

SPECIFICATION

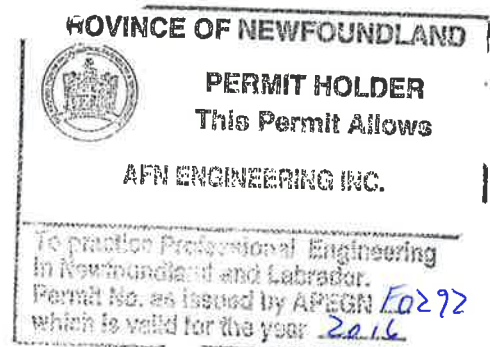
Contaminated Soil Removal  
Cape Spear, NL  
F6879-161002

PREPARED FOR

Fisheries and Oceans Canada  
P.O. Box 5667  
St. John's, NL, A1C 5X1

DATE

August 11, 2016  
Revision 2



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LIST OF DRAWINGS

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DRAWING NO

TITLE

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Site Plan

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Details

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Appendix A: Project Effects Determination

Appendix B: Laboratory Results

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### 1.1 SCOPE

- .1 The work consists of the furnishing of all plant, labour, equipment and material for petroleum hydrocarbon (PHC) contaminated soil removal in Cape Spear, NL, in strict accordance with specifications and accompanying drawings and subject to all terms and conditions of the Contract.

### 1.2 DESCRIPTION OF WORK

- .1 In general, work under this contract consists of, but will not necessarily be limited to, the following:
- The Contractor shall not commence excavation or subsequent backfilling activities without prior authorization to proceed from the Departmental Representative. Confirmatory samples are to be collected by the Departmental Representative once the excavation is complete, before backfilling commences.
  - The Contractor shall excavate PHC impacted soils from the area shown on the drawings. The excavation may be required to extend beyond the subject area based on actual conditions encountered during the work. The Departmental Representative will indicate the areas and extents of the remedial excavation requirements as it progresses, based on soil conditions encountered. Costs associated with excavating beyond the area shown will be negotiated under a contemplated change notice.
  - The Contractor shall recover, transport and dispose of all excavated material at an approved landfill or soil treatment facility that accepts PHC impacted material, in accordance with the requirements of regulatory agencies having jurisdiction, and authorization of the Departmental Representative.

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- The Contractor should allow for a requirement to leave the excavation open for a duration of 5 calendar days to allow for laboratory analysis of clearance soil samples. Take all measures to properly barricade and secure open excavations in accordance with occupational health and safety guidelines.
- Following completion of the excavation and upon authorization from the Departmental Representative, the Contractor shall backfill the excavation as noted on the drawings.
- Supply and install wooden protection posts, complete with reflective tape and eye bolt rings. Supply and install 25mm diameter rope, as noted on the drawings, between the eye bolts on each post.

Do not proceed with any portion of the work until the Departmental Representative has approved the limits of the area to be excavated/remediated.

1.3 SITE OF WORK

- .1 Work will be carried out at Cape Spear, NL.

1.4 DATUM

- .1 Datum used for this project is Lowest Normal Tides (LNT). If requested by the Contractor, the Departmental Representative will establish a benchmark prior to the start of work.

1.5 FAMILIARIZATION WITH SITE

- .1 Before submitting a bid, it is recommended that bidders visit the site and its surroundings to review and verify the form, nature and extent of the work, materials needed for the completion of the work, the means of access to the site, severity, exposure and uncertainty of weather, any accommodations they may require, and in general shall obtain all

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necessary information as to risks, contingencies and other circumstances which may influence or affect their bid or costs to do the work. No allowance shall be made subsequently in this connection on account of error or negligence to properly observe and determine the conditions that will apply.

- .2 Contractors, bidders or those they invite to site are to review specification Section 01 35 29 - Health and Safety Requirements before visiting site. Take all appropriate safety measures for any visit to site, either before or after acceptance of bid.
- .3 Obtain prior permission from the Departmental Representative before carrying out such site inspection.

#### 1.6 CODES AND STANDARDS

- .1 Perform work in accordance with the latest edition of the National Building Code of Canada, and any other code of provincial or local application including all amendments up to project bid closing date provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
- .2 Materials and workmanship must meet or exceed requirements of specified standards, codes and referenced documents.

#### 1.7 TERM ENGINEER

- .1 Unless specifically stated otherwise, the term Engineer where used in the Specifications and on the Drawings shall mean the Departmental Representative.

#### 1.8 SETTING OUT WORK

- .1 Set grades and layout work in detail from control points and grades established by Departmental Representative.

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- .2 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated or as directed by Departmental Representative.
- .3 Provide devices needed to layout and construct work.
- .4 Supply such devices required to facilitate Departmental Representative's inspection of work.
- .5 Supply stakes and other survey markers required for laying out work.

#### 1.9 COST BREAKDOWN

- .1 Before submitting first progress claim submit breakdown of Contract price in detail as directed by Departmental Representative and aggregating contract price.
- .2 Provide cost breakdown in same format as the numerical and subject title system used in this specification project manual and thereafter sub-divided into major work components as directed by Departmental Representative.
- .3 Upon approval by Departmental Representative, cost breakdown will be used as basis for progress payment.
- .4 This will be a lump sum project. Individual work items will not be measured separately for payment.

#### 1.10 WORK SCHEDULE

- .1 Submit within 7 work days of notification of acceptance of bid, a construction schedule showing commencement and completion of all work within the time stated on the Bid and Acceptance Form and

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- the date stated in the bid acceptance letter. The schedule should allow time for analytical results to be received (after being collected from the open excavation).
- .2 Provide sufficient details in schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.
  - .3 As a minimum, work schedule to be prepared and submitted in the form of Bar (GANTT) Charts, indicating work activities, tasks and other project elements, their anticipated durations and planned dates for achieving key activities and major project milestones provided in sufficient details and supported by narratives to demonstrate a reasonable plan for completion of project within designated time. Generally Bar Charts derived from commercially available computerized project management system are preferred but not mandatory.
  - .4 Submit schedule updates on a minimum bi-weekly basis and more often, when requested by Departmental Representative, due to frequent changing project conditions. Provide a narrative explanation of necessary changes and schedule revisions at each update.
  - .5 The schedule, including all updates, shall be to Departmental Representative's approval. Take necessary measures to complete work within approved time. Do not change schedule without Departmental Representative's approval.



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- .6 All work on the project will be completed within the time indicated on the Bid and Acceptance Form.

1.11 ABBREVIATIONS

- .1 Following abbreviations of standard specifications have been used in this specification and on the drawings:

CGSB - Canadian Government Specifications Board

CSA - Canadian Standards Association

NLGA - National Lumber Grades Authority

ASTM - American Society for Testing and Materials

- .2 Where these abbreviations and standards are used in this project, latest edition in effect on date of bid call will be considered applicable.

1.12 SITE OPERATIONS

- .1 Arrange for sufficient space adjacent to project site for conduct of operations, storage of materials and so on. Exercise care so as not to obstruct or damage public or private property in area. All arrangements for space and access will be made by Contractor.

1.13 PROJECT MEETINGS

- .1 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording minutes.
- .2 Project meetings will take place on site of work unless so directed by the Departmental Representative.
- .3 Departmental Representative will assume responsibility for recording minutes of meetings and forwarding copies to all parties present at the meetings.
- .4 Have a responsible member of firm present

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at all project meetings.

- 1.14 PROTECTION .1 Store all materials and equipment to be incorporated into work to prevent damage by any means.
- .2 Repair or replace all materials damaged in transit or storage to the satisfaction of Departmental Representative and at no cost to Canada.
- 1.15 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 site operations, and tenant operations.
- .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 approval from Departmental Representative for any shut-down or closure of active service or facility.
- .4 Provide temporary services when directed by Departmental Representative to maintain critical facility systems.
- 1.16 DOCUMENTS REQUIRED .1 Maintain at job site, one copy each of the following:
- .1 Contract Drawings
  - .2 Specifications
  - .3 Addenda
  - .4 Contract and any resulting amendments signed by contracting authority.
  - .5 Test Reports
  - .6 Copy of Approved Work Schedule
  - .7 Site specific Health and Safety Plan and other safety related documents.

