

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- .1 This project consists of connecting the potable water and wastewater systems of the Gatineau Park Visitor Centre located at 33 Scott in Chelsea to the new municipal water and sewer services. This includes the following:
 - .1 Install new water and sewer pipes from stubs previously installed near chemin Scott up to the mechanical in the basement of the building;
 - .2 Backfill and re-grade, reinstate vegetation;
 - .3 Demolish existing water supply system, e.g., well pump, water treatment system, expansion tanks, etc.;
 - .4 Perform associated electrical work: disconnect well pump, remove electrical wiring, etc.;
 - .5 Decommission on-site well;
 - .6 Flush and clean existing sanitary piping, septic tank, and septic pumping station;
 - .7 Modify existing sanitary and DCW piping inside the building to connect to new services in the basement mechanical room, install new water meter, backflow preventer, backwater valve, etc.;
 - .8 Miscellaneous plumbing work: replace water closets and shut-off valves on water supplies to plumbing fixtures, repair venting of urinals, cut and patch floors and walls to suit.
 - .9 Remove obsolete 240V service to the building.
- .2 Site Supervisor: Provide competent site supervisor, capable of managing the site operations of this Contract on a full-time basis during the duration of the implementation of the work of this Contract at the site.
- .3 Site Safety Officer: Appoint a Site Safety Officer responsible for health and site safety for activities and duration of the implementation of the work of this Contract.

1.2 INFORMATION TO TENDERS

- .1 The provided scope of work is general in nature and under no circumstances shall be construed as exhaustive.

1.3 PAY ITEMS

- .1 Each Item of Work shall include all incidental work such as, but not limited to:
 - .1 Dust control.
 - .2 Protection of facilities to remain.
 - .3 Protection of utilities and equipment.
 - .4 Reinstatement of any disturbed element of structure or equipment affected by Contractor's operation.
 - .5 Costs of all applicable submissions and permits.
 - .6 All costs associated with compliance to noise and vibration restrictions.
 - .7 All costs of testing.
 - .8 All costs associated with disposal of all removed materials in a safe environmental manner and in full compliance with applicable Federal, Provincial and Municipal legislations and statutes.
 - .9 All costs associated with certifying parts of work.
 - .10 All costs of concrete saw cutting.
 - .11 All measures required to assure safe closure of pathway to protect vehicles, pedestrians, and bicycles at all times.
 - .12 Cost of all submissions.

- .13 All costs of SITEWORK:
 - .1 Protect all existing utilities.
 - .2 All bonds, administration and supervisory costs.
 - .3 Mobilization and demobilization.
 - .4 Schedules.
 - .5 Site preparation for work.
 - .6 Costs of all necessary approvals and permits as applicable.
 - .7 All costs associated with protection of utilities, if applicable.
 - .8 Installation of temporary barricades, hoarding, fencing and other protection required.
 - .9 All cost of any incidental work not specifically mentioned in Contract Documents, but required due to virtue of work and/or Contractor methods..
 - .10 All costs associated with environmental protection measures.
 - .11 Costs for installing, maintaining and removal of sediment control measures.
 - .12 Protection of vehicles and public, when and where affected by Contractor's operation, methods or works.
 - .13 Contractor is responsible to provide all labour, equipment and materials necessary to properly complete the work for all items.

1.4 INDIVIDUAL DESCRIPTION OF WORK

- .1 The scope of work is provided for convenience of bidder and is for general information only and shall not be construed as exhaustive. Any particular description of work shall be read together with the Contract Drawings. In case of discrepancy between specifications and drawings, Tenderer shall assume that the more expensive option will be employed. Any work, which is shown on the Contract Drawings, but is not necessarily separately listed, mentioned or described in written provisions of the Contract or vice versa is deemed to be included in both.

1.5 PAY ITEM 1 - CIVIL WORK

- .1 This item includes all labor, materials, equipment and services necessary for the installation of a new watermain and sanitary sewer pipe from stubs previously installed near chemin Scott up to the mechanical/electrical room in the basement of the building.
- .2 This work includes, but is not limited to:
 - .1 excavation, backfilling, compaction, re-grading.
 - .2 coring of foundation wall, installation of watermain and sanitary sewer pipes, insulation of watermain, disinfection of water main, pipe anchors, pressure testing of new pipes,
 - .3 demolition of a buried electrical duct bank.
- .3 Work of this item is primarily described on drawings G-1, C-1, C-2 and in the Specifications.
- .4 This item will be paid on a lump sum basis at the price included in the Tender Form.
- .5 No measurement for payment will be made for this item.

1.6 PAY ITEM 2 - MECHANICAL WORK

- .1 This item includes all labor, materials, equipment and services necessary to disconnect the building's potable water and sanitary drainage systems from a well and septic system and connect them to the new watermain and sanitary sewer installed by Civil.
- .2 This work includes, but is not limited to:
 - .1 demolition of existing water supply system, i.e., well pump, water treatment system, expansion tanks, piping, water meter, etc.
 - .2 modifications to existing sanitary and potable water piping inside the building to connect to the new watermain and sanitary sewer, i.e., installation of new piping, water meter, backflow preventer, pipe insulation, backwater valve, etc.

- .3 miscellaneous plumbing work, i.e., replace water closets and shut-off valves on water supplies to plumbing fixtures.
- .3 Work of this item is primarily described on drawings G-1, M-1, M-2, P/S-1 and in the Specifications.
- .4 This item will be paid on a lump sum basis at the price included in the Tender Form.
- .5 No measurement for payment will be made for this item.

1.7 PAY ITEM 3 - STRUCTURAL WORK

- .1 This item includes all labor, materials, equipment and services necessary for structural work associated with this project.
- .2 This work includes, but is not limited to:
 - .1 cutting and reinstating concrete slab to allow for the installation of a buried sanitary drain pipe.
 - .2 demolition of concrete housekeeping pad and patching of concrete floor.
- .3 Work of this item is primarily described on drawings M-2, P/S-1 and in the Specifications.
- .4 This item will be paid on a lump sum basis at the price included in the Tender Form.
- .5 No measurement for payment will be made for this item.

1.8 PAY ITEM 4 - ELECTRICAL WORK

- .1 This item includes all labor, materials, equipment and services necessary for electrical work to disconnect electrically powered equipment being demolished as part of this project.
- .2 This work includes, but is not limited to:
 - .1 disconnection of well pump.
 - .2 demolition of obsolete 240V service to the building.
- .3 Work of this item is primarily described on drawings G-1, E-1 and in the Specifications.
- .4 This item will be paid on a lump sum basis at the price included in the Tender Form.
- .5 No measurement for payment will be made for this item.

