

ISSUED FOR TENDER

SPECIFICATIONS

CAPE PINE ACCESS ROAD UPGRADES

P/N: F6879-154016

OWNER/AGENT

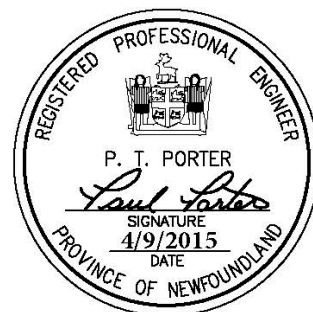
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DATE: September 2015

PROVINCE OF NEWFOUNDLAND AND LABRADOR	
 Professional Engineers and Geoscientists	PERMIT HOLDER This Permit Allows
NEWFOUNDLAND DESIGN ASSOCIATES LIMITED	
To practice Professional Engineering in Newfoundland and Labrador. Permit No. as issued by PEG D0184 which is valid for the year 2015.	



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PART 1 **GENERAL**

1.1 **SCOPE**

- .1 The work covered under this contract consists of the furnishing of all plant, labour, equipment and material for scarifying and grading and installing granulars along approximately 1.2 km portions of the 8.5 km gravel access road to the Cape Pine Lightstation from St. Shotts Road, NL. Including removal and replacement of 13 culverts along the route in strict accordance with the specifications and accompanying drawings and subject to all terms and condition of contract.

1.2 **DESCRIPTION OF WORK**

- .1 Work of this contract comprises of, but not limited to, the following:
 - .1 Scarifying and grading select areas of existing gravel road.
 - .2 Supplying and installing granular road surface..
 - .3 Removal and replacement of culverts as indicated by drawings.

1.3 **SITE OF WORK**

- .1 Work will be carried out at access road to the Cape Pine Lightstation, from St. Shotts Road, NL.

1.4 **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, the exposure and the 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. No allowance shall be made subsequently in this connection on account of error or negligence to properly observe and determine the conditions that will apply.
- .2 Contractors, bidders or those they invite to site are to review specification Section 01 35 29 - Health and Safety Requirements before visiting site. Take all appropriate safety measures for any visit to site, either before or after acceptance of bid.
- .3 Obtain prior permission from the Departmental Representative before carrying out such site inspection.

PART 2 **PRODUCTS (NOT APPLICABLE)**

PART 3 **EXECUTION (NOT APPLICABLE)**

END OF SECTION

PART 1 **GENERAL**

1.1 **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. No allowance shall be made subsequently in this connection on account of error or negligence to properly observe and determine the conditions that will apply.
- .2 Contractors, bidders or those they invite to site are to review specification Section 01 35 29 – Health and Safety Requirements before visiting site. Take all appropriate safety measures for any visit to site, either before or after acceptance of bid.
- .3 Obtain prior permission from the Departmental Representative before carrying out such site inspection.

1.2 **WORK SCHEDULE**

- .1 Immediately upon award of contract, Contractor will submit a schedule of work to Department Representative. Each entry will show an intended start and completion date using a horizontal bar graph chart.
- .2 Should Contractor find that he cannot maintain schedule as he originally intended, he will immediately submit a revised schedule without being requested to do so by Departmental Representative.
- .3 All work on the project will be completed within the time indicated as shown on the Tender and Acceptance/Construction Tender Form.

1.3 **WORK BY OTHERS**

- .1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from Engineer.
- .2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Engineer, in writing, any defects which may interfere with proper execution of Work.

1.4 **CONTRACTOR USE OF PREMISES**

- .1 Unrestricted use of site until Substantial Performance.
- .2 Remove or alter existing work to prevent injury or damage to portions of existing work which remain, with approval of Engineer.
- .3 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Engineer.
- .4 At completion of operations condition of existing work: shall be equal to or better than that which existed before new work started.

1.5 OCCUPANCY

- .1 The premises will be occupied during entire construction.
- .2 Co-operate with tenant in scheduling operations to minimize conflict and to facilitate Owner usage, if required.

1.6 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy of each document as follows:
 - .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 Health and Safety Plan and Other Safety Related Documents.
 - .11 Other documents as specified.

1.7 TERM ENGINEER

- .1 Unless specifically stated otherwise, the term Engineer where used in the Specifications or Drawings shall mean the Departmental Representative as defined in 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 the Departmental Representative.
- .3 Provide devices needed to layout and construct work.
- .4 Supply such devices as straight edges and templates required to facilitate the 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 the Departmental Representative and aggregating contract price. Departmental Representative will provide the required forms for application of progress payment.
- .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 the Departmental Representative.

- .3 Upon approval by the Departmental Representative, cost breakdown will be used as basis for progress payment.

1.10 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.

1.11 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.

1.12 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 The 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.

1.13 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 the Departmental Representative and at no cost to Canada.

1.14 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 and tenant operations.
- .2 Before commencing work, establish location and extent of service lines in area of work and notify the Departmental Representative of findings.
- .3 Submit schedule to and obtain approval from the 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 the 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 the 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.

1.15 PERMITS

- .1 Obtain and pay for all permits, certificates and licenses as required by Municipal, Provincial, Federal and other Authorities.
- .2 Provide appropriate notifications of project to municipal and provincial inspection authorities.
- .3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.
- .4 Submit to the Departmental Representative, copy of application submissions and approval documents received for above referenced authorities.
- .5 Submit to the Departmental Representative, copy of quarry permit, if applicable, prior to start of quarry operations.
- .6 Comply with all requirements, recommendations and advise by all regulatory authorities unless otherwise agreed in writing by the Departmental Representative. Make requests for such deviations to these requirements sufficiently in advance of related work.

1.16 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.

1.17 EXISTING SUB-SURFACE CONDITIONS

- .1 No Information pertaining to the existing sub-surface conditions are available. Contractor to visit site and make own assessment of existing sub-surface conditions.

1.18 ACCEPTANCE

- .1 Prior to the issuance of the Certificate of Substantial Performance, in company with the Departmental Representative, make a check of all work. Correct all discrepancies before final inspection and acceptance.

1.19 CONTRACTOR'S USE OF SITE

- .1 Construction operations, including storage of materials for this contract, not to interfere with the activity and/or operations at this facility.
- .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 the Departmental Representative.
- .3 Contractor will take adequate precautions to protect existing facilities and features.
- .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 the Departmental Representative.

1.20 WORK COMMENCEMENT

- .1 Mobilization to project site is to commence immediately after acceptance of bid and submission of Site Specific Safety Plan, unless otherwise agreed by the Departmental Representative.
- .2 Project work on site is to commence as soon as possible, with a continuous reasonable work force, unless otherwise agreed by the 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.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

PART 1 **GENERAL**

1.1 **ACCESS AND EGRESS**

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas accordance with relevant municipal, provincial and other regulations.

1.2 **USE OF SITE AND FACILITIES**

- .1 Where security is reduced by work provide temporary means to maintain security.
- .2 Contractor will be responsible for sanitary facilities for Contractor's personnel, and for maintenance of these facilities.