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- 1.17 PERMITS
- .1 Obtain and pay for all permits, certificates and licenses as required by Municipal, Provincial, Federal and other Authorities.
  - .2 Provide appropriate notifications of project to municipal and provincial inspection authorities.
  - .3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.
  - .4 Submit to Departmental Representative, copy of application submissions and approval documents received for above referenced authorities.
  - .5 Comply with all requirements, recommendations and advice by all regulatory authorities unless otherwise agreed in writing by Departmental Representative. Make requests for such deviations to these requirements sufficiently in advance of related work.
- 1.18 CUTTING, FITTING AND PATCHING
- .1 Execute cutting, including excavation, fitting and patching required to make work fit properly.
- 1.19 ACCEPTANCE
- .1 Prior to the issuance of the Certificate of Substantial Performance, in company with Departmental Representative, make a check of all work. Correct all discrepancies before final inspection and acceptance.
- 1.20 WORKS COORDINATION
- .1 Responsible for coordinating the work of the various trades, where the work of such trades interfaces with each other.

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- .2 Convene meetings between trades whose work interfaces and ensure that they are fully aware of the areas and the extent of where interfacing is required. Provide each trade with the plans and specifications of the interfacing trade, as required, to assist them in planning and carrying out their respective work.
- .3 Canada will not be responsible for or held accountable for any extra costs incurred as a result of the failure to carry out coordination work. Disputes between the various trades as a result of their not being informed of the areas and extent of interface work shall be the sole responsibility of the General Contractor and shall be resolved at no extra cost to Canada.

1.21 CONTRACTOR'S  
USE OF SITE

- .1 Responsible for arranging the storage of materials on or off site, and any materials stored at the site which interfere with any of the day to day activities at or near the site will be moved promptly at the Contractor's expense, upon request by Departmental Representative.
- .2 Exercise care so as not to obstruct or damage public or private property in the area.
- .3 At completion of work, restore area to its original condition. Damage to ground and property will be repaired by Contractor. Remove all construction materials, residue, excess, etc., and leave site in a condition acceptable to Departmental Representative.

1.22 WORK  
COMMENCEMENT

- .1 Mobilization to project site is to commence immediately after acceptance of

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- bid and submission of Site Specific Safety Plan and insurance and bonding documentation, unless otherwise agreed by Departmental Representative.
- .2 Project work on site is to commence as soon as possible, with a continuous reasonable work force, unless otherwise agreed by Departmental Representative.
  - .3 Weather conditions, short construction season, delivery challenges and the location of the work site may require the use of longer working days and additional work force to complete the project within the specified completion time.
  - .4 Make every effort to ensure that sufficient material and equipment is delivered to site at the earliest possible date after acceptance of bid and replenished as required.
  - .5 Sufficient notice has to be provided to the Departmental Representative regarding schedule in order to allow sufficient time for the Departmental Representative to make necessary arrangements, etc.
  - .6 Parks Canada closes the site on October 14<sup>th</sup> of each year. All proposed work has to be coordinated with Newfoundland Power prior to commencement.

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PART 1 - GENERAL

- 1.1 SECTION INCLUDES
- .1 Product data.
  - .2 Samples.
  - .3 Certificates.
- 1.2 SUBMITTAL GENERAL REQUIREMENTS
- .1 Submit to Departmental Representative for review submittals listed, including samples, certificates and other data, as specified in other sections of the Specifications. Note that any and all changes to the contract will have to be approved in writing by the Contracting Authority.
  - .2 Submit with reasonable promptness and in orderly sequence so as to allow for Departmental Representative's review and not cause delay in Work. Failure to submit in ample time will not be considered sufficient reason for an extension of Contract time and no claim for extension by reason of such default will be allowed.
  - .3 Do not proceed with work until relevant submissions are reviewed by Departmental Representative.
  - .4 Present product data, samples and mock-ups in SI Metric units.
  - .5 Where items or information is not produced in SI Metric units, provide soft converted values.
  - .6 Review submittals prior to submission to Departmental Representative. Ensure during review that necessary requirements have been determined and verified, required field measurements or data have been taken, and that

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each submittal has been checked and co-ordinated with requirements of Work and Contract Documents.

.1 Submittals not stamped, signed, dated and identified as to specific project will be returned unexamined by Departmental Representative and considered rejected.

- .7 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .8 Verify field measurements and affected adjacent work and coordinate.
- .9 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .10 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative's review.
- .11 Submittal format: paper originals, or alternatively clear and fully legible photocopies of originals. Facsimiles are not acceptable, except in special circumstances pre-approved by Departmental Representative. Poorly printed non-legible photocopies or facsimiles will not be accepted and be returned for resubmission.
- .12 Make changes or revision to submissions which Departmental Representative may require, consistent with Contract Documents and resubmit as directed by Departmental Representative. When resubmitting, notify Departmental Representative in writing of any revisions other than those requested.

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- .13 Keep one reviewed copy of each submittal document on site for duration of Work.

### 1.3 PRODUCT DATA

- .1 Product data includes drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit sufficient copies of product data which are required by the General Contractor and sub-contractors plus 2 copies which will be retained by Departmental Representative. Ensure sufficient numbers are submitted to enable one complete set to be included in each of the maintenance manuals specified, if applicable.
- .3 Allow 10 calendar days for Departmental Representative's review of each submission.
- .4 Adjustments or corrections made on product data by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, advise Departmental Representative in writing prior to proceeding with Work.
- .5 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections and comments are made, fabrication and installation may proceed upon receipt of shop drawings. If product data are rejected and noted to be Resubmitted, do not proceed with that portion of work until resubmission and review of corrected product data, through same submission procedures indicated above.
- .6 Accompany each submission with transmittal letter, containing:



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- .1 Date.
- .2 Project title and project number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each product data and sample.
- .5 Other pertinent data.
- .7 Submissions shall include:
  - .1 Date and revision dates.
  - .2 Project title and project number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Cross references to particular details of contract drawings and specifications section number for which product data submission addresses.
  - .6 Details of appropriate portions of Work.
- .8 After Departmental Representative's review, distribute copies.
- .9 The review of samples and product data by the Departmental Representative or their delegated representative is for sole purpose of ascertaining conformance with general concept. This review shall not mean that the Departmental Representative approves the detail design inherent in the product data, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in product data or of responsibility for meeting all requirements of the construction and Contract Documents. Without restricting generality of foregoing, Contractor is

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responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.4 SCHEDULES,  
PERMITS AND  
CERTIFICATES

- .1 Upon acceptance of bid, submit to Departmental Representative copy of Work Schedule and various other schedules, permits, certification documents and project management plans as specified in other sections of the Specifications.
- .2 Submit copy of permits, notices, compliance Certificates received by Regulatory Agencies having jurisdiction and as applicable to the Work.
- .3 Submission of above documents to be in accordance with Submittal General Requirements procedures specified in this section.

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- 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.
- 1.3 REFERENCES .1 Fire Protection Standards issued by Fire Protection Services of Human Resources Development Canada as follows:  
.1 National Fire Code - Standard for Construction Operations - latest edition ([http://www.hrsdc.gc.ca/eng/labour/fire\\_protection/policies\\_standards/commissioner/301/page00.shtml](http://www.hrsdc.gc.ca/eng/labour/fire_protection/policies_standards/commissioner/301/page00.shtml)).  
.2 National Fire Code - Standard for Welding and Cutting - latest edition ([http://www.hrsdc.gc.ca/eng/labour/fire\\_protection/policies\\_standards/commissioner/302/page00.shtml](http://www.hrsdc.gc.ca/eng/labour/fire_protection/policies_standards/commissioner/302/page00.shtml)).  
.3 FCC standards, may also be viewed at the Regional Labour Canada Office located at Baine Johnson Centre, 10 Fort William Place, St. John's, NL, A1C 1K4; Telephone 1-800-641-4049; fax 1-709-772-5985.
- 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.
- 1.5 SUBMITTALS .1 Submit copy of Hot Work Procedures and sample of Hot Work permit to Departmental Representative for review, within five (5) calendar days after notification of acceptance of bid.  
.2 Submit in accordance with the Submittal General Requirements specified in Section 01 33 00.