1.9 PAY ITEM 5 - MISCELLANEOUS WORK NOT COVERED ELSEWHERE

- .1 This item includes all labor, materials, equipment and services necessary for all miscellaneous work associated with this project.
- .2 This work includes, but is not limited to:
 - .1 environmental protection measures: cleaning of septic system; decommissioning of well, disposal of designated substances and hazardous materials, etc.
 - .2 architectural work: cutting and patching of linoleum flooring, painting of mechanical/electrical room floor, cutting and patching of floors and walls, etc.
 - .3 organization of construction site: site preparation, mobilization / demobilization, installation of the temporary barriers/hoarding/dust screens protecting construction areas, waste disposal, etc.
 - .4 landscaping work: topsoil, reinstatement of vegetation, removal of pine tree
 - .5 project submittals: shop drawings, as-built drawings, O&M manuals, project schedule, etc.
- .3 Work of this item is primarily described on all drawings and in the Specifications.
- .4 This item will be paid on a lump sum basis at the price included in the Tender Form.
- .5 No measurement for payment will be made for this item.

1.10 TIME OF START AND COMPLETION

- .1 Preliminary site investigations, approval of shop drawings and ordering of long lead items shall begin mid-July 2016.
- .2 Construction shall begin at the latest on August 8, 2016.
- .3 Substantial Completion shall be September 2, 2016.
- .4 Final Completion shall be September 16, 2106.
- .5 All work must be completed well ahead of the Fall Rhapsody events which are starting on October 1, 2016.

1.11 PRE-CONTRACT AWARD CONDITIONS

- .1 Prior to the award of Contract, the Contractor must submit within 10 days of receiving the letter of notification: a site specific health and safety plan, corporate health and safety policy, and all other documents required by the letter of notification (Performance and Labour & Material bonds, insurance certificate, WSIB certificate), and information required for security access application.
- .2 If the requested documentation is not received within 10 business days of receiving the letter of notification, the NCC reserves the right to proceed on to the next lowest compliant bidder.

1.12 ADDENDA

- .1 Answers to questions directed to the NCC Representative and all amendments to the drawings or specifications during the tender period shall be issued in the form of Addenda.
- .2 Addenda form part of the Contract Documents.

1.13 CONTRAT PRICE

- .1 The Contract price shall include sufficient allowance for expenses associated with all probable and unforeseen site conditions related to work. No payment shall be made for claims based on site conditions varying from the conditions assumed by the Contractor during tendering.

PART 2 ON-SITE ACTIVITIES

2.1 OCCUPANCY and USERS of the SITE

- .1 The site & building will remain occupied during the implementation of the work of this contract.
- .2 The site also accommodates the following uses and services:
 - .1 NCC administration offices;
 - .2 Public access to the grounds and building.
- .3 Coordinate and cooperate with NCC so as to minimize conflict and impacts to other activities in the building.

2.2 BUILDING/SITE SERVICES

- .1 Services for this Contract: Existing and available services required for the work may be used by the Contractor without charge. Ensure capacity is adequate prior to imposing loads. Connect, use and disconnect at own expense and responsibility. The following itemizes availability of site services:
 - .1 Water and electrical service are available.

- .2 The Contractor is to arrange and supply required services above and beyond what is available, in order to carry out work of this contract within the time period specified. Any such arrangements shall be at no additional cost to the Contract.
- .3 Provide 14 days' notice to and obtain requisite permissions from the NCC Representative and utility companies of any intended interruption of services. Keep duration of these interruptions to a minimum. These notifications shall be subject to review and acceptance by the NCC Representative.
- .4 All interruptions of services which could disrupt the normal operations of the building, e.g., building's potable water and sanitary drainage services, shall be performed in the evenings after regular business hours, and when the building is closed to the public.

2.3 USE OF SITE & FACILITIES

- .1 The Contractor shall arrange with the NCC Representative a work schedule and procedures for access, deliveries and transportation of materials to and from the work site.
- .2 Communication: Contractor shall ensure provision of telecommunication equipment (i.e. cellular phones, email, etc.) necessary to ensure continuous progress of operations of the work of this contract on site.
- .3 Protection and Hoarding, identification of the Designated Work Site Area: the Contractor shall clearly demarcate the work site area by erecting hoarding and/or fencing. Review proposed installations with NCC Representative.
- .4 Temporary Barriers and Enclosures for mandatory hoarding around the Work area.
 - .1 Erect hoarding indicated and as necessary to protect building occupants, the public, workers and property from injury or damage.
- .5 Weather Enclosures
 - .1 Provide weathertight closures at openings in floors and roofs where required to protect building components as the work proceeds.
 - .2 Design enclosures to withstand wind pressure.
- .6 Dust Tight Screens
 - .1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, building occupants and public.
 - .2 Surround all construction zones with required tarps, add negative airs in construction zones, sticky mats at the entrance/exit of construction zones to minimize spread of dirt from contractor boots.
 - .3 Maintain and relocate protection until such Work is complete.
- .7 Storage: NCC Representative will establish on-site areas for storage of material.
- .8 Waste bin shall be permitted in area designated and pre-approved by NCC Representative and shall be planned for minimal duration. Waste containers for potential designated substances shall be in accordance to applicable regulations.
- .9 Materials and equipment shall not be permitted to encumber any area outside of the designated work site area unless pre-authorized by NCC Representative.
- .10 Execute work with least possible interference or disturbance to the normal use of the building's operations. Confine the Work and operations of employees to limits indicated by Contract Documents and as directed by the NCC Representative. Make arrangements with NCC Representative to facilitate work as stated.
- .11 Ventilation
 - .1 Provide ventilation to prevent accumulation of dust, fumes, mists, vapours, or gases in areas of Work.
 - .2 Provide ventilation through portable fan(s) exhausted to the out of doors to prevent migration of dust and debris within the building.
 - .3 Dispose of exhaust materials in manner that does not contaminate adjacent areas.

- .4 Continue operation of ventilation and exhaust systems for sufficient time after cessation of operations to ensure removal of pollutants.
- .12 Parking: Access and parking on site for contractor's work force and sub-trades shall be as approved by NCC Representative at the start of the work.
- .13 Provide for personnel and vehicle access. Maintain safe exiting routes from the site and building at all times.
- .14 Smoking is prohibited within 50 feet of buildings. A designated smoking area shall be identified by the NCC Representative. The Contractor is to ensure adequate sealed cigarette butt disposal.
- .15 Washrooms: Use of water for the project and cleaning of equipment is strictly forbidden from any washrooms.
- .16 Location of Utilities: Ensure locates of site services and infrastructures, including security systems, prior to any work. Where unknown services are encountered, immediately advise the NCC Representative and confirm findings in writing. Stop work immediately upon encountering services suspect of being part of the security infrastructure.
- .17 Please follow the guidelines below, to respect adjacent users and functions within site:
 - .1 Language and behaviour deemed inappropriate will not be tolerated on site.
 - .2 Talk at sound level deemed reasonable.
 - .3 Ensure staff and sub-trades dress appropriately while on site. Abstain from wearing profane depiction or graphics on pieces of clothing, equipment or hardhat.

2.4 **SIGNAGE**

- .1 All signage for this project shall be bilingual in French and English.
- .2 Proposed wording and signage shall be submitted for review and approval by NCC Representative.
- .3 Contractor is to provide warning signage to clearly identify area under construction and access restrictions (protective gear, sign-in, etc.).
- .4 No promotion signage will be permitted.
- .5 No signage representing supply and installations companies and/or contractors and consultants shall be permitted.

