



SPECIFICATIONS

**MARGINAL WHARF RECONSTRUCTION
SUMMERFORD, NL**

SMALL CRAFT HARBOURS

DATE: May 2016

**DEPARTMENT OF FISHERIES AND OCEANS – SMALL CRAFT HARBOURS
SPECIFICATION FOR MARGINAL WHARF RECONSTRUCTION – SUMMERFORD, NL**

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PART 1 GENERAL

1.1 SCOPE

- .1 The work consists of the furnishing of all plant, labour, equipment and material for, marginal wharf reconstruction at Summerford, 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 consist of but will not necessarily be limited to the following:
 - .1 Demolition and removal of the existing wharf infrastructure in the area noted on the drawings, to accommodate the new work. Note that the existing structure may contain creosote timber as indicated on the plans.
 - .2 Construction of a new treated timber crib marginal wharf with reinforced concrete deck, to the dimensions as indicated on the drawings.
 - .3 Supply and installation of mooring cleats, structural timber for coping, wheelguard, wheelguard blocking, fenders, ladders and associated hardware for new work.

1.3 SITE OF WORK

- .1 Work will be carried out at Summerford, NL, in the location as shown on the accompanying drawings.

1.4 DATUM

- .1 Datum used for this project is Lowest Normal Tides (LNT). Departmental Representative will provide a benchmark upon contract award.
- .2 Bidders are advised to consult the Tide Tables issued by Fisheries and Oceans in order to make sure of the tidal conditions affecting 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, soil conditions, any accommodations they may require, and in general shall obtain all 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 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 29.06 - Health and Safety Requirements before visiting site. Take all appropriate safety measures for any visit to site, either before or after acceptance of bid.

1.6 CODES AND STANDARDS

- .1 Perform work in accordance with the latest edition of the National Building Code of Canada, FCC Standard 373 - Standard for Piers and Wharves 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 as defined in the General Conditions of the Contract.

1.8 SETTING OUT WORK

- .1 Set grades and layout work in detail from control points and grades established by Departmental Representative.
- .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 as straight edges and templates 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 All work items not designated in the unit price table as a measurement for payment, are to be included in the lump sum arrangement, or is to be included as incidental to the work.

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 the date stated in the bid acceptance letter.
- .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, e.g., show target dates for the placement of each crib, if applicable. Generally, Bar Charts derived from commercially available computerized project management system are preferred but not mandatory.
- .4 Submit schedule updates on a minimum monthly 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.
- .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:
 - .1 CGSB – Canadian Government Specifications Board
 - .2 CSA – Canadian Standards Association
 - .3 NLGA – National Lumber Grades Authority
 - .4 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 QUARRY AND EXPLOSIVES

- .1 Make own arrangements with Provincial authorities and owners of private properties, for the quarrying and transportation of rock and all materials and machinery necessary for work over their property, roads or streets as case may be.

1.13 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. Do not interfere with normal day-to-day operations in progress at site. All arrangements for space and access will be made by Contractor.
- .2 Remove snow and ice as required to maintain safe access in a manner that does not damage existing structures or interfere with the operations of others.

1.14 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 at all project meetings.

1.15 PROTECTION

- .1 Store all materials and equipment to be incorporated into work to prevent damage by any means.
- .2 Repair or replace all materials or equipment damaged in transit or storage to the satisfaction of Departmental Representative and at no cost to Canada.

1.16 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, pedestrian, vehicular traffic 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. This includes disconnection of electrical power and communication services to tenant's operational areas. Adhere to approved schedule and provide notice to affected parties.

- .4 Provide temporary services when directed by Departmental Representative to maintain critical facility systems.
- .5 Provide adequate bridging over trenches which cross walkways or roads to permit normal traffic.
- .6 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .7 Protect, relocate or maintain existing active services as required. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction over service. Record locations of maintained, re-routed and abandoned service lines.

1.17 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract Drawings
 - .2 Specifications
 - .3 Addenda
 - .4 Reviewed Shop Drawings
 - .5 List of outstanding shop drawings
 - .6 Change Orders
 - .7 Other modifications to Contract
 - .8 Field Test Reports
 - .9 Copy of Approved Work Schedule
 - .10 Site specific Health and Safety Plan and other safety related documents
 - .11 Other documents as stipulated elsewhere in the Contract Documents.

1.18 PERMITS

- .1 Obtain and pay for all permits, certificates and licenses as required by Municipal, Provincial, Federal and other Authorities. This includes any municipal permits that may be required, prior to initiating work. Contact the Town of Summerford prior to Bidding to confirm the costs associated with municipal permits and carry these costs in Bid price.
- .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 Submit to Departmental Representative, copy of quarry permit, if applicable, prior to start of quarry operations.

- .6 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.

1.19 CUTTING, FITTING AND PATCHING

- .1 Execute cutting, including excavation, fitting and patching required to make work fit properly.
- .2 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work. This includes patching of openings in existing work resulting from removal of existing services.
- .3 Do not cut, bore, or sleeve load-bearing members.
- .4 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

1.20 EXISTING SUB-SURFACE CONDITIONS

- .1 A diving probe investigation commenting on the existing sub-surface conditions is available for review, by contacting the Departmental Representative.
- .2 Contractors are cautioned that any previous investigations that may be available for review, were intended to provide general site information only. Any interpolation and/or assumptions made relative to any previous investigations is the Contractor's responsibility.

1.21 LOCATION OF EQUIPMENT

- .1 Location of cleats and ladders shown, or specified shall be considered as approximate. Actual location shall be as required to suit conditions at time of installation and as is reasonable. Obtain approval of Departmental Representative.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Departmental Representative when impending installation conflicts with other new or existing components. Follow directives for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.22 FISH HABITAT

- .1 This work is being conducted in an area where fish habitat may be affected. Perform work to conform with rules and regulations governing fish habitat and in accordance with authorization for work or undertakings affecting fish habitat.
- .2 Contact the local Department of Fisheries and Oceans detachment at least 48 hours in advance of starting any work on site. Submit confirmation to the Departmental Representative that DFO have been contacted.

1.23 NOTICE TO SHIPPING/MARINERS

- .1 Notify the Marine Communications and Traffic Services' Centre, of Fisheries and Oceans Canada, at (709) 772-2083, ten (10) days prior to commencement and upon completion of the work, in order to allow for the issuance of Notices to Shipping/Mariners.
- .2 During construction any vessels or barges utilized must be marked in accordance with the provisions of the Canada Shipping Act Collision Regulations.

1.24 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.

1.25 WORKS COORDINATION

- .1 Responsible for coordinating the work of the various trades, where the work of such trades interfaces with each other.
- .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.

1.26 CONTRACTOR'S USE OF SITE

- .1 Construction operations, including storage of materials for this contract, not to interfere with the fishing activity and/or operations at this harbour facility. Note that the fish plant infrastructure is in close proximity to the work area and coordination with users of the site will be required. Implement temporary shoring measures (at no additional contract cost), in order to protect existing infrastructure.
- .2 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.
- .3 Contractor will take adequate precautions to protect existing concrete decks and asphalt when operating tracked equipment.
- .4 Exercise care so as not to obstruct or damage public or private property in the area.

- .5 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.

1.27 WORK COMMENCEMENT

- .1 Mobilization to project site is to commence immediately after acceptance of bid and submission of Site Specific Safety Plan and insurance 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.

1.28 FACILITY SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions.

1.29 WORKING ADJACENT TO COMMUNITY ROADS

- .1 The Contractor will be responsible to restore any damage to existing roadways.

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTION INCLUDES**

- .1 Inspecting and testing by inspecting firms or testing laboratories designated by Departmental Representative

1.2 **RELATED REQUIREMENTS SPECIFIED ELSEWHERE**

- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Departmental Representative are specified under various sections.

1.3 **APPOINTMENT AND PAYMENT**

- .1 Departmental Representative will appoint and pay for services of testing laboratory except as follows:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.
 - .6 Additional tests specified in the following paragraph.
- .2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

1.4 **CONTRACTOR'S RESPONSIBILITIES**

- .1 Provide labour, equipment and facilities to:
 - .1 Provide access to Work to be inspected and tested.
 - .2 Facilitate inspections and tests.
 - .3 Make good Work disturbed by inspection and test.
 - .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
- .2 Notify Departmental Representative sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

- 4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Departmental Representative.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTIONS INCLUDE

- .1 Shop drawings and product data.
- .2 Samples.
- .3 Certificates and transcripts.

1.2 RELATED SECTIONS

- .1 Section 01 45 00 – Quality Control
- .2 Section 01 78 00 – Closeout Submittals

1.3 ADMINISTRATIVE

- .1 This section specifies general requirements and procedures for contractor's submissions of shop drawings, product data, samples and mock-ups to Departmental Representative for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with work until relevant submissions are reviewed by Departmental Representative.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
- .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are coordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review of submission, unless Departmental Representative gives written acceptance of specific deviations.

Submittal Procedures

- .10 Make any changes in 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 revisions other than those requested.
- .11 Notify Departmental Representative, in writing, when resubmitting, of any revisions other than those requested by Departmental Representative.
- .12 Keep one reviewed copy of each submission on site.

1.4 SUBMITTALS

- .1 The term "shop drawings" means 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 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow 10 days for Departmental Representative review of each submission.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change contract price. If adjustments affect value of Work, state such in writing to Departmental Representative immediately after receipt of approval of shop drawings. If value of work is to change a change order must be issued prior to proceeding with work.
- .6 Accompany submissions with transmittal letter, 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.
 - .5 Other pertinent data.
- .7 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.

Submittal Procedures

- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Relationship to adjacent work.
- .8 After Departmental Representative review, distribute copies.
- .9 Submit 3 prints plus one electronic copy in PDF format of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .10 Submit electronic copy in PDF format of product data sheets or brochures for requirements requested in Specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .11 Delete information not applicable to project.
- .12 Supplement standard information to provide details applicable to project.
- .13 Cross-reference product data information to applicable portions of Contract Documents.
- .14 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of work may proceed.
- .15 Samples: examples of materials, equipment, quality, finishes, workmanship. Label samples with origin and intended use.
- .16 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of contract documents.
- .17 Where colour, pattern or texture is criterion, submit full range of samples.
- .18 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

Submittal Procedures

- .19 Make changes in samples, which Departmental Representative may require, consistent with Contract Documents.
- .20 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 MOCK-UPS

- .1 Erect mock-ups in accordance with Section 01 45 00 - Quality Control.

1.6 PROGRESS PHOTOGRAPHS

- .1 Progress photograph to be electronically formatted and labelled as to location and view.

1.7 SHOP DRAWINGS REVIEW

- .1 The review of shop drawings by Departmental Representative is for the sole purpose of ascertaining conformance with the general concept. This review shall not mean that Departmental Representative 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 to fabrication processes or to techniques of construction and installation and for co-ordination of the work of all sub-trades.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Fire Safety Requirements.
- .2 Hot Work Permit.

1.2 RELATED SECTIONS

- .1 Section 01 35 25 - Special Procedures on Lockout Requirements.
- .2 Section 01 35 29.06 - Health and Safety Requirements.

1.3 REFERENCES

- .1 Fire Protection Standards issued by Fire Protection Services of Human Resources Development Canada as follows:
 - .1 FCC No. 301-June 1982 Standard for Construction Operations.
 - .2 FCC No. 302-June 1982 Standard for Welding and Cutting.
 - .3 FCC standards, may also be viewed at the Regional Fire Protection Services' office (previously known as the Fire Commissioner of Canada) located at 99 Wyse Road, 8th Floor, Dartmouth, NS, Tel: (902) 426-6053.

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 14 calendar days after notification of acceptance of bid.
- .2 Submit in accordance with the Submittal General Requirements specified in Section 01 33 00.

1.6 FIRE SAFETY REQUIREMENTS

- .1 Implement and follow fire safety measures during Work. Comply with following:
 - .1 National Fire Code, 2005
 - .2 Fire Protection Standards FCC 301 and FCC 302.

- .3 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 29.06.
- .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 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 .
- .6 In tenant occupied Facility, coordinate performance of Hot Work with Facility Manager through the Departmental Representative. When directed, perform Hot Work only during non-operative hours of Facility. Follow Departmental Representative's directives in this regard.

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 29.06.
 - .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 Section 01 35 29.06.
- .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 29.06.

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.

Special Procedures on Fire Safety Requirements

- .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.
 - .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.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Procedures to isolate and lockout electrical facility or other equipment from energy source.

1.2 RELATED WORK

- .1 Section 01 35 24 – Special Procedures on Fire Safety Requirements.
- .2 Section 01 35 29.06 - Health and Safety Requirements.

1.3 REFERENCES

- .1 C22.1-06 - Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.
- .2 CAN/CSA C22.3 No. 1-10 - Overhead Systems.
- .3 CAN/CSA C22.3 No. 7-10 - Underground Systems.
- .4 COSH, Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

1.4 DEFINITIONS

- .1 **Electrical Facility:** means any system, equipment, device, apparatus, wiring, conductor, assembly or part thereof that is used for the generation, transformation, transmission, distribution, storage, control, measurement or utilization of electrical energy, and that has an amperage and voltage that is dangerous to persons.
- .2 **Guarantee of Isolation:** means a guarantee by a competent person in control or in charge that a particular facility or equipment is isolated.
- .3 **De-energize:** in the electrical sense, that a piece of equipment is isolated and grounded, e.g. if the equipment is not grounded, it cannot be considered de-energized (DEAD).
- .4 **Guarded:** means that an equipment or facility is covered, shielded, fenced, enclosed, inaccessible by location, or otherwise protected in a manner that, to the extent that is reasonably practicable, will prevent or reduce danger to any person who might touch or go near such item.
- .5 **Isolate:** means that an electrical facility, mechanical equipment or machinery is separated or disconnected from every source of electrical, mechanical, hydraulic, pneumatic or other kind of energy that is capable of making it dangerous.
- .6 **Live/alive:** means that an electrical facility produces, contains, stores or is electrically connected to a source of alternating or direct current of an amperage and voltage that is

dangerous or contains any hydraulic, pneumatic or other kind of energy that is capable of making the facility dangerous to persons.

1.5 COMPLIANCE REQUIREMENTS

- .1 Perform lockouts in compliance with:
 - .1 Canadian Electrical Code.
 - .2 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 29.06.
 - .3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.
 - .4 Procedures specified herein.
- .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.

1.6 SUBMITTALS

- .1 Submit copy of proposed Lockout Procedures and sample form of lockout permit or lockout tags for review.
- .2 Submit documentation within 7 calendar days of acceptance of bid. Do not proceed with work until submittal has been reviewed by Departmental Representative.
- .3 Submit above documents in accordance with the submittal requirements specified in Section 01 33 00.
- .4 Resubmit Lockout Procedures with noted revisions as may result from Departmental Representative's review.

1.7 ISOLATION OF EXISTING SERVICES

- .1 Obtain Departmental Representative's written authorization prior to conducting work on an existing active, energized service or facility required as part of the work and before proceeding with lockout of such services or facility.
- .2 To obtain authorization, submit to Departmental Representative the following documentation:
 - .1 Written Request for Isolation of the service or facility and;
 - .2 Copy of Contractor's Lockout Procedures
- .3 Make a Request for Isolation for each event, unless directed otherwise by Departmental Representative, and as follows:
 - .1 Fill-out standard forms in current use at the Facility when so directed by Departmental Representative or;

Special Procedures on Lockout Requirements

- .2 Where no form exists at Facility, make request in writing identifying:
 - .1 Identification of system or equipment to be isolated, including its location.
 - .2 Time duration, indicating Start time and date, and Completion time and date when isolation will be in effect;
 - .3 Voltage of service feed to system or equipment being isolated;
 - .4 Name of person making the request.
- .4 Document to be in typewritten format.
- .4 Do not proceed until receipt of written notification from Departmental Representative granting the Isolation Request and authorization to proceed with the isolation of designated equipment or facility. Departmental Representative may designate other individual at the Facility as the person authorized to grant the Isolation Request.
- .5 Conduct safe, orderly shut down of equipment or facilities, de-energize and isolate power and other sources of energy and lockout items in accordance with requirement of clause 1.8 below.
- .6 Plan and schedule shut down of existing services in consultation with the Departmental Representative and the Facility Manager. Minimize impact and downtime of facility operations.
- .7 Determine in advance, as much as possible, in cooperation with the Departmental Representative, the type and frequency of situations which will require a Request for Isolation. Follow Departmental Representative's directives in this regard.
- .8 Conduct hazard assessment as part of the planning process of isolating existing equipment and facilities. Hazard Assessments to conform with requirements of Health and Safety Section 01 35 29.06.

1.8 LOCKOUTS

- .1 Isolate and lockout electrical facilities, mechanical equipment and machinery from all potential energy sources prior to starting work on such items.
- .2 Develop and implement lockout procedures to be followed on site as an integral part of the Work.
- .3 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.
- .4 Use industry standard lockout tags.
- .5 Provide appropriate safety grounding and guards as required.
- .6 Prepare Lockout Procedures in writing. Describe safe work practices, work functions and sequence of activities to be followed on site to safely isolate all potential energy sources and lockout/tagout facilities and equipment

- .7 Include within procedures a system of worker request and issuance of individual lockout permit by a person, employed by Contractor, designated to be "in-charge" and being responsible for:
 - .1 Controlling issuance of permits or tags to workers.
 - .2 Determining permit duration.
 - .3 Maintaining record of permits and tags issued.
 - .4 Submitting a Request for Isolation to Departmental Representative when required in accordance with Clause 1.7 above.
 - .5 Designating a Safety Watcher, when one is required based on type of work.
 - .6 Ensuring equipment or facility has been properly isolated, providing a Guarantee of Isolation to worker(s) prior to proceeding with work.
 - .7 Collecting and safekeeping lockout tags, returned by workers, as a record of the event.
- .8 Clearly establish, describe and allocate, within procedures, the responsibilities of:
 - .1 Workers.
 - .2 Designated person controlling issuance of lockout tags/permits.
 - .3 Safety Watcher.
 - .4 Subcontractors and General Contractor.
- .9 Procedures shall meet the requirements of Codes and Regulations specified in Clause 1.5 above.
- .10 Generic procedures if used, must be edited, supplemented with pertinent information and tailored to reflect specific project conditions. Clearly label as being the procedures applicable to this contract.
 - .1 Incorporate site specific rules and procedures established by Facility Manager and in force at site. Obtain such procedures through Departmental Representative.
- .11 Procedures to be in typewritten format.
- .12 Submit copy of Lockout Procedures to Departmental Representative, in accordance with submittal requirements of clause 1.6 herein, prior to commencement of work.

1.9 CONFORMANCE

- .1 Ensure that lockout procedures, as established for project on site, are stringently followed. Enforce use and compliance by all workers.
- .2 Brief all persons working on electrical facilities, mechanical and other equipment fed by an energy source on requirements of this section.
- .3 Failure to perform lockouts in accordance with regulatory requirements or follow procedures specified herein 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 29.06.

1.10 DOCUMENTS ON SITE

- .1 Post Lockout Procedures on site in common location for viewing by workers.
- .2 Keep copies of Request for Isolation submitted to Departmental Representative and lockout permits or tags issued to workers during the course of work for full project duration.
- .3 Upon request, make such data available to Departmental Representative or to authorized safety representative for inspection.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-Z259.1 Body Belts and Saddles for Work Positioning and Travel Restraint.
 - .2 CAN/CSA-Z259.10 Full body Harnesses.
 - .3 CAN/CSA-Z259.11 Energy Absorbers and Lanyards.
 - .4 CAN/CSA-Z259.2.1 Fall Arresters, Vertical Lifelines and Rails.
 - .5 FCC No. 301 Standard for Construction Operations.
 - .6 CSA Z275.2 Occupational Safety Code for Diving Operations.
 - .7 CSA Z275.4 Competency Standard for Divers Operations.
 - .8 CSA Z797, Code of Practice for Access Scaffold.
- .2 FCC No. 302 Standard for Welding and Cutting.
- .3 Transportation of Dangerous Goods Act Regulations.
- .4 Newfoundland Occupational Health and Safety Act, Amended
- .5 Consolidated Newfoundland and Regulations 1149 WMIS Regulations Under the Occupational Health and Safety Act
- .6 Consolidated Newfoundland and Regulations Occupational Health and Safety Regulations under the Occupational Health and Safety Act.
- .7 Canada Labour Code, Part 2.
- .8 National Building Code of Canada.
- .9 Department of Transportation and Works Occupational Health and Safety Manual.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 24 – Special Procedures on Fire Safety Requirements
- .3 Section 01 35 25 – Special Procedures on Lockout Requirements
- .4 Section 01 35 43 - Environmental Procedures.
- .5 Section 01 41 00 - Regulatory Requirements.

1.3 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 Medial Aid Injury: any minor injury for which medical treatment was provided and the costs 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 performance of the Work.

1.4 SUBMITTALS

- .1 At least 10 (ten) working days prior to commencing any site work: submit to Departmental Representative copies of:
 - .1 A complete Site Specific Health and Safety Plan. Provide three (3) copies.
 - .1 Departmental Representative will review Health and Safety Plan and provide comments.
 - .2 Revise the Plan as appropriate and resubmit within 5 work days after receipt of comments.
 - .3 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.
 - .4 Submit revisions and updates made to the Plan during the course of the Work.
 - .2 Submit name of designated Health and Safety Site Representative and support documentation specified in the Safety Plan.
 - .3 Submit building permit, compliance certificates and other permits obtained.
 - .4 Submit copy of Letter of 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.

- .5 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .6 Submit copies of incident reports.
- .7 Submit WHMIS MSDS – Material Safety Data Sheets.
- .8 If work entails blasting, submit the following:
 - .1 Valid Blaster's Certificate and Certificates of Qualification acceptable to the OHS Regulations 5/12 under section 419 identifying the Level of Qualification for the project requirements (Journey Persons Blaster Certificate will still be accepted). An acceptable letter of extension of blasters certificate from the Industrial Training Division of the Provincial Department of Education is required when certificate expires (5 years max.). Certificate numbers and names are required for all blasters proposed for the project.
 - .2 Temporary Magazine License, when required issued, by Natural Resources Canada.
 - .3 Explosives Vehicle Certificate, when required, issued by Transport Canada for transport of explosives regulated under the Transportation of Dangerous Good Act.
 - .4 Blaster resume which clearly states and demonstrates:
 - .1 Minimum five (5) years of experience in handling, storage and detonation of explosives.
 - .2 Training at a blaster's school which is acceptable to the provincial government.
- .9 If work entails diving, submit the following:
 - .1 Diver(s) and dive supervisor (s).
 - .1 Copy of valid Diving Certificate and Supervisor Certificate from the Diving Certification Board of Canada (or equivalent) for the required work on the project. (i.e. Restricted SCUBA Diver, Unrestricted SCUBA Diver, SCUBA Supervisor, Restricted Surface-Supplied Diver, Unrestricted Surface-Supplied Diver, etc. (See www.divercertification.com)
 - .2 Resume which clearly demonstrates years of experience for the specific type (SCUBA, Surface Supplied Air, etc.) of diving to be performed at the site and projects completed to achieve minimum number of logged bottom time, hours and
 - .3 First aid and CPT Training Certification.
 - .2 Dive tender(s) resume which clearly states relevant training (including first aid and (CPR) and experience for the specific task (i.e. dive tender log book).
 - .3 Current (less than one year) medical examination certificate (s) from a licensed medical doctor in the Province of Newfoundland and Labrador who is knowledgeable and competent in diving and hyperbaric medicine for all dives.