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1.6 FIRE SAFETY  
REQUIREMENTS

- .1 Implement and follow fire safety measures during Work. Comply with following:
  - .1 National Fire Code, latest edition.
  - .2 Fire Protection Standards FCC 301 and FCC 302 - latest edition.
  - .3 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 29 - Health and Safety Requirements.
- .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.

1.7 HOT WORK  
AUTHORIZATION

- .1 Obtain Departmental Representative's written "Authorization to Proceed" before conducting any form of Hot work on site.
- .2 To obtain authorization submit to Departmental Representative:
  - .1 Contractor's typewritten Hot Work Procedures to be followed on site as specified below.
  - .2 Description of the type and frequency of Hot Work required.
  - .3 Sample Hot Work Permit to be used.
- .3 Upon review and confirmation that effective fire safety measures will be implemented during performance of hot work, Departmental Representative will provide authorization to proceed as follows:
  - .1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;
  - .2 Separate work, or segregate certain parts of work, into individual entities. Each entity requiring a separately written "Authorization to Proceed" from Departmental

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Representative. Follow Departmental Representative's directives in this regard.

- .4 Requirement for individual authorization based on:
  - .1 Nature or phasing of work;
  - .2 Risk to Facility operations;
  - .3 Quantity of various trades needing to perform hot work on project or;
  - .4 Other situation deemed necessary by Departmental Representative to ensure fire safety on premises.
- .5 Do not perform any Hot Work until receipt of Departmental Representative's written "Authorization to Proceed" for that portion of work.

1.8 HOT WORK  
PROCEDURES

- .1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.
- .2 Procedures to include:
  - .1 Requirement to perform hazard assessment of site and immediate hot work area for each hot work event in accordance with Hazard Assessment and Safety Plan requirements of Section 01 35 29.
  - .2 Use of a Hot Work Permit system for each hot work event.
  - .3 The step by step process of how to prepare and issue permit.
  - .4 Permit shall be issued by Contractor's site Superintendent, or other authorized person designated by Contractor, granting permission to worker or subcontractor to proceed with hot work.
  - .5 Provision of a designated person to carryout a Fire Safety Watch for a minimum of 60 minutes immediately upon completion of the hot work.
  - .6 Compliance with fire safety codes and standards specified herein and occupational health and safety regulations specified in

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Section 01 35 29.

- .3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Clearly label as being the Hot Work Procedures applicable to this contract.
- .4 Hot Work Procedures shall clearly establish worker instructions and allocate responsibilities of:
  - .1 Worker(s),
  - .2 Authorized person issuing the Hot Work Permit,
  - .3 Fire Safety Watcher,
  - .4 Subcontractors and Contractor.
- .5 Brief all workers and subcontractors on Hot Work Procedures and Permit system established for project. Stringently enforce compliance.
  - .1 Failure to comply with the established procedures may result in the issuance of a Non-Compliance Notification at Departmental Representative's discretion with possible disciplinary measures imposed as specified in Section 01 35 29.

1.9 HOT WORK  
PERMIT

- .1 Hot Work Permit to include, as a minimum, the following data:
  - .1 Project name and project number.
  - .2 Building name, address and specific room or area where hot work will be performed.
  - .3 Date when permit issued.
  - .4 Description of hot work type to be performed.
  - .5 Special precautions required, including type of fire extinguisher needed.
  - .6 Name and signature of person authorized to issue the permit.
  - .7 Name of worker (clearly printed) to which the permit is being issued.
  - .8 Time Duration that permit is valid (not to exceed 8 hours). Indicate start time and date, and completion time and date.

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.9 Worker signature with date and time upon hot work termination.

.10 Specified time period requiring safety watch.

.11 Name and signature of designated Fire Safety Watcher, complete with time and date when safety watch terminated, certifying that surrounding area was under continual surveillance and inspection during the full watch time period specified in Permit and commenced immediately upon completion of Hot Work.

.2 Permit to be typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.

.3 Each Hot Work Permit to be completed in full and signed as follows:

.1 Authorized person issuing Permit before hot work commences.

.2 Worker upon completion of Hot Work.

.3 Fire Safety Watcher upon termination of safety watch.

.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.

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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 to Departmental Representative, copies of the following documents including updates.
- .1 Site specific Health and Safety Plan.



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- .2 Building permit, compliance certification and other permits obtained.
- .3 Reports or directives issued by Federal and Provincial Inspectors and other Authorities having jurisdiction.
- .4 Accident or incident reports.
- .5 WHMIS - MSDS data sheets.
- .6 Name of Contractor's Representative designated to perform health and safety supervision in site.
- .7 Certificate of clearance from Workplace Health Safety and Compensation Commission (Assessment Services Department) of Newfoundland and Labrador.

- .3 Submit within five (5) work days of notification of Bid Acceptance. Provide one (1) copy.
- .4 Departmental Representative will review Health and Safety Plan and provide comments.
- .5 The Contractor will revise the Plan as appropriate and resubmit within five (5) work days after receipt of comments.
- .6 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.
- .7 Submit revisions and updates made to the Plan during the course of Work.

1.4 COMPLIANCE  
REQUIREMENTS

- .1 Comply with the Occupational Health and Safety Act for the Province of Newfoundland and Labrador, and the Occupational Health and Safety Regulations

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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: [www.http://laws.justice.gc.ca/en/L-2/](http://laws.justice.gc.ca/en/L-2/)
  - .2 COSH can be viewed at: [www.http://laws.justice.gc.ca/eng/SOR-86-304/ne.html](http://laws.justice.gc.ca/eng/SOR-86-304/ne.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 Observe construction safety measures of:
  - .1 Part 8 of National Building Code.
  - .2 Municipal by-laws and ordinances.
- .4 In case of conflict or discrepancy between any specified requirements, the more stringent shall apply.
- .6 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof through submission of Certificate of Clearance from Workplace Health, Safety and Compensation Commission (Assessment Services Department) of Newfoundland and Labrador.
- .7 Obtain and maintain worker medical surveillance documentation where prescribed by legislation or regulation.

1.5 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property and for protection of persons and environment

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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.
- .3 Provide safety orientation session to

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persons granted access to Work Site.  
Advise of hazards and safety rules to be  
observed while on site.

- .4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.
- .5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm. Provide security guard where adequate protection cannot be achieved by other means.

1.7 PROTECTION

- .1 Give precedence to safety and health of persons and protection of environment over cost and schedule considerations for Work.
- .2 Should unforeseen or peculiar safety related hazard or condition become evident during performance of Work, immediately take measures to rectify situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

1.8 FILING OF NOTICE

- .1 File Notice of Project with pertinent provincial health and safety authorities prior to beginning of Work.

1.9 PERMITS

- .1 Post permits, licenses and compliance Certificates at Work Site.
- .2 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.

1.10 HAZARD  
ASSESSMENTS

- .1 Perform site specific health and safety hazard assessment of the Work and its site.

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- .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 The following are known or potential project related safety hazards at site:
  - .1 Remote site location.
  - .2 Wet and slippery conditions.
  - .3 Inclement weather conditions.
  - .4 Heavy lifting.
  - .5 Cutting tools and other construction power tools.
  - .6 Hazardous materials, including PHC impacted soil.
  - .7 Sharp objects (construction debris).
  - .8 Working around heavy equipment.
- .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 into hazard assessment process.

1.12 MEETINGS

- .1 Contractor to hold pre-construction health and safety meeting prior to commencement of Work. Ensure attendance of:
  - .1 Superintendent of Work.
  - .2 Contractor's designated Health & Safety Site Representative.
  - .3 Subcontractor's Health and Safety Site Representative.

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- .4 Health and Safety Site Coordinator.
  - .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

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layouts showing escape routes, marshaling 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.
- .4 On-site Communication Plan:
  - .1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.
- .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.