2.5 **CO-OPERATION WITH OTHERS and PUBLIC RELATIONS**

- .1 At all times during the construction activities of the work of this contract, the Contractor shall permit and facilitate access to the work site to NCC construction services and to NCC contracted consultants for design and implementation phases of this work.
- .2 The Contractor may be in contact with users/visitors on site. If interacting with users/visitors to the site, the Contractor shall, at all times, be courteous, helpful and respectful to the users/visitors.
- .3 Behaviour, demeanor and conduct at the work site shall be in good practices. Profane language from the Contractor's workforce is not acceptable at the work site.
- .4 The Contractor shall at all times during work of this contract, respect traffic regulations of the site.
- .5 Co-operate with site operations and maintenance staff and services at all times.
- .6 Co-operate with Other Contractors retained for site operations and maintenance services.

2.6 **DAMAGES**

- .1 Restore or replace to their original condition existing public and/or privately owned property, structures, finishes, services and/or utilities damaged during the execution of the work of this contract, or make adequate compensation to affected parties.
- .2 The terms “restore” and “replace” include labour, equipment and material costs.

2.7 FIRE SAFETY

- .1 Provide fire extinguishers to protect the work in progress.
- .2 Advise NCC Representative of any work that would impede fire apparatus / personnel response.
- .3 Know the location of nearest fire alarm box and telephone, including the emergency phone number.
- .4 Observe at all times smoking regulations. There is no smoking in or near the Work. The NCC Representative will designate a smoking area.

2.8 ENVIRONMENTAL PROTECTION

- .1 Fires
 - .1 Fires and burning of rubbish on site not permitted.
- .2 Disposal of Wastes
 - .1 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
- .3 Drainage
 - .1 Do not pump water containing suspended materials into waterways, sewer or drainage system.
- .4 Tree and Plant Protection
 - .1 Protect trees and plants on site.
- .5 Pollution Control
 - .1 Control emissions from equipment and plant to local authorities emission requirements.
 - .2 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
- .6 Spills Reporting
 - .1 Prepare an environmental emergency measure plan and post at the place of work indicating:
 - .1 The site's refuelling area.
 - .2 The NCC Environmental Emergency Service telephone number (613) 239-5353. Call immediately in the event of accidental spill of fuel or other pollutant.
 - .2 Assume financial responsibility to clean up effects of spill.

2.9 ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES

- .1 Archaeological Resources
 - .1 NCC Archaeologist will be present to monitor proposed excavation works on the east side of the building to connect to municipal services.
- .2 Cleaning of the septic system
 - .1 Removal of all solids and liquids from septic tank, sanitary pumping station, sanitary manhole and sewer pipes must be performed by a registered hauler and disposed of at a licensed sewage treatment plant or licensed wastewater treatment lagoon.
- .3 Decommissioning of well

- .1 The contractor shall follow the following recommended procedure for well decommissioning, which respects provincial (Quebec and Ontario) and federal regulations:
 - .1 Remove all pumping equipment, debris and pipes from the well;
 - .2 Disinfect the water left in the well with a chlorine solution;
 - .3 Plug the well with disinfected bentonite, gravel, sand or clay, up to 2m below the ground level;
 - .4 Remove the top portion of the well casing, to a depth of 2m below ground level;
 - .5 Plug the final 2m of the well (inside and outside of the well casing) with disinfected bentonite or clay;
 - .6 Cover the well with clay up to 10 cm below grade and a minimum of 10 cm of topsoil creating a raised profile overtop of the well (crowning the well) to allow for subsistence.
- .4 Handling and disposal of designated substances or hazardous building materials
 - .1 Appropriate precautions for silica shall be followed. Silica exposure is regulated under the Québec Regulation Respecting Occupational Health and Safety (chapter S-2.1, r.13, September 2014). The regulation sets limit on the emission of silica dusts, air quality and specifies the need for respiratory equipment.
 - .2 Since there are no labour guidelines regarding silica construction and removal, the Ontario Ministry of Labour Guidelines: Silica on Construction Projects shall be followed.
- .5 Potential disturbance/destruction of migratory bird nests due to construction noise, removal of trees, and/or damage to trees and environment
 - .1 No vegetation removal or any other activity susceptible to destroy or disturb the nest of migratory birds or species at risk shall occur between April 15th and August 15th (core nesting season in the Ottawa Valley area).
 - .2 If at any point nests containing eggs or young are encountered, the immediate area should be avoided, work shall stop, and NCC Environmental Services shall be contacted.
 - .3 This protection measure should be taken even if the nest has been found outside the dates of the general nesting period for the area.
- .6 Potential disturbance of Snapping Turtles nesting activities and nests.
 - .1 If proposed works are carried out during Snapping Turtles nesting season (from May to October), mitigation measures may be required to either prevent the turtles to use the works area as a nesting site (exclusion fences to be installed before May 1st following Ontario Ministry of Natural Resources and Forestry Reptile and Amphibian Exclusion Fencing Guidelines if works proposed in months of May-June) or to protect existing nests and young turtles (if works start later in June-October and nests are identified as present in the works area by the NCC biologists).
 - .2 Relevant protection plan to be discussed with the NCC Environmental Management division once contractor schedule is confirmed.

2.10 WASTE DISPOSAL

- .1 Unless otherwise indicated or specified, materials indicated for removal become the Contractor's property and shall be taken from site.
- .2 Dispose of waste materials in accordance with requirements of authorities having jurisdiction and as described in the Contract Documents.

2.11 POWER/EXPLOSIVE ACTUATED FASTENING DEVICES

- .1 Do not employ power guns using explosives without prior written permission of NCC Representative.

2.12 PROTECTION OF WORK AND SITE

- .1 Protect finished work against damage until take-over.
- .2 Protect hard and soft landscaping adjacent to the work from damage unless indicated or described otherwise.
- .3 Protect adjacent building spaces and occupants against spread of dust, harmful vapours, hazardous materials and dirt. Use devices and methods that minimize inconvenience and risk to the occupants.

2.13 CUTTING AND PATCHING

- .1 Do cutting and patching as indicated and as required.
- .2 In the absence of explicit indication or specification, and as directed by the NCC Representative, do cutting and patching as follows:
 - .1 Perform cutting, fitting, and patching to complete the Work.
 - .2 Remove and replace defective and non-conforming work that is to form the base or substrate for new work.
 - .3 Perform work to avoid damage to other work.
 - .4 Prepare surfaces to receive patching and finishing.
 - .5 Refinish surfaces to match adjacent finishes; for continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit, unless indicated otherwise.
 - .6 Make cuts with clean, true, smooth edges.