Health and Safety Requirements

- .4 Certificates of Analysis for quality/purity of breathing air to be used by diver(s).
- .5 Documentation showing that diving life support equipment is in good working order and properly maintained.
- .6 Copies of documentation shall be submitted to show:
 - .1 An up-to-date dive site listing of the contact Hyperbaric facility and phone numbers for each location.
 - .2 Written arrangements with standby physician(s) specializing in diving/hyperbaric medicine for contingent emergency response and post dive follow-up for 48 hours after dive is completed.
 - .3 Effective means of communication between the diving supervisor and physician are available.
 - .4 The name, location and telephone number of the hospital and emergency department nearest the dive site.
- .10 If work entails confined space, submit the following:
 - .1 Copies of current confined space entry training certificates acceptable to WHSCC, as well as copies of confined space entry programs, confined space assessment, safe work practices and rescue plans.
 - .2 Acceptance of the Site Specific Health and Safety Plan and other submitted documents by the Departmental Representative shall only be viewed as acknowledgement that the contractor has submitted the required documentation under this specification section.
 - .3 Departmental Representative makes no representation and provides no warranty for the accuracy, completeness and legislative compliance of the Site Specific Health and Safety Plan and other submitted documents by this acceptance.
 - .4 Responsibility for errors and omissions in the Site Specific Health and Safety Plan and other submitted documents is not relieved by acceptance by Departmental Representative.

1.5 OCCUPATIONAL HEALTH AND SAFETY (SITE SPECIFIC HEALTH AND SAFETY PLANS)

- .1 Conduct operations in accordance with the latest Federal and Provincial Occupational Health and Safety Regulations, with specific reference to codes and standards referenced therein.
- .2 Prepare a detailed Site Specific Health and Safety Plan that shall identify, evaluate and control job specific hazards and the necessary control measures to be implemented for managing hazards.
- .3 Provide a copy of the Site Specific Health and Safety Plan upon request to Occupational Health and Safety Branch, Services NL, Province of Newfoundland and Labrador and the Departmental Representative.
- .4 The written Site Specific Health and Safety Plan shall incorporate the following:

- .1 Hazard assessment results.
- .2 Engineering and administrative demonstrative controls (work-practices and procedures) to be implemented for managing identified and potential hazards, and comply with applicable federal and provincial legislation and more stringent requirements that have been specified in these specifications.
- .3 An organizational structure which shall establish the specific chain of command and specify the overall responsibilities of contractor's employees at the work site.
- .4 A comprehensive work plan which shall:
 - .1 define work tasks and objectives of site activities/operations and the logistics and resources required to reach these tasks and objectives.
 - .2 establish personnel requirements for implementing the plan.
- .5 A personal protected equipment (PPE) Program which shall detail PPE:
 - .1 Selection criteria based on site hazards.
 - .2 Use, maintenance, inspection and storage requirements and procedures.
 - .3 Decontamination and disposal procedures.
 - .4 Inspection procedures prior to, during and after use, and other appropriate medical considerations.
 - .5 Limitations during temperature extremes, heat stress and other appropriate medical consideration.
- .6 An emergency response procedure, refer to Clause 1.5 Supervision and Emergency Response Procedure of this section for requirements.
- .7 A hazard communication program for informing workers, visitors and individuals outside of the work area as required. This will include but not be limited to a visitor safety and orientation policy and program that will include education on hazards, required PPE and accompaniment while on site.
- .8 A hearing conservation program in accordance with the OHS Regulations.
- .9 A recent (current year) inspection form for all powered mobile equipment that will be used in fulfilling the terms of the contract. The inspection form shall, at a minimum, state that the equipment is in a safe operating condition.
- .10 A complete listing of employee names, their driver's license classification, expiry date, endorsements and the type of equipment that they are qualified to operate for the complete scope of work for this project. The Driver's License Number should not be provided as this is confidential information. Provision of the License Number may breach *PIPEDA* - the Personal Information Protection and Electronic Documents Act. (Federal Act) or *ATIPPA* - *Access to Information and Protection of Privacy Act* - Part IV. (Provincial Act of Newfoundland and Labrador). This shall also include documentation where required of certification in power line hazards.
- .11 An acceptable parking policy for all powered mobile equipment to be used on this project. The policy shall, at a minimum, be based on a hazard assessment that considers factors such as equipment type, potential for roll over, load capacity of the parking area, pedestrian and vehicular traffic, and potential for

- equipment tampering, equipment energy, and equipment contact with power lines.
- .12 A diving program which shall contain standard operating procedures to be followed in the diving operation.
- .13 A health and safety training program which includes a safety training matrix.
- .14 General safety rules.
- .5 Periodically review and modify as required each component of the Site Specific Health and Safety Plan when a new hazard is identified during completion of work and when an error or omission is identified in any part of the Site Specific Health and Safety Plan.
- .6 Review the completeness of the hazard assessment immediately prior to commencing work, when a new hazard is identified during completion of work and when an error or omission is identified.
 - .1 Be solely responsible for investigating, evaluating and managing any report of actual or potential hazards.
 - .2 Clearly define accident incident investigation procedures.
 - .3 Clearly define policy and processes for early and safe return to work.
 - .4 Retain copies of all completed hazard assessments at the project site and make available to the Departmental Representative immediately upon request.
- .7 Implement all requirements of the Site Specific Health and Safety Plan.
 - .1 Ensure that every person entering the project site is informed of requirements under the Site Specific Health and Safety Plan.
 - .2 Take all necessary measures to immediately implement any engineering controls, administrative controls, personal protective equipment required or termination of work procedures to ensure compliance with the Site Specific Health and Safety Plan.

1.6 SUPERVISION AND EMERGENCY RESCUE PROCEDURE

- .1 Carry out work under the direct supervision of competent persons responsible for safety by ensuring the work complies with the appropriate section of Federal and Provincial Occupational Health and Safety Regulations
- .2 Assign a sufficient number of supervisory personnel to the work site.
 - .1 Any person assigned to supervisory duties shall not conduct significant work in relation to the contract that inhibits them from the ability to properly supervise the work site.
- .3 Provide a suitable means of communications and check-in for workers required to work alone.
- .4 Develop an emergency rescue plan for the job site and ensure that supervisors and workers are trained in the emergency rescue plan.
- .5 The emergency response plan shall address, as a minimum:

- .1 Pre-emergency planning.
- .2 Personnel roles, lines of authority and communication.
- .3 Emergency recognition and prevention.
- .4 Safe distances and places of refuge.
- .5 Site security and control
- .6 Evacuation routes and procedures
- .7 Decontamination procedures which are not covered by the site specific safety and health plan.
- .8 Emergency medical treatment and first aid.
- .9 Emergency alarm, notification and response procedures including procedures for reporting incidents to local, provincial and federal government departments.
- .10 PPE and emergency equipment.
- .11 Procedures for handling emergency incidents.
- .12 Site specific emergency response training requirements and schedules.
- .13 For diving operation, include procedures for:
 - .1 Managing deteriorating environmental conditions.
 - .2 Managing unexpected weather or sea-state condition.
 - .3 Evacuation of diver(s) under pressures greater than atmospheric pressure.
 - .4 In-water emergency transfers.
 - .5 Managing failing of equipment below the surface that impairs the ability of a diver to complete a dive.
 - .6 Managing failure of any major component of diving plant or equipment.
 - .7 Emergency signalling between divers involved in the diving program and between the diver(s) and the attendants using umbilical, tethers or other suitable methods.
 - .8 Mobilizing stand-by divers.
 - .9 Mobilizing crafts, stand-by boats and any other devices to be used for rescue.
 - .10 Contacting evacuation, rescue, treatment facilities and medical services that will be used in the diving program.
 - .11 Operation of emergency power and lighting facilities.
- .6 The emergency response procedures shall be rehearsed regularly as part of the overall training program.
- .7 Provide adequate first aid facilities for the jobsite and ensure that a minimum number of workers are trained in first aid in accordance with the Occupational Health and Safety First Aid Regulations.

1.7 CONTRACTORS SAFETY OFFICER

- .1 The contractor shall employ a Contractor's Safety Officer (CSO) who shall have as a minimum successfully completed the following training, and must have current credentials for those that have expiration dates:
 - .1 Training in hazardous materials management and response/protocols.
 - .2 Training in the use, maintenance of fall protection systems certified by WHSCC at a minimum.
 - .3 Training in the inspection of scaffolding in accordance with CSA Z797.
 - .4 Training in confined space entry protocols, techniques and rescue plans, certified by WHSCC at a minimum.
 - .5 Supervisory training.
 - .6 Training in records and statistics.
 - .7 Training in hazard identification, inspections, analysis and control.
 - .8 Training in WHMIS.
 - .9 Training in health and safety program content.
 - .10 Training in investigations and reporting.
 - .11 Training in occupational health/hygiene.
 - .12 Training in employee training and communication.
 - .13 Training in Emergency Preparedness and First Aid.
 - .14 A working knowledge of, and experience satisfactory to the Departmental Representative, using the occupational safety and health legislation and regulations specific to Newfoundland and Labrador.
 - .15 Experience, satisfactory to the Departmental Representative, with the safe work practices required for execution of the work and operation of equipment specific to the project.
 - .16 Experience, satisfactory to the Departmental Representative, in developing and monitoring site safety and housekeeping policies.
 - .17 Experience, satisfactory to the Departmental Representative, in developing and monitoring a preventative maintenance and inspection program for Construction Site Equipment.
- .2 The CSO shall:
 - .1 Be responsible for developing, implementing, daily enforcement, monitoring and updating of the Site Specific Health and Safety Plan.
 - .2 Be responsible for the delivery of the site safety orientation and ensure that the personnel who have not been orientated are not permitted to enter the site. This applies to workers, inspectors and visitors.
 - .3 Report directly to and be under direction of the Site Superintendent or Contractor's Project Manager.

- .4 Prior to mobilization on-site, hold an orientation meeting with the contractors, subcontractors and Departmental Representative to review project occupational health and safety. Include but not limit meeting to a review of:
 - .1 Site Specific Health and Safety Plan.
 - .2 Construction Safety Measures.
 - .3 Supervision and Emergency Rescue Procedures.
 - .4 Hazard Assessments
- .5 Maintain a daily log of inspections, meetings, infractions and mitigating measures. Log is to be filed daily and copies to be provided to the Site Superintendent and Departmental Representative.

1.8 HEALTH AND SAFETY COMMITTEE

- .1 Establish an Occupational Health and Safety Committee where ten or more workers are employed on the job site as per the OH&S Act and Regulations.

1.8 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with Site Specific Health and Safety Plan.
- .3 Where safety risks exist, the contractor must stop the work until such time as the risk can be mitigated to a safe level.
- .4 Take appropriate steps to ensure that the hazards are mitigated to a safe level, workers are notified of the hazards and how to protect themselves. As well, workers must be provided with any new safe work practices or information regarding mitigation of the risk.

1.9 UNFORSEEN HAZARDS

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Federal and Provincial Regulations having jurisdiction. Advise Departmental Representative verbally and in writing.

1.10 INSTRUCTION AND TRAINING

- .1 Workers shall not participate in or supervise any activity on the work site until they have been trained to a level required by this job function and responsibility. Training shall as a minimum thoroughly cover the following:

Health and Safety Requirements

- .1 Federal and Provincial Health and Safety Legislation requirements including roles and responsibilities of workers and person(s) responsible for implementing, monitoring and enforcing health and safety requirements.
 - .2 Safety and health hazards associated with working on a contaminated site including recognition of symptoms and signs which might indicate over exposure to hazards.
 - .3 Limitations, use, maintenance and disinfection-decontamination of personal protective equipment associated with completing work.
 - .4 Limitations, use, maintenance and care of engineering controls and equipment.
 - .5 Limitations and use of emergency notifications and response equipment including emergency response protocol.
 - .6 Work practices and procedures to minimize the risk of an accident and hazardous occurrence from exposure to a hazard.
- .2 Provide and maintain training of workers, as required, by Federal and Provincial legislation.
 - .3 Provide copies of all training certificates to Departmental Representative for review, before a worker is to enter the work site.
 - .4 Authorized visitors shall not access the work site until they have been:
 - .1 Notified of the names of persons responsible for implementing, monitoring and enforcing the Site Specific Health and Safety Plan.
 - .2 Briefed on safety and health hazards present on the site.
 - .3 Instructed in the proper use and limitations of personal protective equipment.
 - .4 Briefed as the emergency response protocol including notification and evacuation process.
 - .5 Informed of practices and procedures to minimize risks from hazards and applicable to activities performed by visitors.
 - .6 Accompanied while on site, and provided with the appropriate PPE.
 - .5 All workers will be instructed and trained on the hazards associated with work they will perform and how to protect themselves. This will include a review of all safe work practices, the reporting and documentation of hazards, reporting accidents and injuries as well as, formal training in areas of high risk (i.e. fall protection, power line hazards, traffic control persons training).
 - .6 The work site shall have the appropriate number of persons trained in emergency and Standard First Aid according to the First Aid Regulations.

1.11 CONSTRUCTION SAFETY MEASURES

- .1 Observe construction safety measures of National Building Code, latest edition, Provincial Government, OH&S Act and Regulations, Workplace Health and Safety Compensation Commission and Municipal Authority provided that in any case of conflict or discrepancy more stringent requirements shall apply.

- .2 Administer the project in a manner that will ensure, at all times, full compliance with Federal and Provincial Acts, regulations and applicable safety codes and the Site Specific Health and Safety Plan.
- .3 Provide Departmental Representative with copies of all orders, directions and any other documentation, issued by the Occupational Health and Safety Branch, Services NL, immediately after receipt.

1.12 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.

1.13 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Federal and Provincial Regulations and authority having jurisdiction, and in consultation with Departmental Representative.
- .2 Post other documents as specified herein, including:
 - .1 Site specific Health and Safety Plan.
 - .2 WHMIS data sheets.

1.14 HEALTH AND SAFETY MONITORING

- .1 Periodic inspections of the contractor's work may be carried out by the Departmental Representative to maintain compliance with the Health and Safety Program. Inspections will include visual inspections as well as testing and sampling as required.
- .2 The contractor shall be responsible for any and all costs associated with delays as a result of contractor's failure to comply with the requirements outlined in this section.

1.15 NOTIFICATION

- .1 For projects exceeding thirty (30) days or more, the contractor shall, prior to the commencement of work, notify in writing the Occupational Health and Safety Branch, Services NL with the following information:
 - .1 Name and location of construction site.
 - .2 Company name and mailing address of contractor doing the work.
 - .3 The number of workers to be employed.
 - .4 A copy of the Site Specific Health and Safety Plan if requested.

1.16 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 within ten (10) working days.
- .3 Departmental Representative may stop work if non-compliance of health and safety regulations is not corrected in a timely manner.

1.17 WHMIS

- .1 Ensure that all controlled products are in accordance with the Workplace Hazardous Materials Information System (WHMIS) Regulations and Chemical Substances of the OH&S Act and Regulations regarding use, handling, labelling, storage, and disposal of hazardous materials.
- .2 Deliver copies of relevant Material Safety Data Sheets (MSDS) to job site and the Departmental Representative. The MSDS must be acceptable to Labour Canada and Health and Welfare Canada for all controlled products that will be used in the performance of this work. All MSDS should be located in accessible locations for all workers and visitors throughout the site, bound and organized in binders.
- .3 Train workers required to use or work in close proximity to controlled products as per OH&S Act and Regulations.
- .4 Label controlled products at jobsite as per OH&S and Regulations and WHMIS.
- .5 Provide appropriate emergency facilities as specified in the MSDS where workers might be exposed to contact with chemicals, e.g. eye-wash facilities, emergency shower.
 - .1 Workers to be trained in use of such emergency equipment.
- .6 Contractor shall provide appropriate personal protective equipment as specified in the MSDS where workers are required to use controlled products.
 - .1 Properly fit workers for personal protective equipment
 - .2 Train workers in care, use and maintenance of personal protective equipment.
- .7 No controlled products are to be brought on-site without prior approved MSDS.
- .8 The MSDS are to remain on site at all times.

1.18 OVERLOADING

- .1 The Contractor's Full Time CSO and/or Site Superintendent shall ensure no part of work or associated equipment is subjected to loading that will endanger its safety or will cause permanent deformation.

1.19 FALSEWORK

- .1 Design and construct falsework in accordance with CSA S269.1.

1.20 SCAFFOLDING

- .1 Design, erect, inspect, operate, modify, and dismantle scaffolding in accordance with CSA Z797, the OH&S Act and Regulations, and the scaffold manufacturer's written instructions.
- .2 Provide trained and certified Competent Scaffold Erectors for all scaffold erection, modification and dismantling. Training certification must be valid at time of erection, modification and dismantling of scaffold.
- .3 Conduct and document daily inspections of scaffolding by trained and certified Competent Scaffold Inspectors or Erectors. Training certification must be valid at the time of inspection.
- .4 Provide a scaffold tagging system as described in CSA Z797.
- .5 Ensure that all industry best practices for safe scaffold usage, including fall protection, proper loading, safe access, electrical hazards, exit door management and other concerns are strictly adhered to.

1.21 WORKING AT HEIGHTS

- .1 Ensure that fall restraint or fall arrest devices are used by all workers working at elevations greater than 3.05 meters above grade or floor level in accordance with CSA Z259, where alternate fall protection systems are not provided in accordance with Occupational Health and Safety Act and Regulations.
- .2 All workers performing work at height and who will be required to utilize a fall arrest system must be trained in a fall protection program certified by the WHSCC. Training must be current and valid at the time of use.
- .3 Prior to working at height workers shall be instructed in a Contractor Safe Work Practice for working at height and associated Rescue Plan for working at heights, developed specific to the work to be performed, locations and risks.

1.22 PERSONAL PROTECTIVE EQUIPMENT

- .1 Ensure workers on the jobsite use personal protective equipment appropriate to the hazards identified in the Site Specific Health and Safety Plan and those workers are trained in the proper care, use, and maintenance of such equipment.
- .2 PPE selections shall be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the site, task-specific conditions, duration and hazards and potential hazards identified on site. PPE must also be fitted for the worker.

- .3 Provide workers and visitors to the site with proper respiratory protection equipment.
 - .1 No work shall be performed in an area where an airborne contaminant exceeds recommendations of the ACGIH, do not meet the appropriate standards for the specific contaminants or are not in accordance with the OHS regulations.
 - .2 Respiratory protection shall be provided in accordance with the requirements of the Occupational Health and Safety Branch, Services NL and these specifications.
 - .3 Establish, implement and maintain a respirator inspection and maintenance program in accordance with the CSA standard identified in the OHS Regulations.
 - .4 Copies of all respirator owners' maintenance manuals shall be kept at all times at the contractor's site office.
- .4 Provide and maintain a supply of dermal protection equipment to allow visitors and all workers proper dermal protection.
 - .1 Dermal protection shall be sufficient to act as a protective barrier between the skin and an airborne contaminant or hazardous material. Dermal protection shall also be provided for all physical hazards.
 - .2 Dermal protection equipment shall not be used after exceeding 75% of the break through time. The break through time shall be based on the contaminant which requires the least amount of time to break through the protective equipment
 - .3 Copies of all dermal protection user specifications, owners and maintenance manuals shall be kept at all times at the contractor's site office.
 - .4 Establish, implement and maintain air inspection program to ensure proper dermal protection in accordance with CSA, NIOSH, U.S. EPA and manufacturer's requirements.
- .5 Provide all workers and up to five (5) visitors to the site with proper hearing protection. Workers and visitors shall not be exposed to noise levels greater than 85 dB (A) over an eight-hour shift without proper hearing protection, in accordance with the Hearing Conservation Program.
- .6 Provide all workers and up to five (5) visitors to the site with CSA approved eye protection sufficient to act as a protective barrier between the eye and airborne contaminants, hazardous materials and physical hazard.
- .7 Provide workers and up to five (5) visitors to the site with CSA approved hard hats meeting the CSA Z94.1.
- .8 Provide high visibility apparel as defined in Occupational Health and Safety Regulations.
- .9 Provide CSA approved safety boots meeting CSA Z195.
- .10 Provide other personal protective equipment, as may be required by the owner, depending on duties being performed.

1.23 TRAFFIC CONTROL

- .1 Provide traffic control measures when working on, or adjacent to, roadways in accordance with the "Traffic Control Manual for Roadwork Operations", Department of Transportation and Works.

1.24 EXCAVATION SAFETY

- .1 Protect excavations more than 1.25 metres deep against cave-ins or wall collapse by side wall sloping to the appropriate angle of repose, an engineered shoring/sheathing system or an approved trench box.
 - .1 Provide a ladder which can extend from the bottom of the excavation to at least 0.91 metres above the top of the excavation.
- .2 Ensure that all excavations less than 1.25 metres deep are effectively protected when hazardous ground movement may be expected.
- .3 Design trench boxes, certified by a registered Professional Engineer, and fabricated by a reputable manufacturer. Provide the manufacturer's Depth Certificate Statement permanently affixed. Use trench boxes in strict accordance with manufacturer's instructions and depth certification data.
- .4 For excavations deeper than six (6) metres, provide a certificate from a registered Professional Engineer stating that the protection methods proposed have been properly designed in accordance with accepted engineering practice. The engineer's certificate shall verify that the trench boxes, if used, are properly designed and constructed to suit the depth and soil conditions.
- .5 Ensure that the superintendent and every crew chief, foreperson and lead hand engaged in trenching operations or working in trenches have in his/her possession a copy of Occupational Health and Safety Regulations: Part XVII: Construction, Excavation and Demolition and Part XVIII: Excavation, Underground Work and Rock Crushing.

1.25 BLASTING OPERATIONS

- .1 Blasting or other use of explosives is not permitted on site without prior receipt of written permission and instructions from Departmental Representative.
- .2 Ensure blasting operations are carried out under the direct visual supervision of a certified Blaster either registered with the Industrial Training Division of the Department of Education or has been issued a certificate from completion of a program approved by Service NL. Ensure that the certificate level is appropriate for the blasting activities which will occur. Comply with the requirements of:
 - .1 Explosives Act.
 - .2 Explosives Regulations.
 - .3 Newfoundland Regulation 5/12, Occupational Health and Safety Regulations.
 - .4 Role of certified blaster set out in section 419 of the Occupational Health and Safety Regulations 5/12.

- .3 Store explosives in accordance with the “Explosives Act (Canada)” and transport, handle and use in the manner prescribed by the manufacturer of the substance and subject to specific regulations. An inventory of explosives shall be kept.
- .4 Ensure that workers required to transport explosives have a valid Transportation of Dangerous Goods Training Certification in accordance with the “Act to Promote Public Safety in the Transportation of Dangerous Goods, and the “Explosives Act (Canada)”. Vehicle used to transport explosives on site shall be placarded and explosives shall be transported in containers lined with wood (reference section 428 of the Occupational Health and Safety Regulations 5/12 comply with section 42. Detonators shall not be placed in a magazine or day box with other types of explosives or in a compartment of a vehicle with another type of explosive.
- .5 Use of explosives on site shall comply with the Occupational Health and Safety Regulations 5/12 General Blasting requirements set out in Part XIX of the Regulations.
- .6 Loaded holes shall be clearly identified with barricades put in place to prevent access to the holes. Drilling shall not be done closer to a loaded bore hole than a distance half the total depth of the hole being drilled and in no case shall drilling be conducted at a distance closer than 6.0 m from a loaded borehole. Drill cuttings shall not be used as stemming material.
- .7 Advise the public by suitable public notices, advertisements, house to house contacts etc. for blasting operations in close proximity to areas occupied by the public. Advise of the warning device to be sounded and the procedure to be used before detonation of individual blasts. Roads and approaches to the danger area to be guarded or barricaded to prevent anyone from entering. Loaded holes which have not been fired by the end of the day shall not be left unattended.
- .8 Prior to detonation of a blast, give sufficient warning in every direction and ensure that all persons have reached a place of safety before the blast is fired.
- .9 File an Emergency Response Assistance Plan with the Explosives Branch, Natural Resources Canada.
- .10 Blaster shall:
 - .1 Be solely responsible for implementation of the Explosives Management Program.
 - .2 Have a valid blaster’s safety certificate from the Department of Education Division of Institutions and Industrial Education, and have a valid temporary Magazine License, when required issued by Natural Resources Canada, for storage and explosives.
 - .3 Possess a thorough working knowledge of the Federal Explosives Act and Provincial Regulations.
 - .4 Possess a specialized training in handling storage and detonation of explosives.
 - .5 Keep a field journal concerning the blast activities.

