Travaux publics et Services gouvernementaux Canada
Public Works and Government Services Canada

UTILITIES AND PROCUREMENT CANADA INSTALLATION OF ELECTRIC CHARGING STATIONS
TRANSPORT CANADA

PWGSC Ref: R.114347.001

CIVIL TECHNICAL SPECIFICATIONS
ISSUED FOR FINALVERSION 100 %

October 1st, 2021

Prepared by :

Cledor Diagne, Eng.
(Civil)

2021-10-22

Mathieu Beauregard, Eng.
(Civil)

Drawing no.	Title	Revision No.
679959-C401	Civil - Building layout	00

PART 1 GENERAL

1.1 Work covered by the contract documents

.1 The work under this contract consists of:

.1 Any other work described in the plans and specifications.

.2 Demolition of sidewalks.

.3 Edge removal.

.4 Protection of lamp post.

.5 Installation of road signs.

.6 Removal of paving.

.7 Proposed sidewalk installation.

.8 Proposed paving installation.

.9 Pavement marking work.

1.2 Restrictions on work

.1 Coordinate the schedule of work progress with airport operations and coordinate with the Departmental Representative.

.2 Execute the work in stages and in the manner specified in the Contract, so as to permit normal airport operations to continue as scheduled. The progress of the work shall also allow for the restoration of air traffic in emergency situations and medical evacuations during non-operational periods.

.3 Maintain access for firefighting purposes; also provide firefighting capabilities.

1.3 Use of the Premises by the Contractor

.1 The use of the premises is restricted to the areas necessary for the execution of the work.

.2 Coordinate the use of the premises as directed by the Departmental Representative.

.3 Upon completion of the work, the existing facilities not covered by this work must be in a condition equivalent to or better than the condition they were in before the work began.

1.4 Existing utilities

.1 Before interrupting utility services, inform the Departmental Representative and the utility companies involved and obtain the necessary approvals.

.2 Where tapping or connection to existing utility lines is required, give the Departmental Representative 48 hours advance notice of the planned interruption of electrical or mechanical services. Ensure that the duration of interruptions is as short as possible. Work shall be performed at times determined by the local authority having jurisdiction, with minimal interference with airport operations.

.3 Provide alternative routes for pedestrian and vehicle traffic.

.4 Prior to the commencement of work, identify the extent and location of utility lines in the work area and inform the Departmental Representative.

.5 When unlisted utility lines are discovered, immediately notify the Departmental Representative and document them.

.6 Protect, relocate, or maintain in service utility lines that are functional. If non-functioning pipelines are discovered during the course of the work, block them off in a manner authorized by the authorities having jurisdiction.

.7 Record the location of utility lines that are maintained, relocated or abandoned.

1.5 Required documents

.1 Keep a copy of each of the following documents on the job site.

.1 Contractual drawings.

.2 Quote.

.3 Addendum.

.4 Revised studio drawings.

.5 List of unreviewed shop drawings.

.6 Change orders.

.7 Other changes to the contract.

.8 Reports of tests carried out on site.

.9 Copy of the approved schedule.

.10 Health and safety plan and other safety-related documents.

.11 Other documents indicated.

1.6 Type of contract

.1 The work shall be subject to a lump sum and/or unit price contract.

.2 Costs incurred in meeting the requirements of this specification and not covered by a payment item shall be apportioned proportionately to the various bid items.

.3 The Contractor, at the time of filing his bid, acknowledges that he is fully informed of all conditions affecting the work to be done, the labor, materials, equipment, plants to be furnished by him, and the means of access to the site, and that his information has been obtained by personal investigation of the site by himself or his authorized representative and not from verbal information given to him by representatives of this department.

.4 The drawings and specifications shall indicate the general nature of the work to be performed. However, it should be understood that the Department reserves the right to change the levels of the alignment, or the extent of the work as required, without in any way rendering the terms of the contract void.

.5 All costs incurred in fulfilling the requirements of this contract and not covered by a payment item in the price schedule shall be included in the Contractor's overhead and allocated proportionately to the various payment items in the bid.

1.7 Initial field models

.1 Model of the initial plot provided by the Departmental Representative:

.1 The Contractor shall validate and approve for volume calculation purposes the terrain model provided from the survey performed during the summer of 2018 by the Department Representative performed by scan method.

.2 In the event of a dispute over the original survey data provided, the resurvey shall be conducted jointly between the Departmental Representative and the Contractor.

1.8 Codes

.1 Perform the work to meet all requirements:

.1 Contractual documents.

.2 Specified standards and codes as well as other referenced documents.

.3 Local authorities.

.2 In the event of discrepancies or contradictions, the most stringent requirements shall prevail.

1.9 Work schedule

.1 Within 5 working days of contract award, submit a work schedule indicating the progress of the various stages of the project to be completed within the time frame stipulated in the contract documents.

.2 Interim revisions to the progress of the work, based on the submitted schedule, will be made at the discretion of the Departmental Representative. The schedule will be updated by the Contractor.

.3 Acceptance by the Department Representative of the revised schedule does not relieve the Contractor of responsibility for any consequences that may result from the Contractor's failure to complete the Work in accordance with the original schedule.

1.10 Additional drawings

.1 The Departmental Representative may provide the Contractor with additional drawings for clarification purposes. Such supplemental drawings shall have the same meaning and scope as if they were part of the contract documents.

PART 2 PRODUCT

2.1 Not applicable

.1 Not applicable.

PART 3 EXECUTION

3.1 Not applicable

.1 Not applicable.

END OF SECTION

PART 1 GENERAL

1.1 Related requirements

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 32 11 23 - Granular Subgrade.

1.2 Administrative procedures

.1 As soon as possible and in a predetermined sequence so as not to delay the work, submit the required documents and samples to the Departmental Representative for review. Delay in submission shall not constitute sufficient reason for an extension of time to complete the work and no such request will be granted.

.2 Do not undertake any work requiring the submission of documents and samples until the review of all submissions has been completed.

.3 Specifications on shop drawings, data sheets and samples of products and structures shall be expressed in metric (SI) units.

.4 Where items are not produced or manufactured in metric (SI) units or where characteristics are not given in metric (SI) units, converted values may be accepted.