2.14 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures, outlets and distribution systems indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures, outlets and distribution systems to minimize interference between systems, to allow access for maintenance and to maximize the usable space.
- .3 Inform the NCC Representative of a conflicting installation. Install as directed
- .4 Inform NCC Representative of impending installation and obtain approval for actual location

2.15 EXISTING SERVICES

- .1 Where work involves disruption of existing services:
 - .1 All interruptions of services which could disrupt the normal operations of the building, e.g., building's potable water and sanitary drainage services, shall be performed in the evenings after regular business hours, and when the building is closed to the public.
 - .2 Execute work at times directed by NCC Representative,
 - .3 Submit schedule to and obtain approval from NCC Representative for any shutdown or closure of active services,
 - .4 Notify NCC Representative at least 14 days before service disruption,
 - .5 Adhere to approved schedule.

2.16 CLEAN-UP

- .1 Provide on-site waste containers for collection of waste materials and debris and locate as directed by NCC Representative. Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .2 At the end of each work period, and more often if directed by the NCC Representative, remove debris from site, neatly stack material for use, and clean up generally. Conduct disposal operations to comply with municipal and site ordinances, anti pollution laws and as required by the Contract Documents.

- .3 Upon completion, remove temporary protections installed under this contract and remove surplus materials. Make good defects noted at this stage.
- .4 Cleaning during construction
 - .1 Clean-up work area as the work progresses in order to prevent migration of dust and debris.
 - .2 Clean as directed by the NCC Representative.
- .5 Final clean-up
 - .1 For site, broom clean hard landscaped surfaces. Rake clean other landscaped areas. Hose down with water and wash hard landscaped surfaces as directed by NCC Representative.
 - .2 Broom clean all interiors before inspection process.
 - .3 Clean as directed by the NCC Representative.

2.17 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations, occupants, public and normal use of premises. Arrange with NCC Representative to facilitate execution of work.

PART 3 CONTRACT ADMINISTRATION

3.1 CONTRACT DOCUMENTS

- .1 All contract documents are complementary. Items indicated in one and not in the other are deemed to be included in the contract work.
- .2 Drawings are intended to convey the scope of work and to indicate general arrangements. Obtain NCC Representative's approval of exact locations before installation.
- .3 Obtain direction from NCC Representative before proceeding if a possible obstacle or interference with an indicated installation is identified.
- .4 When the Contractor encounters an obstacle or interference that could have been reasonably foreseen and the Contractor failed to obtain direction from the NCC Representative in the matter, the NCC Representative may require that the work of the Contractor be modified in whole or part in response to the obstacle or interference. The Contractor shall assume the costs of additional work arising from such work.

3.2 CODES, STANDARDS AND CONTRACT DOCUMENT CONFLICTS

- .1 Unless otherwise specified or indicated, perform work in accordance with the National Building Code of Canada, the Code de Construction du Québec, (current edition), and all applicable federal, provincial, and municipal codes.
- .2 In the instance of a conflict among building codes, referenced standards and contract documents, the more stringent requirement shall apply.

3.3 PERMIT, FEES & TAXES

- .1 Contractor to pay all permit, fees & taxes properly levied by law Federal, Provincial, Municipal and other regulatory bodies.
- .2 Obtain all permits required for the work of this contract. Provide authorities with plans and information for acceptance certificates. Provide inspection certificates as evidence that work conforms to requirements of Authority having jurisdiction.
- .3 Pay for and obtain certificates of verification from applicable municipal, provincial and federal authorities for Work of this Contract.

3.4 SUBMITTALS

- .1 Administrative
 - .1 Submit to NCC Representative submittals listed for review. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the Work.
 - .2 Work affected by submittal shall not proceed until review is complete.
 - .3 Review submittals and stamp all submittals with Contractor's shop drawing stamp prior to submission to NCC Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of the Work and Contract Documents.
 - .4 Verify field measurements and affected adjacent Work are coordinated.
- .2 Shop drawings and product data
 - .1 "Shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data that are to be provided by Contractor to illustrate details of a portion of the Work.
 - .2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connection, explanatory notes and other information necessary for completion of Work.
 - .3 Adjustments made on shop drawings by NCC Representative are not intended to change Contract Price.
 - .4 Make changes in shop drawings as NCC Representative may require.
 - .5 Submit one electronic copy in PDF format, unless indicated otherwise, of shop drawings for each requirement requested in specification Sections and as NCC Representative may reasonably request
 - .6 Submit one electronic copy in PDF format, unless indicated otherwise, of product data sheets or brochures for requirements requested in Specification Sections and as NCC Representative may reasonably request where shop drawings will not be prepared due to standardized manufacture of product.
- .3 Samples
 - .1 Submit for review, samples as requested in respective Specification Sections and as indicated on the drawings.
 - .2 Deliver samples prepaid to NCC Representative's business address.

3.5 CONTRACT PRICE BREAKDOWN

- .1 Within 10 working days following award of this contract, the Contractor shall submit a sample request for payment, identifying the contract price breakdown by activity and/or sub-trade for review and approval.
- .2 Approved cost breakdown will be used as basis for progress claim payments.

3.6 PROJECT MEETINGS

- .1 Administrative
 - .1 NCC Representative will schedule and administer regular progress meetings throughout the progress of work, at times, frequency and locations set by the NCC Representative.
 - .2 The NCC Representative will distribute written notice of each meeting in advance of meeting date to Contractor, Consultant, and all other affected parties.
 - .3 The Contractor shall attend.
 - .4 The Contractor shall ensure affected Subcontractors attend.
 - .5 The NCC Representative will record minutes and include significant proceedings and decisions and identify 'action by' parties.
 - .6 The NCC Representative will reproduce and distribute copies of minutes to meeting participants and affected parties not in attendance.

3.7 AS-BUILT DRAWINGS

- .1 NCC Representative will provide two sets of white prints for record drawing purposes.
- .2 Maintain project record drawings and record accurately all deviations from Contract documents as project progresses. Maintain on-going as-built records on site, ready for inspection during the course of the construction.
- .3 Update these drawings daily.
- .4 Record changes in red. Mark on one set of prints and at completion of project and prior to final inspection, neatly transfer notations to second set and submit both sets to NCC Representative.
- .5 Provide a cost for the As-Built Drawings in the Contractor cost breakdown.

3.8 DOCUMENTS REQUIRED ON-SITE

- .1 Maintain at job site, one copy each of following:
 - .1 Contract drawings,
 - .2 Specifications,
 - .3 Addenda,
 - .4 Change orders,
 - .5 Other modifications to Contract,
 - .6 Approved work schedule,
 - .7 Permits,
 - .8 Field test reports,
 - .9 Reviewed shop drawings,
 - .10 As-built drawings.