1.26 CONFINED SPACE WORK

- .1 Comply with the Newfoundland and Labrador Occupational Health and Safety Regulations.
- .2 Ensure a hazard assessment has been conducted related to the confined space and the work to be performed within the space.
- .3 Provide approved air monitoring equipment where workers are working in confined spaces and ensure any test equipment to be used is calibrated, in good working order and used by trained persons.
- .4 Ensure all required PPE is provided to the workers and workers are trained in its use, care and selection.
- .5 Develop a confined space entry (CSE) program specific to the nature of work performed and in accordance with OH&S Act and Regulations and ensure supervisors and workers are trained in the confined space entry program. This shall include training on the CSE permit system, rescue plan, testing, communication equipment and all equipment and safe work procedures conducted in and around the confined space.
 - .1 Ensure that personal protective equipment and emergency rescue equipment appropriate to the nature of the work being performed is provided and used.
- .6 Provide and maintain training of workers through a provider certified by the WHSCC.
- .7 Obtain an Entry Permit in accordance with Part XI of the Canada Occupational Health and Safety Regulations for entry into an existing identified confined space located at the Facility or premises of Work.
 - .1 Obtain permit from Facility Manager
 - .2 Keep copy of permit issued.
 - .3 Safety for Inspectors:
 - .1 Provide PPE and training to Departmental Representative and other persons who require entry into confined space to perform inspections.
 - .2 Be responsible for efficacy of equipment and safety of persons during their entry and occupancy in the confined space.
- .8 Provide Departmental Representative with a copy of an "Entry Permit" for each entry into the confined space to ensure compliance Provincial Legislation.

1.27 HAZARDOUS MATERIALS

- .1 Should material resembling hazardous materials (e.g. asbestos/mould) not previously identified/documentated be encountered during the execution of work, stop work and notify Departmental Representative. Do not proceed until written instructions have been received from Departmental Representative.

- .2 Unless otherwise noted the services of a recognized Environmental Consultant to provide all air monitoring and testing services required by regulatory requirements for hazardous materials abatement and repair.

1.28 HEAVY EQUIPMENT

- .1 Ensure mobile equipment used on jobsite is of the type specified in OH&S Act and Regulations fitted with a Roll Over Protective (ROP) Structure and Falling Object Protective (FOP) Structure.
- .2 Provide certificate of training in Power Line Hazards for operators of heavy equipment.
- .3 Obtain written clearance from the power utility where equipment is used in close proximity to (within 5.5 metres) overhead or underground power lines.
- .4 Equip cranes with:
 - .1 A mechanism which will effectively prevent the hook assembly from running into the top boom pulley.
 - .2 A legible load chart.
 - .3 A maintenance log book.

1.29 TREE AND BRUSH CLEARING

- .1 Ensure workers using chain saws wear the following safety equipment:
 - .1 CSA safety hat.
 - .2 Hearing protection, e.g. ear muffs.
 - .3 CSA approved chain saw pants.
 - .4 CSA approved chain saw boots.
 - .5 CSA approved eye protection.
- .2 Ensure that all workers using brush saws wear the following safety equipment:
 - .1 CSA approved safety hat fitted with face screen or shield or approved safety glasses.
 - .2 Hearing protection, e.g. ear muffs.
 - .3 CSA approved safety footwear.
- .3 Equip chain saws with a safety chain break.
- .4 A safe work practice (SWP) must be developed, implemented and all workers trained in the SWP prior to undertaking such tasks and utilizing tree and brush clearing equipment.

1.30 DIVING OPERATIONS

- .1 Ensure diving operations conform to CSA Z275.2 - Occupational Safety Code for Diving Operations, CSA Z275.4 - Competency Standard for Diving Operations and CSA Z180.1 – Compressed Breathing Air Systems.
- .2 Sampling:
 - .1 Prior to commencing diving activities, sample water and analyze sample(s) for:
 - .1 Fecal Coliforms (Escherichia coli).
 - .2 Total Coliforms.
 - .3 Any health hazard identified during the site specific hazard assessment.
 - .4 Any parameter as directed by the Service NL, Government of Newfoundland and Labrador.
 - .2 Water will be designated a contaminant if the chemical concentration of a contaminant exceeds:
 - .1 200 fecal Coliforms (Escherichia coli) per 1000 milliliter of water.
 - .2 100 times the guidelines concentration established in the most recent Guidelines of Canadian Drinking Water Quality.
 - .3 Any other criteria established by the Service NL, Government of Newfoundland and Labrador.
 - .3 Sample analysis is to be completed by a laboratory that is accredited by the Canadian Associates of Environmental and Analytical Laboratories (CAEAL) or other national equivalent.
 - .4 Dive personnel must meet the minimum competency requirements of CSA 275.4.
 - .1 The Dive supervisor(s) shall as a minimum:
 - .1 Possess a Valid Category 1 Diving Certificate, or equivalent, for a minimum of three (3) years for the type of diving to be performed.
 - .2 Have completed one hundred and fifty (150) hours of logged diving time for the type of diving to be performed.
 - .3 Have completed fifty (50) hours of dive supervision for the type of diving to be performed.
 - .2 Diver(s) shall as a minimum:
 - .1 Possess a valid Category 1 Diving Certificate or equivalent, for the type of diving to be performed.
 - .2 Have completed fifty (50) hours of logged dive time for the type of diving to be performed.
 - .3 Have a current (less than one year) validated medical examination certificate(s) from a licensed Diving Physician in Newfoundland and Labrador who is knowledgeable and competent in diving and hyperbaric medicine, for all dives.
 - .5 A diving operation shall be interrupted or discontinued or not commenced when:

- .1 Continuation of the diving operation would or is likely to compromise the safety of any person involved in the diving operation.
- .2 The water currents at the underwater work site are likely to compromise the safety of any person involved in the diving operation.
- .3 Combustible material is stored too close for safety to any diving plant and equipment used in the diving operation.
- .6 A diving operation shall:
 - .1 Not be conducted in the vicinity for any other activity that might pose a danger to any person involved in the diving operation.
 - .2 Not use any craft that has insufficient power or stability for the safe continuity of the diving operation.
 - .3 Provide measures for making work area boundary and stopping unauthorized entry into the work area.
 - .4 Provide adequate illumination of the dive site and the underwater work site of the diving operation.
- .7 Provide, at the worksite while completing diving operations, a diving operations log book that is permanently bound and has numbered pages.
 - .1 Produce on request, any log books, records or other documentation associated with the diving operation, for inspection by Departmental Representative.
 - .2 As a minimum, for each diving operation enter into the diving operation logbook:
 - .1 date and time the diving operation commenced and terminated including any time the diving operation was interrupted
 - .2 name of supervisor; names of all other persons involved
 - .3 the procedures followed
 - .4 the decompression table and the schedule in that the decompression table was used
 - .5 the maximum depth, bottom time, dive time and total dive time for each dive
 - .6 the type of diving plant and equipment and the type of breathing mixture used
 - .7 the type of discomfort, injury or illness including decompression sickness, suffered by any person involved
 - .8 any environmental conditions that affected or might have affected the diving operation
 - .9 any other factors relevant to the safety to health of any person involved
- .8 Diving in free swim mode is not permitted at the work site.
- .9 Provide separate first aid supplies for dive operation. All dive team personnel shall be trained in first aid and cardiopulmonary resuscitation (CPR).
- .10 Provide medical oxygen for emergency response at work site. The dive supervisor shall be trained in administering medical oxygen.

1.31 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations of Work.

1.32 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act for the Province of Newfoundland and Labrador, and the Occupational Health and Safety 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: [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.
- .5 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter of Good Standing.
- .6 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

1.33 RESPONSIBILITY

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

1.34 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 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.
- .3 Provide safety orientation session to 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.

1.35 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.

1.36 FILING OF NOTICE

- .1 File Notice of Project with pertinent provincial health and safety authorities prior to beginning of Work.
 - .1 Departmental Representative will assist in locating address if needed.

1.37 PERMITS

- .1 Post permits, licenses and compliance certificates, specified in section 01 10 10, 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.

1.38 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.

1.39 PROJECT/SITE CONDITIONS

- .1 The following are known or potential project related safety hazards at site:
 - .1 Working in close proximity of water.
 - .2 Use of water crafts and floating platforms.
 - .3 Wet and slippery conditions.
 - .4 Inclement weather.
 - .5 Rock removal activities involving busting and/or blasting.
 - .6 Heavy equipment activity.
 - .7 Heavy lifting.
 - .8 Working at heights.
 - .9 Cutting tools and other construction power tools.
 - .10 Overhead power/utility lines.
 - .11 Risk of electric shock.
 - .12 Vehicular and pedestrian traffic.
 - .13 Confined spaces.
- .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.
- .4 MSDS Data sheets of pertinent hazardous and controlled products stored on site can be obtained from Departmental Representative.

1.40 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:

Health and Safety Requirements

- .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.

1.41 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, marshaling areas. Details on alarm notification methods, fire drills, location of firefighting 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 DFO 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 resubmission of the Plan with correction of deficiencies or concerns.
- .8 Post copy of the Plan, and updates, prominently on Work Site.

1.42 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.
 - .2 Conduct Formal Inspections on a minimum monthly basis. Use standardized safety inspection forms. Distribute to subcontractors.

- .3 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.

1.43 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.

1.44 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. Post rules on site.

1.45 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 \$5000.00.
- .2 Submit report in writing.

1.46 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.

1.47 POWDER ACTUATED DEVICES

- .1 Use powder actuated fastening devices only after receipt of written permission from Departmental Representative.

PART 2 PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 FIRES

- .1 Fires and burning of rubbish on site not permitted.

1.2 DISPOSAL OF WASTES

- .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.3 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 local authority requirements.

1.4 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties where indicated.
- .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated or designated by Departmental Representative.

1.5 WORK ADJACENT TO WATERWAYS

- .1 Do not operate construction equipment in waterways.
- .2 Do not use waterway beds for borrow material.
- .3 Do not dump excavated fill, waste material or debris in waterways.

- .4 Design and construct temporary crossings to minimize erosion to waterways.
- .5 Do not skid logs or construction materials across waterways.
- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .7 Do not blast under water or within 100 m of indicated spawning beds.

1.6 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 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.7 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of environmental protection. Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action as approved by Departmental Representative.
- .2 Departmental Representative may issue stop order of work until satisfactory corrective action has been taken.
- .3 No time extensions will be granted or equitable adjustments allowed to Contractor for such suspensions.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS – (NOT APPLICABLE)

1.2 REFERENCES AND CODES

- .1 Perform Work in accordance with National Building Code of Canada (NBC) including all amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.

1.3 HAZARDOUS MATERIAL DISCOVERY

- .1 Stop work immediately should materials believed to contain hazardous material be encountered in during the execution of the work and notify Departmental Representative. Do not proceed until written instructions have been received from Departmental Representative.

1.4 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions.

1.5 RELICS AND ANTIQUITIES

- .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 Departmental Representative's written instructions before proceeding with work in this area.
- .3 Relics, antiquities and items of historical or scientific interest remain Her Majesty's property.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTIONS INCLUDE

- .1 Inspection and testing, administrative and enforcement requirements.
- .2 Tests and mix designs.
- .3 Mock-ups.
- .4 Mill tests.

1.2 RELATED SECTIONS

- .1 Section 01 29 83 – Payment Procedures: Testing Laboratory Services.
- .2 Section 01 33 00 – Submittal Procedures
- .3 Section 01 78 00 – Closeout Submittals

1.3 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.4 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work.
- .2 Allocated costs: to Section 01 29 83 – Payment Procedures: Testing Laboratory Services.
- .3 Provide equipment required for executing inspection and testing by appointed agencies.

- .4 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .5 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and reinspection.

1.5 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.6 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.7 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Departmental Representative.

1.8 REPORTS

- .1 Submit 3 copies of inspection and test reports to Departmental Representative, plus electronic copies in PDF format.

Quality Control

- .2 Provide copy to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.
- .3 Include copy of all inspection and test reports in Commissioning Manuals.

1.9 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.
- .2 Construct in all locations acceptable to Departmental Representative as specified in specific Section.
- .3 Prepare mock-ups for Departmental Representative review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Remove mock-up at conclusion of Work or when acceptable to Departmental Representative
- .6 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.
- .7 Reviewed and accepted mock-ups will become standards of workmanship and material against which installed work will be verified.
- .8 Mock-ups may remain as part of Work.

1.10 EQUIPMENT AND SYSTEMS (NOT APPLICABLE)

1.11 FIRE SEPARATIONS (NOT APPLICABLE)

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 52 00 - Construction Facilities.
- .2 Section 01 56 00 - Temporary Barriers and Enclosures.

1.2 INSTALLATION AND REMOVAL

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.3 DEWATERING

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.4 WATER SUPPLY

- .1 Arrange for connection with appropriate utility company and pay all costs for installation, maintenance and removal.

1.5 TEMPORARY HEATING AND VENTILATION

- .1 Pay for costs of temporary heat and ventilation used during construction, including costs of installation, fuel operation, maintenance and removal of equipment. Use of direct, fired heaters discharging waste products into work areas will not be permitted unless prior approval is given by Departmental Representative.
- .2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Protect Work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Maintain temperatures of minimum 10°C and relative humidity less than 60% in areas where construction is in progress.

Temporary Utilities

- .1 Maintain minimum temperature of 10° C or higher where specified as soon as finished work is commenced. Maintain until acceptance of structure by Departmental Representative.
- .2 Maintain ambient temperature and humidity levels as required for comfort of office personnel.
- .5 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .6 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct-fired combustion units to outside.
- .7 Be responsible for damage to Work due to failure in providing adequate heat, humidity and protection during construction.
- .8 Use of new or existing systems for temporary heating, ventilating or air conditioning will not be permitted.

1.6 TEMPORARY POWER AND LIGHT

- .1 Provide and pay for temporary power during constructing for temporary lighting, heating, site construction trailers and operating of power tools in accordance with governing regulations and the Canadian Electrical Code, latest edition.
- .2 Arrange for connection with Utility company. Pay all costs for installation, maintenance and removal of cables, distribution and branch panel boards, poles, lighting, heating and general power receptacles as required.
- .3 Temporary power for electric cranes and other equipment requiring in excess of above is responsibility of Contractor.

- .4 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lux. Temporary lighting to consist of wiring, pig tail sockets and 75 watt shatterproof incandescent lamps to provide a minimum light level of 162 lux.
- .5 Electrical power and lighting systems installed under this contract may be used for construction requirements only with prior approval of Departmental Representative provided that guarantees are not affected. Make good damage to electrical system caused by use under this contract. Replace lamps which have been used for more than 3 months.
- .6 General contractor responsible for payment of all electrical energy charges associated with temporary power up to date of substantial completion.

1.7 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

1.8 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.
- .3 When permanent water and drain connections are completed, provide temporary water closets and urinals complete with temporary enclosures, inside building. Permanent facilities may be used on approval of Departmental Representative.

1.9 TEMPORARY COMMUNICATION FACILITIES

- .1 Provide and pay for temporary telephone, fax, data hook up, lines and equipment necessary for own use and use of Departmental Representative.

1.10 SITE SIGN AND NOTICES (NOTAPPLICABLE)

1.11 REMOVAL OF TEMPORARY FACILITIES

- .1 Remove temporary facilities from site when directed by Departmental Representative.
- .2 When project is closed down at end of construction season keep temporary facilities operational until close down or removal is approved by Departmental Representative.

PART 2 **PRODUCTS (NOT APPLICABLE)**

PART 3 **EXECUTION (NOT APPLICABLE)**

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Construction aids.
- .2 Office and sheds.
- .3 Parking.
- .4 Project identification.

1.2 RELATED SECTIONS

- .1 Section 01 35 29.06 – Health and Safety Requirements
- .2 Section 01 51 00 - Temporary Utilities.
- .3 Section 01 56 00 - Temporary Barriers and Enclosures.

1.3 INSTALLATION AND REMOVAL

- .1 Provide construction facilities in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.4 SCAFFOLDING

- .1 Provide and maintain scaffolding in rigid, secure and safe manner.
- .2 Erect scaffolding independent of walls. Remove promptly when no longer required. Refer to Section 01 35 29.06 – Health and Safety Requirements.

1.5 HOISTING

- .1 Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Hoists cranes shall be operated by certified operator.

1.6 SITE STORAGE/LOADING

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.7 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of work.
- .2 Provide and maintain adequate access to project site.
- .3 Build and maintain temporary roads where indicated or directed by Departmental Representative and provide snow removal during period of Work.
- .4 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads.

1.8 CONTRACTOR'S SITE OFFICES

- .1 Provide office heated to 22 °C, lighted 750 lux and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table, fax machine, telephone, file cabinet and chair.
- .2 Provide a clearly marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors may provide their own offices as necessary. Direct location of these offices.

1.9 DEPARTMENTAL REPRESENTATIVE SITE OFFICE

- .1 Provide or construct a separate temporary site office for the use of the Departmental Representative and the Site Representative. The building must be in place prior to commencement of work.
- .2 Inside dimensions minimum 3600mm long x 2400mm wide x 2400mm high, with floor 300mm above grade. It shall be complete with 2 - 50% opening windows of at least 1 m² and one lockable door with 2 keys. Door and access to the Departmental Representative site office to meet the accessibility requirements of the NL Accessibility Act and Regulations, and CSA B651, Accessible Design for the Built Environment.
- .3 Insulate building and provide heating system to maintain 22 °C inside temperature at -20 °C outside temperature.
- .4 Building shall have a suitable frame covered with a weatherproof siding. Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19mm thick plywood.
- .5 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10% upward light component.
- .6 Site office to have washroom facility complete with running water and sewage disposal. Maintain supply of washroom supplies. Washroom to meet the accessibility

requirements of the NL Accessibility Act and Regulations, and CSA B651, Accessible Design for the Built Environment.

- .7 Equip office with a drafting chair and a 900mm x 1500mm table having a hinged, smooth wooden top suitable for drafting.
- .8 Maintain in clean condition.
- .9 Arrange and pay for telephone and facsimile machine in the Departmental Representative's Site Office for Site Representative's exclusive use. Long distance calls or faxes placed on this phone by the Departmental Representative or the Site Representative will be paid by the Departmental Representative.
- .10 Contractor may, on approval of the Departmental Representative, provide cellular or mobile phone. If approval to use cellular or mobile phone is granted, the contractor shall be responsible for all services, airtime, license and network access fees, and all other fees or charges required to utilize the phone as intended by the supplier.

1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.11 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.12 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Barriers.
- .2 Environmental Controls.
- .3 Traffic Controls.
- .4 Fire Routes.

1.2 RELATED SECTIONS

- .1 Section 01 51 00 – Temporary Utilities.
- .2 Section 01 52 00 – Construction Facilities.

1.3 INSTALLATION AND REMOVAL

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.4 HOARDING

- .1 Erect temporary site enclosures using new 1.2m high snow fence wired to rolled steel "T" bars fence posts spaced at 2.4m on centres. Provide one lockable truck gate. Maintain fence in good repair.

1.5 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.
- .2 Provide as required by governing authorities.

1.6 ACCESS TO SITE

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.
- .2 Build and maintain temporary roads where indicated or directed and provide snow removal during period on work.
- .3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads.

1.7 PUBLIC TRAFFIC FLOW

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.8 FIRE ROUTES

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.10 PROTECTION OF BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

- .1 This section specifies requirements for board, lodgings and related services to be provided by the Contractor for the Site Monitor.

- .2 Due to the location of this site, it is a requirement of this contract that the Contractor provide and pay for all board and lodgings for the Site Monitor's sole use for the duration of the project. Provide for and maintain acceptable living accommodations on site for the Site Monitor's sole use. The minimum requirement would be a self-contained unit with private sleeping accommodation and shower or bath or other arrangement approved by the Departmental Representative.

1.2 BOARD AND LODGINGS

- .1 For the purpose of this contract board and lodgings shall include but not necessarily be limited to: sleeping accommodation, meals and dining facilities, washroom facilities, laundry facilities, electrical and heating service, linens and bedding, etc. and any reasonable service as directed by the Departmental Representative.

- .2 Board and lodgings must be approved by the Departmental Representative and Contractor will cooperate in providing all services required to maintain an acceptable standard of living during construction period

- .3 The Contractor shall include all calendar days, including weekends and statutory holidays in determining the cost.

1.3 REQUIREMENTS OF REGULATORY AGENCIES

- .1 Comply with any or all applicable Agencies regulation of the Province of Newfoundland and Labrador, relating to the set up, servicing and maintenance of accommodations for the Site Monitor.

- .2 Obtain and pay for any permits which may be required and comply to regulations of same.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Product quality, availability, storage, handling, protection, and transportation.
- .2 Manufacturer's instructions.
- .3 Quality of Work, coordination and fastenings.

1.2 RELATED SECTIONS

- .1 Section 01 45 00 – Quality Control.
- .2 Section 01 73 00 – Execution.

1.3 REFERENCES

- .1 Within text of each specifications section, reference may be made to reference standards. Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .2 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

1.4 QUALITY

- .1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .4 Within seven (7) working days of written request by Departmental Representative, submit following information for material and equipment proposed for supply:
 - .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.
- .5 Use products of one manufacturer for material and equipment of same type or classification unless otherwise specified.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.5 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of work.
- .2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.6 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.7 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.

1.8 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.9 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.10 CO-ORDINATION

- .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.11 CONCEALMENT

- .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation, inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.12 REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

Common Product Requirements

- .2 Perform remedial work by specialists' familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.13 LOCATION OF FIXTURES (NOT APPLICABLE)

1.14 FASTENINGS GENERAL

- .1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work, unless stainless steel or other material is specifically requested in affected specification section.
- .2 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood plugs are not acceptable.
- .3 Conceal fasteners where indicated. Space evenly and lay out neatly.
- .4 Fastenings which cause spalling or cracking are not acceptable.
- .5 Obtain Departmental Representative's approval before using explosive actuated fastening devices. If approval is obtained comply with CSA Z166.

1.15 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified.
- .3 Bolts may not project more than one diameter beyond nuts.

1.16 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

1.17 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute work at times directed by local governing authorities, with minimum of disturbance to work.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.
- .3 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active services 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.
- .5 Remove abandoned services lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

1.18 SELECTION OF MATERIAL AND EQUIPMENT

- .1 Material and equipment will be specified in the tender documents, and selected by Contractor, by one or more of the following methods:
 - .1 Specification by reference to a relevant Standard, such as CSA, ASTM, ULC, etc., select any material or equipment that meets or exceeds the specified.
 - .2 Specification by reference to an accepted product evaluation publication, such as the CGSB "Qualified Products List", or CCMC Registry of Product Evaluations", - select any manufacturer's product so listed.
 - .3 Specification by Prescriptive or Performance specification – select any material or equipment meeting or exceeding specification.
 - .4 Specification by identification of one or more Manufacturer's specific product(s) as an "Acceptable Product", along with a listing of other manufacturers who may offer equivalent products – select any product so named, or select from equivalent product(s) of other listed manufacturers.
- .2 "Acceptable Product" is deemed to be a complete and working commodity as described by a manufacturer's name, catalogue number, trade name, or any combination thereof, and will constitute the minimum standard of acceptance.
- .3 Departmental Representative will determine acceptability of Contractor's selection of material and equipment at time of Shop Drawing review.
- .4 When material or equipment is specified by a Standard, Prescriptive or Performance specification, upon request of the Departmental Representative, obtain from manufacturer an independent laboratory reporting, showing that material or equipment meets or exceeds the specified requirements.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Requirements and limitations for cutting and patching the Work.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.

