	mg/kg	0.024	0.018	0.013	<0.0050	0.0050	3728104
Acenaphthylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	3728104
Anthracene	mg/kg	0.081	0.070	0.024	<0.0050	0.0050	3728104
Benzo(a)anthracene	mg/kg	0.14	0.060	0.020	<0.0050	0.0050	3728104
Benzo(a)pyrene	mg/kg	0.063	0.040	0.011	<0.0050	0.0050	3728104
Benzo(b)fluoranthene	mg/kg	0.13	0.052	0.018	<0.0050	0.0050	3728104
Benzo(g,h,i)perylene	mg/kg	0.031	0.021	<0.0050	<0.0050	0.0050	3728104
Benzo(j)fluoranthene	mg/kg	0.058	0.033	<0.0050	<0.0050	0.0050	3728104
Benzo(k)fluoranthene	mg/kg	0.054	0.024	<0.0050	<0.0050	0.0050	3728104
Chrysene	mg/kg	0.15	0.066	0.029	<0.0050	0.0050	3728104
Dibenz(a,h)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	3728104
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							
(1) Elevated RDL(s) due to detected levels in the leachate blank.							

Maxxam Job #: B4F3858
Report Date: 2014/09/29

Conestoga-Rovers and Associates Ltd
Client Project #: 088617
Site Location: PLEASANT BAY SCH
Sampler Initials: AF

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		XG5687	XG5688	XG5689	XG5690		
Sampling Date		2014/08/20	2014/08/20	2014/08/20	2014/08/20		
COC Number		B 66180	B 66180	B 66180	B 66180		
	Units	SED-1	SED-2	SED-3	SED-4	RDL	QC Batch
Fluoranthene	mg/kg	0.65	0.27	0.15	<0.0050	0.0050	3728104
Fluorene	mg/kg	0.039	0.039	0.024	<0.0050	0.0050	3728104
Indeno(1,2,3-cd)pyrene	mg/kg	0.031	0.020	<0.0050	<0.0050	0.0050	3728104
Naphthalene	mg/kg	0.011	<0.0050	0.022	<0.0050	0.0050	3728104
Perylene	mg/kg	0.51	0.098	0.081	<0.0050	0.0050	3728104
Phenanthrene	mg/kg	0.086	0.043	0.094	<0.0050	0.0050	3728104
Pyrene	mg/kg	0.23	0.17	0.090	<0.0050	0.0050	3728104
Surrogate Recovery (%)							
Leachable D10-Anthracene	%	56	54				3761529
Leachable D14-Terphenyl	%	59 (1)	56 (1)				3761529
Leachable D8-Acenaphthylene	%	59	56				3761529
D10-Anthracene	%	74	80	75	66		3728104
D14-Terphenyl	%	100	89	99	84 (2)		3728104
D8-Acenaphthylene	%	68	69	69	69		3728104
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) Elevated PAH RDL(s) due to insufficient sample. (2) PAH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.							

Maxxam Job #: B4F3858
Report Date: 2014/09/29

Conestoga-Rovers and Associates Ltd
Client Project #: 088617
Site Location: PLEASANT BAY SCH
Sampler Initials: AF

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		XG5687		XG5688	XG5688	XG5689		
Sampling Date		2014/08/20		2014/08/20	2014/08/20	2014/08/20		
COC Number		B 66180		B 66180	B 66180	B 66180		
	Units	SED-1	QC Batch	SED-2	SED-2 Lab-Dup	SED-3	RDL	QC Batch

Petroleum Hydrocarbons								
Benzene	mg/kg	<0.0050	3732101	<0.0050		<0.0050	0.0050	3732101
Toluene	mg/kg	<0.025	3732101	<0.025		<0.025	0.025	3732101
Ethylbenzene	mg/kg	<0.010	3732101	<0.010		<0.010	0.010	3732101
Xylene (Total)	mg/kg	<0.050	3732101	<0.050		<0.050	0.050	3732101
C6 - C10 (less BTEX)	mg/kg	<2.5	3732101	<2.5		8.1	2.5	3732101
>C10-C16 Hydrocarbons	mg/kg	<10	3732249	<10		<10	10	3729709
Leachable >C10-C16 Hydrocarbons	mg/L	<0.20	3758543	<0.20	<0.20		0.20	3758543
>C16-C21 Hydrocarbons	mg/kg	<10	3732249	26		<10	10	3729709
Leachable >C16-C21 Hydrocarbons	mg/L	<0.20	3758543	<0.20	<0.20		0.20	3758543
>C21-<C32 Hydrocarbons	mg/kg	160	3732249	130		77	15	3729709
Leachable >C21-<C32 Hydrocarbons	mg/L	<0.50	3758543	<0.50	<0.50		0.50	3758543
Modified TPH (Tier1)	mg/kg	160	3723844	160		85	15	3723844
Reached Baseline at C32	mg/kg	Yes	3732249	Yes		Yes	N/A	3729709
Leachable Reached Baseline at C32	mg/L	NA	3758543	NA			N/A	3758543
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	3732249	COMMENT (2)		COMMENT (3)	N/A	3729709
Leachable Hydrocarbon Resemblance	mg/L	NA	3758543	NA			N/A	3758543
Surrogate Recovery (%)								
Leachable Isobutylbenzene - Extractable	%	119	3758543	79	122			3758543
Leachable n-Dotriacontane - Extractable	%	125	3758543	86	129			3758543
Isobutylbenzene - Extractable	%	103	3732249	127		116		3729709
n-Dotriacontane - Extractable	%	101 (4)	3732249	101 (4)		102 (4)		3729709
Isobutylbenzene - Volatile	%	106	3732101	110		111		3732101

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 Lab-Dup = Laboratory Initiated Duplicate
 N/A = Not Applicable
 (1) Unidentified compound(s) in lube oil range. Lube oil fraction.
 (2) Unidentified compound(s) in fuel / lube range.
 (3) Lube oil fraction.
 (4) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request.