3.9 QUALITY OF EQUIPMENT, MATERIALS AND WORKMANSHIP

- .1 Use only new materials, unless indicated otherwise.
- .2 Exceed or meet the minimum requirements of standards referenced in the specifications, such as the Canadian Standards Association (CSA), and the National Building Code of Canada, the Code de Construction du Québec, (current edition), and of all applicable federal, provincial, and municipal codes. In the case of conflict or discrepancy between these requirements, the most stringent applies.
- .3 Workmanship
 - .1 Workmanship shall be best quality, executed by workers experienced and skilled in respective duties for which they are employed.
 - .2 Employ persons fit for and skilled in their required duties.
 - .3 Assume the costs of redoing work that, in the NCC Representative's opinion, does not meet the specified quality of workmanship.
- .4 Alternatives
 - .1 The NCC Representative will only consider Alternatives
 - .1 for materials, products or processes specified with the term "and/or approved equivalent" applied and;
 - .2 submitted in accordance with the "General Instructions for Tendering".
 - .2 The NCC Representative will approve alternatives that are in his opinion equal in material content, workmanship and quality to the materials, products or processes identified and at least conformant to the standards specified.
 - .3 Assume the cost of additional work or modifications to the design due to the use of NCC Representative approved alternatives.

3.10 SECURITY CLEARANCE

- .1 The NCC complies with Treasury Board's Policy on Government Security and consequently, it will require that the contractor's personnel submit to a personal security screening process (Security Clearance Form TBS/SCT 330-60E).
- .2 The NCC reserves the right to not award the Contract until such time as the contractor's personnel core employees have obtained the required level of security screening as identified by the NCC's Corporate Security. In this case the level of security required will be Reliability*

*For operation needs, with advice or assistance from NCC Corporate Security, the security level can be upgraded (Confidential, Secret or Top Secret) on the basis of the sensitivity of the information and assets that need to be accessed.
- .3 The NCC reserves the right to refuse access to personnel not passing a Reliability Check.
- .4 Unless otherwise indicated, access to the site (employees, deliveries, visitors and pick-ups of materials, etc.) must be coordinated with and approved by the NCC Representative.
- .5 Reasonable care must be exercised to ensure the security of any material prepared or received in handling this project.

3.11 SITE SECURITY

- .1 Provide site security as Contractor deems necessary to ensure protection of Contractor's materials, equipment, and building.
- .2 Where security has been reduced by work of the Contract, provide temporary means to maintain security.
- .3 Cooperate with NCC and security staff in maintenance of site security.

3.12 RELICS AND ANTIQUITIES

- .1 Archeological Monitoring: NCC's archeologist will monitor the excavation work.
- .2 Protect relics and antiquities, items of historical or scientific interest and similar objects found during the course of work.
- .3 Immediately notify NCC Representative of any findings and await NCC Representative's written instructions before proceeding with work adjacent to findings.
- .4 If any vestiges of early human occupancy of the land are uncovered during construction, suspend construction activity and notify the NCC Representative.
- .5 Relics, antiquities and items of historical or scientific interest shall remain the property of the Crown.

3.13 SCHEDULING OF WORK and RESTRICTIONS

- .1 The Contractor shall schedule work activities to prevent and minimize any disruption to the occupants and users of the site. Disruptive work activities and their scheduling shall be done in co-ordination with the NCC Representative and site security
- .2 Within 10 working days following notification of intent to award this contract, the Contractor shall submit and review with NCC Representative the sequencing of intended work and activity schedule for approval:
 - .1 Shop drawings submittals.
 - .2 Work commencement.
 - .3 Contractor's on-site mobilization area.
 - .4 Protection, hoarding and temporary shoring structures.
 - .5 Installation and delivery of equipment and waste disposal bins.
 - .6 Deliveries of materials.

- .7 Sequencing of and preparation measures for dis-assembly and selective demolition, assembly and construction activities.
- .8 Identification of noisy and disruptive activities; identification of service interruptions.
- .9 Connection to site infrastructures for water and sanitary systems.
- .10 Testing and commissioning of components and systems.
- .11 Exterior landscaping.
- .3 The Contractor shall submit to the NCC Representative for review the proposed implementation methodology for work of this Contract.
- .4 Site Access Restriction: Individuals requiring access to the site will require pre-authorized reliability check.

3.14 SCHEDULE

- .1 Submit a detailed schedule of work for approval within ten (10) days of award of contract.
- .2 The Detailed Work Schedule shall be in bar chart form indicating the following items against a weekly time scale:
 - .1 activities forming the critical path of the Schedule.
 - .2 dates and time periods of all major construction activities.
 - .3 dates of critical activities.
 - .4 dates of important milestones.
 - .5 shop drawing, material lists and samples submissions;
 - .6 equipment and material delivery;
 - .7 work commencement and completion for each trade as it corresponds to each trade section of the Specification;
 - .8 Substantial and final completion date within time period required by Contract Documents.
- .3 Submit updated schedules at each progress meeting and as reasonably requested by the NCC Representative.

3.15 HOURS OF WORK / WORK WEEK

- .1 Standard authorised hours of work are Monday to Friday, 07:00 hours to 18:00 hours.
- .2 Extended hours and weekend work shall be performed by Contractor to ensure work is completed on schedule. The Contract price will not be changed for this work.
- .3 Obtain prior permission through NCC Representative for work outside of 07:00h to 18:00h / Monday to Friday time frame or weekend work. Assume any extra costs for labour, material or equipment associated with work performed outside of the standard authorised time frame unless specifically requested by Owner.

3.16 PROJECT COORDINATION

- .1 Coordinate progress of the Work, progress schedules, submittals, use of the site, temporary utilities and construction facilities and controls.

3.17 SETTING-OUT OF WORK

- .1 Provide devices needed to lay out and carry out the work. Supply such devices as required to facilitate NCC Representative's inspection of work.

3.18 CO-ORDINATION of the WORK and SUB-TRADES

- .1 Co-ordination of the work: It is the Contractors' responsibility to co-ordinate work to be carried out as identified in the contract documents between all trades.

- .2 Should there be discrepancies, conflicts in the instructions of the contract documents and/or conflicts with applicable regulations, the Contractor shall notify the NCC Representative prior to proceeding with implementation of the work and wait for instructions and directions on how to proceed.
- .3 Manage the sequencing of the work activities in consideration of health and safety of the work area and adjacent structures and site.
- .4 Ensure adequate access and equipment is supplied for work of the contract.
- .5 Cut surfaces as required to accommodate work.
- .6 Remove, dis-assemble all items so shown or specified. Identify, protect from damage components to be retained for re-installation.
- .7 Patch and make good surfaces cut, damaged or disturbed, to NCC Representative's approval. Match existing material, colour, finish and textures unless indicated otherwise.

3.19 CONSTRUCTION SITE ORGANIZATION

- .1 The Contractor is advised that no additional payment will be made for any repeated mobilization and demobilization for any of the construction activities covered by this Contract, interrupted by weather, or by any other construction activity included in any part of this Contract.

PART 4 EXECUTION

4.1 NOT USED

- .1 Not used.