1.3 **SPECIAL REQUIREMENTS**

- .1 Submit schedule in form of Bar (GANNT) Chart.
- .2 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .3 Keep within limits of work and avenues of ingress and egress.

PART 2 **PRODUCTS**

NOT USED

PART 3 **EXECUTION**

NOT USED

END OF SECTION

PART 1 **GENERAL**

1.1 **ADMINISTRATIVE**

- .1 Submit to Engineer submittals listed 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 extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .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 Engineer. 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 considered rejected.
- .6 Notify Engineer 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 co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Engineer's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Engineer's review.
- .10 Keep one reviewed copy of each submission on site.

1.2 **SHOP DRAWINGS AND PRODUCT DATA**

- .1 Refer to CCDC 2 GC 3.11.
- .2 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.
- .3 Indicate materials, methods of construction and explanatory notes and other information necessary for completion of Work. Indicate cross references to design drawings and specifications.
- .4 Allow fifteen (15) working days for Engineer's review of each submission.
- .5 Adjustments made on shop drawings by Engineer are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Engineer prior to proceeding with Work.
- .6 Make changes in shop drawings as Engineer may require, consistent with Contract Documents. When resubmitting, notify Engineer in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, in 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.
- .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 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 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .9 After Engineer's review, distribute copies.
- .10 Submit two reproducible copies or one electronic copy of shop drawings for each requirement requested in specification Sections and as Engineer may reasonably request.
- .11 Submit two reproducible copies or one electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Engineer where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit two reproducible copies or one electronic copy of test reports for requirements requested in specification Sections and as requested by Engineer.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 2 years of date of contract award for project.
- .13 Submit two reproducible copies or one electronic copy of certificates for requirements requested in specification Sections and as requested by Engineer.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit two reproducible copies or one electronic copy of manufacturer's instructions for requirements requested in specification Sections and as requested by Engineer.

- .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit two reproducible copies or one electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Engineer.
 - .1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .16 Submit two reproducible copies or one electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Engineer.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 If upon review by Engineer, 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.

1.3 SAMPLES

- .1 Submit for review samples as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Engineer's business address site office.
- .3 Notify Engineer in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Engineer are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Engineer prior to proceeding with Work.
- .6 Make changes in samples which Engineer may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 MOCK-UPS

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

1.5 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 Code and standards referenced in this section refer to the latest edition thereof.
- .2 Canadian Standards Association (CSA)
 - .1 CSA S269.1 Falsework for Construction Purposes.
 - .2 CAN/CSA-Z259.1 Safety Belts and Lanyards.
 - .3 CAN/CSA-Z259.10 Full body Harnesses.
 - .4 CAN/CSA-Z259.11 Shock Absorbers for Personal Fall Arrest Systems.
 - .5 CAN/CSA-Z259.2, Fall Arresting Devices, Personnel Lowering Devices and Lifelines.
 - .6 FCC No. 301 Standard for Construction Operations.
 - .7 CSA Z275.2 Occupational Safety Code for Diving Operations.
 - .8 CSA Z275.4 Competency Standard for Divers Operations.
- .3 FCC No. 302 Standard for Welding and Cutting.
- .4 Transportation of Dangerous Goods Act Regulations.
- .5 Newfoundland Occupational Health and Safety Act, Amended
- .6 Consolidated Newfoundland and Regulations 1149 WMIS Regulations Under the Occupational Health and Safety Act
- .7 Consolidated Newfoundland and Regulations 1165 Occupational Health and Safety Regulations under the Occupational Health and Safety Act.
- .8 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .9 National Building Code of Canada.

1.2 **RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 35 43 - Environmental Procedures

1.3 **SUBMITTALS**

- .1 Acceptance of the Project Health and Safety Risk Assessment and Management 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.
- .2 The Departmental Representative makes no representation and provides no warranty for the accuracy, completeness and legislative compliance of the Project Health and Safety Risk Management Plan and other submitted documents by this acceptance.
- .3 Responsibility for errors and omissions in the Project Health and Safety risk Assessment and Management Plan and other submitted documents is not relieved by acceptance by the Departmental Representative.

- 1.4 OCCUPATIONAL HEALTH AND SAFETY (PROJECT HEALTH AND SAFETY RISK ASSESSMENT AND MANAGEMENT PLANS)**
- .1 Conduct operations in accordance with latest edition of the Newfoundland Occupational Health and Safety (OH&S) Act and Regulations.
 - .2 Prepare a detailed Project Health and Safety Risk Assessment and Management Plan for the Departmental Representative. Assessment 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 Project Health and Safety Risk Assessment and Management Plan to the Departmental Representative.
 - .4 The written Health and Safety Risk Assessment and Management Plan shall incorporate the following:
 - .1 A site-specific health and safety plan, refer to clause 1.5 Site-Specific Health and Safety Risk Assessment and Management Plan of this section for requirements.
 - .2 An organizational structure which shall establish the specific chain of command and specify the overall responsibilities of contractors employees at the work site.
 - .3 A comprehensive workplan 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, and
 - .3 Establish site specific training and notification requirements and schedules.
 - .4 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.
 - .5 An emergency response procedure, refer to Clause 1.6 Supervision and Emergency Response Procedure of this section for requirements.
 - .6 A hazard communication program for informing workers, visitors and individuals outside of the work area as required.
 - .7 A diving program which shall contain standard operating procedures to be followed in the diving operation.
 - .8 A health and safety training program.
 - .9 General safety rules.
 - .5 Periodically review and modify as required each component of the Project Health and Safety Risk Assessment and Management Plan when a new hazard is identified during completion of work and when an error or omission is identified in any part of the Project Health and Safety Risk Assessment and Management Plan.
 - .6 Implement all requirements of the Project Health and Safety Risk Assessment and Management Plan.
 - .1 Ensure that every person entering the project site is informed of requirements under the Project Health and Safety Risk Assessment and Management Plan.

- .2 Take all necessary measures to immediately implement any engineering controls, administrative contacts, personal protective equipment required or termination of work procedures to ensure compliance with the Project Health and Safety Risk Assessment and Management Plan.

1.5 SITE SPECIFIC HEALTH AND SAFETY PLAN

- .1 Prepare a detailed site Specific Project Health and Safety Plan which shall:
 - .1 Contain certain hazard assessment results.
 - .2 Identify 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.
- .2 Review for completeness the hazard assessment results 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, evaluation and managing any report of actual or potential hazards.
 - .2 Retain copies of all completed hazard assessments at the project site and make available to the Engineer/Architect immediately upon request.

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 OH&S Act and Regulations
- .2 Assign a sufficient number of supervisory personnel to the work site.
- .3 Provide a suitable means of communications 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.
- .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 First Aid Regulations.