1.3 SUBMITTALS

- .1 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of any element of Project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of any operational element.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Owner or separate contractor.
- .2 Include in request:
 - .1 Identification of Project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.4 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

- .6 Obtain Departmental Representative's approval before cutting, boring or sleeving load-bearing members.

1.5 EXECUTION

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .6 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .7 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .8 Restore work with new products in accordance with requirements of Contract Documents.
- .9 Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .10 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.
- .11 Make cuts with clean, true, smooth edges.
- .12 Where new work connects with existing, and where existing work is altered, cut, patch and make good to match existing work.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

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 Provide adequate ventilation during use of volatile or noxious substances. Use for building ventilation systems is not permitted for this purpose.

1.2 RELATED SECTION

- .1 Section 01 77 00 - Closeout Procedures.

1.3 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.
- .2 Remove waste materials and debris from site at the end of each working day. Do not burn waste materials on site.
- .3 Clear snow and ice from access to building.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.
- .7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

Cleaning

1.4 FINAL CLEANING

- .1 Refer to General Conditions.
- .2 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .3 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .4 When the Work is Totally Performed, remove surplus products, tools, construction machinery and equipment. Remove waste products and debris other than that caused by the Owner or other Contractors.
- .5 Remove waste materials from the site at regularly scheduled times or dispose of as directed by the Departmental Representative. Do not burn waste materials on site.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Leave the work broom clean before the inspection process commences.
- .8 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .9 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .10 Remove dirt and other disfiguration from exterior surfaces.
- .11 Sweep and wash clean paved areas.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 STORAGE, HANDLING AND PROTECTION

- .1 Unless specified otherwise, materials for removal become Contractor's property.
- .2 Protect structural components not removed for demolition from movement or damage.
- .3 Support affected structures. If safety of building is endangered, cease operations and immediately notify Department having jurisdiction.
- .4 Separate and store materials produced during dismantling of structures in designated areas.

1.2 DISPOSAL OF WASTES

- .1 All demolished materials, except materials designated to be reused, will become property of contractor and will be removed from site and disposed of to satisfaction of Departmental Representative and in accordance with Federal and Provincial 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 for from work site.
- .2 Contractor shall obtain and pay for all necessary permits and disposal fees for use of an approved waste disposal site.
- .3 Do not bury rubbish or waste materials.
- .4 Do not dispose of any waste into waterways, storm, or sanitary sewers.
- .5 Do not dispose of preservative treated wood through incineration.
- .6 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- .7 Dispose of treated wood, end pieces, wood scraps and sawdust at a sanitary landfill.
- .8 Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction. Pay all fees related to waste materials disposal.
- .9 Contact the authority having jurisdiction prior to commencement of work, to determine what, if any, demolition and construction waste materials have been banned from disposal in landfills and at transfer stations. Take appropriate action to isolate such banned materials at site of work and dispose in strict accordance with provincial and municipal regulations.

- .10 Transport waste intended for landfill in separated condition, following rules and recommendations of Landfill Operator in support of their effort to divert, recycle and reduce amount of solid waste placed in landfill.
- .11 Collect, bundle and transport salvaged materials to be recycled in separated categories and condition as directed by recycling facility. Ship materials only to approved recycling facilities.
- .12 Sale of salvaged items by Contractor to other parties not permitted on site.
- .13 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
- .14 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.3 DISPOSAL OF CREOSOTE TIMBER

- .1 All demolished materials, except materials designated to be reused, will become property of contractor and will be removed from site and disposed of to satisfaction of Departmental Representative and in accordance with Federal and Provincial 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 for from work site.
- .2 Contractor shall obtain and pay for all necessary permits and disposal fees for use of an approved waste disposal site.
- .3 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- .4 Dispose of treaded wood, end pieces, wood scraps and sawdust at a sanitary landfill.
- .5 Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction.
- .6 Do not bury rubbish and waste material on site. Dispose at approved landfill sites as specified in this Section.
- .7 Dispose of construction waste materials and demolition debris, resulting from work, at approved landfill sites only. Carry out such disposal in strict accordance with Federal, Provincial and Municipal rules and regulations. Separate out and prevent improper disposal of items banned from landfills.
- .8 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.

1.4 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises.
- .2 Provide security measures approved by Departmental Representative.

1.5 SCHEDULING

- .1 Coordinate Work with other activities at site to ensure timely and orderly progress of Work.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 APPLICATION

- .1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 74 11 - Cleaning.
- .2 Section 01 78 00 - Closeout Submittals.

1.2 FINAL INSPECTION AND DECLARATION PROCEDURES

- .1 Contractor's Inspection: The Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects; repair as required. Notify the Departmental Representative in writing of satisfactory completion of the Contractor's Inspection and that corrections have been made. Request an Departmental Representative's Consultant's Inspection.
- .2 Departmental Representative's Inspection: Departmental Representative and the Contractor will perform an inspection of the Work to identify obvious defects or deficiencies. The contractor shall correct Work accordingly.
- .3 Completion: submit written certificate that the following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
 - .4 Certificates required by Fire Commissioner, Utility companies have been submitted.
 - .5 Operation of systems have been demonstrated to Owner's personnel.
 - .6 Work is complete and ready for Final Inspection.
- .4 Final Inspection: When items noted above are completed, request final inspection of Work by the Departmental Representative, and the Contractor. If Work is deemed incomplete by the Departmental Representative, complete outstanding items and request a reinspection.
- .5 Declaration of Substantial Performance: When the Departmental Representative considers deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for Certificate of Substantial Performance. Refer to General Conditions for specifics to application.
- .6 Commencement of Lien and Warranty Periods: The date of Small Craft Harbours' acceptance of the submitted declaration of Substantial Performance shall be the date for commencement for the warranty period and commencement of the lien period.
- .7 Declaration of Total Performance: When the Departmental Representative considers final deficiencies and defects have been corrected and it appears requirements of the

Closeout Procedures

Contract have been totally performed, make application for certificate of Total Performance. Refer to General Conditions for specifics to application. If Work is deemed incomplete by the Consultant, complete the outstanding items and request a reinspection.

1.3 REINSPECTION

- .1 Should status of work require reinspection by Departmental Representative due to failure of work to comply with Contractor's claims for inspection, Owner will deduct amount of compensation for reinspection services from payment to Contractor.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTION INCLUDES**

- .1 As-built drawings
- .2 As-built specifications.
- .3 Reviewed shop drawings.
- .4 Warranties and bonds.
- .5 Final site survey.

1.2 **RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 45 00- Quality Control.
- .3 Section 01 77 00 - Closeout Procedures.

1.3 **PROJECT RECORD DOCUMENTS**

- .1 Departmental Representative will provide two white print sets of contract drawings and two copies of Specifications Manual specifically for "as-built" purposes.
- .2 Maintain at site one set of the contract drawings and specifications to record actual as-built site conditions.
- .3 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Departmental Representative at any time during construction.
- .4 As-Built Drawings:
 - .1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of project and prior to final inspection, neatly transfer notations to second set (also by use of red ink). Submit both sets to Departmental Representative. All drawings of both sets shall be stamped "As-Built Drawings" and be signed and dated by Contractor.
 - .2 Show all modifications, substitutions and deviations from what is shown on the contract drawings or in specifications.
 - .3 Record following information:
 - .1 Horizontal and vertical location of various elements in relation to Geodetic Datum.
 - .2 Field changes of dimension and detail.

Closeout Submittals

- .3 All design elevations, sections, and details dimensioned and marked-up to consistently report finished installation conditions.
- .4 Any details produced in the course of the contract by the Departmental Representative to supplement or to change existing design drawings must also be marked-up and dimensioned to reflect final as-built conditions and appended to the as-built drawing document.
- .5 All change orders issued over the course of the contract must be documented on the finished as-built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.
- .4 As-built Specifications: legibly mark in red each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly items substituted from that specified.
 - .2 Changes made by Addenda and Change Orders.
 - .3 Mark up both copies of specifications; stamp "as-built", sign and date similarly to drawings as per above clause.
- .5 Maintain As-built documents current as the contract progresses. Departmental Representative will conduct reviews and inspections of the documents on a regular basis. Frequency of reviews will be subject to Departmental Representative's discretion. Failure to maintain as-builts current and complete to satisfaction of the Departmental Representative shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.

1.4 SUBMISSION

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .2 Submit one copy of completed volumes in final form 15 days prior to final inspection.
- .3 Copy will be returned after final inspection, with Departmental Representative's comments.
- .4 Revise content of documents as required prior to final submittal.
- .5 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, two final copies of operating and maintenance manuals.
- .6 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
- .7 If requested, furnish evidence as to type, source and quality of products provided.
- .8 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .9 Pay costs of transportation.

1.5 AS-BUILTS

- .1 In addition to requirements in General Conditions, maintain at the site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to the Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.6 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of blue line opaque drawings, provided by Departmental Representative.
- .2 Provide felt tip marking pens, maintaining red color pens for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Measured depths of elements of wharf relative to L.N.T..
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Field changes of dimension and detail.
 - .4 Changes made by change orders.
 - .5 Details not on original Contract Drawings.
 - .6 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:

Closeout Submittals

- .1 Changes made by Addenda and change orders.
- .6 Other Documents: submit manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.
- .7 At completion of project provide all recorded information on print drawings or alternatively transfer to CAD files in DWG format. Submit DWG files, also with electronic files in PDF format as part of the Closeout Submittals.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 GENERAL

1.1 SECTIONS INCLUDES

- .1 Methods and procedures for demolishing, salvaging, recycling and removing sitework items designated to be removed in whole or in part, and for backfilling resulting trenches and excavations.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 35 29.06 - Health and Safety Requirements
- .3 Section 01 35 43 - Environmental Procedures
- .4 Section 01 45 00 - Quality Control
- .5 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .6 Section 31 23 33.01 – Excavating, Trenching and Backfilling.

1.3 SUBMITTALS

- .1 Shop drawings
 - .1 Submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning, where required by authorities having jurisdiction.
- .2 Hazardous Materials: provide description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of Work as required.
- .3 Submit plan indicating:
 - .1 Descriptions of and anticipated quantities of materials to be salvaged, reused, recycled and landfilled.
 - .2 Schedule of selective demolition.
 - .3 Number and location of dumpsters.
 - .4 Anticipated frequency of tippage.
- .4 Submit copies of certified weigh bills, bills of landing from authorized disposal sites and reuse and recycling facilities for material removed from upon request from Departmental Representative.

1.4 QUALITY ASSURANCE

- .1 Convene pre-installation meeting one week prior to beginning work of this section to:

Selective Site Demolition

- .1 Verify project requirements.
- .2 Review installation and substrate conditions.
- .3 Co-ordination with building subtrades.
- .2 Arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work, prior to start of Work.
- .3 Hold project meetings every month.
 - .1 Ensure key personnel, site supervisor, project manager, subcontractor representatives attend.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Departmental Representative and at no cost to Departmental Representative.
- .2 Remove and store materials to be salvaged, in manner to prevent damage.
- .3 Store and protect in accordance with requirements for maximum preservation of material.

1.6 SITE CONDITIONS

- .1 In all circumstances ensure that demolition work does not adversely affect adjacent water courses groundwater and wildlife, or contribute to excess air and noise pollution.
- .2 Do not dispose, of waste or volatile materials such as mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.
- .3 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.
- .5 Protect trees, plants and foliage on site and adjacent properties where indicated.

1.7 EXISTING CONDITIONS

- .1 Prior to start of any demolition work remove contaminated or hazardous materials as defined by authorities having jurisdiction from site and dispose of at designated disposal facilities

1.8 SCHEDULING

- .1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.

- .2 Notify Departmental Representative in writing when unforeseen delays occur.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 PREPARATION

- .1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.

3.2 REMOVAL OPERATIONS

- .1 Remove items as indicated.
- .2 Do not disturb items designated to remain in place.
- .3 Removal of Pavements, Curbs and Gutters
 - .1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.
 - .2 Protect adjacent joints and load transfer devices.
 - .3 Protect underlying and adjacent granular material.
- .4 When removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving, prevent contamination with base course aggregates.
- .5 When removing pipes under existing or future pavement area, excavate at least 300mm below pipe invert.
- .6 Removal from site
 - .1 Interim removal of stockpiled material will be required by Departmental Representative, if it is deemed to interfere with operations of Departmental Representative, Owner or other contractors.
- .7 Sealing
 - .1 Seal pipe ends and walls of manholes or catch basins as indicated. Securely plug to form watertight seal.
- .8 Backfill

Selective Site Demolition

- .1 Backfill in areas as indicated

3.3 RESTORATION

- .1 Restore areas and existing works outside areas of demolition to match conditions of adjacent, undisturbed areas.
- .2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.4 CLEAN UP

- .1 Upon completion of work, remove debris, trim surfaces and leave work site clean.
- .2 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Methods and procedures for demolition of structures, parts of structures, basements and foundation walls and includes abandonment and removal of septic tanks and tanks containing petroleum products.

1.2 RELATED SECTIONS

- .1 Section 01 35 29.06 - Health and Safety Requirements
- .2 Section 01 35 43 - Environmental Procedures
- .3 Section 01 52 00 – Construction Facilities
- .4 Section 01 56 00 - Temporary Barriers and Enclosures
- .5 Section 01 74 21 – Construction/Demolition Waste Management and Disposal

1.3 REFERENCES

- .1 Canadian Standards Association (CSA).
 - .1 CSA S350, Code of Practice for Safety in Demolition of Structures

1.4 QUALITY ASSURANCE

- .1 Prior to start of Work arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work
- .2 Hold project meetings every month.
- .3 Ensure key personnel, site supervisor, project manager, subcontractor representatives, attend.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.6 EXISTING CONDITIONS

- .1 Should material resembling spray or trowel applied asbestos or any other designated substance be encountered in course of demolition, stop work, take preventative measures, and notify Departmental Representative immediately. Do not proceed until written instructions have been received.

Structure Demolition

- .2 Structures to be demolished to be based on their condition on date that tender is accepted.
- .3 Salvage items as identified by Departmental Representative. Remove, protect and store salvaged items as directed by Departmental Representative. Deliver to Owner as directed.

1.7 DEMOLITION DRAWINGS

- .1 Where required by authorities having jurisdiction, submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning.

1.8 ENVIRONMENTAL PROTECTION

- .1 Ensure work is done in accordance with Section 01 35 43 – Environmental Procedures.
- .2 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades parts of existing building to remain.
- .3 Support affected structures and, if safety of structure being demolished or adjacent structures or services appears to be endangered cease operations and notify Departmental Representative.
- .4 Prevent debris from blocking surface drainage system, which must remain in operation.
- .5 Ensure that demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
- .6 Fires and burning of waste or materials is not permitted on site.
- .7 Do not bury waste or materials on site.
- .8 Do not dispose of waste or volatile materials such as mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.
- .9 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
- .10 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities' requirements.
- .11 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .12 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.

- .13 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

1.9 SCHEDULING

- .1 Ensure project time lines are met without compromising specified minimum rates of material diversion. Notify Departmental Representative in writing of delays.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 PREPARATION

- .1 Do work in accordance with 01 35 29.06 – Health and Safety Requirements.
- .2 Disconnect and cap designated mechanical services.
 - .1 Sewer and water lines: remove to property line.
 - .2 Other underground services: remove and dispose of as directed by Departmental Representative.
- .3 Do not disrupt active or energized utilities designated to remain undisturbed.

3.2 SAFETY CODE

- .1 Do demolition work in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.
- .2 Blasting operations not permitted during demolition.

3.3 DEMOLITION

- .1 Demolish existing cribs down to existing crib seat elevation, as indicated on plans.
- .2 At end of each day's work, leave Work in safe and stable condition. Protect interiors of parts not to be demolished from exterior elements at all times.
- .3 Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.
- .4 Only dispose of material specified by selected alternative disposal option as directed by Departmental Representative.
- .5 Ensure that these materials will not be disposed of in landfill or waste stream destined for landfill.

Structure Demolition

- .6 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.
- .7 Environmental:
 - .1 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimized danger at site or during disposal.
- .8 Prior to the start of any demolition work remove contaminated or hazardous materials as defined by authorities having jurisdiction, from site and dispose of at designated disposal facilities.
- .9 Use natural lighting to work by wherever possible. Shut off all lighting except those required for security purposes at the end of each day.

3.4 STOCKPILING

- .1 Stockpile materials in a location as directed by Departmental Representative.
- .2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.
- .3 Stockpile materials in neat and orderly fashion in location and as directed by Departmental Representative for alternate disposal. Stockpile materials in accordance with applicable fire regulations.
- .4 Provide collection areas for collection of miscellaneous metals in the area of demolition.

3.5 REMOVAL FROM SITE

- .1 Notify Departmental Representative in writing of any materials identified as not suitable for alternate disposal. Provide reasons prior to approval for disposal.
- .2 Dispose of materials as directed by Departmental Representative.
- .3 Remove stockpiled material as directed by Departmental Representative when it interferes with operations of project construction.
- .4 Remove stockpiles of like materials by an alternate disposal option once collection of materials is complete.
- .5 Transport material designated for alternate disposal in accordance with applicable regulations.
- .6 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.6 REPORTING

- .1 Record off-site removal of debris and materials and provide following information regarding removed materials to Departmental Representative within 24 hours.
 - .1 Time and date of Removal
 - .2 Description of Material
 - .3 Weight and Quantity of Materials.
 - .4 Breakdown of reuse, recycling and landfill quantities.
 - .5 End Demolition of Materials.

3.7 COORDINATION

- .1 Coordinate alternative disposal activities with Departmental Representative's on site waste diversion representative.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Section 03 20 00 - Concrete Reinforcing.
- .3 Section 03 30 00 - Cast-in-place Concrete.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-O86S1, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
 - .3 CSA O121, Douglas Fir Plywood.
 - .4 CSA O151, Canadian Softwood Plywood.
 - .5 CSA S269.1, Falsework for Construction Purposes.
 - .6 CAN/CSA-S269.3, Concrete Formwork.

1.3 SUBMITTALS

- .1 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings. Comply with CAN/CSA-S269.3, for formwork drawings.
- .2 Indicate formwork design data, such as permissible rate of concrete placement, and temperature of concrete, in forms.
- .3 Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Formwork materials:
 - .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121.
 - .2 For concrete with special architectural features, use formwork materials to CSA-A23.1/A23.2.

- .2 Form ties:
 - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface.
- .3 Form liner:
 - .1 Plywood: medium density overlay Douglas Fir to CSA O121, Canadian Softwood Plywood to CSA O151, T and G thickness as indicated.
- .4 Form release agent: chemically active release agents containing compounds that react with free lime in concrete resulting in water insoluble soaps, non-toxic, biodegradable.
- .5 Falsework materials: to CSA-S269.1.
- .6 Sealant: to Section 07 92 10 - Joint Sealing.

PART 3 EXECUTION

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1.
- .3 Do not place shores and mud sills on frozen ground.
- .4 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .5 Fabricate and erect formwork in accordance with CAN/CSA-S269.3, to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .6 Align form joints and make watertight. Keep form joints to minimum.
- .7 Locate horizontal form joints for exposed columns 2400 mm above finished floor elevation.
- .8 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
- .9 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .10 Construct forms for architectural concrete, and place ties as indicated and/or as directed. Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.

- .11 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections. Ensure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .12 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

3.2 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
 - .1 1 day for footings and abutments.
- .2 Provide all necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
- .3 Space reshoring in each principal direction at not more than 3000 mm apart.
- .4 Re-use formwork and falsework subject to requirements of CSA-A23.1A23.2.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Section 03 10 00 – Concrete Forming and Accessories.
- .3 Section 03 30 00 - Cast-in-Place Concrete.

1.2 REFERENCES

- .1 American Concrete Institute (ACI)
 - .1 ANSI/ACI 315, Details and Detailing of Concrete Reinforcement.
 - .2 ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A185/A185M, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - .2 ASTM A497/A497M, Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
- .3 Canadian Standards Association (CSA)
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of test and Standard Practices for Concrete.
 - .2 CSA-A23.3, Design of Concrete Structures.
 - .3 CAN/CSA-G30.18, Billet-Steel Bars for Concrete Reinforcement, A National Standard of Canada.
 - .4 CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel /Structural Quality Steel.
 - .5 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .6 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.3 SUBMITTALS

- .1 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada . ANSI/ACI 315 and ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.

- .2 Detail lap lengths and bar development lengths to CSA-A23.3, unless otherwise indicated.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.
- .3 Cold-drawn annealed steel wire ties: to ASTM A497/A497M.
- .4 Welded steel wire fabric: to ASTM A185/A185M. Provide in flat sheets only.
- .5 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .6 Mechanical splices: subject to approval of Departmental Representative.
- .7 Plain round bars: to CSA-G40.20/G40.21.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1 A23.2, ACI 315, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 SOURCE QUALITY CONTROL

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to commencing reinforcing work.
- .2 Upon request inform Departmental Representative of proposed source of material to be supplied.

PART 3 EXECUTION

3.1 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars which develop cracks or splits.

3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CSA-A23.1/A23.2.
- .2 Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.
- .3 Prior to placing concrete, obtain Departmental Representative approval of reinforcing material and placement.
- .4 Ensure cover to reinforcement is maintained during concrete pour.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Section 03 10 00 - Concrete Forming and Accessories.
- .3 Section 03 20 00 - Concrete Reinforcing.

1.2 MEASUREMENT PROCEDURES

- .1 250mm Structural Deck: Supply and installation of reinforced concrete deck for the new wharf to be measured in square metres (m²) calculated from actual field measurements, excluding area occupied by mooring cleat, poles and coping. Contractor to provide all plant, equipment, material, and labour including concrete and reinforcing steel.
- .2 200mm Slab on Grade: Supply and installation of reinforced concrete slab on grade to be measured in square metres (m²) calculated from actual field measurements. Contractor to provide all plant, equipment, material, and labour including concrete, reinforcing steel, and control joints.
- .3 Cleat Pedestals: No measurement for payment to be made under this section. Include costs incidental to unit price for all mooring cleats.
- .4 No separate payment will be made for any other ingredient or feature of concrete work, and all factors, including cold weather placement, reinforcing steel, anchor bolts, joint filler for control joints, cement, concrete safety posts around fuel storage area, plant and labour will be considered as being included in the unit price for item.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C260, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
 - .4 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
 - .5 ASTM D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.

- .6 ASTM D1751, Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 Canadian Standards Association (CSA)
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.2, Methods of Test for Concrete.
 - .3 CAN3-A266.4, Guidelines for the Use of Admixtures in concrete.
 - .4 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .5 CSA-A3001, Cementitious Materials for Use in Concrete.

1.4 SUBMITTALS

- .1 At least 4 weeks prior to commencing work, inform Departmental Representative of proposed source of aggregates and provide access for sampling.
- .2 Submit testing results and reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.
- .3 Certificates:
 - .1 Minimum 4 weeks prior to starting concrete work submit to Departmental Representative manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:
 - .1 Portland cement.
 - .2 Blended hydraulic cement.
 - .3 Supplementary cementing materials.
 - .4 Grout.
 - .5 Admixtures.
 - .6 Aggregates.
 - .7 Water.
 - .8 Joint filler.
 - .2 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CSA-A23.1/A23.2.
 - .3 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1/A23.2.

1.5 SOURCE QUALITY CONTROL

- .1 Have all concrete produced and delivered by a ready-mix plant that is a member of the Atlantic Provinces Ready Mixed Concrete Association (APRMCA) and holds a current "Certificate of Ready Mixed Concrete Production Facilities" issued by the Association. Submit a copy of this certificate to the Departmental Representative for approval.