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SUPERVISION

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 daily basis. Record deficiencies and remedial action taken.
  - .2 Conduct Formal Inspections on a minimum monthly basis. Use standardized safety inspection forms. Distribute to



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subcontractors.

.3 Follow-up and ensure corrective measures are taken.

.6 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.
- .4 All workers dealing with hazardous materials are required to provide evidence of training, in accordance with Provincial regulations.

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 safety vest and hearing protection.
  - .2 Immediately report unsafe condition at site, near-miss accident, injury and damage.

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.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. Post rules on site.

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.

.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.

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.2 Submit copy to Departmental  
Representative.

1.20 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.

1.21 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.

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- 1.1 RELATED WORK .1 Section 02 41 16 - Sitework, Demolition and Removal.
- 1.2 DEFINITIONS .1 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.
- 1.3 DISPOSAL OF WASTES AND HAZARDOUS MATERIALS
- .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of hazardous waste or volatile materials, such as mineral spirits, paints, thinners, oil or fuel into waterways, storm or sanitary sewers or waste landfill sites.
- .3 Store, handle and dispose of hazardous materials and hazardous waste in accordance with applicable federal and provincial laws, regulations, codes and guidelines. The Departmental Representative is to be provided with copies of all weigh bill slips, manifests, etc., from the waste disposal sites.
- .4 Dispose of construction waste materials and demolition debris, resulting from work, at approved landfill sites only. Carryout such disposal in strict accordance with provincial and municipal rules and regulations. Separate out and prevent improper disposal of items banned from landfills.
- .5 Establish methods and undertake construction practices which will minimize waste and optimize use of construction materials. Separate at source all construction waste materials, demolition debris and product packaging and delivery containers into various waste categories in order to maximize

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recycling abilities of various materials and avoid disposal of debris at landfill site(s) in a "mixed state". Where recycling firms, specializing in recycling of specific materials exist, transport such materials to the recycling facility and avoid disposal at landfill sites.

- .6 Communicate with landfill operator prior to commencement of work, to determine what specific construction, demolition and renovation waste materials have been banned from disposal at the landfill and at transfer stations.

#### 1.5 DRAINAGE

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with governing regulations and requirements.
- .4 Pumped water must meet applicable federal, provincial, and municipal standards before it can be discharged to a surface water body. If regulatory guidelines exceedences are noted, the Departmental Representative has the right to issue stop pumping instructions to the Contractor. Contractor will not be compensated for any delays associated with retrofitting equipment to meet guidelines.

#### 1.6 PERMITS

- .1 All guidelines and instructions stated on permits must be strictly adhered to.

#### 1.7 WORK ADJACENT TO WATERWAYS

- .1 Do not operate construction equipment in waterways.

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- .2 Do not use waterway beds for borrow material.
- .3 Do not dump excavated fill, waste material or debris in waterways.
- .4 At borrow sites, design and construct temporary crossings to minimize erosion to waterways in strict conformance with provincial and federal environmental regulations.
- .5 Do not skid logs or construction materials across waterways.
- .6 Ensure refueling of any type of equipment does not, either directly or indirectly, create pollution by causing or permitting any leaks or spills.
- .7 Maintain equipment in good working condition with no fluid leaks, loose hoses or fittings.

#### 1.8 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
- .4 Have emergency spill response equipment and rapid clean-up kit, appropriate to work, at site. Locate adjacent to work and where hazardous materials are stored. Provide personal protective equipment as required for clean-up.
- .5 Report, to Federal and Provincial Department of the Environment, spills of petroleum and other hazardous materials as well as

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accidents having potential of polluting the environment. Also notify Departmental Representative and submit a written spill report to Departmental Representative within 24 hours of occurrence.

- .6 Use water tight trucks for excavated material. Avoid excavating and transporting material in heavy rain.

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|--|----|---|
| <u>1.1 SANITARY FACILITIES</u>             | .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.   |
| <u>1.2 WATER SUPPLY</u>                    | .1 | Arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.   |
| <u>1.3 CONSTRUCTION SIGN AND NOTICES</u>   | .1 | Contractor or subcontractor advertisement signboards are not permitted on site.   |
|  | .2 | Only notices of safety or instructions are permitted on site.   |
|  | .3 | Maintenance and Disposal of Site Signs:<br>.1 Maintain approved signs and notices in good condition for duration of project and dispose of off site on completion of project or earlier if directed by Departmental Representative. |
| <u>1.4 REMOVAL OF TEMPORARY FACILITIES</u> | .1 | Remove temporary facilities from site when directed by Departmental Representative.   |



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PART 1 - GENERAL

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| <u>1.1 SECTION<br/>INCLUDES</u>           | .1 | Barriers.   |
| <u>1.2 INSTALLATION<br/>AND REMOVAL</u>   | .1 | Provide temporary controls in order to execute work expeditiously.  |
|   | .2 | Remove from site all such work after use.   |
| <u>1.3 HOARDING</u>                       | .1 | Erect temporary site enclosure if required by governing authorities, using new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m centres. Provide one lockable truck gate. Maintain fence in good repair. |
| <u>1.4 GUARD RAILS<br/>AND BARRICADES</u> | .1 | Provide secure, rigid guard rails and barricades as required to protect against falls.  |
|   | .2 | Provide as required by governing authorities.   |

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PART 1 - GENERAL

- 1.1 GENERAL
- .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
  - .2 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
  - .3 Prevent accumulation of wastes which create hazardous conditions.
  - .4 Provide adequate ventilation during use of volatile or noxious substances.
- 1.2 CLEANING DURING CONSTRUCTION
- .1 Maintain project grounds and public properties in a tidy condition, free from accumulations of waste material and debris. Clean areas on a daily basis.
  - .2 Provide on-site garbage containers for collection of waste materials and debris.
  - .3 Remove waste materials and debris from site on a daily basis.
- 1.3 FINAL CLEANING
- .1 In preparation for acceptance of the Work perform final cleaning. Final cleaning to include exterior rake of work area, to satisfaction of Departmental Representative.

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1.1 SECTION  
INCLUDES

- .1 Project Record Documents as follows:
  - .1 As-built drawings and specifications.
  - .2 Weigh bill slips for quantity of impacted soil removed for off-site disposal.
  - .3 Weigh bill slips for quantity of new class "A", gravel fill, topsoil and sod delivered to site.

1.2 PROJECT RECORD  
DOCUMENTS

- .1 Departmental Representative will provide two white print sets of contract drawings and two copies of Specifications.
- .2 Maintain at site one set of the contract drawings and specifications to record actual "As-Built" site conditions.

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PART 1 - GENERAL

- 1.1 DESCRIPTION .1 This section specifies requirements for demolishing and removing wholly or in part various items designated to be removed or partially removed.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 - EXECUTION

- 3.1 EXECUTION .1 Inspect site and verify with Departmental Representative objects designated for removal.
- .2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.
- 3.2 REMOVAL .1 Remove in their entirety all materials and objects specified for removal.
- .2 Do not disturb adjacent work designated to remain in place.
- 3.3 DISPOSAL OF MATERIAL .1 All demolished materials will become property of contractor and will be removed from site and disposed of to satisfaction of Departmental Representative and in accordance with environmental guidelines. It is the sole responsibility of the contractor to dispose of all demolished materials at an approved disposal site. Ensure that disposal site is approved and willing to accommodate any materials disposed of from work site. If approved by the Departmental Representative, un-stained concrete may be crushed on site (after the reinforcing steel

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is removed), and used as backfill.

- .2 Contractor shall obtain and pay for all necessary permits and disposal fees for use of an approved waste disposal site.

#### 3.4 RESTORATION

- .1 Upon completion of work, remove debris, trim surfaces and leave work site in clean condition.
- .2 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work.

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PART 1 - GENERAL

- 1.1 RELATED WORK .1 Section 01 33 00 - Submittal Procedures.
- 1.2 SUBMITTALS .1 Submit samples in accordance with  
Section 01 33 00 - Submittal Procedures.
- .2 Submit:  
.1 Sod for each type specified.
- .3 Obtain approval of samples by Departmental  
Representative.
- 1.3 QUALITY ASSURANCE .1 Test Reports: certified test reports showing  
compliance with specified performance  
characteristics and physical properties.
- .2 Certificates: product certificates signed by  
manufacturer certifying materials comply  
with specified performance characteristics  
and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct  
pre-installation meeting to verify project  
requirements, installation instructions and  
warranty requirements.
- 1.4 SCHEDULING .1 Schedule sod installation when frost has left  
ground.
- .2 Schedule sod laying to coincide with  
preparation of soil surface.