1.7 CONTRACTORS SAFETY OFFICER

- .1 The contractor's Safety Officer will be solely responsible for the implementation and monitoring of the Project Health and Safety Risk Assessment and Management Plan, and will have the authority to implement health and safety changes as directed by the Departmental Representative. The Safety Officer shall have as a minimum:
 - .1 Completed training in hazardous occurrence management and response/protocols.
 - .2 Completed training in the use, maintenance of fall protection systems.
 - .3 Completed training in the design and construction of scaffolding.
 - .4 Completed training in confined space entry protocols and techniques.
 - .5 Completed training in First Aid.
 - .6 Have working knowledge of occupational safety and health regulations.
 - .7 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .8 Be responsible for implementing, enforcing daily and monitoring site specific Contractor's Health and Safety Plan.
 - .9 Be on site during execution of Work and report directly to and be under direction of site supervisor.

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.
- .2 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.
- .3 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.

1.9 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.

1.10 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 Acts and Regulations of Province having jurisdiction. Advise the Departmental Representative verbally and in writing.

1.11 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:
 - .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 the 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 health and Safety Risk Assessment and Management 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.

1.12 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 and 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 Health and Safety Risk Assessment and Management Plan.
- .3 Provide Departmental Representative with copies of all orders, directions and any other documentation, issued by the Provincial Department of Government Services, Occupational Health and Safety branch immediately after receipt.

1.13 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Federal, Province and authority having jurisdiction, and in consultation with the Departmental Representative.

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 The contractor shall, prior to the commencement of work, notify in writing the Work Place Health and Safety Division, Department of Labour 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 Health and Safety Risk Assessment and Management 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 the Departmental Representative.
- .2 Provide the Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 The Departmental Representative may stop work if non-compliance of health and safety regulations is not corrected.

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.
- .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.
- .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 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 and maintain scaffolding in accordance with CSA S269.2 and Sections 91-97 of the OH&S Act and Regulations.
- .2 Ensure that fall-restraint or fall-arrest devices are used by all workers working at elevations greater than 3.05 metres above grade or floor level in accordance with CSA Z259.

1.21 PERSONAL PROTECTIVE EQUIPMENT

- .1 Ensure workers on the jobsite use personal protective equipment appropriate to the hazards identified in the Risk Assessment and Management 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.
- .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 one half (½) the IDLH concentration.
 - .2 Respiratory protection shall be provided in accordance with the requirements of the Occupational Health and Safety Branch, Department of Labour of the Province of Newfoundland and Labrador these specifications.
 - .3 Establish, implement and maintain a respirator inspection and maintenance program.
 - .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.

- .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.

1.22 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.

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 the Department of Labour's "Trench Excavation Safety Guide".

1.23 CONFINED SPACE WORK

- .1 Comply with requirements of Canada Occupational Safety and Health Regulations, Part XI and Consolidated Regulations Newfoundland and Labrador (CRNL) OH&S 1165/96.
- .2 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.
- .3 Develop a confined space entry 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.
 - .1 Ensure that personal protective equipment and emergency rescue equipment appropriate to the nature of the work being performed is provided and used.
- .4 Provide and maintain training of workers, as required by the Federal and Provincial Legislation.
- .5 Provide the Departmental Representative with a copy of an "Entry Permit" for each entry into the confined space to ensure compliance with Federal and Provincial Legislation.

1.24 HAZARDOUS MATERIALS

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

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

1.25 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.
- .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.

1.26 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 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.

1.27 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.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

PART 1 **GENERAL**

1.1 **DEFINITIONS**

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2 **FIRES**

- .1 Fires and burning of rubbish on site permitted only when approved by Engineer.
- .2 Where fires or burning permitted, prevent staining or smoke damage to structures, materials or vegetation which is to be preserved. Restore, clean and return to new condition stained or damaged work.
- .3 Provide supervision, attendance and fire protection measures as directed.

1.3 **DISPOSAL OF WASTES**

- .1 Do not bury rubbish and waste materials on site unless approved by Engineer.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways.

1.4 **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.

1.5 **SITE CLEARING AND PLANT PROTECTION**

- .1 Protect trees and plants on site and adjacent properties where indicated.
- .2 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.
- .3 Minimize stripping of topsoil and vegetation.
- .4 Restrict tree removal to areas indicated or designated by Engineer.

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 and waterways 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 Engineer will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Engineer of proposed corrective action and take such action for approval by Engineer.
- .3 Engineer will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

1.8 MEASURES TO AVOID CAUSING HARM TO FISH AND FISH HABITAT

- .1 Timing
 - .1 Time work in water to respect timing windows to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed.
 - .2 Minimize duration of in-water work.
 - .3 Conduct instream work during periods of low flow, or at low tide, to further reduce the risk to fish and their habitat or to allow work in water to be isolated from flows.
 - .4 Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.
- .2 Site Selection
 - .1 Design and plan activities and works in waterbody such that loss or disturbance to aquatic habitat is minimized and sensitive spawning habitats are avoided.
 - .2 Design and construct approaches to the waterbody such that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation.
 - .3 Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in erosion and scouring of the stream bed or the built structures.
 - .4 Undertake all instream activities in isolation of open or flowing water to maintain the natural flow of water downstream and avoid introducing sediment into the watercourse.
- .3 Contaminant and Spill Management
 - .1 Plan activities near water such that materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, poured concrete or other chemicals do not enter the watercourse.
 - .2 Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance and keep an emergency spill kit on site.
 - .3 Ensure that building material used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.

- .4 Erosion and Sediment Control
 - .1 Develop and implement an Erosion and Sediment Control Plan for the site that minimizes risk of sedimentation of the waterbody during all phases of the project. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear. The plan should, where applicable, include:
 - .1 Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the water body. Contractor shall submit erosion and sedimentation control plan prior to construction.
 - .2 Measures for managing water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering a waterbody. For example, pumping/diversion of water to a vegetated area, construction of a settling basin or other filtration system.
 - .3 Site isolation measures (e.g., silt boom or silt curtain) for containing suspended sediment where in-water work is required.
 - .4 Measures for containing and stabilizing waste material above the high water mark of nearby waterbodies to prevent re-entry.
 - .5 Regular inspection and maintenance of erosion and sediment control measures and structures during the course of construction.
 - .6 Repairs to erosion and sediment control measures and structures if damage occurs.
 - .7 Removal of non-biodegradable erosion and sediment control materials once site is stabilized.
- .5 Shoreline/Bank Re-vegetation and Stabilization
 - .1 Clearing of riparian vegetation should be kept to a minimum: use existing trails, roads or cut lines wherever possible to avoid disturbance to the riparian vegetation and prevent soil compaction. When practicable, prune or top the vegetation instead of grubbing/uprooting.
 - .2 Minimize the removal of natural woody debris, rocks, sand or other materials from the banks, the shoreline or the bed of the waterbody below the ordinary high water mark. If material is removed from the waterbody, set it aside and return it to the original location once construction activities are completed.
 - .3 Immediately stabilize shoreline or banks disturbed by any activity associated with the project to prevent erosion and/or sedimentation, preferably through re-vegetation with native species suitable for the site.
 - .4 Restore bed and banks of the waterbody to their original contour and gradient; if the original gradient cannot be restored due to instability, a stable gradient that does not obstruct fish passage should be restored.
 - .5 If replacement rock reinforcement/armouring is required to stabilize eroding or exposed areas, then ensure that appropriately sized, clean rock is used; and that rock is installed at a similar slope to maintain a uniform bank/shoreline and natural stream/shoreline alignment.
 - .6 Remove all construction materials from site upon project completion.
- .6 Fish Protection
 - .1 Ensure that all in-water activities, or associated in-water structures, do not interfere with fish passage, constrict the channel width, or reduce flows.