.5 Review the documents and samples prior to submission to the Departmental Representative. By this pre-verification, the Contractor confirms that the requirements applicable to the work have been or will be determined and verified, and that each of the documents and samples submitted have been reviewed and found to conform to the requirements of the Work and the Contract Documents. Documents and samples that are not stamped, signed, dated, and identified in relation to the particular project will be returned without review and will be considered rejected.

.6 Notify the Departmental Representative in writing, at the time of submission of documents and samples, of any deviations from -the requirements of the contract documents and the reasons for such deviations.

.7 Ensure accuracy of field measurements in relation to adjacent structures affected by the work.

.8 The fact that the documents and samples submitted are reviewed by the Departmental Representative does not relieve the Contractor of its responsibility to submit complete and accurate documentation.

.9 The fact that the documents and samples submitted are reviewed by the Departmental Representative does not relieve the Contractor of its responsibility to submit documents in accordance with the requirements of the contract documents.

.10 Keep a verified copy of each document submitted on site.

1.3 Shop drawings and technical data sheets

.1 Shop Drawings" means drawings, diagrams, illustrations, charts, performance graphs, pamphlets and other documentation required to be provided by the Contractor to show in detail any part of the subject work.

.2 The drawings must bear the seal and signature of a qualified engineer recognized or licensed to practice in Canada, in the Province of Quebec.

.3 The shop drawings shall indicate the materials to be used and the methods of construction, fastening or anchoring to be employed, and shall contain erection diagrams, details of connections, relevant explanatory notes and any other information necessary for the execution of the work. Where structures or components are connected or joined to other structures or components, indicate on the drawings that the requirements were coordinated, regardless of the section under which the adjacent structures or components are to be supplied and installed. Cross-reference the specifications and preliminary design drawings-.

.4 Allow 10 days for the Departmental Representative to review each batch of documents submitted.

.5 Changes to the shop drawings made by the Departmental Representative are not intended to vary the contract price. If this is the case, however, notify the Departmental Representative in writing before proceeding with the work.

.6 Make changes to the shop drawings as requested by the Departmental Representative in accordance with the requirements of the contract documents. At the time of resubmission of the drawings, advise the Departmental Representative in writing of any changes made in excess of those required.

.7 Submissions must be accompanied by a letter of transmittal, in two (2) copies, containing the following information:

- .1 The date.
- .2 The project name and number.
- .3 The name and address of the Contractor.
- .4 The designation of each drawing, data sheet and sample and the number submitted.
- .5 Any other relevant data.

.8 The documents submitted must include or indicate the following:

- .1 The date of preparation and review dates.
- .2 The project name and number.
- .3 The name and address of the following persons:
  - .1 The subcontractor.
  - .2 The supplier.
  - .3 The manufacturer.

.4 The Contractor's stamp, signed by the Contractor's authorized representative, certifying that the documents submitted are approved, that the field measurements have been verified and that the package conforms to the requirements of the contract documents.

.5 Relevant details for the portions of the work involved:

.1 Materials and manufacturing details.

.2 The layout or configuration, with dimensions, including those taken on site, as well as clearances and clearances.

.3 The details of the assembly or adjustment.

.4 Characteristics such as power, flow rate or capacity.

.5 Performance characteristics.

.6 Reference standards.

.7 The operational mass.

.8 Wiring diagrams.

.9 Single line diagrams and block diagrams.

.10 Links with adjacent structures.

.9 Distribute copies of the shop drawings and data sheets after the Departmental Representative has completed the review.

.10 Submit one (1) electronic copy or three (3) copies of the shop drawings prescribed in the technical sections of the specifications and as reasonably required by the Department Representative.

.11 If no shop drawings are required due to the use of a standard manufactured product, submit one (1) electronic copy or three (3) copies of the manufacturer's data sheets, or documentation prescribed in the technical sections of the specification and required by the Department Representative.

.12 Submit one (1) electronic copy or three (3) copies of the test reports prescribed in the technical sections of the specifications and required by the Departmental Representative.

.1 The report signed by the official representative of the testing laboratory shall certify that materials, products or systems identical to those proposed in the work have been tested in accordance with the prescribed requirements.

.2 The testing must have been completed within three (3) years prior to the contract award date.

.13 Submit one (1) electronic copy or three (3) copies of the certificates prescribed in the technical sections of the specifications and required by the Departmental Representative.

.1 The documents, printed on the manufacturer's official letterhead and signed by a representative of the manufacturer, shall certify that the products, materials, equipment, and systems supplied conform to the specifications.

.2 Certificates must be dated after contract award and must indicate the project designation.

.14 Submit one (1) electronic copy or three (3) copies of the manufacturer's instructions prescribed in the technical sections of the specifications and required by the Departmental Representative.

.1 Pre-printed documents describing the method of installation of products, materials, and systems, including special instructions and material safety data sheets indicating impedances, risks and safety measures to be taken.

.15 Submit one (1) electronic copy or three (3) copies of the manufacturer's field inspection reports required in the technical sections of the specifications and requested by the Departmental Representative.

.16 Reports of tests and verifications performed by the manufacturer's representative to confirm the conformity of the installed products, materials, equipment, or systems with the manufacturer's instructions.

.17 Submit one (1) electronic copy or three (3) copies of the operation and maintenance records prescribed in the technical sections of the specifications and required by the Department Representative.

.18 Delete information that does not apply to the work.

.19 In addition to the standard information, provide any additional details that apply to the work.

.20 When the shop drawings have been checked by the Departmental Representative and no errors or omissions have been found or only minor corrections have been made, the overhead print(s) shall be returned, and the fabrication and installation work may proceed. If the shop drawings are rejected, the marked-up copy(ies) shall be returned, and the corrected shop drawings shall be resubmitted as indicated above before processing and installation can proceed.

.21 TPSGC's review of the shop drawings is limited to verifying that the data shown on the drawings is consistent with the general design.

.1 This review does not imply Departmental approval of the detailed design as presented in the shop drawings, which is the responsibility of the submitting Contractor, nor does it relieve the Contractor of the obligation to submit complete and accurate shop drawings and to comply with all requirements of the work and the contract documents.