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## Part 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.
  - .1 Number one named cultivars: Nursery sod grown from certified seed.
  - .2 Turf Grass Nursery Sod Quality:
    - .1 Not more than 2 broadleaf weeds on 10 other weeds per 40 square metres.
    - .2 Density of sod sufficient so that no soil is visible from height of 1500mm when mown to height of 50 mm.
    - .3 Mowing height limit: 35 to 65 mm.
    - .4 Soil portion of sod: 15 mm in thickness.
- .2 Water:
  - .1 Potable, free of impurities.
- .3 Fertilizer:
  - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
  - .2 Complete, synthetic, slow release with 65% of nitrogen content in waterinsoluble form.
- .4 Topsoil: mixture of mineral particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
  - .1 Soil texture based on The Canadian System of Soil Classification, to consist of 20% to 70% sand, minimum 7% clay, and contain 2 to 10 % organic matter by weight.
  - .2 Contain no toxic elements or growth inhibiting materials.
  - .3 Free from:
    - .1 Debris and stones over 50 mm diameter.
    - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
  - .4 Consistence: friable when moist.

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2.2 SOURCE QUALITY CONTROL

- .1 Obtain approval from Departmental Representative of sod at source.
- .2 When proposed source of sod is approved, use no other source without written Authorization from the Departmental Representative.

Part 3 - EXECUTION

3.1 PREPARATION

- .1 Contractor is responsible for grading plan. The intent is to fill depressions/low points providing positive site drainage, with no low points that could create water ponding.
- .2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.
- .3 Fine grade surface free of humps and hollows to smooth, even grade, surface to drain naturally.
- .4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; and other deleterious materials; off site.
- .5 Cultivate fine grade approved by Departmental Representative to 25mm depth immediately prior to sodding.
- .6 Spread topsoil in uniform layers not exceeding 150 mm, over unfrozen subgrade free of standing water.

3.2 SOD PLACEMENT

- .1 Lay sod within 24 hours of being lifted.



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- .2 Lay sod sections in rows, longitudinally, along contours of slopes, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .3 Roll sod as directed by Departmental Representative. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.
- .4 The first 3 sod rows parallel to the apron, are to be staked, to prevent potential lifting due to proximity to apron area.

### 3.3 FERTILIZING PROGRAM

- .1 Fertilize during establishment and warranty periods to program agreed to by Departmental Representative.

### 3.4 ACCEPTANCE

- .1 Turfgrass Nursery Sod areas will be accepted by Departmental Representative provided that:
  - .1 Sodded areas are properly established.
  - .2 Sod is free of bare and dead spots, and without weeds.
  - .3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.
  - .4 Sodded areas have been cut minimum 2 times, and within 24 hours prior to acceptance.
  - .5 Fertilizing in accordance with fertilizer program has been carried out at least once.

### 3.5 WARRANTY

- .1 Perform following operations from time of acceptance until end of warranty period:
  - .1 Water sodded Turfgrass Nursery Sod at weekly intervals to obtain optimum soil

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- moisture conditions to depth of 100 mm.
- .2 Repair and resod dead or bare spots to satisfaction of Departmental Representative.
- .3 Cut grass and remove clippings as directed by Departmental Representative.
  - .1 Turf Grass Nursery Sod:
    - .1 50 mm during normal growing conditions.
  - .4 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles.
  - .5 Eliminate weeds by mechanical means to extent acceptable to Departmental Representative.

### 3.6 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

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PART 1 - GENERAL

1.1 SCOPE

- .1 This specification section specifies requirements for:
  - .1 Remediation to address total petroleum hydrocarbon (PHC) impacted soil. All PHC remediation involves removal, transportation and off site treatment of impacted soil to a Provincially approved facility.
  - .2 Open excavations are to remain open for the purposes of confirmatory sampling. Backfilling cannot commence until sample results are obtained and clearance is provided by the Departmental Representative.

1.2 GENERAL  
REMEDICATION PROCESS

- .1 All remediation involves excavation of PHC impacted soil for off-site removal and disposal. The general process for remediation will consist of the following:
  - .1 No stockpiling of material on site.
  - .2 Remove soil in the impacted soil zone, as noted on the drawings. The soil is to be transported and disposed of at an approved landfill or soil treatment facility that accepts PHC impacted material, in accordance with the requirements of regulatory agencies having jurisdiction, and authorization of the Departmental Representative.

1.3 WATER TIGHT  
TRUCKS

- .1 All trucks used in the transportation of impacted material to have tail gates with seals in good working order so as to prevent leakage of sludge or liquid material from truck. Contractor must ensure that truck box is water tight and no leakage occurs prior to or during transportation of material. Any vehicles failing to meet these requirements will be rejected. In the event of a spill

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during transportation, the Contractor shall be responsible for the immediate clean-up and must notify the Departmental Representative and appropriate authorities immediately. All trucks shall be cleaned at the waste disposal facility if not returning for re-loading. Note that no work should proceed in adverse weather conditions (i.e. heavy rain).

1.4 DIPOSAL FACILITY

- .1 After award/acceptance of Bid, the successful Contractor will provide the following:
- .1 A copy of the proposed landfill and/or waste disposal sites approval to operate certificates for the PHC impacted soil and free phase product/oily water. All weigh bills/manifests must be provided to the Departmental Representative.

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PART 1 - GENERAL

- 1.1 DESCRIPTION .1 This section specifies supply, placement and compaction of gravel fill. The areas requiring gravel fill are shown on the drawings, and the Contractor will make his own assessment of the quantities required to meet the lines and grades shown on the drawings.

PART 2 - PRODUCTS

- 2.1 GRAVEL FILL .1 Gravel fill will consist of hard, durable, particles of stone mixed with suitable binding material. It shall be free from flat, elongated particles and shall be well graded. When tested by means of laboratory sieves it shall fulfill requirements as follows:

<u>Sieve Size</u>	<u>% by Weight Passing</u>
56 mm	100
16 mm	45-80
4.75 mm	25-55
1.25 mm	10-35
0.300 mm	5-15
0.075 mm	3-8

PART 3 - EXECUTION

- 3.1 PLACING GRAVEL FILL .1 Place gravel fill in equal lifts not exceeding 300mm, to minimum 95% standard proctor density.

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PART 1 - GENERAL

- 1.1 DESCRIPTION .1 This section specifies requirements for supply and installation of structural timber protection posts.
- 1.2 REFERENCES .1 American Society for Testing and Materials (ASTM International)  
.1 ASTM A307-07b, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile.  
.2 American Wood-Preserver's Association (AWPA)  
.1 AWPA M4-06, Standard for the Care of Preservation - Treated Wood Products.  
.3 Canadian Standards Association (CSA International)  
.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.  
.2 CAN/CSA-G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Steel.  
.3 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.  
.4 CAN/CSA-O80 Series-97 (R2007), Wood Preservation.  
.4 Canadian Wood Council  
.1 Wood Design Manual.  
.5 National Lumber Grades Authority (NLGA)  
.1 Standard Grading Rules for Canadian Lumber 2000 edition.
- 1.3 DIMENSIONS .1 Check existing site dimensions and report discrepancies to Departmental Representative before commencing work.
- 1.4 PROTECTION .1 Avoid dropping, bruising or breaking of wood fibres.

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- .2 Avoid breaking surfaces of treated timber.
- .3 Do not damage surfaces of treated timber by boring holes or driving nails or spikes into them to support temporary material or staging.
- .4 Treat bolt holes, cutoffs and field cuts in accordance with CSA 080.