- .2 Avoid using explosives in or near water. Use of explosives in or near water produces shock waves that can damage a fish swim bladder and rupture internal organs. Blasting vibrations may also kill or damage fish eggs or larvae.
- .3 If explosives are required as part of a project, the potential for impacts to fish and fish habitat should be minimized by implementing the following measures:
 - .1 Time in-water work requiring the use of explosives to prevent disruption of vulnerable fish life stages, including eggs and larvae, by adhering to appropriate fisheries timing windows.
 - .2 Isolate the work site to exclude fish from within the blast area by using bubble/air curtains (i.e., a column of bubbled water extending from the substrate to the water surface as generated by forcing large volumes of air through a perforated pipe/hose), cofferdams or aquadams.
 - .3 Remove any fish trapped within the isolated area and release unharmed beyond the blast area prior to initiating blasting.
 - .4 Minimize blast charge weights used and subdivide each charge into a series of smaller charges in blast holes (i.e., decking) with a minimum 25 millisecond (1/1000 seconds) delay between charge detonations.
 - .5 Back-fill blast holes (stemmed) with sand or gravel to grade or to streambed/water interface to confine the blast.
 - .6 Place blasting mats over top of holes to minimize scattering of blast debris around the area.
 - .7 Do not use ammonium nitrate based explosives in or near water due to the production of toxic by-products.
 - .8 Remove all blasting debris and other associated equipment/products from the blast area.
- .7 Operation of Machinery
 - .1 Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds.
 - .2 Whenever possible, operate machinery on land above the high water mark, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the waterbody.
 - .3 Limit machinery fording of the watercourse to a one-time event (i.e., over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are required, construct a temporary crossing structure.
 - .4 Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible (e.g., dominated by organic materials and silts) banks and beds. For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur during fording.
 - .5 Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water.

PART 2 **PRODUCTS**

2.1 **NOT USED**

PART 3 **EXECUTION**

3.1 **NOT USED**

END OF SECTION

PART 1 **GENERAL**

1.1 **REFERENCES AND CODES**

- .1 Perform Work in accordance with National Building Code of Canada (NBC) including 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.

1.2 **HAZARD MATERIAL DISCOVERY**

- .1 Stop work immediately when hazardous material is encountered. Notify Engineer.

PART 2 **PRODUCTS**

NOT USED

PART 3 **EXECUTION**

NOT USED

END OF SECTION

PART 1 **GENERAL**

1.1 **INSPECTION**

- .1 Allow Engineer 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 Engineer's instructions, or law of Place of Work.
- .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 Engineer will order 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.

1.2 **INDEPENDENT INSPECTION AGENCIES**

- .1 Independent Inspection/Testing Agencies will be engaged by Engineer for purpose of inspecting and/or testing portions of Work.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 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 Engineer at no cost to Engineer. Pay costs for retesting and reinspection.

1.3 **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.

1.4 **PROCEDURES**

- .1 Notify appropriate agency and Engineer 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 orderly sequence to not cause delays 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.

1.5 **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 Engineer 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 Engineer it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Engineer

1.6 REPORTS

- .1 Submit copies of inspection and test reports to Engineer.
.2 Provide copies to subcontractor of work being inspected or tested manufacturer or fabricator of material being inspected or tested.

1.7 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.
.2 Cost of tests and mix designs shall be considered incidental to work of the Contract.

1.8 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
.2 Construct in locations as specified in specific Section.
.3 Prepare mock-ups for Engineer's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
.5 If requested, Engineer will assist in preparing schedule fixing dates for preparation.
.6 Mock-ups may remain as part of Work.

1.9 MILL TESTS

- .1 Submit mill test certificates as requested.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

PART 1 **GENERAL**

1.1 **INSTALLATION AND REMOVAL**

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

1.2 **DEWATERING**

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

1.3 **WATER SUPPLY**

- .1 Contractor will provide a continuous supply of potable water for construction use, if required.

1.4 **TEMPORARY POWER AND LIGHT**

- .1 Contractor will provide any necessary temporary power for temporary lighting and operating of power tools, by means of electric generator. Contractor will provide fuel for electric generator.

1.5 **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.

PART 2 **PRODUCTS**

NOT USED

PART 3 **EXECUTION**

3.1 **TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties, according to requirements of authorities having jurisdiction
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.

1.2 **INSTALLATION AND REMOVAL**

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be gravelled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use.

1.3 **HOISTING**

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

1.4 **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.

1.5 **OFFICES**

- .1 Provide office heated to 22 degrees C, and ventilated, of sufficient size to accommodate site meetings and furnished with drawing lay down table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

1.6 **EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in 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 manner to cause least interference with work activities.

1.7 **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.

1.8 CONSTRUCTION SIGNAGE

- .1 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
- .2 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Engineer.

1.9 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .2 Construct access and haul roads necessary.
- .3 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
- .4 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .5 Dust control: adequate to ensure safe operation at all times.
- .6 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Engineer.
- .7 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .8 Provide snow removal during period of Work.
- .9 Remove, upon completion of work, haul roads designated by Engineer.

1.10 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.
- .4 Stack stored new or salvaged material not in construction facilities.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties, according to requirements of authorities having jurisdiction

- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

PART 1 **GENERAL**

1.1 **REFERENCE STANDARDS**

- .1 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .2 If there is question as to whether products or systems are in conformance with applicable standards, Engineer reserves right to have such products or systems tested to prove or disprove conformance.
- .3 Cost for such testing will be born by Contractor.

1.2 **QUALITY**

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 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.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Engineer based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .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.

1.3 **AVAILABILITY**

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Engineer 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 Engineer at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Engineer reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 **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 sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .5 Remove and replace damaged products at own expense and to satisfaction of Engineer.
- .6 Touch-up damaged factory finished surfaces to Engineer's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

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

1.6 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 Engineer in writing, of conflicts between specifications and manufacturer's instructions, so that Engineer will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Engineer to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 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 Engineer if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Engineer 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 Engineer, whose decision is final.

1.8 CO-ORINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

1.9 REMEDIAL WORK

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

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

PART 1 **GENERAL**

1.1 **PROJECT CLEANLINESS**

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Engineer. Do not burn waste materials on site, unless approved by Engineer.
- .3 Clear snow and ice from access bank/pile snow in designated areas only.
- .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 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .7 Dispose of waste materials and debris as directed by Engineer.

1.2 **FINAL CLEANING**

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Engineer. Do not burn waste materials on site, unless approved by Engineer.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Sweep and wash clean paved areas.

1.3 **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.