.2 Without limiting the generality of the foregoing, it is important to note that the Contractor is responsible for the accuracy of confirmed field dimensions, for providing information on shaping methods or construction and installation techniques, and for the coordination of the work performed by all trades.

1.4 Samples

.1 Submit samples for examination as specified in the technical sections of the specifications. Label samples with origin and intended destination.

.2 Ship samples postage paid to the Departmental Representative.

.3 Notify the Departmental Representative in writing at the time of submission of product samples of deviations from the requirements of the contract documents.

.4 Where colour, pattern or texture is specified, submit the full range of samples required.

.5 Changes to the samples made by the Departmental Representative are not intended to vary the contract price. If this is the case, however, notify the Departmental Representative in writing before proceeding with the work.

.6 Make such modifications to samples as may be requested by the Departmental Representative while complying with the requirements of the contract documents.

.7 The reviewed and approved samples will become the benchmark against which the quality of materials and workmanship of the finished and installed works will be assessed.

1.5 Samples of the work - Test board

.1 Make a test bed of the required structure in accordance with Section 32 11 23 - Granular Subgrade.

1.6 Photographic documentation

.1 Submit, as directed by the Departmental Representative, one (1) copy of the high-resolution digital colour photograph file in JPG format, submitted on an electronic medium such as an external hard drive.

.2 Project identification: project name, project number and date the photo was taken.

.3 Photo submission frequency :

.1 Photographs should be taken of all stages and activities of construction, taking care to capture any structures or situations that were of concern from an environmental protection perspective.

.2 After the installation of the utility lines is completed, but before the works are concealed and as directed by the Departmental Representative.

1.7 Certificates and minutes

.1 Submit documents required by the relevant Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST) immediately after contract award.

.2 Submit copies of insurance policies immediately after contract award.

PART 2 PRODUCT

2.1 Not applicable

.1 Not applicable.

PART 3 EXECUTION

3.1 Not applicable

.1 Not applicable.

END OF SECTION

Part 1 GENERAL

1.1 References

.1 Canada Labour Code, Part II, Canada Occupational Safety and Health Regulations.

.2 Canadian Standards Association (CSA).

.3 Workplace Hazardous Materials Information System (WHMIS)/Health Canada.

.1 Material Safety Data Sheet (MSDS).

.4 Act respecting occupational health and safety, R.S.Q. Chapter S-2.1.

.5 Safety Code for the Construction Industry, S-2.1, r.6.

1.2 Documents/Samples to be submitted

.1 Submit the required documents and samples in accordance with Section 01 33 00 -Documents and Samples to be Submitted.

.2 Transmit to the Ministry Representative, the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST) and the Association paritaire en santé et de la sécurité du secteur de la construction (ASP Construction) the prevention program specific to the construction site, as described in section 1.8, at least 10 days before the work begins. The Contractor shall thereafter update his prevention program if the course of the work differs from his initial forecast. The Departmental Representative may, following receipt of the program and at any time during the work, require that the program be modified or completed to better reflect the reality of the work site. The Contractor must then make the required corrections before the work begins.

.3 Submit the completed site inspection grid to the Departmental Representative at the frequency indicated in Section 1.12.1.

.4 Forward to the Departmental Representative, within 24 hours, a copy of any inspection report, correction notice, or recommendations issued by federal or provincial inspectors.

.5 Submit to the Departmental Representative, within 24 hours, an investigation report for any accident resulting in injury and for any incident that highlights a potential hazard.

.6 Provide the Departmental Representative with all Material Safety Data Sheets (MSDS) for controlled products used on the job site at least three (3) days prior to their use on the job site.

.7 Forward to the Department Representative copies of training certificates that are required for the implementation of the prevention program, including:

.1 General health and safety course for construction sites.

.2 Security guard certificate.

.3 Workplace first aid and cardiopulmonary resuscitation.

.4 Work likely to emit asbestos dust.

.5 Work in confined spaces.

.6 Lockout procedure.

.7 Wearing and fitting of personal protective equipment.

.8 Safe driving of forklifts.

.9 Elevating work platforms.

.10 And any other training required by regulation or by the prevention program.

.8 Medical Examinations: where medical examinations are required, by law, regulation, directive, specification or prevention program, the Contractor shall:

.1 Prior to mobilization, forward to the Department Representative the medical examination certificates of its supervisory personnel and of all its employees covered by the first paragraph of this section who will be present at the opening of the work site.

.2 Thereafter, transmit progressively and without delay the medical examination certificates of all persons newly arrived at the site who are covered by the first paragraph of this article.

.9 Contingency plan: The contingency plan, as described in section 1.8.3, must be submitted to the Departmental Representative at the same time as the prevention program.

.10 Notice of commencement of work: the notice of commencement of work must be sent to the CNESST before the work begins, with a copy to the Departmental Representative. A copy of this notice must also be posted in a prominent place at the work site. Upon demobilization, the notice of closure must be sent to the CNESST, with a copy to the Departmental Representative.

.11 Plans and engineer's certificates of compliance: the Contractor must send to the CNESST and to the Departmental Representative a copy signed and sealed by an engineer of all plans and certificates of compliance required under the Safety Code for the Construction Industry (S-2.1, r. 6), another Act, another regulation or another clause of the specifications or contract. A copy of these documents must be available at all times at the work site.

.12 CNESST Certificate of Compliance: The Certificate of Compliance is a document issued by the CNESST confirming that the Contractor is in good standing with the CNESST, i.e., that the Contractor has paid the CNESST all monies owed in respect of a given contract. This document must be provided to the Departmental Representative upon completion of the work.

1.3 Risk assessment

.1 The Contractor shall conduct a hazard identification for each task performed on the site.

.2 The Contractor shall plan and organize the work in such a way as to favour the elimination of hazards at the source or collective protection and thus minimize the use of personal protective equipment. Where personal fall protection is required, workers shall use a safety harness in accordance with CAN/CSA-Z-259.10-M90. A seat belt shall not be used as fall protection.

.3 Equipment, tools or guards that cannot be installed or used without endangering the health and safety of workers or the public are deemed to be inadequate for the work to be performed.