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ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		XG5690	XG5690		
Sampling Date		2014/08/20	2014/08/20		
COC Number		B 66180	B 66180		
	Units	SED-4	SED-4 Lab-Dup	RDL	QC Batch
Petroleum Hydrocarbons					
Benzene	mg/kg	<0.0050	<0.0050	0.0050	3732101
Toluene	mg/kg	<0.025	<0.025	0.025	3732101
Ethylbenzene	mg/kg	<0.010	<0.010	0.010	3732101
Xylene (Total)	mg/kg	<0.050	<0.050	0.050	3732101
C6 - C10 (less BTEX)	mg/kg	<2.5	<2.5	2.5	3732101
>C10-C16 Hydrocarbons	mg/kg	<10		10	3729709
>C16-C21 Hydrocarbons	mg/kg	<10		10	3729709
>C21-<C32 Hydrocarbons	mg/kg	<15		15	3729709
Modified TPH (Tier1)	mg/kg	<15		15	3723844
Reached Baseline at C32	mg/kg	NA		N/A	3729709
Hydrocarbon Resemblance	mg/kg	NA		N/A	3729709
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	111			3729709
n-Dotriacontane - Extractable	%	94 (1)			3729709
Isobutylbenzene - Volatile	%	108 (2)	107 (2)		3732101
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate (1) TEH Analysis: Silica gel clean-up performed prior to analysis as per client request. (2) VPH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.					

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ORGANOCHLORINATED PESTICIDES BY GC-ECD (SOIL)

Maxxam ID		XG5687		XG5688		XG5689			XG5690		
Sampling Date		2014/08/20		2014/08/20		2014/08/20			2014/08/20		
COC Number		B 66180		B 66180		B 66180			B 66180		
	Units	SED-1	RDL	SED-2	RDL	SED-3	RDL	QC Batch	SED-4	RDL	QC Batch
Calculated Parameters											
Aldrin + Dieldrin	ug/g	<0.0070	0.0070	<0.0040	0.0040	<0.0040	0.0040	3723987		0.0040	3723987
Chlordane (Total)	ug/g	<0.0070	0.0070	<0.0040	0.0040	<0.0040	0.0040	3723987		0.0040	3723987
DDT+ Metabolites	ug/g	<0.0070	0.0070	<0.0040	0.0040	<0.0040	0.0040	3723987	<0.0020	0.0020	3727128
Heptachlor + Heptachlor epoxide	ug/g	<0.0070	0.0070	<0.0040	0.0040	<0.0040	0.0040	3723987			
o,p-DDD + p,p-DDD	ug/g	<0.0070	0.0070	<0.0040	0.0040	<0.0040	0.0040	3723987	<0.0020	0.0020	3727128
o,p-DDE + p,p-DDE	ug/g	<0.0070	0.0070	<0.0040	0.0040	<0.0040	0.0040	3723987	<0.0020	0.0020	3727128
o,p-DDT + p,p-DDT	ug/g	<0.0070	0.0070	<0.0040	0.0040	<0.0040	0.0040	3723987	<0.0020	0.0020	3727128
Total Endosulfan	ug/g	<0.0070	0.0070	<0.0040	0.0040	<0.0040	0.0040	3723987			
Total PCB	ug/g	<0.50	0.50	<0.25	0.25	<0.060	0.060	3723987	<0.015	0.015	3727128
Pesticides & Herbicides											
o,p-DDD	ug/g	<0.0070	0.0070	<0.0040	0.0040	<0.0040	0.0040	3731491	<0.0020	0.0020	3731491
p,p-DDD	ug/g	<0.0070	0.0070	<0.0040	0.0040	<0.0040	0.0040	3731491	<0.0020	0.0020	3731491
o,p-DDE	ug/g	<0.0070	0.0070	<0.0040	0.0040	<0.0040	0.0040	3731491	<0.0020	0.0020	3731491
p,p-DDE	ug/g	<0.0070	0.0070	<0.0040	0.0040	<0.0040	0.0040	3731491	<0.0020	0.0020	3731491
o,p-DDT	ug/g	<0.0070	0.0070	<0.0040	0.0040	<0.0040	0.0040	3731491	<0.0020	0.0020	3731491
p,p-DDT	ug/g	<0.0070	0.0070	<0.0040	0.0040	<0.0040	0.0040	3731491	<0.0020	0.0020	3731491
Aroclor 1016	ug/g	<0.50	0.50	<0.25	0.25	<0.060	0.060	3731491	<0.015	0.015	3731491
Aroclor 1221	ug/g	<0.50	0.50	<0.25	0.25	<0.060	0.060	3731491	<0.015	0.015	3731491
Aroclor 1232	ug/g	<0.50	0.50	<0.25	0.25	<0.060	0.060	3731491	<0.015	0.015	3731491
Aroclor 1242	ug/g	<0.50	0.50	<0.25	0.25	<0.060	0.060	3731491	<0.015	0.015	3731491
Aroclor 1248	ug/g	<0.50	0.50	<0.25	0.25	<0.060	0.060	3731491	<0.015	0.015	3731491
Aroclor 1254	ug/g	<0.10	0.10	<0.050	0.050	<0.030	0.030	3731491	<0.015	0.015	3731491
Aroclor 1260	ug/g	<0.10	0.10	<0.050	0.050	<0.030	0.030	3731491	<0.015	0.015	3731491
Aroclor 1262	ug/g	<0.10	0.10	<0.050	0.050	<0.030	0.030	3731491	<0.015	0.015	3731491
Aroclor 1268	ug/g	<0.10	0.10	<0.050	0.050	<0.030	0.030	3731491	<0.015	0.015	3731491
Surrogate Recovery (%)											
2,4,5,6-Tetrachloro-m-xylene	%	71		73		75		3731491	73		3731491
Decachlorobiphenyl	%	89		96		100		3731491	103		3731491
RDL = Reportable Detection Limit											
QC Batch = Quality Control Batch											

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C
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OC Pesticide Analysis: Detection limits were adjusted for high moisture content. Detection limits for some parameters were raised due to matrix interferences.

TEH Analysis: No creosote present.

Revised report: Revised report to report individual aroclors for PCB analysis as per quote. 2014/09/12 MHL

Revised report - Revision 2: Added SPLP leachate plus Boron, PAH and extractable hydrocarbons to samples SED-1 and SED-2 as requested by A. Facey. 2014/09/19 MHL

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

Conestoga-Rovers and Associates Ltd
Client Project #: 088617
Site Location: PLEASANT BAY SCH
Sampler Initials: AF