END OF SECTION

1.0 GENERAL

1.1 MEASUREMENT PROCEDURES

- .1 Cast-in-place concrete will not be measured but will be included in the appropriate lump sum price.
- .2 Heating of water and aggregates and providing cold weather protection will not be measured but considered incidental to work.
- .3 Cooling of concrete and providing hot weather protection will not be measured but considered incidental to work.
- .4 Supply and installation of anchor bolts, nuts and washers and bolt grouting will not be measured but considered incidental to work.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C 109/C109M-01, Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or 50-mm Cube Specimens).
 - .2 ASTM C 260-00, Specification for Air-Entraining Admixtures for Concrete.
 - .3 ASTM C 494-/C 494-99a, Specification for Chemical Admixtures for Concrete.
 - .4 ASTM C 827-01, Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.
 - .5 ASTM D1751-04, Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- .2 Canadian Standards Association (CSA)
 - .1 CAN/CSA-A5-98, Portland Cement.
 - .2 CAN/CSA-A23.1-04, Concrete Materials and Methods of Concrete Construction. Methods of test and standard practices for concrete.
 - .3 CAN/CSA-A23.2-04, Methods of Test and standard practices for concrete.
 - .4 CAN/CSA-A23.5-M86 (R1992), Supplementary Cementing Materials.
 - .5 CSA G30.3-M1983 (R1991), Cold Drawn Steel Wire for Concrete Reinforcement.
 - .6 CAN/CSA G30.18-M92 (R2002), Billet-Steel Bars for Concrete Reinforcement.
- .3 Norme du Ministère des Transports du Québec (MTQ) Tome VII Matériaux.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
- .2 At least 3 weeks prior to commencing work, inform NCC Representative of proposed source of aggregates and provide access for sampling.

1.4 CERTIFICATES

- .1 Submit certificates in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Minimum 3 weeks prior to starting concrete work submit to NCC Representative manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:
 - .1 Portland cement or products.
 - .2 Admixtures.
 - .3 Aggregates.
 - .4 Water.
- .3 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.
- .4 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Use trigger operated spray nozzles for water hoses.
- .3 Designate a cleaning area for tools to limit water use and runoff.
- .4 Carefully coordinate the specified concrete work with weather conditions.
- .5 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .6 Prevent plasticizers, water-reducing agents and air-entraining agents from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, non-combustible material and remove for disposal. Dispose of all waste in accordance with applicable local, provincial and national regulations.
- .7 Choose least harmful, appropriate cleaning method which will perform adequately.

2.0 PRODUCTS

2.1 MATERIALS

- .1 Portland cement : to CAN/CSA-A5.
- .2 Supplementary cementing materials: to CAN/CSA-A23.5.
- .3 Cementitious hydraulic slag: to CAN/CSA-A363.
- .4 Water: to CAN/CSA-A23.1.

- .5 Aggregates: to CAN/CSA-A23.1. Coarse aggregates to be normal density.
- .6 Air entraining admixture: to ASTM C 260.
- .7 Chemical admixtures: to ASTM C 494-99a. NCC Representative to approve accelerating or set retarding admixtures during cold and hot weather placing if required.

2.2 MIXES

- .1 Proportion normal density concrete in accordance with CAN/CSA-A23.1, Alternative 1 – minimum 30 MPa

3.0 EXECUTION

3.1 PREPARATION

- .1 Obtain NCC Representative's approval before placing concrete. Provide 48 hours notice prior to placing of concrete.
- .2 Pumping of concrete is permitted only after approval of equipment and mix.
- .3 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .4 Prior to placing of concrete obtain NCC Representative's approval of proposed method for protection of concrete during placing and curing.
- .5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .6 Do not place load upon new concrete until authorized by NCC Representative.

3.2 CONSTRUCTION

- .1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1.
- .2 Finish concrete in accordance with CAN/CSA-A23.1.
- .3 Use procedures acceptable to NCC Representative or those noted in CAN/CSA-A23.1 to remove excess bleed water. Ensure surface is not damaged.
- .4 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.
- .5 Provide float finish unless otherwise indicated.

3.3 SITE TOLERANCE

- .1 Concrete tolerance in accordance with CAN/CSA-A23.1 straight edge method.

3.4 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by NCC Representative in accordance with CAN/CSA-A23.1.
- .2 NCC Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .3 Non-destructive Methods for Testing Concrete shall be in accordance with CAN/CSA-A23.2.

END of Section

PART 1 - GENERAL

- | | |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.1 Related Sections | .1 Supply Material Safety Data Sheets for materials in this section. |
| 1.2 Maintenance Data | .1 Provide maintenance data for the Marmoleum flooring that conforms with Section 01 00 00 Master General Requirements. |
| 1.3 Submittals | .1 Submit copy of Forbo's installation procedures in accordance with Section 01 00 00 Master General Requirements.

.2 Submit document stating that the moisture content of concrete slab and the pH of the surface is within Forbo written guidelines for installing Marmoleum.

.3 Submit a cut diagram indicating seams locations and rolls directions as well as the different colors of welding rods. Do not proceed with the installation without prior approval of cuttings drawings by the NCC Representative. |
| 1.4 Samples | .1 Submit samples in accordance with Section 01 00 00 Master General Requirements.

.2 Submit one sample pieces 300 x 300 mm of the sheet material. |
| 1.5 Preparation and Installation | .1 Maintain room and material temperature at a minimum of 20°C for at least 48 hours before, during, and 7 days after installation. Avoid excessive ambient humidity and cold air drafts.

.2 The concrete substrate must have a compression resistance of at least 3500 lb./in ² (25 MPa).

.3 The concrete should have a curing time of 28 days and be dry before the beginning of the installation of flooring material.

.4 Do not proceed with flooring installation if the concrete slab moisture content is over 3.5 lbs/1000 square feet (3.5%), using Calcium Chloride Moisture Method. Contact Forbo technical representative. The pH of the concrete must not be higher than 9. |
| 1.6 Quality Control Program | .1 Submit a letter of competence issued by the manufacturer indicating a minimum of 5 years experience related to installation of such product, supported with a list of 3 similar projects (including names of resources individuals) completed using identical system as described in this present document.

.2 Submit proof that the flooring installer has successfully completed the manufacturer's training program. This document must be issued, dated and signed by authorized manufacturer personnel.

.3 An accredited Forbo Contractor and Installer must perform all Marmoleum installation work. They must submit to the NCC Representative a letter of Forbo's certification and compliance. In |

addition, all work must be conducted following Forbo's installation recommendations and /or procedures for Marmoleum.

1.8 Meeting before installation

- .4 Provide a document indicating membership in good standing of the Quebec Federation of floor coverings (FQRS).
- .1 Two (2) weeks prior to the start of the installation in relation with this section, a meeting shall be scheduled between the NCC Representative, the general contractor, the linoleum flooring installer, and the manufacturer's representative to discuss the following points:
 - 1. Sub floor condition and required floor preparation
 - 2. Surface irregularities and tolerance level
 - 3. Floor preparation and adhesive
 - 4. Installation of Marmoleum
 - 5. Welding rod and flash cove (if required)
- .2 Following this meeting, a document will be issued by the manufacturer in order to resume all actions to be taken.
- .3 A complete and detailed report will be sent to all parties involved 72 hours following this meeting.

1.9 Manufacturer's Representative

- .1 The involvement of the manufacturer's representative will have to be arranged, and periodic job site inspections will be conducted to ensure that proper installation is done according to recommendations in this present section.