.4 All mechanical equipment shall be inspected prior to delivery to the site. Prior to the use of any mechanical equipment, the Contractor shall provide the Departmental Representative with a certificate of compliance signed by a qualified mechanic. The Departmental Representative may at any time, if he suspects a defect or a risk of accident, order the immediate shutdown of the equipment and require a second inspection by a specialist of his choice.

1.4 Requirements of regulatory agencies

.1 Comply with all laws, regulations and standards applicable to the performance of the work.

.2 Observe prescribed standards and regulations to ensure the normal conduct of work on lands contaminated by hazardous or toxic materials.

.3 Notwithstanding the date of publication of the standards in the Safety Code for Construction, the version in effect at the time of application shall always be used.

1.5 Field/implementation conditions

.1 On this site, the Contractor must take into account the following particularities:

.1 Evening and night work.

1.6 Health and Safety Management

.1 Accept and assume all the tasks and obligations normally devolved to the prime contractor under the Act respecting occupational health and safety (R.S.Q., chapter S-2.1) and the Safety Code for the Construction Industry (S-2.1, r.6).

.2 Develop a site-specific prevention programme based on the identification of risks and implement this programme from the beginning of the project until the final stage of demobilisation. The prevention programme must take into account the information given in article 1.7. It must be transmitted to all persons concerned, in accordance with the provisions of article 1.3. The prevention programme shall include at least:

.1 The company's health and safety policy.

.2 Description of the work, total cost of work, schedule and expected staffing pattern.

.3 Health and safety responsibility chart.

.4 The physical and material organization of the site.

.5 First aid and first aid standards.

.6 Identification of the risks in relation to the site.

.7 The identification of risks in relation to the tasks performed, including the prevention measures and the methods of implementation.

.8 The training required.

.9 Procedure in case of accident/injury.

.10 A written commitment from all stakeholders to comply with this prevention program.

.11 A site inspection grid based on preventive measures.

.3 The Contractor shall draw up an effective emergency plan in relation to the characteristics and constraints of the work site and its environment. The emergency plan must be transmitted to all persons concerned, in accordance with the provisions of Article 1.3. The emergency plan must contain in particular:

.1 The evacuation procedure.

.2 Identification of resources (police, fire, ambulance, etc.).

.3 Identification of responsible persons on site.

.4 Identification of rescue workers.

.5 The training required for those responsible for its application.

.6 And any other information that may be necessary, taking into account the characteristics of the site.

1.7 Responsibilities

.1 Regardless of the size of the work site or the number of workers present, appoint a competent person to be the supervisor responsible for health and safety. Take all necessary measures to ensure the health and safety of persons and property on the job site and in the immediate environment that may be affected by the work.

.2 Take all necessary measures to ensure the application of and compliance with the health and safety requirements contained in the contract documents, federal and provincial regulations, applicable standards and the specific prevention program for the work site and comply without delay with any order or notice of correction issued by the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST).

.3 Take all necessary measures to keep the site clean and tidy throughout the work.

1.8 Communication and display

.1 Take all necessary steps to ensure effective communication of health and safety information on the work site. Upon arrival at the job site, all workers must be informed of the specifics of the prevention program, their obligations and their rights. The Contractor shall insist on the right of workers to refuse to perform work if they believe that such work may jeopardize their health, safety or physical integrity or that of other persons on the site. The Contractor shall keep and update a register on the work site with the information transmitted and the signatures of all workers who have received this information.

.2 The following information and documents must be posted in a place that is easily accessible to workers:

.1 Notice of commencement of work.

.2 Identification of the project manager.

.3 Company policy on OHS.

.4 Prevention program specific to the site.

.5 Contingency plan.

.6 Material Safety Data Sheets (MSDS) for all controlled products used on the job site.

.7 Minutes of the site committee meetings.

.8 Names of representatives on the worksite committee.

.9 Name of the rescuers.

.10 Intervention and correction reports issued by the CNESST.

1.9 Unforeseen

.1 When a source of danger not specified in the specifications and not identifiable during the preliminary inspection of the work site appears as a result of or during the performance of the work, the Contractor shall immediately stop the work, put in place temporary protective measures for the workers and the public and notify the Departmental Representative verbally and in writing. The Contractor shall then make the necessary changes to the prevention program so that the work can be resumed safely.

1.10 Inspection of workplaces and correction of hazardous situations

.1 Inspect the work site and complete the site inspection grid at least once a week.

.2 Immediately take all necessary steps to correct deviations from laws and regulations and unsafe conditions that are identified by a government inspector, the Departmental Representative, the Health and Safety Construction Coordinator, or during periodic inspections.

.3 Provide the Departmental Representative with written confirmation of all actions taken to correct deviations and unsafe conditions.

.4 Stopping work: giving the Safety Officer or, where there is no Safety Officer, the person designated to deal with health and safety, full authority to order the stopping and resuming of work when he or she deems it necessary or advisable for health and safety reasons. The Health and Safety Officer shall ensure that the health and safety of the public and site personnel and the protection of the environment shall always take precedence over matters relating to the cost and schedule of the work.

.5 Without limiting the scope of sections 1.8 and 1.9, the Departmental Representative may at any time order the work to be stopped if, in his or her opinion, there is a danger or risk to the health or safety of site personnel or the public or to the environment.

PART 2 PRODUCT

2.1 Not applicable

.1 Not applicable.

PART 3 EXECUTION

3.1 Not applicable

.1 Not applicable.

END OF SECTION

PART 1 GENERAL

1.1 Cleanliness of the site

.1 Keep the work site clean and free of debris and waste materials.

.2 Remove debris and waste materials from the job site daily. Waste materials should not be burned on the job site.

.3 Arrange for and obtain permits from the appropriate authorities for the disposal of debris and waste materials.

.4 Provide on-site containers for the disposal of debris and waste materials.

.5 Provide and use separate and identified containers for recycling.

.6 Store volatile wastes in closed metal containers and remove them from the work site at the end of each work period.

.7 Clean runways, taxiways and aprons that have been used by the Contractor's vehicles. Cleaning shall be continuous for areas used by aircraft and daily for other areas.