#### 1.5 DELIVERY AND STORAGE

- .1 Store timber horizontally, evenly supported and open piled permit circulation when stored for prolonged period.
- .2 When handling long timber, provide support at sufficient number of points, properly located to prevent damage due to excessive bending.
- .3 Handle treated timber with hemp, manila or sisal rope slings or other approved means of support that will not damage surface.
- .4 Do not use sharp pointed tools to handle treated timber. Any timber so handled will be rejected and be replaced at Contractor's expense.

### PART 2 - PRODUCTS

#### 2.1 TIMBER MATERIALS

- .1 Timber: Use timber graded and stamped in accordance with applicable grading rules and standards of associations or agencies approved to grade lumber by Canadian Lumber Standards Administration Board of CSA.
- .2 Species
  - .1 Hemlock or Douglas Fir (ACA treated).
- .3 Grade: No. 1 Structural Grade

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.4 Grading Authority: NLGA

2.2 MISCELLANEOUS  
STEEL AND  
FASTENINGS

.1 Miscellaneous Steel: All steel and fastenings to be CSA G40.21, Grade 300 W, galvanized.

.2 Nails and Spikes: to CSA B111.

.3 Machine Bolts, nuts and washers: to ASTM A307. All machine bolts and nuts to be galvanized.

.4 Galvanizing: will conform to CSA G164 "Hot Dip Galvanizing of Irregularly Shaped Articles." Unless otherwise specified, minimum weight of zinc coating will be as stated in Table 1 of this standard. Fabricator is to adhere to recommendations of Appendix A and Appendix B of standard.

2.3 REFLECTORS

.1 Guardrail reflector colour to be florescent yellow or white (to approval of Departmental Representative). The reflector sheeting shall meet ASTM D4956 Type IX or Type XI for luminance level. Minimum reflector dimensions for each post are 75mm deep wrapped around full perimeter of post (at the top).

2.4 EYE BOLT RINGS

.1 Eye bolt rings at each post to support hand rope to be installed as per the drawings. Use mild steel (galvanized) for each eye bolt ring.

PART 3 - EXECUTION

3.1 GENERAL

.1 Install timber posts as shown on drawings. Minimum depth of penetration is 2m.



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PART 1 - GENERAL

- 1.1 DESCRIPTION .1 This section specifies the requirements for the supplying, producing and placing crushed gravel for quarried stone.
- 1.2 REFERENCES .1 ASTM C 117-04, Test method for material finer than 0.075 mm sieve in mineral aggregates by washing.  
 .2 ASTM C 131-06. Test method for resistance to degradation of small size coarse aggregate by abrasion and impact in the Los Angeles machine.  
 .3 ASTM C 136-6, Method for sieve analysis of fine and coarse aggregates, CAN/CGSB-8.2-M88, Sieves testing, woven wire, metric..
- 1.3 DELIVERY, STORAGE AND HANDLING .1 Deliver aggregates as needed. No stockpiling permitted on site.

PART 2 - PRODUCTS

- 2.1 MATERIALS .1 Granular base fill (Class "A") will consist of clean, hard, durable crushed gravel or stone, free from shale, clay, friable materials, organic matter and other deleterious substances and graded within the following limits when tested to ASTM C136 and ASTM C117 and giving a smooth curve without sharp breaks when plotted on a semi-chart.

ASTM Sieve Designation	% Passing
19.0 mm	100

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9.51 mm	50-80
4.76 mm	35-60
1.20 mm	15-35
300 um	7-20
75 um	3-6 (Pit Source)
	3-8 (Rock Source)

.2 Physical Requirements for Class "A":

- .1 Liquid Limit ASTM D4318: Maximum 25
- .2 Plasticity Index ASTM D4318: Maximum 0
- .3 Los Angeles Abrasion ASTM C131-81 Maximum % loss by weight: 35
- .4 Crushed Fragments: 50%. The percent of crushed particles will be determined by examining the fraction retained on the 4.76mm sieve and dividing the weight of the crushed particles by the total weight retained on the 4.76 mm sieve.
- .5 CBR: ASSHTO T193-72 Min 100 when compacted to 100% of AASHTO T180-74 Method D.

.3 Class "A" shall be processed by crushing and, when necessary, to eliminate surplus fines passing the 4.76 mm sieve, shall be screened and washed.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Place granular base as noted on drawings to the approval of the Departmental Representative.

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- .2 Placing:
  - .1 Ensure no frozen material is placed.
  - .2 Place material only on clean unfrozen surface, free from snow and ice.
  - .3 All granular bases shall be placed in uniform layers such that the thickness of the compacted layer does not exceed 50 mm.
  - .4 The materials shall be sprayed with water when and as directed by the Departmental Representative, either to aid compaction or reduce dust nuisance or both. When water is added to aid compaction, it shall be applied immediately ahead of the compacting unit

### 3.2 INSTALLATION

- .1 Testing of materials and compaction will be carried out by testing laboratory designated by the Departmental Representative.
- .2 Contractor will pay costs for inspection and testing.
- .3 Sieve Analysis: proposed granular material will be tested to confirm suitability for intended use and conformity with specifications.
- .4 Frequency of Tests: to be determined by the Departmental Representative.

Appendix A:  
Projects Effects Determination

**FISHERIES AND OCEANS  
CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA) 2012  
PROJECT EFFECTS DETERMINATION REPORT**

**GENERAL INFORMATION**

<p>1. <b>Title:</b> Cape Spear Light Station Transformer Replacement</p> <p>2. <b>Proponent:</b> Department of Fisheries and Oceans – Real Property Safety and Security (DFO-RPSS)</p> <p>3. <b>Other Contacts</b> (Proponent, Consultant, Contractor or another DFO Sector): Public Works and Government Services Canada</p>	<p>4. <b>Role of each contact:</b> OGD Consultant</p>
<p>5. <b>Source (Contact)</b> (DFO sector, company, organization, provincial or federal department): DFO-RPSS</p>	
<p>6. <b>Received Date:</b> July, 2016</p>	
<p>7. <b>PATH No.:</b></p>	<p>8. <b>DFO File No.:</b></p>
<p>9. <b>Other relevant file numbers:</b></p>	

**BACKGROUND**

<p>10. <b>Background about Proposed Development (including a description of the proposed development):</b></p> <p>The proposed development includes the decommissioning and replacement of two existing transformers and the installation of a new guiderail located at the Cape Spear Lighthouse Station, located in Cape Spear, Newfoundland and Labrador (see attachment). The purpose of these transformers is to provide electricity and power to the Cape Spear lighthouse and associated infrastructure, which is a National Historic Site of Canada. The project also includes the remediation of contaminated soil within the vicinity of the existing transformers.</p>
---

**PROJECT REVIEW**

<p>11. <b>DFO's rationale for the project review:</b></p> <p>Project is on federal land <input checked="" type="checkbox"/> and;</p> <p><input checked="" type="checkbox"/> DFO is the proponent</p> <p><input type="checkbox"/> DFO to issue <i>Fisheries Act</i> Authorization, <i>Species at Risk Act</i> Permit or other regulatory permit</p> <p><input type="checkbox"/> DFO to provide financial assistance to another party to enable the project to proceed</p> <p><input type="checkbox"/> DFO to lease or sell federal land to enable the project to proceed</p> <p><input type="checkbox"/> Other</p>	
<p>12. <b>Fisheries Act Section(s) and/or Species at Risk Act Sections 73 or 74 (if applicable):</b></p> <p>N/A</p>	
<p>13. <b>Primary Authority:</b> DFO-RPSS</p>	<p>14. <b>Primary Authority's rationale for involvement:</b> DFO-RPSS</p>
<p>15. <b>Other Authorities involved in review:</b> Parks Canada</p>	<p>16. <b>Other Authority's rationale for involvement:</b> Adjacent Property</p>
<p>17. <b>Other Contacts and Responses:</b> N/A</p>	
<p>18. <b>Scope of Project (details of the project subject to review):</b></p>	

The Project consists of the decommissioning and removal of two existing surface-mounted transformers and their replacement with two new transformers designed for the same purpose. One of the existing transformers began to leak oil and has contaminated soil surrounding both transformers. The new transformers will be approximately the same size as the existing transformers, and will be placed in the existing footprint. The dimension of each transformer is approximately 1.0 m x 0.75 m, within an area of approximately 3 m x 3 m (9 m<sup>2</sup>).