PART 2 **PRODUCTS**

NOT USED

PART 3 **EXECUTION**

NOT USED

END OF SECTION

PART 1 **GENERAL**

1.1 **DISPOSAL REQUIREMENTS**

- .1 Burying or burning of rubbish and waste materials is prohibited.
- .2 Disposal of waste, volatile materials, mineral spirits, oil, or paint thinner into waterways, storm, or sanitary sewers is prohibited.
- .3 Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction.
- .4 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.
- .5 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.
- .6 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.
- .7 Sale of salvaged items by Contractor to other parties not permitted on site.

PART 2 **PRODUCTS**

NOT USED

PART 3 **EXECUTION**

NOT USED

END OF SECTION

PART 1 **GENERAL**

1.1 **INSPECTION AND DECLARATION**

- .1 Contractor's Inspection: Contractor and Subcontractors: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Engineer in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .2 Request Engineer's Inspection.
- .2 Engineer's Inspection: Engineer and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.
- .3 Completion: submit written certificate that 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 Work is complete and ready for final inspection.
- .4 Final Inspection: when items noted above are completed, request final inspection of Work by Owner, Engineer, and Contractor. If Work is deemed incomplete by Owner and Engineer, complete outstanding items and request reinspection.

1.2 **CLEANING**

- .1 In accordance with Section 01 74 11 - Cleaning.
- .2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 **PRODUCTS**

NOT USED

PART 3 **EXECUTION**

NOT USED

END OF SECTION

PART 1 **GENERAL**

1.1 **SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

1.2 **AS-BUILTS AND SAMPLES**

- .1 Maintain, in addition to requirements in General Conditions, at site for Engineer or Owner one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to 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 Engineer.

1.3 **RECORDING ACTUAL SITE CONDITIONS**

- .1 Record information on set of black line opaque drawings, provided by Engineer.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, 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: mark each item to record actual construction, including:
 - .1 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by change orders.
 - .4 Details not on original Contract Drawings.
 - .5 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

- .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.4 FINAL SURVEY

- .1 Submit final site survey certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.5 WARRANTIES AND BONDS

- .1 Assemble warranty information in binder and submit upon acceptance of work. Organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .2 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .3 Respond in a timely manner to oral or written notification of required construction warranty repair work.
- .4 Written verification will follow oral instructions. Failure to respond will be cause for the Engineer to proceed with action against Contractor.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

PART 1 **GENERAL**

1.1 **SUMMARY**

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

1.2 **REFERENCES**

- .1 Canadian Council of Ministers of the Environment (CCME).
- .2 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
 - .2 Canadian Environmental Protection Act, 1999 (CEPA), c. 33.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .4 Transport Canada (TC).
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.

1.3 **DEFINITIONS**

- .1 Waste Audit (WA): detailed inventory of materials in building. Indicates quantities of reuse, recycling and landfill.
 - .1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project.
 - .2 Indicates quantities of reuse, recycling and landfill.
- .2 Waste Management Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .3 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.

1.4 **SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop drawings.
 - .1 Submit for approval drawings, diagrams or details showing sequence of demolition work required by authorities having jurisdiction.

- .3 Waste Reduction Workplan: prior to beginning of Work on site submit detailed Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal indicate:
 - .1 Descriptions of and anticipated quantities in percentages 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.
 - .5 Name and address of haulers waste facilities waste receiving organizations

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable Provincial/Territorial regulations.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Perform Work in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Storage and Protection.
 - .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 Engineer and at no cost to Engineer.
 - .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.
 - .4 Handle salvaged materials as new materials.
- .3 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 Divert excess materials from landfill to site approved by Engineer.
 - .3 Place materials defined as hazardous or toxic in designated containers.
 - .4 Handle and dispose of hazardous materials in accordance with CEPA, Regional and Municipal regulations.
 - .5 Ensure emptied containers are sealed and stored safely.
 - .6 Source separate for recycling materials that cannot be salvaged for reuse including wood, metal and concrete.
 - .7 Remove materials that cannot be salvaged for reuse or recycling and dispose of in accordance with applicable codes at licensed facilities.

1.7 SITE CONDITIONS

- .1 Site Environmental Requirements.
 - .1 Perform work in accordance with Section 01 35 43 - Environmental Procedures.
 - .2 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .3 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.

- .1 Ensure proper disposal procedures are maintained throughout the project.
- .4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities as directed by Engineer.
- .6 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .2 Existing Conditions.
 - .1 Remove contaminated or hazardous materials listed as hazardous as defined by authorities having jurisdiction as directed by Engineer from site, prior to start of demolition Work, and dispose of at designated disposal facilities in safe manner in accordance with applicable regulatory requirements.

1.8 SCHEDULING

- .1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.
 - .1 Notify Engineer in writing when unforeseen delays occur.

PART 2 PRODUCTS

2.1 EQUIPMENT

- .1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Inspect site with Engineer 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 OF HAZARDOUS WASTES

- .1 Remove contaminated or dangerous materials defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

3.3 REMOVAL OPERATIONS

- .1 Remove items as indicated.
- .2 Do not disturb items designated to remain in place.
- .3 Remove as many trees designated trees during demolition.
 - .1 Obtain written approval of Engineer prior to removal of trees.

- .4 Salvage.
 - .1 Dismantle items containing materials for salvage and stockpile salvaged materials at locations.
- .5 Disposal of Material.
 - .1 Dispose of materials not designated for salvage or reuse on site Engineer at authorized facilities approved in Waste Reduction Workplan.
 - .2 Trim disposal areas to approval of Engineer.
- .6 Backfill.
 - .1 Backfill in areas as indicated and in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.4 STOCKPILING

- .1 Label stockpiles, indicating material type and quantity.
- .2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.
- .3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.
- .4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.5 REMOVAL FROM SITE

- .1 Remove stockpiled material as directed by Engineer, when it interferes with operations of project.
- .2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.
- .3 Transport material designated for alternate disposal using facilities and in accordance with applicable regulations.

3.6 RESTORATION

- .1 Restore areas and existing works outside areas of demolition to match condition 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.

3.7 CLEANING

- .1 Remove debris, trim surfaces and leave work site clean, upon completion of Work.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 31 05 16 – Aggregate Materials
- .2 Section 31 23 33.01 – Excavating, Trenching and Backfilling
- .3 Section 33 42 13 – Pipe Culverts

1.2 **REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM D 698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort 600kN-m/m³.
- .2 Ontario Provincial Standard Specifications (OPSS)/Ontario Ministry of Transportation
 - .1 OPSS-April 2003.

1.3 **SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit to designated testing agency, 23 kg sample of backfill for fill material proposed for use, no later than one week before backfilling or filling work.
- .2 Quality Control: in accordance with Section 01 45 00 – Quality Control
 - .1 Submit testing, inspection results and report as described in PART 3 - FIELD QUALITY CONTROL.