1.2 Final cleaning

.1 Upon substantial completion of the Work, remove surplus materials, tools, and construction equipment and materials no longer required for the remainder of the Work.

.2 Remove debris and waste materials and leave the area clean and ready for occupancy.

.3 Before final inspection, remove excess materials, tools, equipment and construction materials.

.4 Dispose of waste materials off the job site. Waste material must not be burned on the job site.

.5 Arrange for and obtain permits from the appropriate authorities for the disposal of debris and waste materials.

.6 Sweep and clean hard surfaces.

.7 Where construction vehicles have been granted permission to operate on active movement areas, appropriate cleaning equipment capable of keeping the portion of the movement areas used by aircraft free of debris shall be maintained at the site to the satisfaction of the Departmental Representative.

.8 On a daily basis and before the movement areas are partially reopened to air traffic, inspect the movement areas of the airport with the Transport Canada escort officer. If necessary, and if deemed appropriate by the Transport Canada official, continue the cleanup.

1.3 Waste management and disposal

.1 Sort waste for reuse and recycling.

1.4 Measurement for payment purposes

.1 There will be no measurement required at the end of this section. Allocate the cost of the clean-up work to the various items in the bid.

PARTIE 2 PRODUCT

2.1 Not applicable

.1 Not applicable.

PARTIE 3 EXECUTION

3.1 Not applicable

.1 Not applicable.

END OF SECTION

PART 1 GENERAL

1.1 Related requirements

.1 Section 31 23 13 - Environmental Management of Excavation Surplus.

1.2 Definitions

.1 Selective demolition: schedule demolition activities to allow for the sorting of materials on site.

.2 Hazardous Substances: Hazardous substances, goods, commodities and products which may include, but are not limited to, PCBs, CFCs, HCFCs, poisons, corrosives, flammable materials, ammunition, explosives, radioactive substances and all other materials which, if misused, may adversely affect human health or welfare or the environment.

.3 Interim Construction Waste Management Plan: a detailed list of materials of which the structure is composed, indicating the quantity of materials to be reused, recycled and landfilled.

.1 The waste audit includes the evaluation, in volume and mass, of the quantities of materials and waste generated by the deconstruction.

.4 Waste Management Coordinator (WMC): Contractor's representative responsible for overseeing waste management activities and coordinating reporting, documentation and sample submission requirements.

1.3 Administrative procedures

.1 Coordinate requirements with the Department Representative regarding ownership of materials, including the following:

.1 With the exception of items or materials that are to be reused, salvaged or relocated or that are to remain the property of the Departmental Representative, demolition materials will become the property of the Contractor and will be removed from the site.

.2 Pre-demolition meetings.

.1 One (1) week prior to the commencement of the work covered by this section, hold a meeting with the Departmental Representative, which will address the following:

.1 Verification of requirements for the work.

.2 Verification of existing conditions in the vicinity of the demolition site.

.3 The coordination of prescriptions with those of other trades.

.4 Examination of existing conditions in the vicinity of the demolition site prior to the commencement of the work.

.5 Waste reporting requirements.

.2 Hold weekly meetings.

.3 Ensure the presence of all key personnel and the Departmental Representative.

.4 At each meeting, the Contractor shall report in writing on the status of waste diversion.

.5 In the event of a change to the meeting dates and/or times established at the time of contract award, the Departmental Representative will provide written notice 24 hours prior to the advertised meeting time.

.3 Scheduling.

.1 Take all necessary measures to meet both the work schedule and the minimum percentages prescribed for waste recovery.

.2 In the event of an unexpected delay, notify the Departmental Representative.

1.4 Documents/samples to be submitted for approval/information

.1 Documents/Samples to be submitted for approval: submit the following documents and samples prior to commencing the work required under this section.

.1 Shop Drawings: Submitted shop drawings shall bear the seal and signature of a qualified professional engineer recognized or licensed to practice in the Province, Canada, as follows

.1 Submit, for review and approval, drawings, diagrams or details indicating the sequence of selective demolition work on the site.

.2 Construction Waste Management Plan: submit a plan of the demolition area showing temporary facilities and props, removal and demolition methods; the plan will be prepared by a professional engineer in accordance with the requirements of the authority having jurisdiction.

.3 Proposed noise control and dust control measures: submit a statement or drawing indicating the proposed measures for use, proposed locations and proposed schedule of operation.

.2 Documents/Samples to be submitted for information: submit the following documents and samples if requested by the Department Representative:

.1 Qualifications Data: submit information on the experience of firms and their personnel and their ability to perform the work under this section, including, but not limited to, a list of completed work sites with project names and addresses, names and addresses for work of similar complexity and scope.

1.5 Quality Assurance

.1 Regulatory requirements: ensure that all work is completed in accordance with all provincial regulations.

.2 Comply with the transport and disposal regulations of the competent authority.

1.6 Conditions of implementation

.1 Environmental protection.

.1 Ensure that the work does not have a detrimental effect on wildlife, groundwater and adjacent watercourses, and does not generate excessive levels of air or noise pollution.

.2 It is forbidden to burn waste and materials on the construction site.

.3 No waste or scrap material shall be buried on the site.

.4 Do not discharge wastes composed of volatile materials, such as mineral spirits, oils, petroleum-based lubricants, or toxic cleaning solutions, into waterways or storm or sanitary sewers.

.5 Enforce proper disposal methods for this type of waste throughout the duration of the work.

.2 Do not pump or otherwise discharge water containing suspended solids into waterways, storm drains, sanitary sewers or onto adjacent land.

.3 Dispose of runoff containing suspended solids or other harmful substances in accordance with local authority guidelines.

.4 Protect vegetation (trees, plants, shrubs, foliage) on the property and on adjacent properties as indicated.

.5 During demolition, erect temporary protective enclosures to prevent foreign substances or materials from contaminating the air outside the work site.

.6 Cover or wet abate dry materials and waste materials to prevent dust and debris from being kicked up. Apply dust suppressant to all temporary access roads.

.7 Conduct selective demolition while avoiding disruption of the Departmental Representative's operations:

.1 Notify the Departmental Representative at least 72 hours in advance of work that will disrupt his or her operations.