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
3728104	D10-Anthracene	2014/08/30	69	30 - 130	72	30 - 130	79	%				
3728104	D14-Terphenyl	2014/08/30	95	30 - 130	92	30 - 130	94	%				
3728104	D8-Acenaphthylene	2014/08/30	58	30 - 130	77	30 - 130	80	%				
3729709	Isobutylbenzene - Extractable	2014/08/29	126	30 - 130	77	30 - 130	76	%				
3729709	n-Dotriacontane - Extractable	2014/08/29	96	30 - 130	78	30 - 130	76	%				
3731491	2,4,5,6-Tetrachloro-m-xylene	2014/09/10	76	50 - 130	72	50 - 130	75	%				
3731491	Decachlorobiphenyl	2014/09/10	106	50 - 130	90	50 - 130	93	%				
3732101	Isobutylbenzene - Volatile	2014/09/01	102 (8,9)	60 - 140	102	60 - 140	102	%				
3732249	Isobutylbenzene - Extractable	2014/09/02	91	30 - 130	99	30 - 130	95	%				
3732249	n-Dotriacontane - Extractable	2014/09/02	89	30 - 130	84	30 - 130	88	%				
3758543	Leachable Isobutylbenzene - Extractable	2014/09/24	120 (12)	30 - 130	114	30 - 130	118	%		30 - 130		
3758543	Leachable n-Dotriacontane - Extractable	2014/09/24	121 (12)	30 - 130	120	30 - 130	124	%		30 - 130		
3761529	Leachable D10-Anthracene	2014/09/27	54	30 - 130	85	30 - 130	90	%		30 - 130		
3761529	Leachable D14-Terphenyl	2014/09/27	57	30 - 130	91	30 - 130	94	%		30 - 130		
3761529	Leachable D8-Acenaphthylene	2014/09/27	56	30 - 130	90	30 - 130	96	%		30 - 130		
3726362	Total Carbon-combustion IR	2014/08/28					<0.20	g/kg	8.4 (1)	35	101	75 - 125
3727981	Clay	2014/09/02							22 (3)	35		
3727981	Gravel	2014/09/02							38 (2,3)	35		
3727981	Sand	2014/09/02							50 (2,3)	35		
3727981	Silt	2014/09/02							52 (2,3)	35		
3727996	Acid Extractable Aluminum (Al)	2014/08/28					<10	mg/kg	5.7 (3)	35		
3727996	Acid Extractable Antimony (Sb)	2014/08/28	100	75 - 125	101	75 - 125	<2.0	mg/kg	NC (3)	35		
3727996	Acid Extractable Arsenic (As)	2014/08/28	104	75 - 125	100	75 - 125	<2.0	mg/kg	NC (3)	35		
3727996	Acid Extractable Barium (Ba)	2014/08/28	NC	75 - 125	94	75 - 125	<5.0	mg/kg	9.3 (3)	35		
3727996	Acid Extractable Beryllium (Be)	2014/08/28	104	75 - 125	97	75 - 125	<2.0	mg/kg	NC (3)	35		
3727996	Acid Extractable Bismuth (Bi)	2014/08/28	105	75 - 125	100	75 - 125	<2.0	mg/kg	NC (3)	35		
3727996	Acid Extractable Boron (B)	2014/08/28	100	75 - 125	99	75 - 125	<50	mg/kg	NC (3)	35		
3727996	Acid Extractable Cadmium (Cd)	2014/08/28	102	75 - 125	97	75 - 125	<0.30	mg/kg	NC (3)	35		
3727996	Acid Extractable Chromium (Cr)	2014/08/28	101	75 - 125	95	75 - 125	<2.0	mg/kg	NC (3)	35		
3727996	Acid Extractable Cobalt (Co)	2014/08/28	99	75 - 125	96	75 - 125	<1.0	mg/kg	NC (3)	35		
3727996	Acid Extractable Copper (Cu)	2014/08/28	105	75 - 125	98	75 - 125	<2.0	mg/kg	NC (3)	35		
3727996	Acid Extractable Iron (Fe)	2014/08/28					<50	mg/kg	7.9 (3)	35		

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QUALITY ASSURANCE REPORT(CONT'D)

Conestoga-Rovers and Associates Ltd
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Sampler Initials: AF

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
3727996	Acid Extractable Lead (Pb)	2014/08/28	101	75 - 125	96	75 - 125	<0.50	mg/kg	NC (3)	35		
3727996	Acid Extractable Lithium (Li)	2014/08/28	111	75 - 125	101	75 - 125	<2.0	mg/kg	NC (3)	35		
3727996	Acid Extractable Manganese (Mn)	2014/08/28	NC	75 - 125	101	75 - 125	<2.0	mg/kg	4.5 (3)	35		
3727996	Acid Extractable Molybdenum (Mo)	2014/08/28	105	75 - 125	99	75 - 125	<2.0	mg/kg	NC (3)	35		
3727996	Acid Extractable Nickel (Ni)	2014/08/28	105	75 - 125	100	75 - 125	<2.0	mg/kg	NC (3)	35		
3727996	Acid Extractable Rubidium (Rb)	2014/08/28	105	75 - 125	100	75 - 125	<2.0	mg/kg	NC (3)	35		
3727996	Acid Extractable Selenium (Se)	2014/08/28	104	75 - 125	101	75 - 125	<1.0	mg/kg	NC (3)	35		
3727996	Acid Extractable Silver (Ag)	2014/08/28	102	75 - 125	98	75 - 125	<0.50	mg/kg	NC (3)	35		
3727996	Acid Extractable Strontium (Sr)	2014/08/28	103	75 - 125	97	75 - 125	<5.0	mg/kg	NC (3)	35		
3727996	Acid Extractable Thallium (Tl)	2014/08/28	103	75 - 125	99	75 - 125	<0.10	mg/kg	NC (3)	35		
3727996	Acid Extractable Tin (Sn)	2014/08/28	117	75 - 125	100	75 - 125	<2.0	mg/kg	NC (3)	35		
3727996	Acid Extractable Uranium (U)	2014/08/28	102	75 - 125	97	75 - 125	<0.10	mg/kg	NC (3)	35		
3727996	Acid Extractable Vanadium (V)	2014/08/28	100	75 - 125	97	75 - 125	<2.0	mg/kg	6.7 (3)	35		
3727996	Acid Extractable Zinc (Zn)	2014/08/28	101	75 - 125	102	75 - 125	<5.0	mg/kg	NC (3)	35		
3728077	Organic Carbon (TOC)	2014/08/28					<0.20	g/kg	6.2 (3)	35	95	75 - 125
3728104	1-Methylnaphthalene	2014/08/30	64	30 - 130	81	30 - 130	<0.0050	mg/kg	NC (3)	50		
3728104	2-Methylnaphthalene	2014/08/30	78	30 - 130	93	30 - 130	<0.0050	mg/kg	NC (3)	50		
3728104	Acenaphthene	2014/08/30	69	30 - 130	84	30 - 130	<0.0050	mg/kg	NC (3)	50		
3728104	Acenaphthylene	2014/08/30	58	30 - 130	84	30 - 130	<0.0050	mg/kg	NC (3)	50		
3728104	Anthracene	2014/08/30	87	30 - 130	89	30 - 130	<0.0050	mg/kg	NC (3)	50		
3728104	Benzo(a)anthracene	2014/08/30	NC	30 - 130	94	30 - 130	<0.0050	mg/kg	1.6 (3)	50		
3728104	Benzo(a)pyrene	2014/08/30	97	30 - 130	92	30 - 130	<0.0050	mg/kg	34 (3)	50		
3728104	Benzo(b)fluoranthene	2014/08/30	NC	30 - 130	103	30 - 130	<0.0050	mg/kg	23 (3)	50		
3728104	Benzo(g,h,i)perylene	2014/08/30	90	30 - 130	81	30 - 130	<0.0050	mg/kg	48 (3)	50		
3728104	Benzo(j)fluoranthene	2014/08/30	110	30 - 130	108	30 - 130	<0.0050	mg/kg	22 (3)	50		
3728104	Benzo(k)fluoranthene	2014/08/30	105	30 - 130	95	30 - 130	<0.0050	mg/kg	21 (3)	50		
3728104	Chrysene	2014/08/30	NC	30 - 130	96	30 - 130	<0.0050	mg/kg	20 (3)	50		
3728104	Dibenz(a,h)anthracene	2014/08/30	83	30 - 130	63	30 - 130	<0.0050	mg/kg	NC (3)	50		
3728104	Fluoranthene	2014/08/30	NC	30 - 130	106	30 - 130	<0.0050	mg/kg	16 (3)	50		
3728104	Fluorene	2014/08/30	75	30 - 130	89	30 - 130	<0.0050	mg/kg	NC (3)	50		
3728104	Indeno(1,2,3-cd)pyrene	2014/08/30	88	30 - 130	71	30 - 130	<0.0050	mg/kg	43 (3)	50		
3728104	Naphthalene	2014/08/30	57	30 - 130	78	30 - 130	<0.0050	mg/kg	NC (3)	50		