1.6 QUALITY ASSURANCE

- .1 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures in accordance with Section 01 45 00 - Quality Control for Departmental Representative approval for following items:
 - .1 Hot weather concrete.
 - .2 Cold weather concrete.
 - .3 Curing.
 - .4 Finishes.
 - .5 Formwork removal.
 - .6 Joints.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Concrete hauling time: maximum allowable time for concrete to be delivered to site of Work and discharged not to exceed 120 minutes after batching.
 - .1 Modifications to maximum time limit must be agreed to Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
 - .2 Deviations to be submitted for review by Departmental Representative.
- .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.
- .3 Waste Management and Disposal:
 - .1 Divert unused concrete materials from landfill to local facility approved by Departmental Representative.
 - .2 Provide an appropriate area on the job site where concrete trucks can be safely washed.
 - .3 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by the Departmental Representative.
 - .4 Unused admixtures and additive materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.
 - .5 Prevent admixtures and additive materials from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal.

Dispose of waste in accordance with applicable local, Provincial and National regulations.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Portland cement: to CAN/CSA-A3001, Type TerC-3.
- .2 Water: to CAN/CSA-A23.1.
- .3 Aggregates: to CSA-A23.1.
- .4 Coarse aggregates to be normal density to CSA-A23.1/A23.2.
- .5 Admixtures:
 - .1 Air entraining admixture: to ASTM C260.
 - .2 Chemical admixtures: to ASTM C494, Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .6 Non premixed dry pack grout: composition of non metallic aggregate Portland cement with sufficient water for the mixture to retain its shape when made into a ball by hand and capable of developing compressive strength of 50 MPa at 28 days.
- .7 Premoulded joint fillers:
 - .1 Sponge rubber: to ASTM D1752, Type I, flexible grade.
- .8 Bonding adhesive: as approved by Departmental Representative.
- .9 Concrete retarders: to ASTM C494/C494M. Do not allow moisture of any kind to come in contact with the retarder film.
- .10 Curing compound: curing compounds are not to be used.

2.2 **MIXES**

- .1 Proportion normal density concrete in accordance with CSA-A23.1/A23.2, Alternative 1 to give following quality and yield for all concrete.
 - .1 Cement:
 - .1 Type TerC-3 Portland cement.
 - .2 Minimum compressive strength at 28 days: 35 MPa.
 - .3 Minimum cement content: 385 kg/m³ of concrete.
 - .4 Class of exposure: C1.
 - .5 Nominal size of coarse aggregate: 20 mm.
 - .6 Slump at time and point of discharge: 50 to 100 mm.

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- .7 Air content: 5 to 8 %.
- .8 Chemical admixtures: admixtures in accordance with ASTM C494.
- .2 When the Contractor wishes to purchase concrete from a ready mix concrete supplier, submit a letter from the supplier certifying the following:
 - .1 That plant and equipment is certified and all materials to be used in the concrete comply with the requirements of CAN/CSA-A23.1.
 - .2 That the mix proportions selected will produce concrete of the specified quality and yield. Indicate mix proportions and sources of all materials.
 - .3 That the strengths will comply with the strengths specified herein.
- .3 When the Contractor wishes to mix concrete on site, identify the source of aggregates and submit samples of fine and coarse aggregates to a testing laboratory for testing and trial mixes in order to determine a suitable mix design. The testing laboratory, at Contractor's cost, will test the trial mix for slump, air content, density and strength. The results of these tests will be submitted to the Departmental Representative to be reviewed for compliance with the specification. This review must be completed before permission to place concrete is given.
 - .1 The sand, gravel, water and air entraining agent should be mixed prior to the addition of cement and water reducer.
- .4 Weigh aggregates, cement, water and admixture when batching. No alternative methods of measuring will be permitted.
- .5 Do not use calcium chloride.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Obtain Departmental Representative approval before placing concrete. Provide 24 h notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Pumping of concrete is permitted only after approval of equipment and mix.
- .5 Ensure reinforcement and inserts are not disturbed during concrete placement.

- .6 Prior to placing of concrete obtain Departmental Representative approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .7 Protect previous Work from staining.
- .8 Clean and remove stains prior to application for concrete finishes.
- .9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .10 Do not place load upon new concrete until authorized by Departmental Representative.

3.2 CONSTRUCTION

- .1 Do cast-in-place concrete work in accordance with CSA-A23.1/A23.2.
- .2 Comply with additional requirements of CAN/CSA-A23.1, Clause 4.1.1.5, for concrete exposed to seawater environments.
- .3 Minimum concrete cover over reinforcing steel bars to be 75 mm.
- .4 Place concrete in hot weather to CAN/CSA A23.1.
- .5 Place concrete in cold weather to CAN/CSA A23.1.
- .6 Keep concrete surfaces moist continually during protection stage.
- .7 Place, consolidate, finish, cure and protect concrete to CAN/CSA-A23.1.
- .8 Do not place concrete on or against frozen material.
- .9 Place concrete continuously from joint to joint.
- .10 Place concrete in a uniform heading, normal to the centreline. Limit rate of placing to that which can be finished before beginning of initial set.
- .11 Do not commence placing concrete until Departmental Representative has inspected and approved forms, foundations, reinforcing steel, joints, conveying, spreading, consolidation and finishing equipment and curing and protective methods.
- .12 Anchor bolts.
 - .1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
 - .2 With approval of Departmental Representative, grout anchor bolts in preformed holes or holes drilled after concrete has set. Formed holes to be

Cast-in-Place Concrete

- minimum 100 mm diameter. Drilled holes to be manufacturers's recommendations.
- .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
 - .4 Set bolts and fill holes with shrinkage compensating grout.
 - .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .13 Strike off and consolidation:
- .1 High speed internal poker vibrators shall be used to consolidate the concrete during placing. Final compaction of the surfaces shall be done by beam-type vibratory air screed as approved by Departmental Representative. A surcharge of approximately 65 mm of concrete will be maintained at the screed face during consolidation.
 - .2 Strikeoff and consolidation must be completed before excess water bleeds to the surface.
 - .3 Ensure that the concrete deck conforms to the elevations and slopes as shown on the drawings so that satisfactory drainage will result.
- .14 Finishing.
- .1 Only ACI certified or other pre-approved concrete finishers are to be utilized in finishing all concrete works.
 - .2 Finish concrete in accordance with CSA-A23.1/A23.2.
 - .3 Use procedures acceptable to Departmental Representative or those noted in CSA-A23.1/A23.2, to remove excess bleed water. Ensure surface is not damaged.
 - .4 Wet cure using polyethylene sheets placed over sufficiently hardened concrete to prevent damage. Overlap adjacent edges 150 mm and tightly seal with sand on wood planks. Weigh sheets down to maintain close contact with concrete during the entire curing period.
 - .5 Where burlap is used for moist curing, place two prewetted layers on concrete surface and keep continuously wet during curing period.
 - .6 The surface will be brought to the specified level by means of darbying or bull floating which will be carried out immediately following screeding and must be completed before any bleed water is present on the surface. Surface tolerance to be 8 mm under a 3 metre straight edge.
 - .7 Provide slope as shown on the drawings to permit proper drainage of the concrete deck.
 - .8 Finish slabs to elevations indicated on drawings.
 - .9 Strike off the surface with a straight edge.
 - .10 Hand tamp low slump concrete with jitterbug.
 - .11 Darby or bull float the surface to smooth and level the concrete.
 - .12 Allow bleed water or sheen to disappear.
 - .13 Float the surface by means of power and/or hand float where the concrete has hardened enough for a man to leave only slight footprints on the surface.

- .14 Do not bring water and fines to the surface by over floating. Where extra floating is required the floating operation shall be repeated after the time interval necessary for any sheen to disappear and for concrete to set further.
 - .15 Steel trowel the concrete surfaces by means of power and/or hand trowel. Do not leave any hard, smooth, polished or burnished surface area.
 - .16 Do not bring water and fines to the surface by overtrowelling.
 - .17 After slight interval necessary for concrete to further harden, repeat the trowelling operation.
 - .18 Lightly broom surface with a soft bristle broom obtaining a fine and even textured finish with a non-slip finish. All brush strokes to be parallel across paving.
 - .19 The surface shall be true and accurate to a maximum tolerance of 1 mm in 500 mm.
 - .20 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.
- .15 Protection and Curing
- .1 Cure to CAN/CSA-A23.1.
 - .2 Cure concrete by protecting it against loss of moisture, rapid temperature change and mechanical injury for at least 7 days after placement. After finishing operations have been completed, the entire surface of the newly placed concrete shall be covered by whatever curing medium is applicable to local conditions and approved by the Departmental Representative. The edges of concrete slabs exposed by removal of forms shall be protected with continuous curing treatment equal to the method selected for curing the slab and curb surfaces. Cure to CAN/CSA-A23.1. Have the equipment needed for adequate curing at hand and ready to install before actual concrete placement begins.
 - .3 When air temperature is at or below 5 ° C or when there is a probability of its falling to that limit within 24 hours of placing (as forecast by the nearest official meteorological office) cold weather protection as per CAN/CSA-A23.1 will be provided and the following:
 - .1 Housing - Protect concrete by a windproof shelter of canvas or other material to allow free circulation of inside air around fresh touch formwork and provide sufficient space for removal of formwork for finishing. Supply approved heating equipment capable of keeping inside air at a constant temperature sufficiently high to maintain concrete at following curing temperatures:
 - .1 For initial 3 days at a temperature of not less than 15° C nor more than 27 ° C at surface.
 - .2 Maintain concrete at 10 ° C for an extra 4 days plus the initial 3 days.
 - .3 In addition to the protective housing, the concrete must be cured as outlined in Clause 3.4.4.2 above.
- .16 Joint fillers.

- .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative.
- .2 When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
- .3 Locate and form, isolation, construction and expansion joints as indicated. Install joint filler.
- .4 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

3.3 CONTROL JOINTS

- .1 Construct control joints in locations shown on drawings or directed by Departmental Representative.
- .2 All joints will be centred over a support. Joints will be made in a perfectly straight line.
- .3 Cut control joint when concrete has hardened.
- .4 Fill saw cut with joint sealer as specified.

3.4 SITE TOLERANCE

- .1 Concrete slab tolerances in accordance with CSA-A23.1/A23.2, F-number Method, $F_F = 25$, $F_L = 20$.

3.5 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Departmental Representative in accordance with CSA-A23.1/A23.2, and Section 01 45 00 - Quality Control.
- .2 Departmental Representative will pay for costs of tests as specified in Section 01 29 83 - Payment Procedures for Testing Laboratory Services. Costs of retesting due to deficient work will be paid for by contractor, by credit change order.
- .3 Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .4 Non-destructive Methods for Testing Concrete shall be in accordance with CSA-A23.1/A23.2.
- .5 Provide Certificate of Field Quality Inspection and Testing to Departmental Representative.
- .6 Inspection or testing by Departmental Representative will not augment or replace Contractor quality control nor relieve the Contractor of his contractual responsibility.

- .7 Testing company shall issue reports to Departmental Representative on quality of test cylinders.
- .8 Notify Departmental Representative at least 7 days prior to start of placing concrete. Provide for testing purposes an adequate quantity of approved test cylinders.
- .9 At least 1 set of 3 cylinders each shall be taken from 25 m³ or fraction thereof of each day's pour, whichever is less. 1 cylinder shall be tested at 7 days and other 2 tested at 28 days.
- .10 Crate cylinders and deliver to the testing laboratory within 48 hours after casting in accordance with CAN/CSA-A23.1. Contractor will pay for crating and delivery of cylinders to the laboratory.
- .11 If strength tests of test cylinder for any portion of the work falls below the specified compressive strength at 28 days, the Departmental Representative reserves the right to determine the acceptability of the concrete by performing additional field testing as outlined in CAN/CSAA23.1. If concrete does not conform to drawings or specifications, take measures as directed to correct the deficiency. All costs of correctional measures will be at the expense of the Contractor.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 61 00 – Common Product requirements.
- .3 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .4 Section 03 30 00 - Cast-in-Place Concrete.

1.2 **REFERENCES**

- .1 American Society for Testing and Materials, (ASTM)
 - .1 ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A269, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .3 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.153, High-Build, Gloss Epoxy Coating.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA S16, Design of Steel Structures.
 - .4 CSA W48; Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .5 CSA W59, Welded Steel Construction (Metal Arc Welding).
- .4 The Environmental Choice Program
 - .1 CCD-047, Architectural Surface Coatings.
 - .2 CCD-048, Surface Coatings - Recycled Water-borne.
- .5 Green Seal Environmental Standards (GS)
 - .1 GS-11, Paints and Coatings.
- .6 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual.

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's:
 - .1 For finishes, coatings, primers and paints.
- .2 Shop Drawings
 - .1 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 QUALITY ASSURANCE

- .1 Test Reports: Submit Certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: Submit Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
- .3 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.
- .2 Steel pipe: to ASTM A53/A53M standard weight, galvanized finish.
- .3 Welding materials: to CSA W59.
- .4 Welding electrodes: to CSA W48 Series.
- .5 Bolts and anchor bolts: to ASTM A307.
- .6 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat round oval headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m² to CAN/CSA-G164.
- .2 Shop coat primer: in accordance with chemical component limits and restrictions requirements and VOC limits of GS-11.
- .3 Zinc primer: zinc rich, ready mix: in accordance with chemical component limits and restrictions requirements and VOC limits of GS-11.

2.4 ISOLATION COATING

- .1 Isolate aluminum from following components, by means of bituminous paint:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

2.5 SHOP PAINTING

- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
- .3 Clean surfaces to be field welded; do not paint.

PART 3 EXECUTION

3.1 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

- .3 Provide suitable means of anchorage acceptable to Owner's Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Provide components for building by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CAN/CSA-S16, or weld.
- .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.2 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.3 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by metal fabrications installation

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.2 REFERENCES

- .1 American Wood-Preservers' Association (AWPA)
 - .1 AWPA M2, Standard Inspection of Treated Wood Products.
 - .2 AWPA M4, Standard for the Care of Preservative-Treated Wood Products.
- .2 Canadian Standards Association (CSA)
 - .1 CSA O80 Series, Wood Preservation.
 - .2 CSA O80.20, Fire-Retardant Treatment of Lumbering Pressure Processes. This Standard applies to the fire-retardant treatment of lumber by pressure processes. Fire-Retardant Treatment of Lumber by Pressure Processes. This is not a stand alone specification.
 - .3 CSA O80.27, Fire-Retardant Treatment of Plywood by Pressure Processes. This Standard covers the fire-retardant treatment of Douglas Fir, hardwood, softwood, and Poplar plywood by pressure processes. Fire-Retardant Treatment of Plywood by Pressure Processes. This not a stand alone specification.
 - .4 CSA O80.201, Standard for Hydrocarbon Solvents for Preservatives. This Standard covers hydrocarbon solvents for preparing solutions of preservatives.- This is not stand alone specification
 - .5 CSA O322, Procedure for Certification of Pressure-Treated Wood Materials for Use in Preserved Wood Foundations.

1.3 REGULATORY REQUIREMENTS

- .1 Each board or bundle of fire-retardant treated material panel to bear ULC label indicating Flame Spread Classification (FSC), and smoke developed.

1.4 CERTIFICATES

- .1 For products treated with preservative, fire-retardant by pressure impregnation submit following information certified by authorized signing officer of treatment plant:
 - .1 Information listed in AWPA M2 and revisions specified in CSA O80 Series, Supplementary Requirement to AWPA M2 applicable to specified treatment.
 - .2 Moisture content after drying following treatment with water-borne preservative, fire-retardant.
 - .3 Acceptable types of paint, stain, and clear finishes that may be used over treated materials to be finished after treatment.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Do not dispose of preservative treated wood through incineration.
- .2 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- .3 Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill approved by Departmental Representative.
- .4 Dispose of unused wood preservative material at official hazardous material collections site approved by Departmental Representative.
- .5 Do not dispose of unused preservative material into sewer system, into streams, lakes, onto ground or in other location where they will pose health or environmental hazard.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Preservative: to CAN/CSA-O80 Series, stained finish.
- .2 Fire-Retardant: to CAN/CSA O80.20.
- .3 Solvent: to CAN/CSA-O80.201.

PART 3 EXECUTION

3.1 APPLICATION: PRESERVATIVE

- .1 Treat lumber to CAN/CSA- O80 Series.
- .2 Following water-borne preservative treatment, dry material to maximum moisture content of 19%.

3.2 APPLICATION: FIRE-RETARDANT

- .1 Treat lumber by pressure impregnation with fire-retardant chemicals in accordance with CAN/CSA - O80.20.
- .2 Following treatment, kiln-dry material to maximum moisture content of 19%.

3.3 APPLICATION: FIELD TREATMENT

- .1 Comply with AWPA M4 and revisions specified in CAN/CSA-O80 Series, Supplementary Requirements to AWPA Standard M2.

Wood Treatment

- .2 Treat all field cuts with two (2) coats of clear copper naphenate or 5% pentachlorophenol solution, water repellent preservative.
- .3 Remove chemical deposits on treated wood to receive applied finish.

END OF SECTION

PART 1 GENERAL

1.1 RELATED WORK

- .1 Coordinate work of this section with other sections as required to properly execute the work and as necessary maintain satisfactory progress of the work of other sections.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 45 00 – Quality Control.

1.3 REFERENCES

- .1 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN-S115, Fire Tests of Firestop Systems.

1.4 DEFINITIONS

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design

1.5 SUBMITTALS

- .1 Submit duplicate samples showing actual firestop material proposed for project.
- .2 Submit shop drawings to show proposed material, and method of installation. Construction details should accurately reflect actual job conditions.
- .3 Submit manufacturer's engineering judgement identification number and drawing details when no ULC or cUL system is available. Engineering judgement must include both project name and contractor's name who will install firestop system as described in drawing.
- .4 Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation. Include manufacturer's specifications, training letter, and technical data for each material including the composition and limitations, documentation of ULC or cUL firestop systems to be used.
- .5 Submit material safety data sheets provided with product delivered to job site.

1.6 QUALITY ASSURANCE

- .1 Qualifications:

Firestopping

- .1 Installer: person specializing in fire stopping installations with minimum five (5) years documented experience approved by the fire stopping manufacturer.
- .2 Manufacturer: company with minimum five (5) years experience in producing of material used for work required for this project, with sufficient production capacity to produce and deliver required units without causing delay in work.
- .2 All fire stopping materials for this project to be supplied by a single manufacturer.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Use only firestop products that have been ULC or cUL tested for specific fire-rated construction conditions conforming to construction indicated on the drawings.
- .2 Fire stopping: in accordance with CAN-S115.
 - .1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN-S115 and not to exceed opening sizes for which they are intended.
- .3 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .4 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .5 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .6 Sealants for vertical joints: non-sagging.
- .7 Firestopping sealant shall be suitable for use on wood in a wet, marine environment with a four (4) hour fire rating.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials to manufacturer's instructions.
- .3 Mask where necessary to avoid spillage and over coating onto adjoining surfaces.

3.2 INSTALLATION

- .1 Install fire stopping in accordance with ULC certification or UL Products Certified for Canada (CUL) and manufacturer's instructions.
- .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool or trowel exposed surfaces to a neat finish.
- .5 Remove excess compound promptly as work progresses and upon completion.

3.3 INSPECTION

- .1 Notify Departmental Representative when ready for inspection and prior to concealing or enclosing firestopping materials.

3.4 SCHEDULE

- .1 Firestop at:
 - .1 Timber joints at firestop location indicated on the plans.

3.5 CLEAN UP

- .1 Remove excess materials and debris and clean adjacent surfaces immediately after application.
- .2 Remove temporary dams after initial set of fire stopping.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Materials, preparation and application for caulking and sealants.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 01 61 00 - Common Product Requirements.
- .4 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C919, Standard Practice for Use of Sealants in Acoustical Applications.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13, Sealing Compound, One-component, Elastomeric, Chemical Curing.
- .3 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA).
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act (TDGA).

1.4 SUBMITTALS

- .1 Manufacturer's product to describe.
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
 - .4 Installation instructions, surface preparation and product limitations.
- .2 Submit duplicate samples of each type of material and colour.

- .3 Cured samples of exposed sealants for each color where required to match adjacent material.
- .4 Manufacturers' instructions to include installation instructions for each product used.

1.5 QUALITY ASSURANCE/MOCK-UP

- .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, caulking and sealant. Mock-up may be part of finished work.
- .3 Allow 24 hours for inspection of mock-up by Owner's Representative before proceeding with sealant work.
- .4 Mock-up will be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
 - .5 When accepted, mock-up will demonstrate minimum standard of quality required for this Work.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.7 PROJECT CONDITIONS

- .1 Environmental Limitations:
 - .1 Do not proceed with installation of joint sealants under following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4°C.
 - .2 When joint substrates are wet.
 - .2 Joint-Width Conditions:
 - .1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
 - .3 Joint-Substrate Conditions:
 - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

PART 2 PRODUCTS

2.1 SEALANT MATERIALS

- .1 Sealants and Caulking compounds must:
 - .1 Meet or exceed all applicable governmental and industrial safety and performance standards; and
 - .2 Be manufactured and transported in such a manner that all steps for the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the Fisheries Act and the Canadian Environmental Protection Act (CEPA).
- .2 Sealant and caulking compounds must not be formulated or manufactured with: aromatic solvents, fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, barium or their compounds, except barium sulphate.
- .3 Sealant and caulking compounds must not contain a total of volatile organic compound (VOC's) in excess of 5% by height as calculated from records of the amounts of constituents used to make the product.
- .4 Sealant and caulking compounds must be accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.
- .5 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
- .6 When low toxicity caulks are not possible, confine usage to areas which off-gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.
- .7 Where sealants are qualified with primers use only these primers.
- .8 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

- .1 Urethanes One Part.
 - .1 Non-Sag to CAN/CGSB-19.13, Type 2.
- .2 Silicones One Part.
 - .1 To CAN/CGSB-19.13, mildew resistant.
- .3 Acoustical Sealant.

Joint Sealants

- .1 To ASTM C919.
- .4 Preformed Compressible and Non-Compressible back-up materials.
 - .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
 - .1 Extruded closed cell foam backer rod.
 - .2 Size: oversize 30 to 50 %.
 - .2 Neoprene or Butyl Rubber.
 - .1 Round solid rod, Shore A hardness 70.
 - .3 High Density Foam.
 - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m³ density, or neoprene foam backer, size as recommended by manufacturer.
 - .4 Bond Breaker Tape.
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

- .1 Expansion and control joints in exterior surfaces of poured-in-place concrete: Sealant type CAN/CGSB – 19.13.

2.4 JOINT CLEANER

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
- .2 Primer: as recommended by manufacturer.

PART 3 EXECUTION

3.1 PROTECTION

- .1 Protect installed Work of other trades from staining or contamination.

3.2 SURFACE PREPARATION

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.

Joint Sealants

- .5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

- .1 Sealant.
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing.
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.
- .3 Cleanup.
 - .1 Clean adjacent surfaces immediately and leave Work neat and clean.
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
 - .3 Remove masking tape after initial set of sealant.

END OF SECTION

PART 1 **GENERAL**

1.1 **SUMMARY**

- .1 This Section defines correction to maximum dry density to take into account aggregate particles larger than 4.75 mm.

1.2 **REFERENCES**

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C127-88, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.
 - .2 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600kN-m/m³).
 - .3 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³).
 - .4 ASTM D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

1.3 **DEFINITIONS**

- .1 Corrected maximum dry density is defined as:
 - .1 $D = (D1 \times D2) / (F1 \times D2) + (F2 \times D1)$
 - .2 Where: D = corrected maximum dry density kg/m³.
 - .1 F1 = fraction (decimal) of total field sample passing 4.75 mm sieve.
 - .2 F2 = fraction (decimal) of total field sample retained on 4.75 mm sieve (equal to 1.00 - F1)
 - .3 D1 = maximum dry density, kg/m³ of material passing 4.75 mm sieve determined in accordance with Method A C of ASTM D698.
 - .4 D2 = bulk density, kg/m³, of material retained on 4.75 mm sieve, equal to 1000G where G is bulk specific gravity (dry basis) of material when tested to ASTM C127.
 - .3 For free draining aggregates, determine D1 (maximum dry density) to ASTM D4253, dry method when directed by Departmental Representative.