.2 Maintain access to walkways, exits and adjacent facilities that are occupied or used:

.1 Do not block or obstruct walkways, exits, or other facilities that are occupied or used without the written permission of the Department Representative.

.8 The Department Representative assumes no responsibility for the selective demolition of site features.

.1 The conditions present during the bidding inspection will be maintained by the Contractor to the extent possible.

.2 Remove, protect and store salvaged items prior to selective demolition as directed by the Departmental Representative.

.1 Retrieve items designated by the Departmental Representative.

.2 Submit them to the Departmental Representative as directed.

1.7 Existing conditions

.1 Hazardous Materials: It is not anticipated that hazardous materials will be discovered during the course of the work.

.1 Hazardous materials means those defined in the Hazardous Products Act.

.2 Avoid disturbing the site if materials that may contain hazardous materials are discovered; notify the Departmental Representative immediately. Hazardous materials will be removed by the Departmental Representative under a separate contract or amendment to the work.

.3 Where materials similar to trowelled or sprayed asbestos materials or any other substance identified in the hazardous materials list are discovered during the performance of demolition work, the demolition work shall be stopped, appropriate preventive measures shall be taken and the Departmental Representative shall be informed immediately. Do not resume work until written instructions are received from the Departmental Representative.

.4 The selection of items to be demolished is based on their condition at the time of the site inspection, prior to submission of the tender.

PART 2 PRODUCT

2.1 Material

.1 Equipment and heavy machinery.

.1 On-road vehicles must meet the requirements of the On-Road Vehicle and Engine Emission Regulations, SOR/2003-2, made under CEPA.

.2 Off-road vehicles must meet the requirements of EPA CFR 86.098-11 or EPA CFR 86.098-10.

.3 Shut down machines immediately after use, unless extreme temperature conditions require continuous operation.

PART 3 EXECUTION

3.1 Inspection

.1 Verify existing conditions and coordinate with stated requirements to determine the area of the structure to be selectively demolished.

.2 The Departmental Representative does not guarantee that the existing conditions and the conditions indicated in the project file are the same.

.3 Make an inventory of the items to be removed and recovered and their condition.

.4 Conduct an examination of unsuspected mechanical, electrical and structural components and measure the nature and extent of these components. Submit a written report to the Departmental Representative without delay.

.5 Verify that hazardous materials treatment has been completed prior to demolition activities on the site.

3.2 Preparation

.1 Temporary erosion and sediment control.

.1 Implement temporary erosion and sediment control measures to prevent soil loss and to prevent the deposition of runoff sediment or windblown dust and particles on adjacent properties and walkways in accordance with the site-specific erosion and sediment control plan guidance in EPA document 832/R-92-005.

.2 Inspect, maintain and repair existing control equipment as required during demolition activities.

.3 After completion of demolition work, remove the control media and restore and stabilize the areas disturbed during the removal work.

.2 Protection of existing structures.

.1 Take necessary measures to prevent displacement or collapse of utility lines, pavement, trees, adjacent soils to prevent damage to them.

.1 Supply and install the bracing and shoring parts and carry out the necessary underpinning work.

.2 Where applicable, repair structures damaged during demolition as directed by the Departmental Representative.

.2 Properly shore up the affected structures or works. If demolition work appears to be a hazard to adjacent structures or utility lines, take appropriate precautions, stop the work and notify the Departmental Representative.

.3 Ensure that demolitions do not obstruct the surface water drainage system, elevators, and electrical and mechanical systems that must remain operational.

.3 Surface preparation.

.1 Natural gas lines: remove lines as required by the gas company.

.2 Water and sewer lines: remove instructions from the Departmental Representative.

.3 Disturbance of utility lines that are in service or energized and shall not be moved is prohibited.

3.3 Removal and demolition

.1 Remove the prescribed works as indicated.

.2 No person shall disturb any structure designated to remain in place.

.3 Removal of road surfaces, curbs and gutters.

.1 Delineate by cutting at right angles the surfaces that are to remain in place; use a saw or other means approved by the Departmental Representative.

.2 Protect adjacent joints and load transfer devices.

.3 Protect granular materials underlying or adjacent to the work area.

.4 When removing pipes buried below the surface of an existing or future pavement, dig to a depth of at least 300 mm below the pipe invert.

.5 Decommission water wells and monitoring wells in accordance with provincial guidelines.

.6 During demolition, remove designated trees.

.1 Obtain written approval from the Departmental Representative before removing a tree not designated for this purpose.

.7 Remove by an environmentally friendly method or donate designated trees for removal.

.1 Grind, chip or shred any other vegetation to make mulch or compost, or to use as pulp or fuel.

.8 Deposit topsoil for final grading and landscaping.

.1 If this land is not used immediately, provide erosion control measures and seeding.

.9 Elimination.

.1 Dispose of materials not designated for salvage or reuse/reemployment on the site as directed by the Departmental Representative.

.2 If demolition disposal occurs on site, restore the areas used for demolition to the satisfaction of the Departmental Representative.

.10 Backfilling: perform backfilling where indicated and in accordance with Section 31 23 33.01 - Excavation, Trenching and Backfilling.

3.4 Deposit

.1 Label all materials placed in storage, indicating the nature and quantity of materials recovered.

.2 Take appropriate security measures and allocate sufficient resources to prevent theft, vandalism and damage to materials.

.3 Store materials in a location suitable for reuse in new construction. Eliminate duplicate handling as much as possible.

.4 Place materials destined for environmentally sound disposal in a location that will facilitate their removal from the site and their examination by potential users interested in their reuse/recycling, and that will not impede their dismantling, processing or trucking.

3.5 Evacuation of materials from the site

.1 If it interferes with the progress of the work, the deposited material shall be removed as directed by the Departmental Representative.

.2 Dispose of similar materials that are deposited for disposal in the same environmentally sound manner once the collection of these materials is complete.

.3 Transport materials for environmentally sound disposal using approved treatment facilities, trucking companies or waste accepting organizations identified in the construction waste management plan and in accordance with applicable regulations:

.1 Written approval from the Departmental Representative must be obtained to use trucking companies, processing facilities or organizations accepting waste other than those identified in the Construction Waste Management Plan.