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Sampler Initials: AF

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
3728104	Perylene	2014/08/30	NC	30 - 130	98	30 - 130	<0.0050	mg/kg	9.3 (3)	50		
3728104	Phenanthrene	2014/08/30	NC	30 - 130	83	30 - 130	<0.0050	mg/kg	35 (3)	50		
3728104	Pyrene	2014/08/30	NC	30 - 130	104	30 - 130	<0.0050	mg/kg	17 (3)	50		
3728369	Soluble (Hot Water) Boron (B)	2014/08/28	NC (4)	75 - 125	96	75 - 125	<0.30	mg/kg	NC (5)	35		
3729328	Chromium (VI)	2014/08/29	0 (6)	75 - 125	95	80 - 120	<0.2	ug/g	NC (3)	35	96	80 - 120
3729709	>C10-C16 Hydrocarbons	2014/09/02	NC	30 - 130	84	30 - 130	<10	mg/kg	13 (3)	50		
3729709	>C16-C21 Hydrocarbons	2014/09/02	NC	30 - 130	97	30 - 130	<10	mg/kg	13 (7,3)	50		
3729709	>C21-<C32 Hydrocarbons	2014/09/02	NC	30 - 130	110	30 - 130	<15	mg/kg	10 (7,3)	50		
3731491	Aroclor 1016	2014/09/10					<0.015	ug/g				
3731491	Aroclor 1221	2014/09/10					<0.015	ug/g				
3731491	Aroclor 1232	2014/09/10					<0.015	ug/g				
3731491	Aroclor 1242	2014/09/10				40	<0.015	ug/g	NC (3)	40		
3731491	Aroclor 1248	2014/09/10					<0.015	ug/g	NC (3)	40		
3731491	Aroclor 1254	2014/09/10					<0.015	ug/g	NC (3)	40		
3731491	Aroclor 1260	2014/09/10					<0.015	ug/g	NC (3)	40		
3731491	Aroclor 1262	2014/09/10					<0.015	ug/g				
3731491	Aroclor 1268	2014/09/10					<0.015	ug/g				
3731491	Chlordane (Total)	2014/09/10							NC (3)	40		
3731491	o,p-DDD + p,p-DDD	2014/09/10							NC (3)	40		
3731491	o,p-DDD	2014/09/10	71	50 - 130	108	50 - 130	<0.0020	ug/g	NC (3)	40		
3731491	o,p-DDE + p,p-DDE	2014/09/10							NC (3)	40		
3731491	o,p-DDE	2014/09/10	100	50 - 130	77	50 - 130	<0.0020	ug/g	NC (3)	40		
3731491	o,p-DDT + p,p-DDT	2014/09/10							NC (3)	40		
3731491	o,p-DDT	2014/09/10	NC	50 - 130	73	50 - 130	<0.0020	ug/g	NC (3)	40		
3731491	p,p-DDD	2014/09/10	62	50 - 130	80	50 - 130	<0.0020	ug/g	7.5 (3)	40		
3731491	p,p-DDE	2014/09/10	NC	50 - 130	90	50 - 130	<0.0020	ug/g	0.47 (3)	40		
3731491	p,p-DDT	2014/09/10	NC	50 - 130	68	50 - 130	<0.0020	ug/g	NC (3)	40		
3731491	Total PCB	2014/09/10							NC (3)	40		
3732101	Benzene	2014/09/01	93 (9)	60 - 140	91	60 - 140	<0.0050	mg/kg	NC (10)	50		
3732101	C6 - C10 (less BTEX)	2014/09/01					<2.5	mg/kg	NC (10)	50		
3732101	Ethylbenzene	2014/09/01	118 (9)	60 - 140	103	60 - 140	<0.010	mg/kg	NC (10)	50		
3732101	Toluene	2014/09/01	130 (9)	60 - 140	100	60 - 140	<0.025	mg/kg	NC (10)	50		