1.4 **QUALITY ASSURANCE/REGULATORY REQUIRMENTS**

- .1 Shore and brace excavations, protect slopes and banks and perform work in accordance with Provincial Territorial and Municipal regulations whichever is more stringent.
- .2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 **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 Divert unused vegetation materials from landfill to local facility as directed by Engineer.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Granular A, B Type I, B Type II, M Select Sub grade to OPSS1010.
- .2 Crushed Granular 20-0, 20-0b, 56-0, Natural Gravel 80-0, Gravel and Sand, Stone Dust, Sand to CCDG14.02.

PART 3 **EXECUTION**

3.1 **TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control drawings.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

3.2 **PREPARATION/PROTECTION**

- .1 Protect excavations from freezing.
- .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 Engineer'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.

3.3 **CLEARING AND GRUBBING**

- .1 Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris within areas designated on drawings.
- .2 Dispose of cleared and grubbed material off site daily to disposal areas acceptable to authority having jurisdiction.

3.4 **EXCAVATION**

- .1 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering topsoil.
 - .1 Stockpile topsoil on site for later use.
- .2 Excavate as required to carry out work.
 - .1 Do not disturb soil or rock below bearing surfaces.
 - .2 Notify Engineer when excavations are complete.
 - .3 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work.

- .3 Excavate trenches to provide uniform continuous bearing and support for 150 mm thickness of pipe bedding material on solid and undisturbed ground.
 - .1 Trench widths below point 150 mm above pipe not to exceed diameter of pipe plus 600 mm.

3.5 BACKFILLING

- .1 Inspection: do not commence backfilling until fill material and spaces to be filled have been inspected and approved by Engineer.
- .2 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.
- .3 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.
- .4 Compaction of sub grade: compact existing sub grade under slabs on grade to same compaction as specified for fill.
 - .1 Fill excavated areas with selected sub grade material compacted as specified for fill.
- .5 Placing:
 - .1 Place backfill, fill and basecourse material in 150 mm lifts: add water as required to achieve specified density.
- .6 Compaction: compact each layer of material to following densities for material to ASTM D 698:
 - .1 To underside of basecourses: 95%.
 - .2 Basecourses: 100%.
 - .3 Elsewhere: 90%.
- .7 In trenches:
 - .1 Up to 300 mm above pipe or conduit: sand placed by hand.
 - .2 Over 300 mm above pipe or conduit: native material approved by Engineer.
- .8 Under seeded areas: use site excavated material to bottom of topsoil except in trenches and within 600 mm of foundations.
- .9 Blown rock material, not capable of fine grading, is not acceptable, imported material must be placed on this type of material.

3.6 GRADING

- .1 Grade so that water will drain.

3.7 FIELD QUALITY CONTROL

- .1 Testing of materials and compaction of backfill and fill will be carried out by testing laboratory designated by Engineer.
- .2 Not later than one week before backfilling or filling, provide to designated testing agency, samples of backfill as described in PART 1 - SUBMITTALS.
- .3 Do not begin backfilling or filling operations until material has been approved for use by Engineer.
- .4 Not later than 48 hours before backfilling or filling with approved material, notify Engineer so that compaction tests can be carried out by designated testing agency.

3.8 SHORTAGE AND SURPLUS

- .1 Supply necessary fill to meet backfilling and grading requirements and with minimum and maximum rough grade variance.
- .2 Dispose of surplus material off site.

3.9 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 00 00.01 – Earthwork – Short Form
- .2 Section 31 05 16 – Aggregate Materials
- .3 Section 31 23 33.01 – Excavating, Trenching and Backfilling

1.2 REFERENCES

- .1 American Society for Testing and materials International (ASTM)
 - .1 ASTM C 127-04, Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.
 - .2 ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort 600 kN-m/m³.

1.3 DEFINITIONS

- .1 Corrected maximum dry density is defined as:
 - .1 $D = (D1xD2) / (F1 \times D2) + (F2 \times D1)$
 - .2 Where: D = corrected maximum dry density kg/m³.
 - .1 F1 = fraction of total field sample passing 19 mm sieve.
 - .2 F2 = fraction of total field sample retained on 19 mm sieve equal to 1.00 – F1.
 - .3 D1 = maximum dry density, kg/m³ of material passing 19 mm sieve determined in accordance with Method A of ASTM D 698.
 - .4 D2 = bulk density, kg/m³, of material retained on 19 mm sieve, equal to 1000G where G is bulk specific gravity(dry basis) of material when tested to ASTM C 127.
 - .3 For free draining aggregates, determine D1 (maximum dry density) to ASTM D 4253 dry method, wet method when directed by Engineer.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

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 31 00 00.01 – Earthworks – Short Form

1.2 **REFERENCES**

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D 4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.3 **SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Allow continual sampling by Engineer during production.
- .3 Provide Engineer with access to source and processed material for sampling.
- .4 Install sampling facilities at discharge end of production conveyor, to allow Engineer to obtain representative samples of items being produced. Stop conveyor belt when requested by Engineer to permit full cross section sampling.
- .5 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

1.4 **WASTE MANAGEMENT AND DISPOSAL**

- .1 Divert unused granular materials from landfill to local quarry as approved by Engineer.

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 D 4791.
 - .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.
 - .2 Gravel and crushed gravel composed of naturally formed particles of stone.
 - .3 Light weight aggregate, including slag and expanded shale.

2.2 SOURCE QUALITY CONTROL

- .1 Inform Engineer of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.
- .2 If, in opinion of Engineer, 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.
- .3 Advise Engineer 4 weeks in advance of proposed change of material source.
- .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Aggregate source preparation
 - .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by Engineer.
 - .2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.
 - .3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
 - .4 When excavation is completed dress sides of excavation to nominal 2:1 slope, and provide drains or ditches as required to prevent surface standing water.
 - .5 Trim off and dress slopes of waste material piles and leave site in neat condition.
- .2 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 Engineer.
 - .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 Handling
 - .1 Handle and transport aggregates to avoid segregation, contamination and degradation.

- .4 Stockpiling
 - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Engineer.
 - .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 Engineer within 48 hours of rejection.
 - .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Max 1.5 m for coarse aggregate and base course materials.
 - .2 Max 1.5 m for fine aggregate and sub-base materials.
 - .3 Max 1.5 m for other materials.
 - .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
 - .9 Do not cone piles or spill material over edges of piles.
 - .10 Do not use conveying stackers.
 - .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.2 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 Engineer.
- .3 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.

END OF SECTION

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 31 00 00.01 – Earthwork – Short Form
- .2 Section 31 05 16 – Aggregate Materials
- .3 Section 33 42 13 – Pipe Culverts.

1.2 **REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C 117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D 422-632002, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D 698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort 600 kN-m/m³.
 - .5 ASTM D 4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.3 **DEFINITIONS**

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock: solid material in excess of 1.00 m³ and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m³ bucket. 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 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters 1 inch in any dimension.
- .4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

- .6 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
- .7 Unsuitable materials:
- .1 Weak, chemically unstable, and compressible materials.
- .2 Frost susceptible materials:
- .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D 4318, and gradation within limits specified when tested to ASTM D 422 and ASTM C 136: Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
- .2 Table:
- | <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> |
- .3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.
- .8 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.4 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Quality Control: in accordance with Section 01 45 00 - Quality Control:
- .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.
- .2 Submit to Engineer written notice at least 7 days prior to excavation work, to ensure cross sections are taken.
- .3 Submit to Engineer written notice when bottom of excavation is reached.
- .4 Submit to Engineer, testing and inspection results as described in PART 3 of this Section.
- .3 Preconstruction Submittals:
- .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
- .4 Samples:
- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Inform Engineer at least 4 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.
- .3 Submit 70 kg samples of type of fill specified including representative samples of excavated material.
- .4 Ship samples prepaid Engineer, in tightly closed containers to prevent contamination and exposure to elements.