.4 Dispose of products and materials not intended for environmentally sound disposal in accordance with relevant regulations.

.1 Use approved landfill sites as identified in the waste reduction plan.

.2 Written authorization from the Departmental Representative must be obtained if products and materials are to be sent to landfills other than those identified in the waste reduction plan.

3.6 Remediation

.1 Restore surfaces and structures outside of the demolition areas to the condition they were in prior to the start of the work.

.2 Use only soil treatment methods and products that are not harmful to health or vegetation, and that do not endanger wildlife, adjacent watercourses or the groundwater table.

3.7 Cleaning

.1 Cleaning during the work: carry out the cleaning work in the following way:

.1 Leave the premises clean at the end of each working day.

.2 Once the work is completed, remove debris, sweep up the surfaces and leave the site clean.

.3 Use cleanup solutions and methods that are not harmful to health or vegetation, and that do not endanger wildlife, adjacent waterways, or the groundwater table.

.2 Final clean-up: remove excess materials/materials, waste, tools and equipment from the site.

END OF SECTION

PART 1 GENERAL

1.1 Related work

.1 Section 26 05 00 - Electrical - General Requirements for the Results of the Work.

.2 Section 03 20 00 - Concrete reinforcement.

.3 Section 03 30 00 - Cast-in-Place Concrete.

1.2 References

.1 CSA A23.1, Concrete -Materials and Methods of Concrete Construction.

.2 CAN3-O86-01-, Allowable Stress Design Rules for Wood Structures.

.3 CAN/CSA-O86-01-, Limit States Design of Wooden Structures.

.4 CAN3-O86S1/O86-.1S187-, Supplement No. -11987, to CAN3O86M84-, Allowable Stress Design of Wood Structures, and CAN/CSA3-O86.1-M84, Limit States Design of Wood Structures.

.5 CSA O121, Douglas Fir Plywood.

.6 CSA S269.1, "Falsework for Construction Purposes".

.7 CAN/CSAS269-.3M92-, Formwork.

.8 Safety Code for the Construction Industry, S-2.1, r.6, Éditeur officiel du Québec.

.9 Standards of the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST).

1.3 Workshop drawings

.1 Submit shop drawings of temporary formwork and shoring in accordance with Section 01 33 00 - Submittal Documents/Samples.

.2 Shop drawings shall indicate, show or include the method of construction and schedule of work, procedures for shoring, stripping and repositioning of props, materials, layout of joints, tie rods and linings, and location of embedded parts. Comply with CSA S269.1 for drawings of temporary shoring structures. Comply with CAN/CSAS269-.3 for formwork drawings.

.3 Shop drawings shall indicate, show or include formwork design data such as allowable concrete placement rates and concrete temperatures in the forms.

.4 Each shipment of shop drawings shall bear the seal and signature of a Departmental Representative recognized or licensed to practice in Canada, in the Province of Quebec.

PART 2 PRODUCTS

2.1 Materials

.1 Formwork materials: Use plywood and wood formwork materials that comply with CSA O121, CAN3-O86, CAN/CSA-O86-.1 and CAN3-O86S1/O86.1S1.

.2 Form ties: use removable or quick release metal tie rods, of fixed or adjustable length, without any device that could leave holes on the concrete surface with a diameter greater than 25 mm.

.3 Interior form liner: Douglas Fir plywood conforming to CSA O121, medium density, standard grade square edge liner with a minimum thickness of 20 mm.

.4 Mould release oil: colourless, kerosene-free mineral oil with a viscosity of 15 to 24 mm^2/s at a temperature of 40°C and a flash point in an open crucible of at least 150°C.

.5 Form release agent: a chemically active agent containing compounds that react with the free lime present in the concrete to form water-insoluble soaps that prevent the concrete from sticking to the form.

.6 Materials for temporary structures: conform to CAN/CSA S269.1.

PART 3 EXECUTION

3.1 Construction and assembly

.1 Before beginning construction of formwork and temporary shoring, check lines, levels and centres and ensure that dimensions match those shown on the drawings.

.2 Obtain approval from the Professional before pouring concrete directly into the ground or making openings in the forms that are not shown on the drawings.

.3 Before pouring the concrete directly into the ground, level the walls and bottom of the excavated area and remove the loose soil.

.4 Fabricate and erect temporary shoring structures in accordance with CSA S269.1.

.5 Fabricate and erect forms in accordance with CAN/CSAS269-.3 to produce finished concrete structures of shape, size and level as specified and, in the locations, indicated; comply with tolerances specified in CSA A23.1.

.6 Align the joints of the forms and make them watertight. Minimize the number of joints in the formwork.

.7 The control joints must be as specified.

.8 Unless otherwise specified, provide each joint with a key 50 mm deep and 1/3 the width of the wall or slab thickness.

.9 Incorporate anchors, sleeves and other embedded parts required for the works specified in other sections.

.10 Before pouring concrete, clean forms in accordance with CSA A23.1.

.11 The formwork must be oiled before the reinforcing steel is laid.

3.2 Stripping and repositioning of props

.1 Do not remove the forms until the concrete has reached at least 80% of its specified 28-day strength or after the minimum curing period previously specified, whichever occurs first, and immediately replace the appropriate props.

.2 Remove the metal tie rods used to hold the forms and fill the holes with cement mortar.

END OF SECTION

PART 1 GENERAL

1.1 Related work

.1 Section 26 05 00 - Electrical - General Requirements for the Results of the Work.

.2 Section 03 10 00 - Concrete forms and accessories.

.3 Section 03 30 00 - Cast-in-Place Concrete.

1.2 References

.1 American Concrete Institute (ACI).

.1 SP-66-04, ACI Detailing Manual 2004.

.2 ASTM International.

.1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

.2 ASTM A143/A143M-07 (2014), Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

.3 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

.4 ASTM A775/A775M-17 (2016), Standard Specification for Epoxy-Coated Reinforcing Steel Bars.

.3 CSA International.

.1 CSA-A23.1-09/A23.2-09, Concrete: Materials and Methods of Concrete Testing and Standard Practices.

.2 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.

.3 CSA-G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement.