1.10 Warranty

- .1 Submit the manufacturer's warranty on material for a period of ten (10) years following the date of installation
- .2 In accordance with Forbo's quality insurance program, submit the limited three (3) year warranty on installation (issued by the flooring contractor) following the date of installation.

PART 2 – PRODUCT

2.1 Materials

- .1 Linoleum: 2.5mm to conform with CSA A-146 made of natural ingredients mixed and calendared to a jute backing with the following specifications:
 - a) Color fastness in accordance with ASTM F1514, minimum Blue Scale 6.
 - b) Electrical resistance and anti-static according ASTM F150
 - c) Manufactured using the two (2) layer system
 - d) Manufacturer under the environmental control ISO 14001
 - e) Static load resistance to meet ASTM F970
 - f) Flame spread and smoke development to meet CAN/ULC S102.2
 - g) Chemical resistance in accordance with ASTM F 925
 - h) Surface protected with a factory applied E.T.C. finish.
 - i) Product should not contain cork or cork powder
 - j) Choice: Marmoleum Real as manufactured by Forbo.
- .2 Adhesives:

- a) Specific weight: 1.2kg/L.
 - b) Spreading weight: 325 -375 g/m².
 - c) Solvent content: 4% maximum.
 - d) Accepted material: Forbo #511(environmental choice) or #414(4% solvent), alkaline and water resistant SBR type applied using the recommended trowel no. 15 "Richard's". The material must be laid while the adhesive is still wet. For further information please contact the manufacturer.
- .3 Welding rod: Accepted material, Marmoweld seam welding rods as manufactured by Forbo.
 - .4 Sub-floor filler: "Portland" cement based patch as recommended by Forbo, and the manufactured Mapei.
 - .5 Floor finishes: according to Forbo recommendations.

PART 3 - EXECUTION

3.1 Installation verification

- .1 As recommended by Forbo, please ensure that all concrete sub floors are dry and clean.

3.2 Sub-floor Treatment

- .1 The installer must make sure that areas and all structures can sustain all related work as described in this present section. He must make sure that all saw cuts located "on grade" level are filled with sealer up to 6mm (1/4") from the surface of the concrete slab.
- .2 Level all uneven surfaces and treat saw cuts using proper techniques. (Suggested product Sikadur, Contact SIKA 1-800-993-SIKA for further details.)
- .3 Clean the sub floor and apply the patching material using proper trowel or spatula to obtain a smooth, hard and even surface. Forbid all traffic until the surface is dry and hard.
- .4 Remove dust, old adhesive, paint, dirt, wax, sealer and foreign matter from existing surfaces.

3.3 Linoleum Installation

- .1 Maintain room and material temperature at a minimum of 20° C for at least 24 hours before installation, during, and 7 days after installation. Avoid excessive ambient humidity and cold air drafts.
- .2 To facilitate installation, it is recommended to store Marmoleum at a temperature of at least 20° C for a period of 48 hours in an upright position.
- .3 Spread the adhesive evenly on the floor in accordance with the manufacturers' recommended trowel. Avoid spreading adhesive onto a large area to avoid drying before the material is laid down. Always lay the material into the wet adhesive.
- .4 The Marmoleum lengths should be positioned in parallel or running

in the same direction. Once installed, roll across the width to secure adhesion – then parallel to the length of roll, using a 150 lb. roller to ensure adhesion and eliminate all trapped air bubbles.

- .5 The seams must be welded with Marmowel welding rods in the colors selected by the NCC Representative 24 hours following the adhesion of the flooring and according to the manufacturer's recommendations.
- .6 When material cuts are visible or apparent, use a protective metallic molding.
- .7 Use a sealer on edges of doorsills and around other obstacles such as pipes, etc., (Suggested product Sikaflex 1A, contact SIKA 1-800-993-SIKA for further details.)
- .8 After the installation of the Marmoleum, wait 72 hours before moving equipment on wheels and 7 days to move heavy equipment.
- .9 Allow a setting time of 48 hours after installation before initial cleaning is done in accordance with Forbo's maintenance instructions.

3.4 Cleaning and waxing

- .1 Clean all traces of adhesives from the surface of material and any other substance.
- .2 Clean surfaces using a neutral pH cleaning detergent approximately 48 hours after the material has been installed. Avoid flooding with water, pick up excess water with a vacuum or squeegee, rinse the floor with clean water and allow drying.
- .3 Apply two thin coats of acrylic polymer floor finish as recommended in the Forbo's maintenance manual.
- .4 The floor finish shall match the existing. For more details, please refer to Forbo's maintenance manual.

END

1.0 GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 24 13 - Excavation, Embankment and compaction

1.2 REFERENCES

- .1 «Cahier des charges et devis généraux (CCDG) Construction et réparation», 2012, from the «Ministère des Transports du Québec».
- .2 BNQ: NQ 2560-114 «Travaux de Génie Civil-Granulats».
- .3 «Tome VII – Matériaux», from the collection of «Normes – Ouvrages routiers» from the «Ministère des Transports du Québec».

2.0 PRODUCTS

2.1 MATERIALS

- .1 MG-20 et MG 112 : According to standard NQ 2560-114 of « Bureau de normalisation du Québec (BNQ) ».
- .2 Granular A: in conformity with Ministry of Transportation of Ontario OPSS 1010 April 2004 «Material Specifications for Aggregates – Base, Subbase, Select Subgrade and Backfill Material»
- .3 The stabilized crushed stone used must be composed of 100% crushed materials and must meet the requirements of table 3 («granulats fins» pg 58) of standard 2560-114 of «Bureau de normalisation du Québec» (BNQ). The stabilized crushed stone must have a gradation contained between 0/4 and 0/10 and the proportion of fines (<80mm) must be between 15% and 20%.

2.2 SOURCE QUALITY CONTROL

- .1 Inform NCC Representative of proposed source of aggregates and provide access for sampling at least 2 weeks prior to commencing production.
- .2 If, in opinion of NCC Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
- .3 Advise NCC Representative 2 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.

3.0 PREPARATION

3.1 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 NCC Representative.
- .3 Wash aggregates, if required to meet specifications. Use only equipment approved by NCC Representative.
- .4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.

3.2 HANDLING

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

3.3 STOCKPILING

- .1 Stockpile aggregates on site in locations as indicated by NCC Representative unless directed otherwise by NCC Representative.
- .2 Stockpile aggregates in sufficient quantities to meet project schedules.
- .3 During winter operations prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

END OF SECTION

1.0 GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 05 17 – Aggregates

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert excess materials from landfill to site approved by the NCC Representative.

2.0 EXECUTION

2.1 SITE PREPARATION

- .1 Cut neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

2.2 STRIPPING OF TOPSOIL

- .1 Strip topsoil to depths as required. Do not mix topsoil with subsoil;
- .2 Stockpile in locations as directed by the NCC Representative. Stockpile height not to exceed 2 m.
- .3 Dispose of unused topsoil off site, on an approved site. Remove clearing and grubbing debris from stripping.