1.5 QUALITY ASSURANCE

- .1 Do not use soil material until written report of soil test results are reviewed and approved by Engineer.
- .2 Health and Safety Requirements:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 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 Divert excess aggregate materials from landfill to local quarry or recycling facility for reuse as directed by Engineer.

1.7 EXISTING CONDITIONS

- .1 Existing buildings and surface features:
 - .1 Conduct, with Engineer, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, 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 as directed by Engineer.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Type 1 and Type 2 fill: properties to Section 31 05 16 - Aggregate Materials and the following requirements:
 - .1 Crushed, pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
 - .3 Type 3 fill: selected material from excavation or other sources, approved by Engineer for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.

.2 Table:

Sieve Designation	% Passing	
	Type 1	Type 2
75 mm	-	100
50 mm	-	-
37.5 mm	-	-
25 mm	100	-
19 mm	75-100	-
12.5 mm	-	-
9.5 mm	50-100	-
4.75 mm	30-70	22-85
2.00 mm	20-45	-
0.425 mm	10-25	5-30
0.180 mm	-	-
0.075 mm	3-8	0-10

PART 3 **EXECUTION**

3.1 **TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.2 **SITE PREPARATION**

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

3.3 **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 Engineer'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.

3.4 **STRIPPING OF TOPSOIL**

- .1 Begin topsoil stripping of areas as directed by Engineer after area has been cleared of brush, weeds and grasses and removed from site.
- .2 Strip topsoil to depths as indicated by Engineer.
 - .1 Do not mix topsoil with subsoil.

- .3 Stockpile in locations as directed by Engineer.
 - .1 Stockpile height not to exceed 2 m and should be protected from erosion.
- .4 Dispose of unused topsoil as directed by Engineer off site.

3.5 STOCKPILING

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

3.6 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 29.06 - Health and Safety Requirements.
 - .1 Where conditions are unstable, Engineer to verify and advise methods.
- .2 Construct temporary Works to depths, heights and locations as directed by Engineer.

3.7 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.
- .2 Provide for Engineer's approval, details of proposed dewatering or heave prevention methods.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
 - .1 Prevent piping or bottom heave of excavations by groundwater lowering, 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 to approved runoff areas.
 - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

3.8 EXCAVATION

- .1 Advise Engineer at least 7 days in advance of excavation operations for initial cross sections to be taken.
- .2 Excavate to lines, grades, elevations and dimensions as indicated by Engineer.
- .3 Remove concrete, masonry, demolished foundations and rubble and other obstructions encountered during excavation in accordance with Section 02 41 13 - Selective Site Demolition.
- .4 Excavation must not interfere with bearing capacity of adjacent foundations.
- .5 For trench excavation, unless otherwise authorized by Engineer 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.
- .6 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Engineer.
- .7 Restrict vehicle operations directly adjacent to open trenches.
- .8 Dispose of surplus and unsuitable excavated material in approved location on site.

- .9 Do not obstruct flow of surface drainage or natural watercourses.
- .10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .11 Notify Engineer when bottom of excavation is reached.
- .12 Obtain Engineer's approval of completed excavation.
- .13 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Engineer.

3.9 FILL TYPES AND COMPACTION

- .1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D 698 in accordance with Section 31 05 10 - Corrected Maximum Dry Density for Fill.
 - .1 Exterior side of perimeter walls: use Type 3 fill to subgrade level. Compact to 95% of corrected maximum dry density.
 - .2 Within building area: use Type 2 to underside of base course for floor slabs. Compact to 100% of corrected maximum dry density.
 - .3 Under concrete slabs: provide 150 mm compacted thickness base course of Type 1 fill to underside of slab. Compact base course to 100%.
 - .4 Retaining walls: use Type 2 fill to subgrade level on high side for minimum 500 mm from wall and compact to 95%. For remaining portion, use Type 3 fill compacted to 95%.

3.10 BACKFILLING

- .1 Do not proceed with backfilling operations until completion of following:
 - .1 Engineer has inspected and approved installations.
 - .2 Engineer has inspected and approved of construction below finish grade.
 - .3 Removal of concrete formwork.
 - .4 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .5 Backfilling 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 1 m.
 - .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 Engineer:

- .2 If approved by Engineer, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Engineer.
- .6 Place recycled fill in areas as indicated.

3.11 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21 - Construction/Demolition Waste Management and Disposal, trim slopes, and correct defects as directed by Engineer.
- .2 Replace topsoil as directed by Engineer.

END OF SECTION

DESCRIPTION: This Section specifies stone, for hand placed rip-rap.

PART 1 **GENERAL**

1.1 **RELATED SECTIONS**

- .1 Section 33 42 13 – Pipe Culverts.

1.2 **WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .2 Collect and separate waste in accordance with Waste Management Plan.
- .3 Place materials defined as hazardous or toxic in designated containers.
- .4 Fold up metal banding, flatten and place in designated area for recycling.
- .5 Divert left over aggregate materials from landfill to local quarry for reuse as approved by Engineer.

PART 2 **PRODUCTS**

2.1 **STONE**

- .1 Hard, dense, durable quarry stone, free from seams, cracks or other structural defects, to meet following size distribution for use intended:
 - .1 Hand placed rip-rap:
 - .1 Minimum size of individual stones 10 dm³.
 - .2 Not less than 75% of total volume of stones with individual volume of 25 dm³ or more.
 - .3 Supply rock spalls or cobbles to fill open joints.

PART 3 **EXECUTION**

3.1 **PLACING**

- .1 Where rip-rap is to be placed on slopes, excavate trench at toe of slope to dimensions as indicated.
- .2 Fine grade area to be rip-rapped to uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.
- .3 Place rip-rap to thickness and details as indicated.
- .4 Place stones in manner approved by Engineer to secure surface and create a stable mass. Place larger stones at bottom of slopes.

- .5 Hand placing:
 - .1 Use larger stones for lower courses and as headers for subsequent courses.
 - .2 Stagger vertical joints and fill voids with rock spalls or cobbles.
 - .3 Finish surface evenly, free of large openings and neat in appearance.

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTION INCLUDES**

- .1 Requirements and procedures for scarifying and reshaping of granular roadbed with addition of new granular base material.

1.2 **RELATED SECTIONS**

- .1 Section 02 41 13 - Selective Site Demolition.
- .2 Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .3 Section 31 05 16 - Aggregate Materials.
- .4 Section 31 05 10 - Corrected Maximum Dry Density for Fill.
- .5 Section 32 11 23 - Aggregate Base Courses.