PART 2 **PRODUCTS (NOT APPLICABLE)**

PART 3 **EXECUTION (NOT APPLICABLE)**

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 30 00 – Cast-in-Place Concrete.
- .3 Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .4 Section 32 11 23 – Aggregate Base Courses.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International).
 - .1 ASTM D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.3 SOURCE QUALITY CONTROL

- .1 Source of materials to be incorporated into work or stockpiles requires approval.
- .2 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.
- .3 If, in opinion of Departmental Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
- .4 Should a change of material source be proposed, advise Departmental Representative 4 weeks in advance of proposed change to allow sampling and testing.
- .5 Acceptance of material at source does not preclude future rejection if it is subsequently found to lack uniformity, or if its field performance is found to be satisfactory.

1.4 SAMPLES

- .1 Aggregate will be subject to continual sampling by Departmental Representative during production.
- .2 Provide Departmental Representative with access to source and processed material for sampling and testing.
- .3 Bear the cost of sampling and testing of aggregates which fail to meet specified requirements.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
 - .1 Greatest dimension to exceed five times least dimension.
- .3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
 - .1 Natural sand.
 - .2 Manufactured sand.
 - .3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
 - .1 Crushed rock or slag.
 - .2 Gravel and crushed gravel composed of naturally formed particles of stone.

PART 3 EXECUTION

3.1 TOPSOIL STRIPPING

- .1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.
- .2 Commence topsoil stripping of areas as indicated after area has been cleared and removed from site.
- .3 Strip topsoil to depths as indicated. Avoid mixing topsoil with subsoil.
- .4 Stockpile in locations as directed by Departmental Representative. Stockpile height not to exceed 2.0 m.

3.2 DEVELOPMENT OF AGGREGATE SOURCE

- .1 Contractor to produce aggregates off site.
- .2 Contractor to develop aggregate source to prevent contamination of aggregates stockpiled.

3.3 PROCESSING

- .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
- .2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Departmental Representative.
- .3 Wash aggregates, if required to meet specifications. Use only equipment approved by Engineer.
- .4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.

3.4 HANDLING

- .1 Handle and transport aggregates to avoid segregation, contamination and degradation.

3.5 STOCKPILING

- .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.
- .2 Stockpile aggregates in sufficient quantities to meet Project schedules.
- .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
- .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into work.
- .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
- .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 h of rejection.
- .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Max 1.0 m for coarse aggregate and base course materials.
 - .2 Max 2.0 m for fine aggregate and sub-base materials.
 - .3 Max 1.5 m for other materials.
- .8 Complete each layer over entire stockpile area before beginning next layer.
- .9 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.

Aggregate Materials

- .10 Do not cone piles or spill material over edges of piles.
- .11 Do not use conveying stackers.
- .12 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.6 CLEANING

- .1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .2 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 31 23 33.01 - Excavation, Trenching and Backfilling.

1.2 **REFERENCES**

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600kN-m/m³),

1.3 **EXISTING CONDITIONS**

- .1 Examine subsurface investigation report which is available for inspection from Departmental Representative.
- .2 Known underground and surface utility lines and buried objects are as indicated on site plan.
- .3 Refer to dewatering in Section 31 23 33.01 - Excavating Trenching and Backfilling.

1.4 **PROTECTION**

- .1 Protect and/or transplant existing fencing trees, landscaping, natural features, bench marks, buildings, pavement, surface or underground utility lines which are to remain as directed by Departmental Representative. If damaged, restore to original or better condition unless directed otherwise.
- .2 Maintain access roads to prevent accumulation of construction related debris on roads.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Fill material: Type 3 in accordance with of Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Excavated or graded material existing on site may be suitable to use as fill for grading work if approved by Departmental Representative.

PART 3 EXECUTION

3.1 STRIPPING OF TOPSOIL

- .1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected as determined by Departmental Representative.
- .2 Commence topsoil stripping of areas as indicated after area has been cleared of brush, weeds and grasses and removed from site.
- .3 Strip topsoil to depths as indicated. Avoid mixing topsoil with subsoil.
- .4 Stockpile in locations as directed by Departmental Representative. Stockpile height not to exceed 2 m.
- .5 Dispose of unused topsoil as directed by Departmental Representative.

3.2 GRADING

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
- .2 Rough grade to following depths below finish grades:
 - .1 250mm for concrete slabs and walks precast paving units.
- .3 Slope rough grade away from building 1:50 minimum.
- .4 Grade ditches to depth as indicated.
- .5 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .6 Compact filled and disturbed areas to corrected maximum dry density to ASTM D698, as follows:
 - .1 85% under landscaped areas.
 - .2 95% under paved and walk areas.
- .7 Do not disturb soil within branch spread of trees or shrubs to remain.

3.3 TESTING

- .1 Inspection and testing of soil compaction will be carried out by testing laboratory designated by Departmental Representative. Refer to Sections 01 29 83 - Payment Procedures for Testing Laboratory Services and 01 45 00 – Quality Control.
- .2 Submit testing procedure, frequency of tests, to Departmental Representative for approval.

3.4 SURPLUS MATERIAL

- .1 Remove surplus material and material unsuitable for fill, grading or landscaping as directed by Departmental Representative.

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

- .1 This section specifies supply, placement and compaction of rock and gravel fill. The areas requiring rock/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. Rock/gravel fill will not be measured separately for payment, as these costs are to be included in the lump sum arrangement.

PART 2 PRODUCTS

2.1 ROCK FILL

- .1 Rock fill will be of hard, durable, evenly graded blasted stone having a maximum diameter of 300 mm in major portion of fill and a maximum diameter of 150 mm in upper 600 mm of rock fill. Fill material will contain not more than 6 percent by weight passing the 25 mm sieve. Rock fill to be evenly graded within the limits specified.
- .2 Use of shale rock or slate will not be permitted.

2.2 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:

Sieve Size	% by Weight Passing
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 ROCK FILL**

- .1 Only rock fill material approved by Departmental Representative will be placed. Material will be placed uniformly across full cross-section in layers not exceeding 300 mm loose depth.
- .2 Use suitable earth moving and surface grading equipment to place and spread rock fill in continuous and uniform horizontal layers.
- .3 Compact rock fill after each 300 mm lift.
- .4 Place rock fill to 350 mm below bottom of finished grade.

3.2 **PLACING GRAVEL FILL**

- .1 Top 300 mm of fill will consist of gravel fill as specified in Clause 2.2.1 of this section.
- .2 Place gravel fill in two (2) equal lifts to minimum 95% standard proctor density.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 01 56 00 - Temporary Barriers and Enclosures.
- .4 Section 02 41 16 – Structure Demolition
- .5 Section 31 05 16 – Aggregate Materials.
- .6 Section 31 22 13 – Rough Grading.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM).
 - .1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .5 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .6 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CA/CGSB-8.2, Sieves, Testing, Woven Wire, Metric
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001, Cementitious Materials for Use in Concrete.
 - .2 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/ Methods of Test and Standard Practices for Concrete.

1.3 DEFINITIONS

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock excavation: excavation of material from solid masses of igneous, sedimentary or metamorphic rock which, prior to its removal, was integral with its parent mass, and boulders or rock fragments having individual volume in excess of 1 m³. Frozen material not classified as rock.
 - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Unclassified excavation: excavation of deposits of whatever character encountered in work.
- .3 Waste material: excavated material unsuitable for use in work or surplus to requirements.
- .4 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of work.
- .5 Unsuitable materials:
 - .1 Weak and compressible materials under excavated areas.
 - .2 Frost susceptible materials under excavated areas.
 - .3 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.1.

<u>Sieve Designation</u>	<u>%Passing</u>
2.00 mm	100
0.10 mm	45-100
0.02 mm	10-80
<u>0.005 mm</u>	<u>0-45</u>

- .2 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.

1.4 MEASUREMENT FOR PAYMENT

- .1 Excavation
 - .1 Payment for excavation shall be included in lump sum fee for fixed price items.
- .2 Backfilling
 - .1 Supply, placement, and compaction of backfill will be measured by the cubic metre place measure (CMPM). The volume of material will be determined in place from measurements taken prior to and at completion of the work. Include the cost of all plant, labour, equipment, and materials required to complete the work as specified.

1.5 SUBMITTALS

- .1 Inform Departmental Representative at least 4 weeks prior to commencing work, of proposed source of fill materials and provide access for sampling.
- .2 Submit 70 kg samples of type of fill specified including representative samples of excavated material.
- .3 Ship samples as directed by Departmental Representative in tightly closed containers to prevent contamination.

1.6 QUALITY ASSURANCE

- .1 Submit design and supporting data at least 2 weeks prior to commencing work.
- .2 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in the province of Newfoundland and Labrador.
- .3 Keep design and supporting data on site.
- .4 Engage services of qualified professional engineer who is registered or licensed in Province of Newfoundland and Labrador to design and inspect cofferdams, shoring, bracing and underpinning required for work.
- .5 Do not use soil material until written report of soil test results are reviewed and approved by Departmental Representative.

1.7 EXISTING CONDITIONS

- .1 Buried services:
 - .1 Before commencing work verify location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
 - .3 Remove obsolete buried services within 2 m of Work: cap cut-offs.
 - .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .5 Prior to commencing excavation work, notify applicable Owner or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Owners or authorities having jurisdiction to clearly mark such locations to prevent disturbance during work.
 - .6 Confirm locations of buried utilities by careful test excavations.
 - .7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.
 - .8 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing.

- .9 Record location of maintained, re-routed and abandoned underground lines.
- .10 Confirm locations of recent excavations adjacent to area of excavation.
- .2 Existing buildings and surface features:
 - .1 Conduct, with Departmental Representative condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by work.
 - .2 Protect existing buildings and surface features from damage while work is in progress. In event of damage, immediately make repair to approval of Departmental Representative.
 - .3 Where required for excavation, cut roots or branches as approved by Departmental Representative.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Backfill materials: properties to Section 31 05 16 - Aggregate Materials, Section 31 23 25 – Rock and Gravel Fill and Section 32 11 23 – Aggregate Base Courses.

PART 3 **EXECUTION**

3.1 **SITE PREPARATION**

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

3.2 **PREPARATION/PROTECTION**

- .1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.
- .2 Keep excavations clean, free of standing water, and loose soil.
- .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative's approval.
- .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage. Protect buried services that are required to remain undisturbed.

3.3 **STOCKPILING**

- .1 Stockpile fill materials in areas designated by Departmental Representative. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

3.4 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 30 - Health and Safety Requirements and Occupational Health and Safety Act for the Province of Newfoundland and Labrador.
- .2 Obtain permit from authority having jurisdiction for temporary diversion of water course.
- .3 Construct temporary works to depths, heights and locations as indicated or approved by Departmental Representative.
- .4 During backfill operation:
 - .1 Unless otherwise as indicated or as directed by Departmental Representative remove sheeting and shoring from excavations.
 - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
 - .3 Pull sheeting in increments that will ensure compacted backfill is maintained at an elevation at least 500 mm above toe of sheeting.
- .5 When sheeting is required to remain in place, cut off tops at elevations as indicated.
- .6 Upon completion of substructure construction:
 - .1 Remove cofferdams, shoring and bracing.
 - .2 Remove excess materials from site and restore water courses as indicated and as directed by Departmental Representative.

3.5 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while work is in progress.
- .2 Submit for Departmental Representative's review details of proposed dewatering or heave prevention methods, such as dikes, well points, and sheet pile cut-offs.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures and in manner not detrimental to public and private property, or any portion of work completed or under construction.
- .6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, water courses or drainage areas.

3.6 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as indicated by Departmental Representative.
- .2 Remove existing timber cribwork, ballast, rubble and other obstructions encountered during excavation in accordance with Section 02 41 13 - Selective Site Demolition.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.
- .5 Keep excavated and stockpiled materials a safe distance away from edge of trench as directed by Departmental Representative.
- .6 Restrict vehicle operations directly adjacent to open trenches.
- .7 Dispose of surplus and unsuitable excavated material off site.
- .8 Do not obstruct flow of surface drainage or natural watercourses.
- .9 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .10 Notify Departmental Representative when bottom of excavation is reached.
- .11 Obtain Departmental Representative approval of completed excavation.
- .12 Remove unsuitable material from trench bottom to extent and depth as directed by Departmental Representative.
- .13 Correct unauthorized over-excavation as required.
- .14 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.

3.7 FILL TYPES AND COMPACTION

- .1 Use fill of types as indicated on drawings and additional requirements below. Compaction densities are percentages of maximum densities obtained from ASTM D698 corrected maximum dry density.
 - .1 Exterior side of perimeter walls: use Gravel Fill to subgrade level. Compact to 95%.
 - .2 Under concrete slabs: provide 50 mm compacted thickness base course of Class "A" fill to underside of slab. Compact base course to 100%.

- .3 To correct over excavation in trenches: use Class "B" fill to underside of sand bedding compacted to 95%.

3.8 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place and compact granular material for bedding and surround of underground services as indicated.
- .2 Place bedding and surround material in unfrozen condition.

3.9 BACKFILLING

- .1 Vibratory compaction equipment: approved by Departmental Representative.
- .2 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.
- .3 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .4 Do not use backfill material which is frozen or contains ice, snow or debris.
- .5 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .6 Backfill around installations.
 - .1 Place bedding and surround material as specified elsewhere.
 - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
 - .3 Place layers simultaneously on both sides of installed work to equalize loading. Difference not to exceed 600 mm.
 - .4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures.
 - .1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure, and approval obtained from Departmental Representative, or
 - .2 If approved by Departmental Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental Representative.

3.10 RESTORATION

- .1 Upon completion of work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Reinstate pavement disturbed by excavation to thickness, structure, and elevation which existed before excavation.
- .3 Clean and reinstate areas affected by work as directed by Departmental Representative.

- .4 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 h.

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTIONS INCLUDE**

- .1 Materials and installation of polymeric geotextiles, purpose of which is to:
 - .1 Separate and prevent mixing of granular materials of different grading.
 - .2 Act as hydraulic filters permitting passage of water while retaining soil strength of granular structure.

1.2 **RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .3 Section 31 53 13 - Timber Cribwork.

1.3 **REFERENCES**

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D4491-99a(2004)e1, Standard Test Methods for Water Permeability of Geotextiles by Permittivity .
 - .2 ASTM D4595-05, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
 - .3 ASTM D4716-04, Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
 - .4 ASTM D4751-04, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2-M88, Textile Test Methods.
 - .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Geomembranes.
 - .1 No.2-M85, Mass per Unit Area.
 - .2 No.3-M85, Thickness of Geotextiles.
 - .3 No.7.3-92, Grab Tensile Test for Geotextiles.
 - .4 No.6.1-93, Bursting Strength of Geotextiles Under No Compressive Load.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative the following samples at least 2 weeks prior to commencing work.
 - .1 Minimum length of 1 m of roll width of geotextile.

1.5 MILL CERTIFICATES

- .1 Submit to Departmental Representative a copy of mill test data and certificate at least 2 weeks prior to start of work.

1.6 DELIVERY AND STORAGE

- .1 During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, and packaging material, in appropriate on-site bins, for recycling in accordance with Waste Management Plan.
- .4 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 PRODUCTS

2.1 MATERIAL

- .1 Geotextile: woven or non-woven synthetic fibre fabric, supplied in rolls.
 - .1 Width: 3.5 m minimum.
 - .2 Length: 50 m minimum.
 - .3 Composed of: minimum 85% by mass of polyester with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure.
- .2 Physical properties:
 - .1 Thickness: to CAN/CGSB-148.1, No.3, minimum 2.5 mm.
 - .2 Mass per unit area: to CAN/CGSB-148.1, No. 2, minimum 400 g/m².
 - .3 Tensile strength and elongation (in any principal direction): to ASTM D4595.

Geotextiles

- .1 Tensile strength: minimum 1200 N, wet condition.
 - .2 Elongation at break: 50 to 100 percent.
 - .3 Seam strength: equal to or greater than tensile strength of fabric.
 - .4 Mullen burst strength: to CAN/CGSB-4.2, method 11.1, minimum 3100 kPa.
- .3 Hydraulic properties:
- .1 Apparent opening size (AOS): to ASTM D4751, 50 to 150 micrometers.
 - .2 Permittivity: to ASTM D4491, 0.25 cm per second.
- .4 Securing pins and washers: to CAN/CSA-G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to CAN/CSA G164.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Place one (1) layer of geotextile material from base elevation of crib to top of crib and retain in position with securing pins and washers.
- .2 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with securing pins and washers.
- .3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.
- .4 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .5 Overlap each successive strip of geotextile 600 mm over previously laid strip.
- .6 Join successive strips of geotextile by sewing.
- .7 Pin successive strips of geotextile with securing pins at mid point of lap to satisfaction of Departmental Representative.
- .8 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .9 After installation, cover with overlying layer within 4 hours of placement.
- .10 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
- .11 For full cribs, extend geotextile over top of cribwork, in portion of cribwork not containing a concrete deck.

3.2 CLEANING

- .1 Remove construction debris from Project site and dispose of debris in an environmentally responsible and legal manner.

3.3 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

- .1 Submit proposed placing method to Departmental Representative for approval, prior to placing of ballast.

1.7 WASTE MANAGEMENT

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Dispose of all corrugated cardboard and polystyrene plastic packaging material in appropriate on-site bin for recycling.
- .3 Place materials defined as hazardous or toxic in designated containers.
- .4 Ensure emptied containers are sealed and stored safely.
- .5 Do not dispose of preservative treated wood through incineration.
- .6 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- .7 Dispose of treated wood, end pieces, wood scraps and sawdust at a sanitary landfill.
- .8 Dispose of unused preservative material at an official hazardous material collections site. Do not dispose of unused preservative material into sewer system, streams, lakes, on ground or in any other location where they will pose a health or environmental hazard.

PART 2 PRODUCTS

2.1 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 Accreditation Board of CSA.
- .2 Species: Douglas Fir, Pacific Coast Hemlock and Eastern Hemlock.
- .3 Grade: No. 1 Structural.
- .4 Grading authority: NLGA.
- .5 Preservative treatment: To CSA 080 for coastal waters and Section 06 05 73. Supply timbers in lengths required. Cut and field treat timbers only as may be necessary to suit site conditions. Contractor will have on site sufficient lengths and thickness of treated timber to permit leveling of cribs after ballasting operations.
- .6 Miscellaneous steel: Medium structural steel conforming to CSA Specification G40.21 "Structural Quality Steels".
 - .1 Hot dip galvanized: to CAN/CSA-G164. Minimum weight of zinc coating as stated in Table 1 of this Standard. Fabricator to adhere to recommendations in Appendix A and B of Standard.

Timber Cribwork

- .2 Wire nails, spikes, staples: to CSA-B111.
- .3 Bolts, nuts, washers: to ASTM A307.
- .4 Drift Bolts: to G40.21 from round stock, button head and diamond or wedge point.
- .5 Washers:
 - .1 Round Plate Washers: for 19 mm diameter machine bolts, 79 mm diameter by 7.9 mm thick, with hole diameter of 21 mm. Washers to G40.21.
 - .2 Square washers not permitted to be used.
- .6 All hardware galvanized.
- .7 Ballast for filling cribs to following requirements:
 - .1 Stone, consisting of hard durable particles free from clay lumps, organic material and other deleterious materials.
 - .2 Dry density in place: minimum 2600 kg per cubic meter.
 - .3 Ballast stone to be well graded with maximum sizes not exceeding 400 mm on any side and minimum size of not less than 250 mm on any side.
- .8 Gravel: Evenly graded pit run or crushed stone, maximum size, 50 mm, with not more than 8% passing the 0.075 mm sieve.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Excavate harbour bottom material, and scribe cribs to bedrock. Crib bottom to be built to ensure full support under timbers. Rock mattress may be used under crib #8 only. No rock mattress to be used beneath cribs #1 through #7 as the intent is to scribe to the bedrock profile.
- .2 Contractor to confirm with Departmental Representative that bottom is adequate for cribwork placement.
- .3 Before construction, stockpile sufficient ballast to completely fill cribs. Provide suitable plant and equipment to keep crib in proper position and alignment during sinking operations.
- .4 Take closely spaced accurate soundings and probings, 1500 mm centre to centre or less, precisely located by template, to determine actual base area of crib.
- .5 Cribs out of alignment or not correctly located to be refloated and replaced in correct position.

3.2 CRIB CONSTRUCTION

- .1 Construct timber cribwork to 400 mm above LNT prior to sinking in final position in work.

Timber Cribwork

- .2 Levelling Pieces:
 - .1 Place treated timber levelling pieces beneath bottom timbers to conform to shape of base area.
 - .2 Place levelling pieces horizontally.
 - .3 Secure succeeding pieces at intersections of bottom timbers and vertical posts, and other levelling pieces with machine bolts.
- .3 Bottom timbers:
 - .1 Place bottom timbers lengthwise, and crosswise to form bottom three courses of cribs.
 - .2 Crosswise bottom timbers to be of one piece.
 - .3 Lengthwise bottom timbers to be of one piece.
 - .4 Secure three courses of bottom timbers together with machine bolts at every intersection with each other and with vertical posts.
- .4 Ballast floor:
 - .1 Place ballast floor on pockets on bottom or middle course of bottom timbers.
 - .2 Secure each ballast floor timber to bottom timbers with drift bolts securing adjacent ballast floor timbers to same bottom timber.
- .5 Longitudinals:
 - .1 Longitudinals one length for individual cribs below LNT.
 - .2 Longitudinals minimum 6100 mm long above LNT.
 - .3 Where cribs are married together, longitudinals of sufficient length to span a minimum of a half a bay of one crib and one and a half bays of the adjacent crib.
 - .4 Butt join exterior and interior longitudinals a minimum distance of 600mm from crosstie with joint in centre of a 1200mm long joiner block.
 - .5 Secure block to lower timber with drift bolt at centre and secure longitudinals and splice at ends to block with drift bolts.
 - .6 Stagger joints in longitudinal timbers. Do not join in same bay or on same vertical post.
 - .7 Secure longitudinals to intersection of cross ties with drift bolt and to intersection of vertical posts with machine bolt every third course of longitudinals, along with the top course.
 - .8 Countersink machine bolts on exterior face above LNT.
- .6 Cross ties: one length across cribs.
 - .1 Secure cross ties to intersection of longitudinals with drift bolt and to intersection of vertical posts with machine bolt every third course of cross tie, along with the top course.
 - .2 One row of crossties and verticals may be eliminated from one crib where cribs marry together above +400 mm LNT.

Timber Cribwork

- .7 Vertical posts: one length from bottom of cribwork to top of cribwork. Locate one vertical post at corner of each crib and at intersection of crossties with longitudinals.
- .8 Blocking: install treated timber filler blocking as indicated on drawings.
 - .1 Cut blocking exact length to completely fill spaces and such that the total thickness of crossties and longitudinals carrying the bearing weight of the deck be a minimum of 1000 mm if cribwork ends on a crosstie.
 - .2 If cribwork ends on a longitudinal one additional tier of blocking is required.
 - .3 Blocking of same size and material as crossties or longitudinals and fastened with 2 drift bolts into timber immediately below it.
- .9 Levelling: treated timber required for levelling of cribwork after ballasting, must be full width continuous over entire length to be levelled.
- .10 Bolt Sizing and Holing:
 - .1 Drift Bolts: length of drift bolts equal to thickness of timbers fastened less 50 mm, unless otherwise specified. Bore holes for drift bolts 2 mm smaller diameter than bolt and for full length of bolt.
 - .2 Machine Bolts: length of machine bolts equal to thickness of timbers fastened plus thickness of washers plus 40 m. Where bolts are countersunk, the length, as noted above, less depth of countersink. Thread machine bolts for 64 mm. Bore holes for machine bolts to same diameter as bolts.