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Sampler Initials: AF

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
3732101	Xylene (Total)	2014/09/01	134 (9)	60 - 140	102	60 - 140	<0.050	mg/kg	NC (10)	50		
3732249	>C10-C16 Hydrocarbons	2014/09/02	67	30 - 130	71	30 - 130	<10	mg/kg	NC (3)	50		
3732249	>C16-C21 Hydrocarbons	2014/09/02	83	30 - 130	80	30 - 130	<10	mg/kg	NC (3)	50		
3732249	>C21-<C32 Hydrocarbons	2014/09/02	84	30 - 130	82	30 - 130	<15	mg/kg	NC (3)	50		
3732722	Mercury (Hg)	2014/09/03	98	75 - 125	97	80 - 120	<0.010	mg/kg	NC (3)	30	77	75 - 125
3732815	Total Carbon-combustion IR	2014/09/03					<0.20	g/kg	2.8 (11)	35	99	75 - 125
3735399	Organic Carbon (TOC)	2014/09/04					<0.20	g/kg	1.6 (3)	35	90	75 - 125
3758491	Sample Weight (as received)	2014/09/23							0 (3)	N/A		
3758497	Final pH	2014/09/23					4.19	N/A	0 (3)	N/A		
3758543	Leachable >C10-C16 Hydrocarbons	2014/09/24	76 (12)	30 - 130	90	30 - 130	<0.20	mg/L	NC (13)	40		
3758543	Leachable >C16-C21 Hydrocarbons	2014/09/24	78 (12)	30 - 130	93	30 - 130	<0.20	mg/L	NC (13)	40		
3758543	Leachable >C21-<C32 Hydrocarbons	2014/09/24	77 (12)	30 - 130	96	30 - 130	<0.50	mg/L	NC (13)	40		
3758543	Leachable Hydrocarbon Resemblance	2014/09/24							NC (13)	N/A		
3760050	Leachable Boron (B)	2014/09/25	NC	80 - 120	96	80 - 120	<500	ug/L	NC (3)	35		
3761529	Leachable 1-Methylnaphthalene	2014/09/27	53	30 - 130	85	30 - 130	<0.010	ug/L	NC (3)	40		
3761529	Leachable 2-Methylnaphthalene	2014/09/27	55	30 - 130	89	30 - 130	<0.010	ug/L	NC (3)	40		
3761529	Leachable Acenaphthene	2014/09/27	53	30 - 130	83	30 - 130	<0.0050	ug/L	NC (3)	40		
3761529	Leachable Acenaphthylene	2014/09/27	68	30 - 130	109	30 - 130	<0.0050	ug/L	NC (3)	40		
3761529	Leachable Anthracene	2014/09/27	58	30 - 130	91	30 - 130	<0.0050	ug/L	NC (3)	40		
3761529	Leachable Benzo(a)anthracene	2014/09/27	53	30 - 130	87	30 - 130	<0.0050	ug/L	NC (3)	40		
3761529	Leachable Benzo(a)pyrene	2014/09/27	55	30 - 130	92	30 - 130	<0.0050	ug/L	NC (3)	40		
3761529	Leachable Benzo(b)fluoranthene	2014/09/27	59	30 - 130	100	30 - 130	<0.0050	ug/L	NC (3)	40		
3761529	Leachable Benzo(g,h,i)perylene	2014/09/27	55	30 - 130	93	30 - 130	<0.0050	ug/L	NC (3)	40		
3761529	Leachable Benzo(j)fluoranthene	2014/09/27	60	30 - 130	97	30 - 130	<0.0050	ug/L	NC (3)	40		
3761529	Leachable Benzo(k)fluoranthene	2014/09/27	59	30 - 130	100	30 - 130	<0.0050	ug/L	NC (3)	40		
3761529	Leachable Chrysene	2014/09/27	56	30 - 130	87	30 - 130	<0.0050	ug/L	NC (3)	40		
3761529	Leachable Dibenz(a,h)anthracene	2014/09/27	47 (14)	30 - 130	80	30 - 130	<0.0050	ug/L	NC (3)	40		
3761529	Leachable Fluoranthene	2014/09/27	58	30 - 130	91	30 - 130	<0.050 (15)	ug/L	NC (15,3)	40		
3761529	Leachable Fluorene	2014/09/27	58	30 - 130	92	30 - 130	<0.0050	ug/L	NC (3)	40		
3761529	Leachable Indeno(1,2,3-cd)pyrene	2014/09/27	52	30 - 130	88	30 - 130	<0.0050	ug/L	NC (3)	40		
3761529	Leachable Naphthalene	2014/09/27	50	30 - 130	78	30 - 130	<0.020	ug/L	NC (3)	40		
3761529	Leachable Perylene	2014/09/27	53	30 - 130	89	30 - 130	<0.0050	ug/L	NC (3)	40		

Maxxam Job #: B4F3858
Report Date: 2014/09/29

QUALITY ASSURANCE REPORT(CONT'D)

Conestoga-Rovers and Associates Ltd
Client Project #: 088617
Site Location: PLEASANT BAY SCH
Sampler Initials: AF

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
3761529	Leachable Phenanthrene	2014/09/27	61	30 - 130	91	30 - 130	<0.060 (15)	ug/L	NC (15,3)	40		
3761529	Leachable Pyrene	2014/09/27	58	30 - 130	84	30 - 130	<0.030 (15)	ug/L	NC (15,3)	40		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Duplicate Parent ID [XG5688-02]

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(3) Duplicate Parent ID

(4) Matrix Spike Parent ID [XG5690-02]

(5) Duplicate Parent ID [XG5690-02]

(6) The matrix spike recovery was below the lower control limit. This may be due in part to the reducing environment of the sample. The matrix spike was reanalyzed to confirm result.

(7) Elevated TEH RDL(s) due to sample dilution.

(8) VPH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.

(9) Matrix Spike Parent ID [XG5690-01]

(10) Duplicate Parent ID [XG5690-01]

(11) Duplicate Parent ID [XG5687-02]

(12) Matrix Spike Parent ID [XG5687-01]

(13) Duplicate Parent ID [XG5688-01]

(14) Matrix Spike: results are outside acceptance limit. Insufficient sample for repeat analysis.

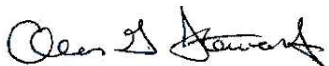
(15) Elevated RDL(s) due to detected levels in the leachate blank.

Maxxam Job #: B4F3858
Report Date: 2014/09/29

Conestoga-Rovers and Associates Ltd
Client Project #: 088617
Site Location: PLEASANT BAY SCH
Sampler Initials: AF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Alan Stewart, Scientific Specialist (Organics)



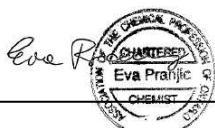
Brad Newman, Scientific Specialist



Colleen Acker, Supervisor, General Chemistry



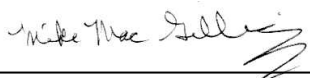
Eric Dearman, Scientific Specialist



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist



Kevin MacDonald, Inorganics Supervisor



Mike MacGillivray, Scientific Specialist (Inorganics)

Maxxam Job #: B4F3858
Report Date: 2014/09/29

Conestoga-Rovers and Associates Ltd
Client Project #: 088617
Site Location: PLEASANT BAY SCH
Sampler Initials: AF

VALIDATION SIGNATURE PAGE(CONT'D)