1.3 **REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C 136-01, Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .2 ASTM D 698-00a, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600kN-m/m³).
 - .3 ASTM D 4318-00, Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-8.2-M88, Sieves Testing, Woven Wire, Metric.

1.4 **WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .2 Excess materials are to be diverted from landfill to site approved by Engineer.

PART 2 **PRODUCTS**

2.1 **MATERIALS**

- .1 Granular base material: to Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Crushed stone or gravel consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material and other deleterious materials.
 - .2 Graduations within limits specified when tested to ASTM C 136. Sieve sizes to CAN/CGSB-8.1.

.3 Gradation to:

<u>Sieve Designation</u>	<u>% Passing</u>
100 mm	-
75 mm	-
50 mm	-
38.1 mm	-
25 mm	-
19 mm	100
12.5 mm	-
9.5 mm	55-80
4.75 mm	35-60
1.20 mm	17-35
0.300 m	3-6 (Pit Source)
0.075 mm	3-8 (Rock Source)

.4 Other properties as follows:

- .1 Liquid limit: ASTM D 423, maximum 25.
- .2 Plasticity index: ASTM D 424, maximum 0.
- .3 Los Angeles Degradation: ASTM C 131, maximum % loss by weight 45.
- .4 Crushed particles: at least 50 % of particles by mass within 19.0 mm to 4.75 mm sieve designation range to have at least 1 freshly fractured face. Material divided into ranges using methods of ASTM C 136.

PART 3 **EXECUTION**

3.1 **SEQUENCE OF OPERATION**

.1 Scarifying and reshaping:

- .1 Scarify roadbed to width as indicated unless directed otherwise by Engineer and to minimum depth of 100 mm.
- .2 Pulverize and break down scarified material to 50 mm maximum particle size.
- .3 Blade and trim pulverized material to elevation and cross section dimensions as indicated unless directed otherwise by Engineer.
- .4 Where deficiency of material exists, add and blend in new granular base material as directed by Engineer. Ensure no frozen material is used.

.2 Compaction equipment:

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

.3 Compacting:

- .1 Compact to density minimum 100 corrected maximum dry density in accordance with ASTM D 698.
- .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
- .3 Apply water as necessary during compaction to obtain specified density.
- .4 Use mechanical tampers, approved by Engineer to compact areas not accessible to rolling equipment to specified density.

- .4 Repair of soft areas:
 - .1 Correct soft areas by removing defective material to depth and extent directed by Engineer. Replace with material acceptable to Engineer and compact to specified density.
 - .2 Maintain reshaped surface in condition conforming to this section until succeeding material is applied or until acceptance by Engineer.

3.2 SITE TOLERANCES

- .1 Reshaped compacted surface within plus or minus 10 mm of elevation as indicated.

END OF SECTION

PART 1 **GENERAL**

1.1 **REFERENCES**

- .1 ASTM C 136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .2 ASTM D 698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort 600kN-m/m³.
- .3 ASTM D 1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory compacted soils.
- .4 ASTM D 4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .5 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.2 **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 beginning operation.

PART 2 **PRODUCTS**

2.1 **MATERIAL**

- .1 Granular base: material in accordance with Section 31 05 16 – Aggregate Materials and following requirements
 - .1 Crushed stone or gravel.
 - .2 Gradations to be within limits specified when tested to ASTM C 136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.

- .2 Gradation to

Sieve Designation	% Passing
100 mm	
75 mm	
50 mm	
37.5 mm	
25 mm	
19 mm	
12.5 mm	100
9.5 mm	55-80
4.75 mm	35-60
1.20 mm	17-35
0.300 mm	3-6 (Pit Source)
0.075 mm	3-8 (Rock Source)

- .1 Liquid limit: to ASTM D 423 maximum 25.
- .2 Plasticity index: to ASTM D 424 maximum 0.

- .3 Los Angeles degradation: to ASTM C 131. Max. % loss by weight: 35.
- .4 Crushed particles: at least 50% of particles by mass within each of following sieve designation ranges to have at least 1 freshly fractured face. Material to be divided into ranges using methods of ASTM C 136.

<u>Passing</u>		<u>Retained on</u>
50 mm	to	25 mm
25 mm	to	19.0 mm
<u>19.0 mm</u>	<u>to</u>	<u>4.75 mm</u>

- .5 Soaked CBR: to ASTM D 1883, min 100, when compacted to 100% of ASTM D 1557.

PART 3 **EXECUTION**

3.1 **SEQUENCE OF OPERATION**

- .1 Place granular base after subgrade surface is inspected and approved by Engineer.
- .2 Placing:
 - .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 Begin spreading base material on crown line or on high side of one-way slope.
 - .5 Place material using methods which do not lead to segregation and degradation of aggregate.
 - .6 For spreading and shaping material use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
 - .7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Engineer may authorize thicker lifts (layers) if specified compaction can be achieved.
 - .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.
- .3 Compaction Equipment
 - .1 Compaction equipment to be capable of obtaining required material densities.
- .4 Compacting
 - .1 Compact to density not less than 100% corrected maximum dry density.
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compacting to obtain specified density.
 - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Engineer.
 - .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.2 SITE TOLERANCE

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

3.3 PROTECTION

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Engineer.

END OF SECTION

PART 1 **GENERAL**

1.1 **SECTIONS 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 23 33.01 - Excavating, Trenching and Backfilling.

1.3 **REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C 117-95, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 136-01, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA-G401-01, Corrugated Steel Pipe Products.

1.4 **DELIVERY, STORAGE AND HANDLING**

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

1.5 **WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal any paper, plastic, polystyrene, or corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal materials from landfill to metal recycling facility as approved by Engineer.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 **PRODUCTS**

2.1 **CORRUGATED STEEL PIPE**

- .1 Corrugated steel pipe: to CSA-G401.

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 C 136 and ASTM C 117. Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.
- .2 Table

<u>Sieve Designation</u>	<u>% Passing</u>
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

PART 3 EXECUTION

3.1 TRENCHING

- .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling.
- .2 Obtain Engineer'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 Engineer, free from sags or high points.
- .4 Place bedding in unfrozen condition.

3.3 LAYING CORRUGATED STEEL PIPE CULVERTS

- .1 Begin pipe placing at downstream end.
- .2 Ensure bottom of pipe is in contact with shaped bed or compacted fill throughout its length.
- .3 Lay pipe with outside circumferential laps facing upstream.
- .4 Do not allow water to flow through pipes during construction except as permitted by Engineer.

3.4 JOINTS: CORRUGATED STEEL CULVERTS

- .1 Corrugated steel pipe:
 - .1 Match corrugations or indentations of coupler with pipe sections before tightening.
 - .2 Tap couplers firmly as they are being tightened, to take up slack and ensure snug fit.
 - .3 Insert and tighten bolts.
 - .4 Repair spots where damage has occurred to spelter coating by applying two coats of asphalt paint approved by Engineer or two coats of zinc rich epoxy paint.

END OF SECTION