The development is located entirely within Cape Spear, Newfoundland and Labrador, which is a National Historic Site and a popular tourist destination. Access to the site will follow existing trails, which can accommodate the transportation of small equipment. Project activities will occur within the existing 9 m<sup>2</sup> footprint, with no additional ground disturbance outside the footprint.

It is likely that the contaminated soil will be removed by hand, using small equipment such as a pick and shovel. However, the potential exists to bring in small equipment such as a backhoe or truck to assist with soil removal and storage. The contaminated soil will be stored and disposed of at an approved waste disposal facility.

No in-water work is proposed and no stream crossings are anticipated along the existing trail to the Project site.

#### **19. Location of Project:**

Cape Spear is located on the east coast of Newfoundland and Labrador, approximately 15 km east of St. John's. Approximate coordinates for the site are 47.5167° N, 52.6333° W.

#### **20. Environment Description:**

Cape Spear was designated as a National Historic Site of Canada in 1975 because of its age and architecture. The lighthouse was built in 1836 and is Newfoundland and Labrador's oldest surviving lighthouse. It was created to help provide navigational aid for mariners travelling Newfoundland's rocky coast. It was converted to a military post during the Second World War to act as a lookout and defence station against German U-boats.

Cape Spear is located within the Maritime Barrens Eco-region of Newfoundland and Labrador, an area characterized by exposed bedrock and extensive barrens. Tree growth is often limited to protected valleys and coves, and balsam fir is the dominant species.

As indicated on site photographs (see attachments), the site is mostly barren, comprising of exposed rock and low-lying vegetation and grasses. There are no ecologically sensitive areas within the immediate vicinity of the Project; the nearest ecologically sensitive area is the Willess Bay Ecological Reserve, approximately 45 km south.

Seabird species can be common around Cape Spear, including shearwaters, murrelets, razorbills, skuas, and jaegers. Marine species such as humpback, minke, and fin whales can be seen during the summer months. Harbour seals and otters are also known to occur occasionally.

A species at risk search was conducted using the AC CDC database, looking to identifying terrestrial, marine, and bird species at risk that could occur in the region. Species at risk with potential to occur in the site area include:

- Short-Eared Owl
- Peregrine Falcon
- Harlequin Duck
- Gray-Cheeked Thrush
- Chimney Swift
- Olive-Sided Flycatcher
- Barrows Goldeneye
- Ivory Gull
- Common Nighthawk
- Red Crossbill
- Bobolink
- Rusty Blackbird

Due to the limited footprint of the Project, and habitat present around the site, interaction with these species is not

anticipated.

**21. Scope of Effects Considered (section 5(1) and 5(2)):**

N/A

**22. Environmental Effects:**

N/A

**23. Mitigation Measures for Project (including Habitat Compensation if applicable):**

Cape Spear is a National Historic Site of Canada, and as a result, a popular tourist destination. Therefore, where possible, Project activities should avoid periods of heavy tourist activity to help reduce the risk of effects to the public from the Project and to reduce the socio-economic impact to the site.

Even small spills of oil can interact with the surrounding environment. Therefore, a reasonable effort should be made to reduce the chances of an oil spill occurring. Refuelling and maintenance activities of Project equipment should take place on a level surface, a minimum of 30 m away from any surface water (including both marine and freshwater shorelines), on a prepared impermeable surface with a collection system to reduce the potential for oil, gasoline, and hydraulic fluids entering the environment.

As the Project involves hydrocarbons contained within the transformers, the potential for an oil spill exists. It is the responsibility of the contractor to have an established oil spill response plan in place for Project Activities.

Oil and disposable materials used to remove hydrocarbons from the existing transformers will be contained and disposed of in a manner compliant with federal and provincial legislation, such as the *Used Oil Control Regulations*.

The shipment of the decommissioned transformers and associated infrastructure to an approved disposal facility will be compliant with the federal *Transportation of Dangerous Goods Act* and associated regulations

Decommissioned transformers will be removed in a manner that is compliant with federal and provincial legislation, and will be disposed of at an approved facility.

Spill kits will be located adjacent to the Project site, and staff will be trained in the use of these kits in the case of an accidental hydrocarbon spill. Spills or leaks will be promptly contained, cleaned up, and reported to the 24-hour environmental emergencies report line (1-800-563-9089).

Contaminated soil unearthed and removed as part of site remediation will be stored in a manner compliant with federal and provincial legislation, and will be kept protected from precipitation to avoid potential contaminated run-off or sedimentation. It will be removed and transported to a certified waste disposal facility.

Project activities will avoid periods of heavy precipitation, and effective sediment and erosion control measures should be put in place prior to the start of Project activities. These measures will be inspected regularly to determine if they are functioning properly to reduce the chances of sediment or contaminants entering surface water.

Should the project result in the discovery of any items of historical value, work must be suspended and the matter referred to the Provincial Archaeological Office at 709-729-0862 as well as local Parks Canada representatives and associated Cultural Resource Staff.

Representatives of Parks Canada should be contacted prior to the start of project activities to ensure there is no interaction with other potential Parks Canada projects and/or to ensure no negative impact to visitor experience.

**24. Significance of Adverse Environmental Effects:**

**25. Monitoring and Compliance Requirements under *Species at Risk Act*:**

## CONCLUSION

### 26. Conclusion on Significance of Adverse Environmental Effects:

The Federal Authority has evaluated the project as required under Section 67 of *Canadian Environmental Assessment Act (CEAA), 2012*. On the basis of this evaluation, DFO-RPSS has determined that the project is not likely to cause significant adverse environmental effects and the project can be carried out in accordance with current environmental standards, guidelines and objectives based. Project specific environmental protection measures are outlined in the attached tender specification.

27. Prepared by: \_\_\_\_\_

28. Date: \_\_\_\_\_

29. Name: \_\_\_\_\_

30. Title: \_\_\_\_\_

31. Approved by: \_\_\_\_\_

32. Date: \_\_\_\_\_

33. Name: \_\_\_\_\_

34. Title: \_\_\_\_\_



## DECISION

### 35. Decision Taken

- The project is not likely to cause significant adverse environmental effects, and DFO may exercise its power, duty or function.
- The project is likely to cause significant adverse environmental effects, and DFO has decided not to exercise its power, duty or function.
- The project is likely to cause significant adverse environmental effects, and DFO will ask the Governor in Council to determine if the significant adverse environmental effects are justified in the circumstances