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Rose MacDonald, Scientific Specialist (Organics)

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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MAXXAM Chain of Custody Record
 COC #: B 66180 Page 1 of 1

This column for lab use only:							INVOICE INFORMATION:		REPORT INFORMATION (if differs from invoice):										TURNAROUND TIME		
Client Code							Company Name: CRA		Company Name:										Standard <input checked="" type="checkbox"/>		
Maxxam Job # B4F 3858							Contact Name: Amanda Facey		Contact Name:										10 day <input type="checkbox"/>		
Cooler ID							Address: Dartmouth, NS		Address:										If RUSH Specify Date:		
Seal Present							Postal Code: B3B 1J7		Postal Code:										Pre-schedule rush work		
Seal Intact							Email: afacey@ccrworld.com		Email:										Charge for # Jars used but not submitted <input checked="" type="checkbox"/>		
Temp 1							Ph: 468-1248 Fax: 468-2207		Ph:												
Temp 2							Guideline Requirements / Detection Limits / Special Instructions		Lab Filtration Required												
Temp 3							Low level BTEX/TPH (CCME SQGs)		Choose Total or Diss Metals												
Average Temp							Return to baseline at C32 required and is to be verified		RCAP-30												
							Silica gel clean-up		Choose Total or Diss Metals												
							Low level PAHs (2010 CCME), scan for creosote		RCAP-MS												
							Metals include hexavalent chromium		Total Digest (Default Method)												
							Low level mercury		Total Digest (Default Method) for well water, surface water												
							*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/ Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater		Dissolved for ground water												
Integrity YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>									Metals Water												
Integrity / Checklist by									Metals Soil												
Labelled by									Hydrocarbons												
Location / Bin #									PAH's												
									PAH's with Acridine, Quinoline												
																			PCBs & DDT suite		
																			Carbon (TK & TOC)		
																			Grain size distribution		
1							SED-1		SED-1												
2							SED-2		SED-2												
3							SED-3		SED-3												
4							SED-4		SED-4												
5																					
6																					



B4F3858

RELINQUISHED BY: (Signature/Print) Date Time RECEIVED BY: (Signature/Print) Date Time
 [Signature] / Sherman Jockson Aug 22/14 Sara Mason SARA MASON