3.3 HANDLING TREATED TIMBER

- .1 Handle treated material without damaging original treatment.
 - .1 replace treated timber with major damage to original treatment, as instructed by Departmental Representative.
- .2 Field treatment: to CAN/CSA-080. Apply and saturate cuts, minor surface damage, abrasions, and nail and spike holes with preservative.
- .3 Ripping of treated timber not permitted without prior approval of Departmental Representative.

3.4 BALLAST

- .1 Place ballast to avoid damage to timber cribwork.
- .2 Place ballast so that differential height of fill between adjacent cells, at any time, will be less than 1 m.
- .3 Pockets of cribs ballasted within 100 mm of top of crib timbers.

3.5 GRAVEL

- .1 Install a 100 mm layer of gravel over the top of ballast to form a base for the reinforced concrete deck.

Timber Cribwork

- .2 Hand place final items of ballast stone to fill voids and depressions to hold gravel in place.
- .3 Install gravel to grade required and compact in preparation for concrete deck work.
- .4 Clean any loose gravel off timber surface prior to placement of deck.

3.6 TOLERANCES

- .1 1 in 300 in overall dimensions.
- .2 Locate cribs within 100 mm of location as indicated. Horizontal misalignment within 100 mm along the outside faces.
- .3 Space between ballasted cribs within 200 mm. No payment for this space will be made above or below LNT.

3.7 PROTECTION

- .1 Protect work from damage resulting from work on other sections and from damage resulting from environmental conditions.
- .2 Repair or replace portion or entire crib at no additional cost if damaged by work.

END OF SECTION

PART 1 **GENERAL**

1.1 **DESCRIPTION**

- .1 This section specifies requirements for supply and installation of structural timber as follows:
 - .1 Supply and installation of treated dimension timber wheelguard, wheelguard blocking, coping, and associated painting.
 - .2 Supply and installation of untreated dimension hardwood timber fenders, and associated painting.
 - .3 Supply and installation of untreated timber hardwood ladders, ladder handgrips, and associated hardware.

1.2 **RELATED WORK**

- .1 Section 02 41 16 - Sitework, Demolition and Removal.
- .2 Section 03 30 00 - Cast-in-Place Concrete.
- .3 Section 06 05 73 - Wood Treatment.
- .4 Section 31 53 13 - Timber Cribwork.

1.3 **REFERENCES**

- .1 American Society for Testing and Materials (ASTM International)
 - .1 STM 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-080 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.

Structural Timber

- 1.4 DIMENSIONS**
- .1 Check existing site dimensions and report discrepancies to Departmental Representative before commencing work.
- 1.5 PROTECTION**
- .1 Avoid dropping, bruising or breaking of wood fibres.
 - .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 cuts, breaks or abrasions on surfaces of treated timber with 3 brush coats of preservative to CSA 080.
 - .5 Treat bolt holes, cutoffs and field cuts in accordance with CSA 080.
- 1.6 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.
- 1.7 MEASUREMENT FOR PAYMENT**
- .1 Structural Timber
 - .1 Treated Dimension Timber: The supply and installation of treated dimension timber for wheelguard, wheelguard blocking and coping will be measured by the cubic metre (m³) of timber secured in place, including all timber, fastenings, plant, material, equipment, labour, wheelguard bolt hole levelling sealant, painting of wheelguard and wheelguard blocking.
 - .2 Untreated Dimension Timber: The supply and installation of untreated dimension hardwood timber for hardwood fenders, and ladders as specified will be measured by the cubic metre (m³) of timber secured in place including all timber, fastenings, plant, material, equipment, and labour, ladder rungs, wheelguard hand grips, and painting of complete ladder uprights.
 - .3 Fire separator: The supply and installation of fire separators as shown on the drawings will be measured by the unit. Include all timber, fastenings, plant, material, equipment, and labour.

- .2 Payment for all dimension timber will be made on volume calculated from nominal sizes as indicated on drawing and specified, eg. 200 mm x 200 mm.

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 Wheelguard, wheelguard blocks and coping: Hemlock or Douglas Fir (CCA or ACA treated) .
- .2 Hardwood fenders and ladder uprights: Birch or Maple (untreated) .
- .3 Grade: No. 1 Structural Grade
- .4 Grading Authority: NLGA
- .5 Preservative Treatment: Treat to CSA 080, for coastal waters and Section 06 05 73. Timbers will be treated in the lengths required. Unnecessary field cutting will not be permitted.
- .6 Primer: Alkyd undercoat, exterior oil wood primer, similar to Pittsburgh 6-9.
- .7 Paint: Alkyd/Oil Resin paint similar to Pittsburgh Paints "Safety Yellow" Product ID 7-808. Paint to conform to CAN/CGSB-1.61-2004.

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 Bill.
- .3 Machine Bolts and Nuts: to ASTM A307. All machine bolts and nuts to be galvanized.
- .4 Drift Bolts: to G40. 21 from round stock button head and diamond or wedge point. All drift bolts to be galvanized.
- .5 Washers:
- .1 Round Plate Washers: for 16 mm machine bolts will be 76 mm diameter by 6.4 mm thick, for 19 mm machine bolts will be 79 mm diameter by 7.9 mm thick and have a hole diameter of 18 mm and 21 mm diameter respectively. Washers to conform to G40.21. All washers to be galvanized.
- .2 Plain Washers: to CSA B19.1, Class 2. All washers to be galvanized.
- .3 Square washers are not permitted.

Structural Timber

- .6 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.
- .7 Ladder Rungs and Hand Grips: to CSA G40.21, galvanized.
- .8 Welding in accordance with CSA Standards. The welders will be qualified to the appropriate classification as stated in CSA W47.1 "Certification of Companies for Fusion Welding of Steel Structures." Conform welding to all appropriate requirements and recommendations of CSA Standard W59 "Welded Steel Construction" (metal arc welding).

PART 3 **EXECUTION**

3.1 **PREPARATION**

- .1 Install structural timbers to details shown on drawings or as specified.

3.2 **WHEELGUARD AND WHEELGUARD BLOCKING**

- .1 Wheelguard timbers to be 200 mm x 200 mm, and will be in minimum lengths of 6100 mm or as specially required with butt joints made over wheelguard blocking. Wheelguard timbers to be chamfered on top, 25 mm on each horizontal and vertical surface.
- .2 Wheelguard blocks will be installed at 1500 mm on centre as support for wheelguard.
- .3 Wheelguard will be secured through wheelguard blocking, coping and two (2) crib timbers below with two (2) 25 mm diameter drift bolts as shown on detail drawings. Bolts to be countersunk and filled with leveling sealant following installation.

3.3 **COPING**

- .1 Install 200 mm x 250 mm treated timber coping in minimum length of 7620 mm around perimeter of wharf as directed.
- .2 Secure coping to timber below with 19 mm diameter drift bolts spaced at 1500 mm on centre. Use machine bolts through coping into new deck as detailed on the drawings.

3.4 **FENDERS**

- .1 Horizontal Fenders:
 - .1 Install hardwood timber fenders in minimum length of 4880 mm along top perimeter of wharf. Stagger joints in coping from joints in horizontal fender.
 - .2 Top horizontal fender to be chamfered 25 mm on top seaward face.
 - .3 Secure horizontal fender to coping with 16 mm diameter lag screws, minimum of four (4) each lag screws per fender, spaced at 1500 mm on centre. Secure

bottom horizontal fender to a crib timber in a similar manner. All lag screws to be countersunk on the exterior face.

- .2 Vertical Fenders:
 - .1 Install hardwood timber fenders spaced at 300 mm on centre along face of wharf except for exterior corners where fenders will be closed face for 1500 mm as directed.
 - .2 Secure each fender with three (3) each 16 mm diameter lag screws evenly spaced from LNT to underside of horizontal fender. All lag screws to be countersunk.
 - .3 All fenders to extend from underside of horizontal fender to 300 mm below LNT.
 - .4 Do not notch or cut fenders to provide straight wharf face. Continuous blocking will be installed behind fenders to provide straight face.

3.5 LADDERS

- .1 Install ladders on face of wharf in locations shown on drawings or designated by Engineer.
- .2 Ladder uprights to be 150 mm x 200 mm and installed from 1100 mm below LNT to wheelguard elevation. Uprights to be bevelled at 45° on top and complete ladder upright to be painted.
- .3 Construction details and steel handgrips as per detail.
- .4 Secure each upright with four (4) each evenly spaced 19 mm diameter galvanized lag screws. All lag screws to be countersunk.

3.6 PAINTING

- .1 Paint four (4) sides and exposed ends of wheelguard, exposed sides of wheelguard blocking, and complete ladder uprights as directed by the Departmental Representative.
- .2 Use one (1) coat of exterior oil wood primer and two (2) coats of alkyd/oil resin paint as specified. Paint materials for each coat to be product of a single manufacturer as specified. Ensure previous coat of primer or paint is dry before second coat is applied.

3.7 BOLT SIZING

- .1 Drift Bolts: Drift bolts used in the work will have a length equal to thickness of timbers being fastened less 50 mm unless otherwise specified. Holes for drift bolts will be bored 2 mm smaller diameter than size of steel used and for full length of bolts.
- .2 Machine Bolts: Machine bolts used in work will have a length equal to thickness of timbers being fastened plus thickness of washers plus 40 mm. Where bolts are countersunk, the length will be as above less depth of countersinking. Machine bolts will be threaded for 64 mm. Holes will be drilled same diameter as bolt.

Structural Timber

- .3 Lag Screws: All lag screws used in the work will have a length equal to thickness of timbers being fastened less 50 mm and depth of countersinking. Holes for lag screws to be drilled same diameter as shank portion of screw and to inside thread diameter for threaded portion of screw and for full length. All lag screws will be countersunk, screwed, not driven in place, and will have one (1) standard washer under the head.
- .4 Countersink lag screws in hardwood fenders and ladders to the extent that the minimum distance from face of timber to head of bolt is 12 mm.
- .5 Bolting of timbers without properly drilled bolt holes will not be accepted.

3.8 FIRE SEPARATOR

- .1 Install fire separators as shown on the drawings.

END OF SECTION

PART 1 **GENERAL**

1.1 **DESCRIPTION**

- .1 This section specifies the requirements for the supplying, producing and placing crushed gravel for quarried stone as a granular base course to lines, grades and typical cross sections indicated, or as directed by Departmental Representative.

1.2 **RELATED SECTIONS**

- .1 Section 31 05 16 - Aggregate Materials.

1.3 **REFERENCES**

- .1 American Society for Testing and Materials (ASTM).
 - .1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM D136, Standard Test Method for Sieve Analysis of Fine and Course Aggregated.
 - .4 ASTM D698, Stand Test Methods for Laboratory Compaction Characteristics of Soil Using standard Effort (12,400 ft-lbf/ft³)(600 N m/m³).
 - .5 ASTM D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .6 ASTTM D 1883, Standard Test Method of CBR (California Bearing Ratio) of Laboratory Compacted Soil.
 - .7 ASTM D4318, Standard Test Methods for Liquid Unit, Plastic Unit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven-Wire, Inch Series.
 - .2 CAN/CGSB-8.2-, Sieves, Testing, Woven Wire, Metric.

1.4 **DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver and stockpile aggregates in accordance with Section 31 05 16 – Aggregate Materials. Stockpile minimum 50% of total aggregate required prior to commencing operation.
- .2 Store cement in weathertight bins or silos that provide protection from dampness and easy access for inspection and identification of each shipment.

1.5 MEASUREMENT FOR PAYMENT

- .1 Class "A" Granular Base: The supply and installation of Class "A" granular base will be measured in cubic metres of materials supplied and installed in the work. Include all costs in the unit price including plant, material and labour. Any re-grading required to remove high points and blend to the existing topography (providing positive site drainage), is to be considered incidental to the work.
- .2 Class "B" Granular Sub-Base: The supply and installation of Class "B" granular sub-base will be measured in cubic metres of materials supplied and installed in the work. Include all costs in the unit price including plant, material and labour.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Granular base fill (Class "A"): material to Section 31 05 16- Aggregate Materials will consist of clean, hard, durable crushed gravel or stone, free from shale, clay, friable materials, organic matter and other deleterious substances and the following requirements:

- .1 Crushed stone or gravel.
- .2 Granulations to be within limits specified when tested to ASTM C136 and ASTM C117 and giving a smooth curve without sharp breaks when plotted on a semi-log chart. Sieve sizes to CAN/CGSB - 8.1.

- .1 Granulation to:

Sieve Designation	% Passing
200 mm	-
75 mm	-
50 mm	-
38.1 mm	-
25 mm	-
19 mm	100
15.9 mm	-
12.5 mm	-
9.5 mm	50-80
4.75 mm	35-60
2.00 mm	-
1.20 mm	15-35
0.425 mm	-
0.300 mm	7-20
0.180 mm	-
0.075 mm	3-6 (pit source) 3-8 (rock source)

- .3 Liquid limit: to ASTM D4318, maximum 25
- .4 Plasticity index: to ASTM D4318 maximum 0
- .5 Los Angeles degranulation: to ASTM C131. Maximum % loss by weight 35.

Aggregate Base Courses

- .6 Crushed particles: at least 50% of particles by mass within each of following sieve designation ranges to have at least 1 (one) freshly fractured face. Materials to be divided into ranges using methods of ASTM C136.

<u>Passing</u>		<u>Retained on</u>	
50 mm	to	25 mm	
25 mm	to	19 mm	
19 mm	to	4.75 mm	

- .7 Soaked CBR to ASTM D1833, min 100 when compacted to 100% of ASTM D1557.
- .2 Granular base fill (Class "B") will consist of clean, hard, durable crushed gravel or stone, free from shale, clay, friable materials, organic matter and other deleterious substances and the following requirements:
- .1 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-log chart.

.1 Granulation to:

Sieve Designation	% Passing
200 mm	-
75 mm	-
50 mm	100
38.1 mm	-
25 mm	50-100
19 mm	-
15.9 mm	-
12.5 mm	-
9.5 mm	-
4.75 mm	20-55
2.00 mm	-
1.20 mm	10-35
0.425 mm	-
0.300 mm	5-20
0.180 mm	-
0.75	2-6 (pit source) 2-8 (rock source)

- .2 Physical Requirements for Class "B":
- .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 4.76 mm 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.

Aggregate Base Courses

- .3 Materials from deposits acceptable as to the quality of the particles, but deficient in sizes to provide the required gradation, may be accepted if the contractor furnishes and satisfactorily incorporates into the product supplementary sizes from other sources to produce the required grading. If the deficiencies occur in Class "A" or Class "B" materials, corrections may be attempted by crushing to a smaller maximum particle size. In that event, the Departmental Representative will furnish special grading limits on the actual maximum particle size.
- .4 Material shall be considered unsuitable even though particle sizes are within the specified gradation limits if particle shape or any other characteristic precludes satisfactory compaction or fails to provide a roadway suitable for traffic. If, in the opinion of the Departmental Representative, an improved particle shape can be achieved by using a different crushing unit for that proposed by the contractor, then the Contractor shall supply and use a crushing unit of the type directed by the Departmental Representative.
- .5 Class "A" and Class "B" 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 after granular sub base surface is inspected and approved by Departmental Representative.
 - .1 Construct granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice.
 - .4 The contractor shall place all granular bases in such a manner as to prevent contamination by other materials and to prevent segregation of degradation. If, in the opinion of the Departmental Representative, the methods and techniques used by the Contractor cannot overcome contamination or segregation, then the Departmental Representative may direct a modification in these methods which may require the use of an approved spreader box or other acceptable device.
 - .5 Place material to full width in uniform layers not exceeding 50 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
 - .6 Prior to closing down operations for each working day, all granular materials shall be bladed and compacted to the specified density.
 - .7 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

Each layer of granular base shall be bladed shaped and compacted as necessary to produce the required profile and cross-section. The finished surface shall not deviate at any place on a 3 m straight edge by more than 10mm for Class "A" and Class "B". The upper layer shall be maintained to these tolerances and to the

Aggregate Base Courses

specified density until compaction of the contract. This may require keeping the moisture content at the appropriate value during periods of dry weather in addition to regarding and re-compacting as frequently as may be deemed necessary by the Departmental Representative.

- .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .9 Remove and replace that portion of layer in which material becomes segregated during spreading.

.2 Compaction Equipment

- .1 Compaction equipment to be capable of obtaining required material densities.

.3 Compacting

- .1 Compact to density not less than 100% corrected maximum dry density ASTM D698.
- .2 Compaction operations shall be carried out as closely as possible behind the placing and spreading operation. At the end of each working day, all materials placed shall have been compacted to the specified density.
- .3 Each layer of material shall be graded and compacted as specified before the next layer is placed.
- .4 Where necessary to obtain the required compaction, the contractor shall apply sufficient water by means of an approved distributor.
- .5 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
- .6 Apply water as necessary during compacting to obtain specified density.
- .7 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
- .8 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.2 QUALITY ASSURANCE

- .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.

3.3 SITE TOLERANCES

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.4 PROTECTION

- .1 Maintain finished base in condition conforming to this section until succeeding material is applied or until acceptance by Departmental Representative.

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTION INCLUDES**

- .1 Materials and installation for constructing new outfall structures, precast and cast-in-place manholes and catch basins.

1.2 **RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 20 00 – Concrete Reinforcement.
- .3 Section 03 30 00 - Cast-in-Place Concrete.
- .4 Section 31 05 16 - Aggregate Materials.
- .5 Section 31 23 33.01 - Excavation, Trenching and Backfilling.

1.3 **REFERENCES**

- .1 American Society for Testing and Materials (ASTM International).
 - .1 ASTM A48/A48M, Standard Specification for Gray Iron Castings.
 - .2 ASTM C139, Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
 - .3 ASTM C478M, Specification for Precast Reinforced Concrete Manhole Sections Metric.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association (CSA International).
 - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
 - .2 CAN/CSA-G30.18-M92, Billet Steel Bars for Concrete Reinforcement.
 - .3 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.4 **MEASUREMENT FOR PAYMENT**

- .1 Catch Basins: The supply and installation of all catch basin structures will be measured by the unit secured in place. Contractor to provide all concrete, reinforcing steel, anchor bolts, nuts, washers, welding, standard frame and grate, grout, fastenings, paint, plant, equipment, and labour.

- .2 **Manhole Chambers:** The supply and installation of all manhole chambers will be measured by the unit secured in place. Contractor to provide all concrete, reinforcing steel, anchor bolts, nuts, washers, welding, standard frame and solid cover, grout, fastenings, paint, plant, equipment, and labour.

1.5 SUBMITTALS

- .1 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work. Include manufacturer's drawings, information and shop drawings where pertinent.

1.6 SCHEDULING OF WORK

- .1 Schedule work to minimize interruptions to existing services and to maintain existing flow during construction.
- .2 Submit schedule of expected interruptions for approval and adhere to approved schedule.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Cast-in-place concrete: to Section 03 30 00 - Cast-in-Place Concrete.
- .2 Concrete reinforcement: to Section 03 30 00 - Concrete Reinforcement.
- .3 Precast manhole units: to ASTM C478M, circular or oval. Top sections eccentric cone or flat slab top type with opening offset for vertical ladder installation.
- .4 Precast catch basin sections: to ASTM C478M.
- .5 Joints: to be made watertight using rubber rings.
- .6 Mortar:
 - .1 Aggregate: to CSA A82.56.
 - .2 Cement: to CAN/CSA-A8.
- .7 Ladder rungs: to CAN/CSA-G30.18, No.25M billet steel deformed bars, hot dipped galvanized to CAN/CSA-G164. Rungs to be safety pattern (drop step type).
- .8 Adjusting rings: to ASTM C478M.
- .9 Concrete Brick: to CAN3-A165 Series.
- .10 Drop manhole pipe: to be same as sewer pipe.
- .11 Steel gratings, I-beams and fasteners: as indicated.

- .12 Frames, gratings, covers to dimensions as indicated and following requirements:
- .1 Metal gratings and covers to bear evenly on frames. A frame with grating or cover to constitute one unit. Assemble and mark unit components before shipment.
 - .2 Gray iron castings: to ASTM A48/A48M, strength class 30B.
 - .3 Castings: coated with two applications of asphalt varnish or cleaned and ground to eliminate surface imperfections.
 - .4 Manhole frames and covers: heavy duty municipal type for road service; Cover cast without perforations and complete with two 25 mm square lifting holes.
- .13 Granular bedding and backfill: in accordance with Section 31 05 16 - Aggregate Materials and following requirements:
- .1 Crushed screed stone, gravel or sand.
 - .2 Granulations to be within limits specified when tested to ASTM C136. Sieve sizes to CAN/CGSB-8.1.
 - .3 TABLE

Sieve Designation	% Passing Stone/Gravel	Gravel/Sand
200 mm	-	-
75 mm	-	-
50 mm	-	-
38.1 mm	-	-
25 mm	100	-
19 mm	-	-
12.5 mm	65-90	100
9.5 mm	-	-
4.75 mm	35-55	50-100
2.00 mm	-	30-90
0.425 mm	10-25	10-50
0.180 mm	-	-
0.075 mm	0-8	0-10

- .4 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.

PART 3 **EXECUTION**

3.1 **EXCAVATION AND BACKFILL**

- .1 Excavate and backfill in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling and as indicated.
- .2 Obtain approval of Departmental Representative before installing, manholes or catch basins.

3.2 CONCRETE WORK

- .1 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Position metal inserts in accordance with dimensions and details as indicated.

3.3 INSTALLATION

- .1 Construct units in accordance with details indicated, plumb and true to alignment and grade.
- .2 Complete units as pipe laying progresses. Maximum of three units behind point of pipe laying will be allowed.
- .3 Dewater excavation to approval of Departmental Representative and remove soft and foreign material before placing concrete base.
- .4 Set precast concrete base on 150 mm minimum of granular bedding compacted to 100% corrected maximum dry density.
- .5 Precast units:
 - .1 Set bottom section of precast unit in bed of cement mortar and bond to concrete slab or base. Make each successive joint watertight with Departmental Representative approved rubber ring gaskets, bituminous compound, cement mortar, epoxy resin cement, or combination thereof.
 - .2 Clean surplus mortar and joint compounds from interior surface of unit as work progresses.
 - .3 Plug lifting holes with precast concrete plugs set in cement mortar or mastic compound.
- .6 Compact granular backfill to 95% corrected maximum dry density.
- .7 Place unshrinkable backfill in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfill.
- .8 Set frame and cover to required elevation on no more than 4 courses of brick. Make brick joints and join brick to frame with cement mortar. Parge and make smooth and watertight.
- .9 Place frame and cover on top section to elevation as indicated. If adjustment required use concrete ring.
- .10 Clean units of debris and foreign materials. Remove fins and sharp projections. Prevent debris from entering system.
- .11 Install safety platforms in manholes having depth of 5 m or greater, as indicated.

3.4 LEAKAGE TEST

- .1 Install watertight plugs or seals on inlets and outlets of each new manhole and fill manhole with water. Leakage not to exceed 0.3% per hour of volume of manhole.
- .2 If permissible leakage is exceeded, correct defects. Repeat until approved by Departmental Representative.
- .3 Departmental Representative will issue Test Certificate for each manhole passing test.
- .4 Provide copy certification of leakage test acceptance to Departmental Representative. Include certification in Commissioning Manual.

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTION INCLUDES**

- .1 Materials and installation for pipe culverts.

1.2 **RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 61 00 - Common Product Requirements.
- .3 Section 31 00 00.01 – Earth Work and Related Work.
- .4 Section 31 05 16 - Aggregate Materials.
- .5 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

1.3 **REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

1.4 **MEASUREMENT FOR PAYMENT**

- .1 Payment for pipe culverts shall be based on the length of pipe install and shall include the cost of all plant, labour, equipment, and materials required to complete the work as specified.