36. Approved by: 

37. Date: August 16, 2016

38. Name: Ann Margaret White

39. Title: Regional FII

40. References:

#### Attachments:

- Site Photographs
- Drawings
- Transformer test results



**Figure 1**      **Transformers to be Decommissioned and Replaced**





**Figure 2      Transformers to be Decommissioned and Replaced**



**Figure 3** Proposed Area of Work and Site Access





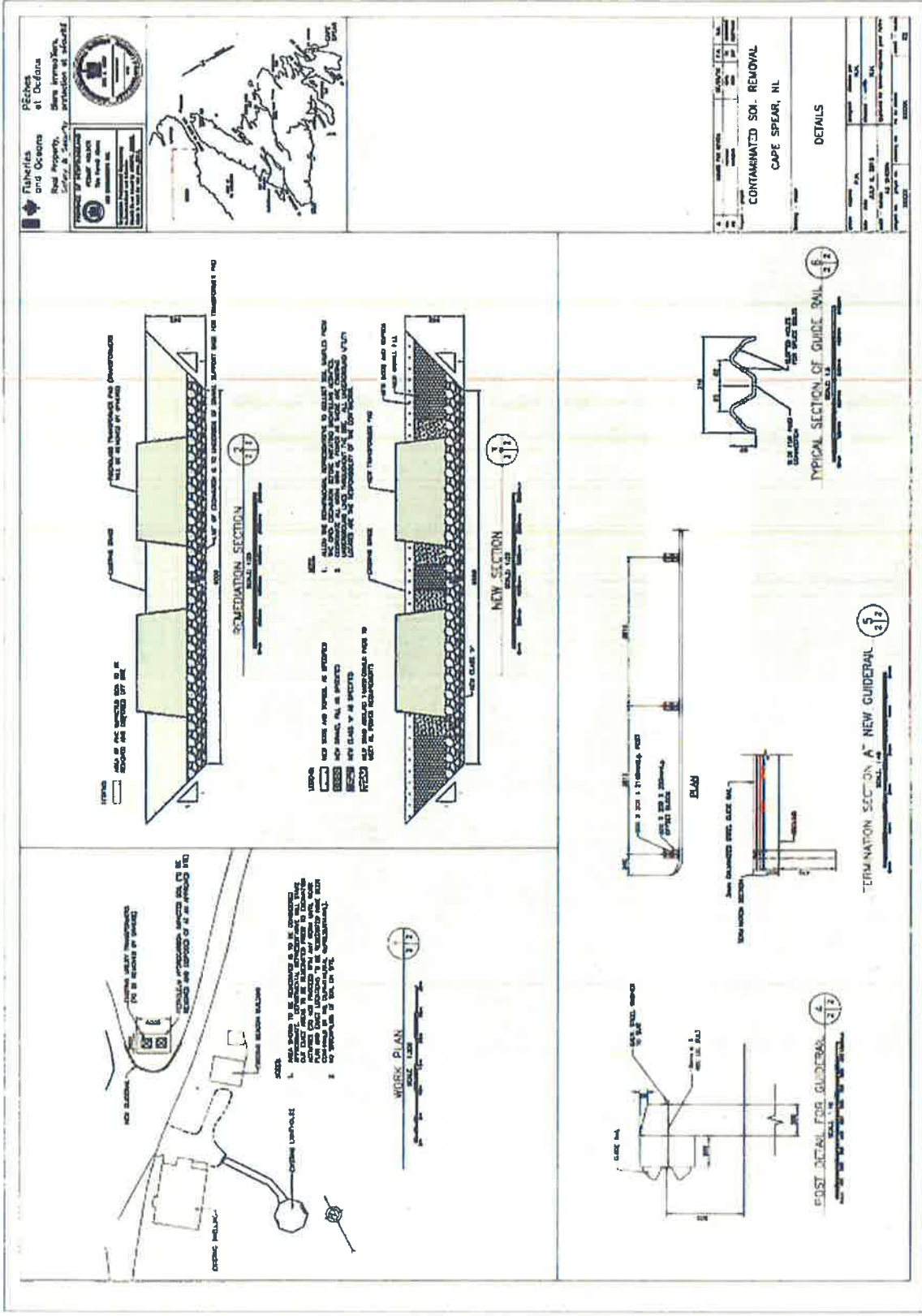


Figure 5 Project Drawings

Appendix B:  
Laboratory Results

**Table C.1 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil**  
**Cape Spear Transformer Oil Spill Soil Sampling**  
**Public Works and Government Services Canada**  
**Stantec Project No. 121414088**

Sample ID	Depth (mbgs)	Date	Benzene	Toluene	Ethylbenzene	Xylenes	F1 C <sub>6</sub> -C <sub>10</sub>	F2 C <sub>10</sub> -C <sub>16</sub>	F3 C <sub>16</sub> -C <sub>32</sub> <sup>5</sup>	F4 >C <sub>32</sub> <sup>5</sup>	Modified TPH - Tier I <sup>4</sup>	Resemblance / Comments
<b>RDL</b>			0.025	0.025	0.025	0.05	2.5	10	10	-	15	-
<b>Units</b>			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-
<b>CCME CSQG<sup>1</sup></b>			0.03	0.37	0.082	11	-	-	-	-	-	-
<b>CCME CWS PHC - Protection of GW for Aquatic Life<sup>2</sup></b>			-	-	-	-	970	380	-	-	-	-
<b>CCME CWS PHC - Eco Soil Contact<sup>2</sup></b>			-	-	-	-	210	150	300	2,800	-	-
<b>CCME CWS PHC - Management Limit<sup>2</sup></b>			-	-	-	-	700	1,000	2,500	10,000	-	-
<b>NLDEC Disposal Guideline<sup>3</sup></b>			0.03	0.37	0.082	11.00	-	-	-	-	1,000	-
<b>TP1-BS1</b>	0.0-0.15	8-Apr-16	nd	nd	nd	nd	nd	<b>670</b>	<b>12800</b>	-	<b>14000</b>	FO/LO
<b>TP2-BS1</b>	0.0-0.15	8-Apr-16	nd	nd	nd	nd	nd	nd	nd	-	nd	-
<b>*TP3-BS1</b>	0.0-0.15	8-Apr-16	nd	nd	nd	nd	nd	nd	52	-	52	NRLO
<b>*TP4-BS1</b>	0.0-0.15	8-Apr-16	nd	nd	nd	nd	nd	nd	44	-	44	NRLO
<b>*TP5-BS1</b>	0.0-0.15	8-Apr-16	nd	nd	nd	nd	nd	nd	25	-	25	NRLO
<b>*TP6-BS1</b>	0.0-0.15	8-Apr-16	nd	nd	nd	nd	nd	nd	24	-	24	NRLO

**Notes:**

1 = CCME CSQG = Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (CSQGs) for the Protection of Environmental and Human Health for BTEX (CSQG on-line 2015) - Commercial Site, coarse-grained soil.

2 = CCME CWS PHC = CCME Canada Wide Standards (CWS) for Petroleum Hydrocarbons (PHC) in Soil (January 2008) - Commercial Site (Table B-2) for specified exposure path.

3 = For benzene, toluene, ethylbenzene and xylene (BTEX); CCME Canada Wide Standards (CWS) for Petroleum Hydrocarbons (PHC) in Soil (January 2008) - Industrial Site (Table B-2) for specified exposure path.

4 = Modified TPH = total petroleum hydrocarbons excluding BTEX.

5 = Atlantic PIRI analytical method does not analyse for >C<sub>32</sub>. Laboratory certificate indicates (Yes or No) whether chromatogram for each sample returns to baseline after C<sub>32</sub>.

Samples are considered to have returned to baseline if the area from C<sub>32</sub>-C<sub>36</sub> is less than 10% of the area from C<sub>10</sub>-C<sub>32</sub>.

\* = Baseline not reached at C<sub>32</sub>; sample may contain carbon fractions >C<sub>32</sub>.

RDL = Reportable Detection Limit for routine analysis.

mbgs = metres below ground surface.

"-" = Not analyzed, not applicable or no applicable guideline.

**Bold & Shaded = Value exceeds applicable CCME CWS PHC**

**Bold & Underlined = Value exceeds NLDEC Disposal Guideline**

**Resemblance:**

FO/LO = One product in fuel/lube oil range

NRLO = No resemblance to petroleum products in lube oil range



**Table C.2. Results of Laboratory Analysis of Polychlorinated Biphenyls in Soil  
Cape Spear Transformer Oil Spill Soil Sampling  
Public Works and Government Services Canada  
Stantec Project No. 121414088**

Sample ID	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1242	Aroclor 1254	Aroclor 1260	Calculated Total PCB
<b>RDL</b>	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
<b>Units</b>	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
<b>Generic Criteria<sup>1</sup></b>	-	-	-	-	-	-	-	1.3
<b>TP1-BS1</b>	nd	nd	nd	nd	nd	nd	nd	nd
<b>TP1-BS1 Lab-Dup</b>	nd	nd	nd	nd	nd	nd	nd	nd
<b>TP4-BS1</b>	nd	nd	nd	nd	nd	nd	nd	nd
<b>TP5-BS1</b>	nd	nd	nd	nd	nd	nd	nd	nd
<b>TP6-BS1</b>	nd	nd	nd	nd	nd	nd	nd	nd

**Notes:**

1 = CCME Canadian Soil Quality Guideline (CSQG) for residential/parkland use (2016 on-line)

RDL = Reportable Detection Limit for routine analysis

nd = Not detected above RDL noted

Lab-dup = laboratory duplicate sample

"-" = Not analyzed, not applicable or no applicable guideline.