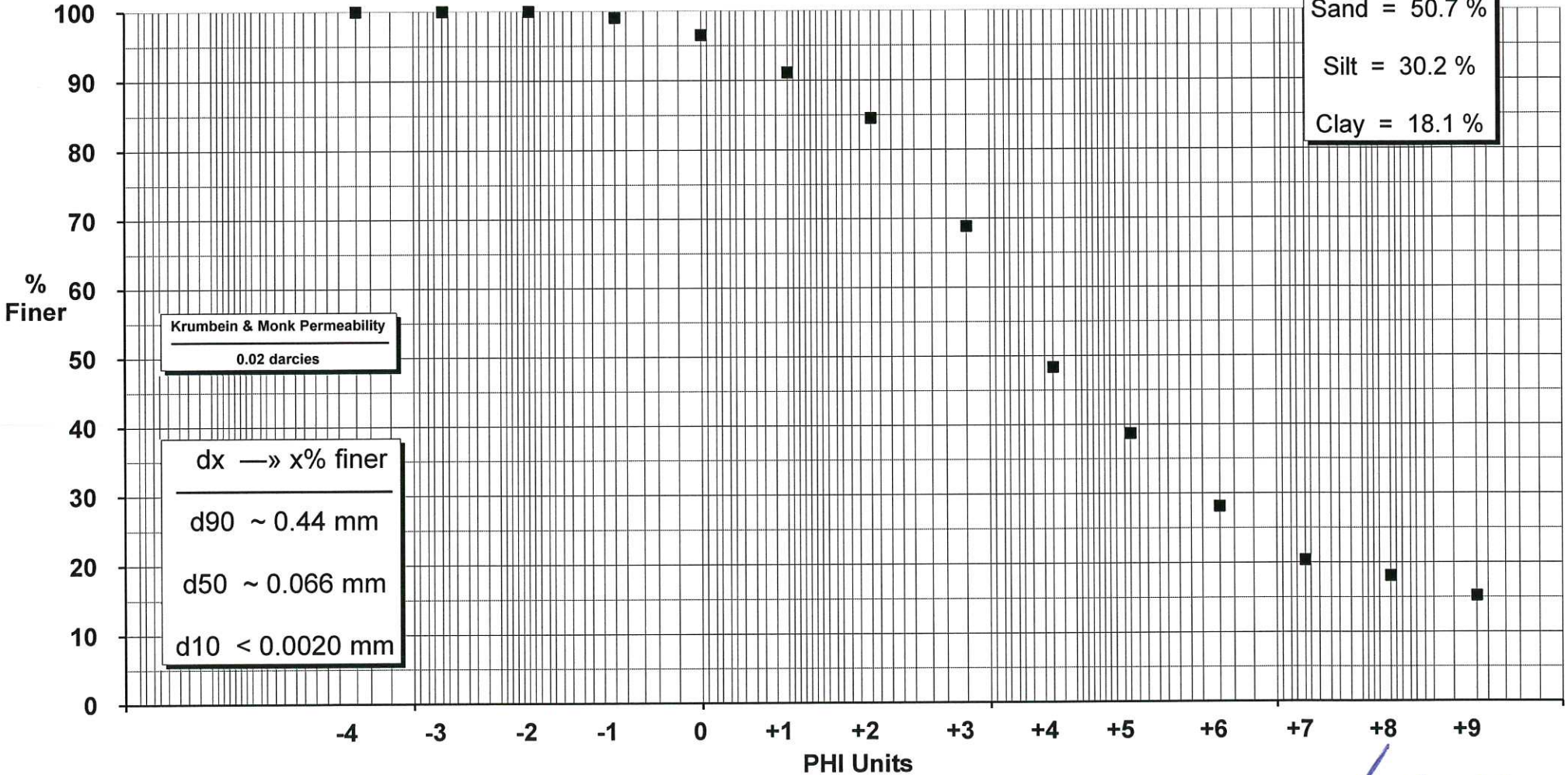


SED-1

Percent Coarser than 75 μm
(PHI = 3.737)
—
46.3 %

Percent Coarser than 50 μm
(PHI = 4.322)
—
54.8 %

Wentworth
—
Gravel = 0.9 %
Sand = 50.7 %
Silt = 30.2 %
Clay = 18.1 %



[Signature]
Approved

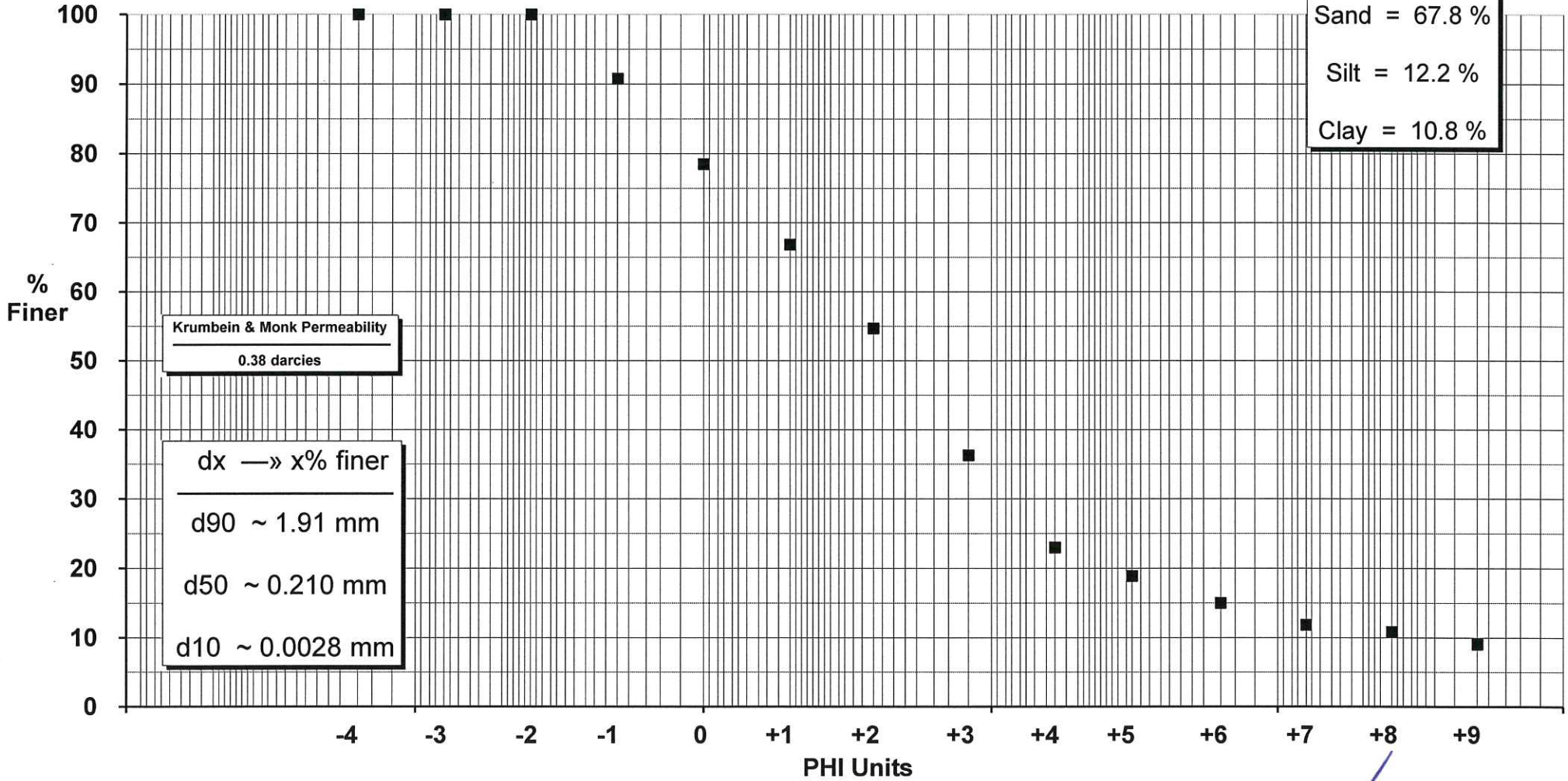


SED-2

Percent Coarser than 75 μm
(PHI = 3.737)
—
73.5 %

Percent Coarser than 50 μm
(PHI = 4.322)
—
78.3 %

Wentworth
—
Gravel = 9.2 %
Sand = 67.8 %
Silt = 12.2 %
Clay = 10.8 %




Approved

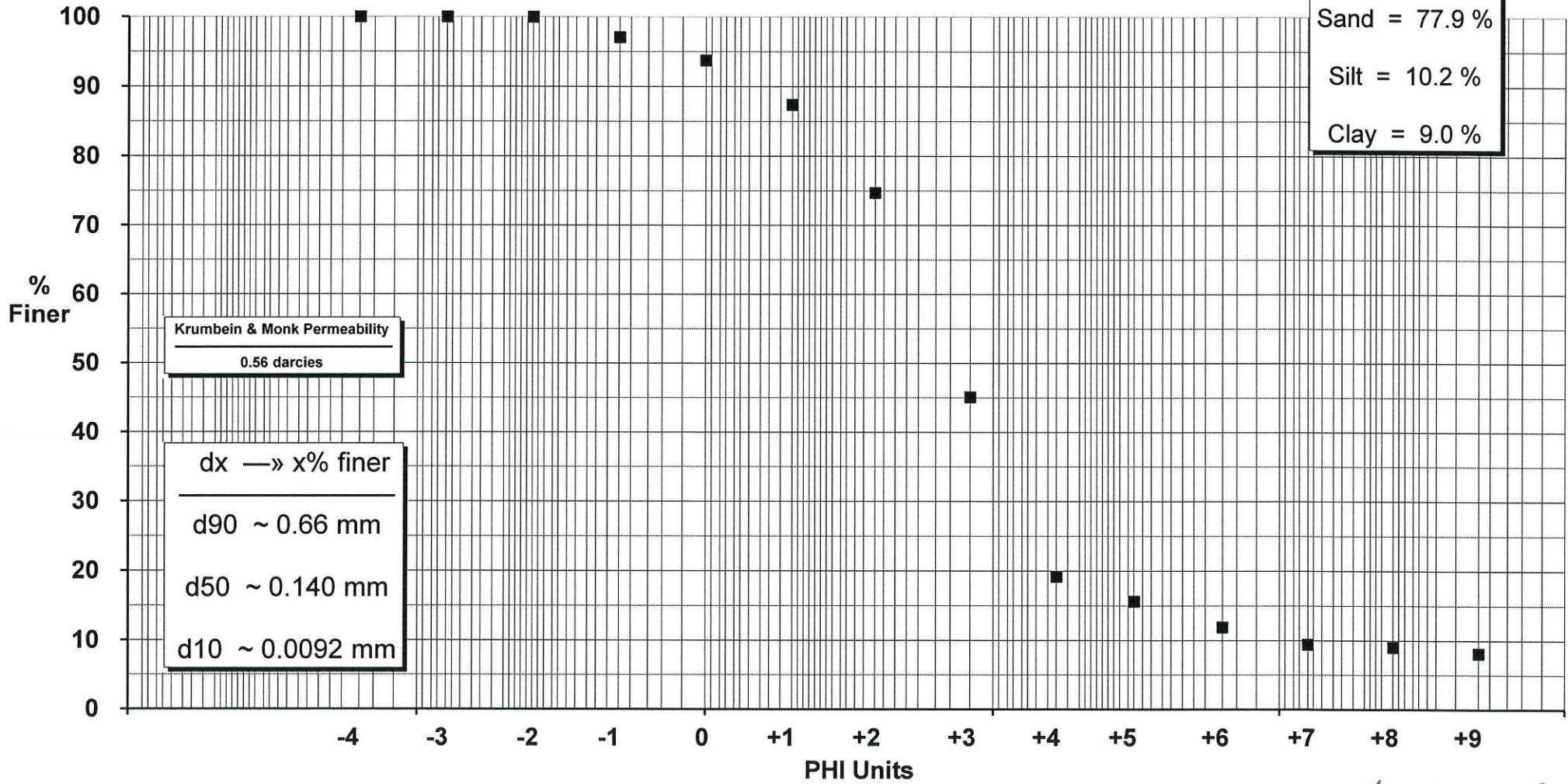


SED-3

Percent Coarser than 75 μm
(PHI = 3.737)
—
74.0 %

Percent Coarser than 50 μm
(PHI = 4.322)
—
82.0 %

Wentworth
—
Gravel = 2.9 %
Sand = 77.9 %
Silt = 10.2 %
Clay = 9.0 %




Approved

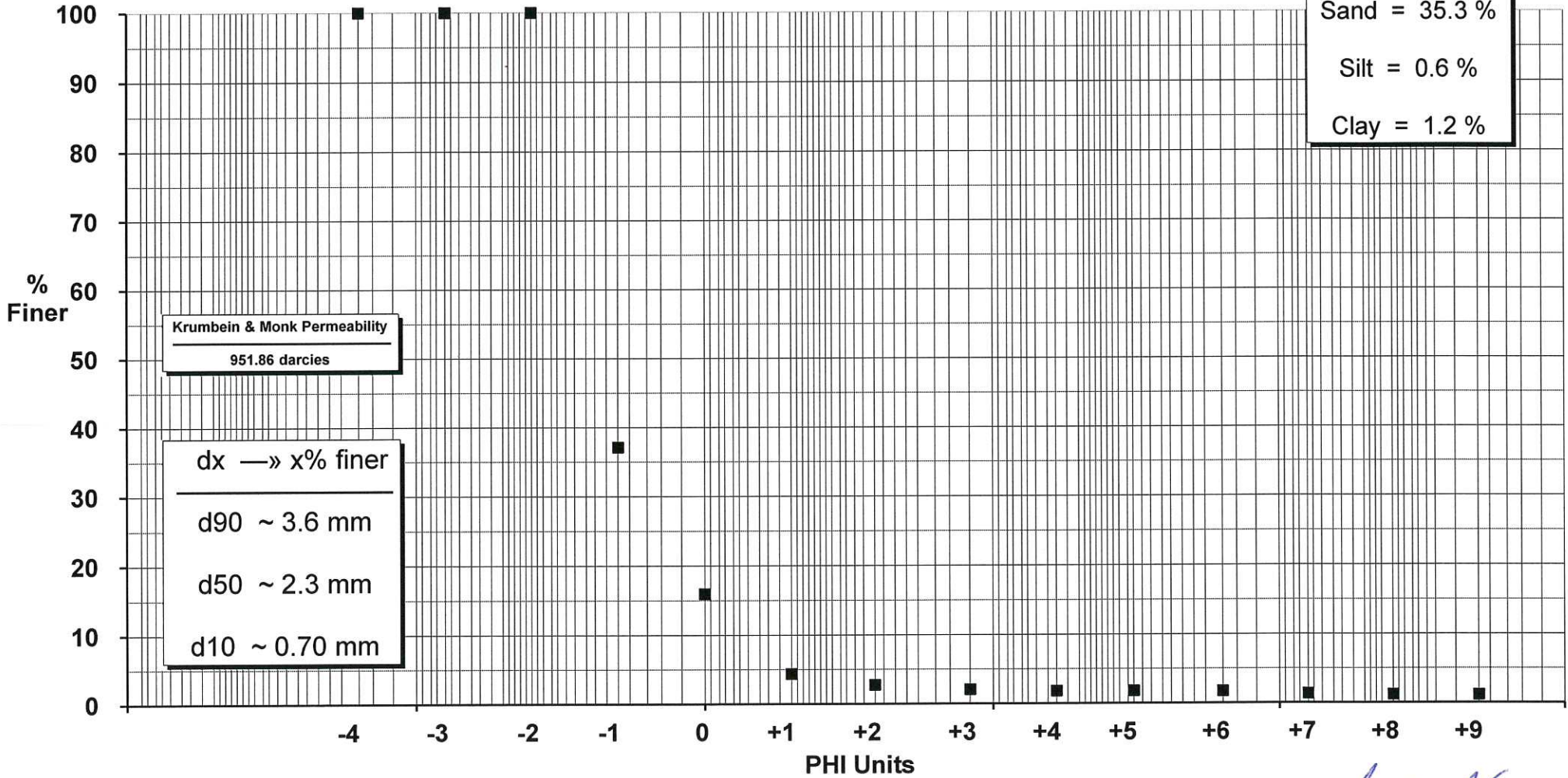


SED-4

Percent Coarser than 75 μm
(PHI = 3.737)
—
98.1 %

Percent Coarser than 50 μm
(PHI = 4.322)
—
98.2 %

Wentworth
—
Gravel = 62.9 %
Sand = 35.3 %
Silt = 0.6 %
Clay = 1.2 %




Approved

**APPENDIX D
Limitations**



This report has been prepared for the sole benefit of Public Works and Government Services Canada and Fisheries and Oceans Canada. The report may not be used by any other person or entity without the express written consent of Conestoga-Rovers & Associates, Public Works and Government Services Canada, and Fisheries and Oceans Canada. Any use which a third party makes of this report, or any reliance on decisions made based on it, is the responsibility of such third parties. Conestoga-Rovers & Associates accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

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