1.5 **SUBMITTALS**

- .1 Inform Departmental Representative at least 4 weeks prior to commencing work, of proposed source of bedding materials and provide access for sampling.
- .2 Submit manufacturer's test data and certification at least 4 weeks prior to beginning work.
- .3 Certification to be marked on pipe.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

PART 2 PRODUCTS

2.1 HIGH DENSITY POLYETHYLENE PIPE

- .1 Pressure pipe to CSA B137.1 to be supplied in 12.2 metre lengths, iron pipe size. All polyethylene pressure pipe to be joined by means of thermal butt fusion or socket fusion, in accordance with the recommendations of the manufacturer. Approved butt fusion equipment to be used and all work to be carried out by workers skilled in the use of such equipment.
- .2 Corrugated, doubled wall pipe to CSA B182.6-M92 for storm sewer. Pipes to have a smooth inner wall. Pipes may be bell and spigot style or plain end fastened with a coupling recommended by the manufacturer.

2.2 GRANULAR BEDDING AND BACKFILL

- .1 Granular bedding and backfill material to Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Crushed pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.

.2 Table

Sieve Designation	% Passing
200 mm	-
75 mm	100
50 mm	-
38.1 mm	-
25 mm	-
19 mm	-
12.5 mm	-
9.5 mm	-
4.75 mm	25-85
2.00 mm	-
0.425 mm	5-30
0.180 mm	-
0.075 mm	0-10

- .3 Concrete mixes and materials for bedding, cradles, encasement, supports: to Section 03 30 00- Cast-in-Place Concrete.

PART 3 **EXECUTION**

3.1 **TRENCHING**

- .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling.
- .2 Obtain Departmental Representative's approval of trench line and depth prior to placing bedding material or pipe.

3.2 **BEDDING**

- .1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.
- .2 Place minimum thickness of 200 mm of approved granular material on bottom of excavation and compact to minimum 95% of corrected maximum dry density.
- .3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.
- .4 Place bedding in unfrozen condition.

3.3 **LAYING HIGH DENSITY POLYETHYLENE PIPE**

- .1 Commence pipe placing at downstream end.
- .2 Lay and join pipes in accordance with manufacturer's recommendations.
- .3 Handle pipes with approved equipment.
- .4 Lay pipes on prepared bedding, true to line and grade, with pipe invert smooth and free of sags or high points. Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.
- .5 Lay pipe with outside circumferential laps facing upstream and longitudinal laps or seams at side or quarter points.
- .6 Do not allow water to flow through pipes during construction except as permitted by Departmental Representative.
- .7 Make watertight connection to manholes or other structures. Provide details of proposed method of installing pipe stubs in structure walls to ensure a watertight joint. In the case of precast manhole bases an integral joint gasket may be cast in the manhole wall to receive the pipe stub. In the case of cast-in-place manhole bases the exterior pipe surface in contact with the structure wall shall be roughened or treated to provide a bond with the concrete. Any grout used to be non-shrink type.

3.4 JOINTS

- .1 High density polyethylene pipe:
 - .1 Install gaskets as recommended by manufacturer.
 - .2 Support pipes with hand slings of crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
 - .3 Align pipes carefully before joining.
 - .4 Maintain pipe joints free from mud, silt, gravel and other foreign material.
 - .5 Avoid displacing gasket or contaminating with dirt or other foreign material. Remove disturbed or dirty gaskets; clean, lubricate and replace before joining is attempted. Use only manufacturer's recommended lubricant.
 - .6 Complete each joint before laying next length of pipe.
 - .7 Minimize joint deflection after joint has been made to avoid joint damage.
 - .8 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
 - .9 At rigid structures, install pipe joints not more than 600 mm from side of structure.

3.5 BACKFILLING

- .1 Backfill around and over culverts as indicated or as directed by Departmental Representative.
- .2 Place granular backfill material backfill material, approved by Departmental Representative, in 150 mm layers to full width, alternately on each side of culvert, so as not to displace it laterally or vertically.
- .3 Compact each layer to 95% corrected maximum dry density maximum density to ASTM D698 taking special care to obtain required density under haunches.
- .4 Protect installed culvert with minimum 600 mm cover of compacted fill before heavy equipment is permitted to cross. During construction, width of fill, at its top, to be at least twice diameter or span of pipe and with slopes not steeper than 1:2.
- .5 Place backfill in unfrozen condition.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 78 00 - Closeout Submittals.

1.2 **DEFINITIONS**

- .1 Dredging: excavating, transporting and disposing of underwater materials.
- .2 Class A material: solid rock requiring drilling and blasting to loosen, and boulders or rock fragments of individual volumes 4.0 m³ or more.
- .3 Class B material: loose or shale rock, silt, sand, quick sand, mud, shingle, gravel, clay, sand, gumbo, boulders, hardpan and debris of individual volumes less than 4.0 m³.
- .4 Obstructions: material other than Class A, having individual volumes of 4.0 m³ or more.
- .5 CPM: cubic metres place measurement. SQM: area in square metres projected horizontal. CMSM: cubic meters' scow measurement.
- .6 Debris: pieces of wood, wire rope, scrap steel, pieces of concrete and other waste materials.
- .7 Grade: plane above which material is to be dredged.
- .8 Estimated quantity:
 - .1 Volume of material calculated to be above grade and within specified side slopes unless otherwise specified
 - .2 Areas in square metres of material calculated horizontally to exist above grade and within dredge limits, unless otherwise specified.
- .9 Side slope: inclined surface or plane from subgrade at side limit of dredging area to intersect original ground line outside of side limit and to be expressed as ratio of horizontal to vertical.
- .10 Chart Datum: permanently established plane from which soundings or tide heights are referenced usually Lowest Normal Tide (LNT).
- .11 Coordinates:
 - .1 U.T.M.: universal transverse mercator projection
 - .2 M.T.M.: modified transverse mercator projection.

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- .3 U.T.M. or M.T.M Coordinates: plane rectangular coordinates used in grid system in which grid network is applied to U.T.M. or M.T.M. projection. Horizontal control information as indicated.
- .12 Minimum Mode: mode of operation of hydrographic survey equipment where minimum sounding over length of travel between position updates will be retained in memory. Soundings taken in this mode may be shallower than actual bottom elevations due to variations in water depths due to wave action.
- .13 Matrix Block: each dredge area is presented as number of 2.4 x 2.4 m long blocks. Dependent on position of sounding, block may have 1 to 6 soundings contained within it.
- .14 Least of Minimum Plan: hydrographic survey plan in which least sounding in grouping of matrix blocks is plotted.
- .15 Instanteous Mode: mode of operation of hydrographic survey equipment where only sounding observed at predetermined distance interval is retained in memory.
- .16 Average of Instanteous Plan: hydrographic survey plan in which average sounding in appropriate grouping of matrix blocks is plotted.
- .17 Lowest Normal Tide (LNT): plane so low that tide will seldom fall below it.
- .18 Cleared Area: area of dredging accepted as achieving the required grade and verified by a PWGSC survey.

1.3 SUBMITTALS

- .1 Submit to Departmental Representative for approval, six weeks before blasting, details of proposed blasting operations showing types and quantities of explosives, loading charges and patterns, type of blasting caps, blasting techniques, blast protection measures, time of blasting and other pertinent details. Submit subsequent changes to Departmental Representative before proceeding.
- .2 Submit to Departmental Representative complete photographic and descriptive record of buildings, roads and structures in general area of Project Work, before blasting is started. Describe buildings both inside and out. Record existing cracks in walls or structural components.

1.4 REGULATORY REQUIREMENTS

- .1 Comply with municipal, provincial and national codes and regulations relating to project.
- .2 Mark floating equipment with lights in accordance with the provisions of the Canada Shipping Act Collision Regulations and Notices to Mariners.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

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- .2 Contaminated sediments must be disposed of in confined disposal facility capped disposal site.
- .3 Metals, wood and recyclable materials removed during the dredging activities must be diverted appropriate recycling facilities.

1.6 SCHEDULING

- .1 Submit to Departmental Representative, within 2 weeks after acceptance of bid, schedule of work including time periods during which each operation involved in Work will be undertaken. At time of submission of schedule, meet with Departmental Representative to review schedule.
- .2 Adhere to schedule and take immediate action to correct any slippage by effectively altering existing dredging operations or mobilizing other equipment. Notify Departmental Representative of corrective action to be taken.

1.7 LOCATION

- .1 Work comprises dredging of areas as indicated.

1.8 INTERFERENCE TO NAVIGATION

- .1 Be familiar with vessel movements and fishery activities in area affected by dredging operations. Plan and execute Work in manner that will not interfere with fishing operations, marine operations and construction activities at wharf sites, or access to wharves by land or water.
- .2 Departmental Representative will not be responsible for loss of time, equipment, material or any other cost related to interference with moored vessels in harbour or due to other Contractor's operations.
- .3 Keep the Marine Communications and Traffic Services' Centre, Fisheries and Oceans Canada, informed of dredging operations in order that necessary Notices to Mariners will be issued.

1.9 DATUM, WATER GAUGES AND TARGETS

- .1 Elevations used in this specification and contract drawings are in metres referred to UTM datum.
- .2 Areas to be dredged are to be referenced to vertical bench marks for each location of dredging as indicated.

1.10 FLOATING PLANT

- .1 Dredges or other floating plants to be employed on this Work, to be of Canadian registry, make or manufacture, or, must receive certificate of qualification from Industry Canada,

Aerospace, Defence and Marine Branch and this certificate to accompany bid submission.

- .2 Requests for certification in format of form PWGSC-TPSGC 2843 (06/2007) attached to the Bid and Acceptance Form to be directed to Mr. Emile Rochon, Aerospace, Defence and Marine Branch, Industry Canada, CD Howe Building -Room 733C, 235 Queen Street, Ottawa, Ontario, K1A 0H5, and to be received there not less than 14 days prior to bid closing.

1.11 INSPECTION OF SITE

- .1 Contractor to visit site of Work and become thoroughly familiar with extent and nature of Work and conditions affecting Work before bidding.

1.12 SITE INFORMATION

- .1 Results of prior soundings, are included in the drawing.
- .2 Results of prior soundings are made available for bidding purposes only. It should be noted that this information may differ from site condition. Take this into consideration when submitting bid.
- .3 Take necessary steps to become fully familiar with potential inclement weather and sea conditions in this area.

1.13 SURVEY REQUIREMENTS

- .1 Provide, at own expense, survey vessel, equipment and crew to set up and maintain control for location of dredge limits and to sound areas immediately after dredging to verify that grade depth has been attained. Areas are to be sounded to provide sounding printout display of at least 2.4 x 2.4 m UTM grid to approval of Departmental Representative.

1.14 SURVEYS AND ACCEPTANCE OF WORK

- .1 As soon as practical after acceptance of bid, Departmental Representative will complete pre-dredge survey of all dredge area locations Contractor has 7 days to accept sounding survey in contract. If any differences are found, Departmental Representative will complete new pre-dredge survey of all dredge area locations within 7 days of the request. Survey will be by electronic survey equipment sounding in instantaneous mode. Survey plan at 1:250 scale plotting average of instantaneous depths obtained in this survey will define actual pre-dredge seabed areas.
- .2 No area will be dredged prior to Departmental Representative and Contractor's mutual acceptance of pre-dredge survey for that area.
- .3 Post-dredge survey will be undertaken by Departmental Representative upon completion of dredging. Survey will confirm if dredging is completed as specified and whether area can be considered cleared area. Survey will be by electronic sweep equipment. Survey

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plan at 1:250 plotting least of minimum depths obtained in this survey will identify areas requiring reworking to obtain following elevations using least of minimum mode.

- .4 Contractor to redredge as necessary to remove all material within dredge areas which is found to be above grade.
- .5 One additional survey will be undertaken at Departmental Representative's cost, for those areas not meeting acceptance criteria for dredging. All additional surveys required to clear areas will be undertaken by the Departmental Representative at Contractor's cost.

1.15 MEASUREMENT FOR PAYMENT

- .1 The dredge area is defined by the grade plane contour line and the side slopes as shown on the drawings and in the specifications. Only material excavated above grade plane and within side slopes indicated or specified will be measured.
- .2 Class B Dredging: will be measured in cubic metres (m³), determined in-place measurement from existing seabed elevation established from the current sounding survey down to the grade depth elevation. Quantities will be determined by a sounding survey performed by the PWGSC Survey Crew using electronic sounding and DPGS positioning equipment. PWGSC will perform only one survey to quantify the amount of Class "B" material which has been removed. If in the opinion of the Departmental Representative all Class "B" material has not been removed, the Contractor will redredge. PWGSC will perform a second survey to quantify the amount of Class "B" material, and the second survey will be at the Contractor's expense. The Contractor will formally request at least seven (7) days in advance that all Class "B" material has been removed and the site is ready for the PWGSC survey crew.
- .3 Obstructions.
 - .1 Removal of obstructions, authorized by Departmental Representative will not be measured separately for payment and will be included in unit price for dredging.
- .4 All operations in connection with field positioning of dredging equipment will not be measured separately for payment.
- .5 No separate payment will be made for Contractor's survey vessel, equipment and crew or diving services.
- .6 Payment will include disposal of dredge material, using water tight boxes, at locations specified or as directed by the Departmental Representative.
- .7 Payment will include disposal of dredge material, using water tight boxes, at locations specified or as directed by the Departmental Representative.
- .8 There will be no additional payment for delays and/or downtime for vessel traffic, fishery operations, marine operations, during periods when no dredging is permitted. Contractor should contact the Harbour Authority to determine schedules of operations.

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- .9 There will be no additional payment for downtime and for delays caused by vessel traffic.
- .10 Removal of infilling material will not be measured for payment.
- .11 No separate payment will be made for sweeping.
- .12 The contractor will be responsible for acquiring permits to operate his equipment on or near private structures and wharves on government wharves. There will be no additional payment for this item.
- .13 The contractor to dispose of all unsuitable material at the Regional Dump including transportation, tipping fees, and whatever work required to bury old creosote crib timber at locations specified or as directed by Departmental Representative.

PART 2 PRODUCTS

2.1 DREDGING EQUIPMENT

- .1 Contractor to determine required equipment necessary to dredge material specified and to dispose of dredged material at approved waste site.

PART 3 EXECUTION

3.1 GENERAL

- .1 Mark floating equipment with lights in accordance with the provisions of the Canada Shipping Act Collision Regulations and maintain radio watch on board.
- .2 Place and maintain buoys, markers and lights required to define work and disposal areas.
- .3 Lay out Work from control points and baselines established by Departmental Representative. Be responsible for accuracy of Work relative to established bench marks. Provide and maintain electronic position fixing and distance measuring equipment, laser transits and such other equipment as normally required for accurate dredging control.
- .4 Establish and maintain tide boards in order that proper depth of dredging can be determined. Locate tide boards so as to be clearly visible.
- .5 Establish and maintain on-land targets for location and definition of designated dredge area limits. Targets to be suitable for control of dredging operations and locating soundings. Remove targets on completion of Work.
- .6 Dredge area to grade depth of as indicated on plans.
- .7 Dredge side slopes to 1.5 horizontal to one vertical in Class B material.

Dredging

- .8 Remove materials above specified grade depths, within limits indicated. Material removed from below grade depth or outside specified area or side slope is not part of Work.
- .9 Remove shoaling which occurs as a result of work at no expense to Owner.
- .10 Remove material cast-over on surrounding area and dispose of it as dredged material. Do not cast-over material unless authorized by Departmental Representative.
- .11 Remove infilling in dredge areas which occurs prior to acceptance of Departmental Representative.
- .12 Immediately notify Departmental Representative upon encountering an object which might be classified as an obstruction. By-pass object after clearly marking its location and continue work.

3.2 DISPOSAL OF DREDGED MATERIAL

- .1 Dispose of dredged material by depositing in approved disposal areas in manner approved by Departmental Representative.

3.3 DREDGING IN VICINITY OF STRUCTURES

- .1 Do not dredge material from areas lying within 3 m of existing structure unless authorized by Departmental Representative.

3.4 SWEEPING

- .1 Sweep dredged areas on completion of dredging to confirm that grade depth has been achieved.
- .2 Sweeping equipment to consist of heavy steel beam suspended from scow at required grade depth or other approved method. Beam to be capable of adjustment and calibration and approved by Departmental Representative.
- .3 If, as result of incomplete Work, additional verification of depths by sounding or sweeping becomes necessary, additional costs involved shall be paid by Contractor.

3.5 RE-DREDGING

- .1 Re-dredge unsatisfactory Work and verify depths with additional sounding or sweeping to approval of Departmental Representative.

3.6 CO-OPERATION AND ASSISTANCE TO DEPARTMENTAL REPRESENTATIVE

- .1 Co-operate with Departmental Representative on inspection of 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 supervise Work. Volume of material transported in partially filled scows will be determined by Departmental Representative.

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTION INCLUDES**

- .1 This section specifies the requirements for the placing of stone scour protection for erosion control at locations and to details indicated or directed by the Engineer.

1.2 **MEASUREMENT FOR PAYMENT**

- .1 Payment for supply and installation of stone scour protection will be measured in cubic meters of material and supplied and placed (CMPM) in the work within the limits specified on the drawings.
- .2 There will be no payment made for any material or stone placed beyond limits indicated on the drawings. The final contract grade must be within 200 mm of the specific elevation. Quantities will be based on an as-built survey. Any material placed outside the lines and grades as shown on the drawings will not be measured.
- .3 There will be no additional payment for delays resulting from fishing operations.
- .4 There will be no additional payment for delays caused by vessel traffic.
- .5 There will be no additional payment for downtime
- .6 There will be no payment for any stone that is washed out, removed, missing or deteriorated by weather or wave action.
- .7 Contractor is to provide cross sections to the Departmental Representative at 10 metre stations to show that lines and grades have been achieved as shown on the drawings over each type of material. Measurement for payment for this will be considered included in the cost of the supply and installation of the materials. There will be no separate payment.
- .8 Construction and maintenance of haul roads will not be measured for payment.
- .9 Transportation of material to placemat site, access to placement site, and excavation for and preparation of foundation base not to be measured for payment but considered incidental to work and included in the Schedule of Quantities and Prices.

PART 2 **PRODUCTS**

2.1 **STONE SCOUR PROTECTION**

- .1 Stones shall consist of clean, hard durable rock having a density not less than 2.6 tonne/m³. The rock material is subject to the Los Angeles Abrasion Test (ASTM C131-81) shall have a loss not greater than 35%. When tested for soundness, five cycles of magnesium sulphate, ASTM C88-83, the rock material shall have a loss not greater than 15%.

- .2 Stones shall be of an angular shape, and be of a uniform gradation. The least dimension of any stone shall not be less than one quarter of the greatest dimension.
- .3 Individual stones shall be of a weight, or of a volume that is not less than that specified in the contract item in the Schedule of Quantities and Prices.

PART 3 EXECUTION

3.1 PLACING

- .1 Stone scour protection shall be placed within the limits as indicated on the design documents.
- .2 The Contractor shall prepare a foundation for the stone scour protection by excavating a seat in the existing ground.
- .3 Excavation shall be by means of a backhoe, or a clam as required, to carry out the excavation for the seat at the required location and to sufficient depth to provide a proper footing for the stone scour protection.
- .4 Stones shall be placed by a crane, or similar equipment, starting at the bottom of the slope and working upwards.
- .5 No pushing or dumping of the stones by bulldozers or other equipment will be allowed.
- .6 The Contractor shall choose the stones and place them in such a way that the whole structure will be bound and consolidated to as great an extent as the nature of the rock will allow. Placing shall be done in such a manner that the surface of the stone treated slope shall have a uniform appearance. The thickness of the treated slope shall not be less than that specified in the item in the Schedule of Quantities and Prices.
- .7 Care shall be taken by the Contractor to ensure that no stones are placed outside of the specified limits.
- .8 If stones are placed outside of the area to be treated or are washed out of place during construction, then they shall be removed or replaced by the Contractor at his own expense.

3.2 TOLERANCES

- .1 These tolerances are not to be considered pay limits but are specified to ensure Contractor keeps with acceptable lines and grades.
- .2 Completed component layers to be with the following tolerances of lines and grades indicated:
 - .1 Stone scour protection: +/- 300mm.

END OF SECTION

Mooring Devices

PART 1 **GENERAL**

1.1 **DESCRIPTION**

- .1 This section specifies the requirements for supply and installation of mooring devices as follows:
 - .1 Supply and installation of Type "BI" mooring cleats.
 - .2 Supply and installation of Type "A" mooring cleats.

1.2 **RELATED WORK**

- .1 Section 02 41 16 - Sitework, Demolition, and Removal.
- .2 Section 03 10 00 - Concrete Forming and Accessories.
- .3 Section 03 20 00 - Concrete Reinforcing.
- .4 Section 03 30 00 - Cast-in-Place Concrete.

1.3 **MEASUREMENT FOR PAYMENT**

- .1 Mooring Cleats - Type "A": The supply and installation of Type "A" mooring cleats, including reinforced concrete block and pedestal, will be measured by the unit secured in place. Contractor to provide all concrete, reinforcing steel, anchor bolts, nuts, washers, welding, grout, fastenings, paint, plant, equipment, and labour.
- .2 Mooring Cleats - Type "BI": The supply and installation of Type "BI" mooring cleats, including reinforced concrete pedestal, will be measured by the unit secured in place. Contractor to provide all concrete, reinforcing steel, anchor bolts, nuts, washers, grout, fastenings, paint, plant, equipment, and labour.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Mooring Devices:
 - .1 Mooring Cleats Type "A": carbon cast steel, 225 kg weight as dimensioned on the attached drawing.
 - .2 Mooring Cleats Type "BI": galvanized cast iron cleats, 36.2 kg weight as dimensioned on the attached drawing.
 - .3 Anchor Bolts and Nuts: to ASTM A307, galvanized.
 - .4 Non-Shrink Grout: pre-mixed compound of non-metallic aggregate and plasticizing agents, capable of developing minimum compressive strength of 50 MPa at 28 days.
 - .5 Galvanizing: to CSA G164, minimum zinc coating 610 g/m².

Mooring Devices

- .6 Welding: to CSA W59.
- .7 Sealer: to Section 07 92 10.
- .8 Concrete: to Section 03 30 00.
- .9 Concrete Reinforcement: to CSA G30.12M, Grade 400.
- .10 Primer: Alkyd undercoat, exterior oil ferrous metal primer, similar to Pittsburgh 6-208.
- .11 Paint: Alkyd/Oil Resin paint similar to Pittsburgh Paints "Brilliant Red (Safety Red)" Product ID 7-801. Paint to conform to CAN/CGSB-1.61-2004.

2.2 SHOP DRAWINGS

- .1 Submit fabricator's shop drawings on cleats in accordance with Section 01 33 00 - Submittal Procedures.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Mooring Cleats - Type "B1":
 - .1 Install concrete cleat block for Type "B1" cleats as per attached drawings.
 - .2 Install concrete cleat blocks monolithically with deck.
 - .3 Secure cleats with 25 mm diameter anchor bolts of lengths required complete with associated nuts and washers.
 - .4 After cleat installation is complete, bolt holes in cleats to be filled with approved waterproofing compound.
- .2 Mooring Cleats - Type "A":
 - .1 Install concrete cleat block and pedestal for Type "A" mooring cleat as per the drawings.
 - .2 Install concrete cleat blocks monolithically with deck.
 - .3 Secure cleats with 25 mm diameter anchor bolts of lengths required complete with associated nuts and washers.
 - .4 After cleat installation is complete, bolt holes in cleats to be filled with approved waterproofing compound.

3.2 GROUT

- .1 Set all mooring cleats at locations and elevations indicated or as directed by the Departmental Representative. Grout under base of cleat using a non-shrink, non-metallic type of grout after tightening of anchor bolts or positioning wedges. Grout must be approved by Departmental Representative. Fill anchor bolt holes with approved sealer. Ensure that temperatures of foundation, air, base and grout are within range specified by grout manufacturers.
- .2 Do not grout until approval given by Departmental Representative.

END OF SECTION