2.3 SETBACKS FOR WORK AROUND TREES

- .1 Unless otherwise directed or approved by NCC Representative, trenching shall respect the minimum setback distances set out in Table 1.

Table 1: Tree Protection Setbacks

Trunk Dia. (cm) of Existing Tree(s)	Min. Setback (distance from trunk in metres)
Less than 30	3,0
30 to 60	4,5

- .2 In specific instances, where minimum setbacks cannot be met due to site conditions, notify NCC Representative for approval of revised setback distance.

2.4 DEWATERING

- .1 Provide all labour and equipment necessary to pump and dewater excavations.

- .2 Protect open excavations against flooding and damage due to surface run-off.

2.5 EXCAVATION

- .1 Notify the NCC Representative when waste materials are encountered and remove to depth and extent directed.
- .2 If excavations along roots are necessary, excavate by hand and cut off roots using a hatchet or a sharpen saw;
- .3 Excavate to lines, grades, elevations and dimensions as indicated;
- .4 When Contractor, by his own account, excavates beyond the indicated depth, the Contractor must effectuate the necessary correction to the bottom of the excavation and receive, following the corrections, the written approbation to continue work by the NCC Representative. The theoretical dimensions for an excavation (length, width and angle of walls) are the following:
 - .1 In solid rock, the walls of the excavation are vertical and the dimensions of the bottom of the excavation are those of the base of the work (footing). In such a case where the rock is not cut out according to the stipulated dimensions, the supplementary work required must be done at the contractors cost.
 - .2 In soil other than solid rock, the circumference of the excavation must exceed by at least 600mm the dimensions of the work (footing).
- .5 The bottom of the excavations must be level and must consist of undisturbed soil, exempt from loose and soft or organic substances. The rock must contain a rugged surface, exempt from rock debris, rocks, gravel and dirt. Slaty rock must be cleaned of all loose fragments.
- .6 In the case of a work which is not built directly on bedrock, excavation of the last 500 millimeters of soil above the bottom of planned excavation must be done using a bucket without teeth, just before the installation of the footing formwork. The soil at the bottom of the excavation should not be reworked.
- .7 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of NCC Representative;
- .8 Notify NCC Representative when bottom of excavation is reached;
- .9 Obtain NCC Representative's approval of completed excavation;
- .10 Remove unsuitable material from trench bottom to extent and depth as directed by NCC Representative;
- .11 Treat ground slopes, where subgrade is on transition from excavation to embankment, at grade points as indicated in drawings;
- .12 Dispose of surplus and unsuitable excavated material off site;
- .13 Do not obstruct the flow of runoff or natural waterways. Shape profiles, the peaks and cross-slopes of excavated areas to maximize water drainage runoff.

- .14 Minimize the alteration and/or undermining of the existing compacted granular material under the existing concrete slab.

2.6 BACKFILLING

- .1 The Contractor shall give written notice to the NCC Representative at least 24 hours in advance specifying the date and time filling and backfilling will begin.
- .2 Around the abutment, the filling of excavations must be made with MG 112 granular material (see Section 31 05 17 - Aggregates). In other cases, unless otherwise specified by the NCC Representative, use materials from excavations for the backfill. The fill material must be approved by the NCC Representative;
- .3 For filling excavations, the granular material is placed over a minimum width corresponding to the theoretical dimensions of the excavations, with a slope of 1V: 1.5H, and this, to ground level before excavation.
- .4 The granular material must be set up by layers of a maximum thickness of 300 mm. Compaction of materials, including the degree of compactness, must be implemented according to the requirements for compaction of materials, found in the following section "Compacting." In the area adjacent to the wall of the structure, respecting a width of 1500 mm from the structure, compaction must be done with dynamic compactors, vibratory plates and vibratory rollers having a mass per meter of roller less than 800 kg.

2.7 COMPACTING

- .1 General
 - .1 The maximum density of the material put in place is determined by the CAN / BNQ 2501-255 "Soils - Determination of water content relationship-density - test with modified compaction energy (2700 kN • m/m3)." If this cannot be achieved, the method used must be that of the standard NQ 2501-258 "Soils - Determination of water content relationship-density - the vibrating hammer test."
 - .2 The NCC Representative checks the compactness of each layer of material using a nucleodensimeter according to method LC 22-003. The correction factor (K factor) used to correct the measured water content of each type of material is determined using the LC 22-002. The nucleodensimeter used is calibrated at least once a year according to the procedure defined in ASTM D6938 "Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)".
 - .3 The compacting must be performed before the material is at a temperature below 0 ° C.

- .4 The Contractor shall ensure to obtain, on site, the water content closest to the optimum determined by laboratory testing for maximum dry density according to the CAN/BNQ 2501–255 « Sols – Détermination de la relation teneur en eau-masse volumique – Essai avec énergie de compactage modifiée (2700 kN • m/m³) ». In the case of clay soils, the water content must never be greater than the plastic limit obtained by the CAN/BNQ 2501–090 « Sols – Détermination de la limite de liquidité à l'aide de l'appareil de Casagrande et de la limite de plasticité ». The Contractor shall provide the means required to accelerate the drying of the soil that is overly wet or moisten the soil that is too dry. If the soil is too wet to allow uniform compaction at maximum dry density, the supervisor may require that the soil be mixed with dry soil or be dried by aeration or by scarification. If instead, the water content is too low, the supervisor may require watering in order to obtain the optimum content. If the surface is smooth, the Contractor shall scarify or use harrowing to promote the penetration of water.
- .5 If the natural soil or a layer of material already compacted to the density required undergoes a loss of density due to movement of equipment, weather, frost action and thaw or any other cause before the end of the project, the contractor must redo the compaction of the soil to the required density, at his expense.
- .6 The degrees of compactness required for the natural terrain and the successive layers forming the embankments are:
 - .1 The bottom of the cuts and the natural soil cleared from topsoil and left in place within 1 m from the infrastructure line must be densified to a depth of 150 mm for each layer of granular to a minimum of 90.0% of the maximum dry density. If the bottom of the cut or the natural soil is located in the subgrade, the first 150 mm below the subgrade line must be densified to a minimum of 95.0%.
 - .2 The backfill soil are densified to a minimum of 90.0% of the maximum dry density, if the infrastructure line coincides with the subgrade, the last 150 mm are densified to a minimum of 95.0%.

2.8 FINISHING

- .1 Finish slopes, ditch bottoms and borrow pits true to lines, grades and drawings;
- .2 Hand finish slopes that cannot be finished satisfactorily by mechanical equipment.

2.9 RESTORATION

- .1 Upon completion of work remove waste materials and debris; trim slopes, and correct defects as directed by NCC Representative;
- .2 Replace topsoil as directed by NCC Representative;
- .3 Alleviate compaction of adjacent turf caused by contractor's equipment by turf aeration;
- .4 Clean and reinstate areas affected by Work as directed by the Contractor.

2.10 PROTECTION

- .1 Maintain finished surfaces in good condition and conforming to this section until acceptance by the Contractor.

END OF SECTION