.4 CSA-G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Steel.

.5 CAN/CSA-G164-M92(R2003), Hot-Dip Galvanizing of Irregularly Shaped Articles.

.6 CSA W186-M1990(C2016), Welding of Reinforcing Bars in Reinforced Concrete Construction.

.4 Reinforcing Steel Institute of Canada (RSIC/IAAC).

.1 IAAC-2004, Reinforcing Steel, Recommended Standards Manual.

1.3 Quality control at the source

.1 Upon request, provide the Departmental Representative with a certified copy of the mill test report containing the results of the physical and chemical analysis of the reinforcing steel.

.2 Inform the Departmental Representative of the proposed source of supply for the materials to be provided.

1.4 Workshop drawings

.1 Submit shop drawings including reinforcement locations as required in Section 01 33 00 - Submittals/Samples.

.2 Show on the shop drawings the list of reinforcing bars required, the number of bars required and the bending details of the bars, the dimensions, spacings and locations of the reinforcing bars and the mechanical splices required if approved for use by the Departmental Representative. The reinforcing bars shown on the drawings shall be marked with an identification code to permit proper placement without reference to the structural drawings. The drawings shall also show the dimensions, spacings and locations of chairs, spacers and supports. Reinforcement drawings shall be executed in accordance with the Recommended Standards Manual published by the Reinforcing Steel Institute of Canada.

.3 Unless otherwise specified, overlap lengths and straight lengths of bars shall be in accordance with CAN/CSAA23-.3. Unless otherwise specified, provide Type C tension lap splices.

.4 No work shall commence without receiving the drawings approved by the Departmental Representative.

1.5 Replacement products

.1 Any replacement of reinforcing bars with different sizes must be authorized in writing by the Departmental Representative.

1.6 Protection of the armature

.1 Reinforcement covers shall conform to the requirements of CSA A23.1 and the following specifications or as indicated on the drawings:

Slab:	top and bottom	75 mm
Walls:	side in contact with the floor	50 mm
	other sides	50 mm

1.7 Storage

.1 Store the steel on wood to avoid contact with the ground.

.2 Locate the steel to protect it from human and machinery traffic.

PART 2 PRODUCTS

2.1 Materials

.1 Reinforcing Steel: Unless otherwise specified, high bond bars made of billet steel, grade 400, conforming to CAN/CSAG30-.18.

.2 Reinforcing steel: high bond weldable low alloy steel bars conforming to CAN/CSAG30-.18.

.3 Binding wire: annealed and cold drawn steel wire, conforming to CAN/CSA G30.3.

.4 High bond steel wire for concrete reinforcement, conforming to CAN/CSA G30.14.

.5 Chairs, support brackets, bar supports and spacers: meet CSA A23.1 standard.

.6 Mechanical junctions: subject to approval by the Departmental Representative.

2.2 Shaping

.1 Unless otherwise specified, reinforcing steel shall be formed in accordance with CSA Standard A23.1 and the Recommended Standards Manual published by the Reinforcing Steel Institute of Canada.

.2 The Departmental Representative shall approve the location of junctions other than those shown on the installation drawings.

.3 Once approved by the Departmental Representative, the reinforcement shall be welded in accordance with NAC/CSA W186.

.4 Shipments of rebar shall be clearly marked with an identification code, in accordance with the list of required rebar and the rebar bending details.

PART 3 EXECUTION

3.1 Folding on site

.1 Unless otherwise specified or authorized by the Departmental Representative, bending and welding of reinforcing bars shall not be performed at the job site.

.2 When bending on site has been authorized, bend the bars without heating them, slowly applying constant pressure.

.3 Replace bars that show cracks or splits.

3.2 Installation of the reinforcement

.1 Install reinforcement as indicated on approved installation drawings and as required by CSA A23.1.

.2 Reinforcement and its placement must be approved by the Departmental Representative prior to the pouring of concrete.

.3 Make sure that the reinforcing bars are covered with a sufficient thickness of concrete when the concrete is poured.

.4 Securely fasten the bars to prevent them from moving during the pouring of concrete.

3.3 Cleaning

.1 Clean the reinforcement before pouring the concrete.

END OF SECTION

PART 1 GENERAL

1.1 Related sections

.1 Section 26 05 00 - Electrical - General Requirements for the Results of the Work.

.2 Section 03 10 00 - Concrete forms and accessories.

.3 Section 03 20 00 - Concrete reinforcement.

.4 Section 31 05 16 – Manholes and sumps.

1.2 References

.1 The latest version in force of the following documents:

.1 CAN/CSA-A23.1, Concrete -Materials and Methods of Concrete Construction.

.2 CAN/CSA-A23.2, Testing of Concrete.

1.3 Samples

.1 At least four (4) weeks prior to commencing work, notify the Departmental Representative of the proposed source of supply for the aggregates, and provide access for sampling.

.2 At least four (4) weeks prior to commencing work, submit to the Departmental Representative a mix design for each type of concrete proposed.

1.4 Certificates

.1 At least four (4) weeks prior to commencing concrete work, submit to the Departmental Representative copies of the manufacturer's test reports and a certificate issued by an independent, qualified testing and inspection laboratory, certifying that the materials listed below meet the specified requirements:

.1 Portland Cement.

.2 Cementitious additions.

.3 Grout.

.4 Adjuvants.

.5 Aggregates.

.6 Water.

.2 The batching plant and delivery equipment must hold a certificate of compliance issued by the Bureau de normalisation du Québec in accordance with certification protocol NQ 2621-905. The plant shall be equipped with an appropriate device for the incorporation of flake ice during concreting operations in hot weather.

1.5 Quality Assurance

.1 At least four (4) weeks prior to commencing concrete work, submit to the Departmental Representative for approval proposed methods of quality control for the following:

.1 Erection of temporary shoring structures.

.2 Protection in hot weather.

.3 Cold weather protection.

.4 Cure.

.5 Finish.

.6 Stripping.

.7 Execution of the joints.

1.6 Transportation, storage and handling

.1 The plant and delivery equipment must hold a certificate of compliance issued by the Bureau de normalisation du Québec in accordance with certification protocol NQ 2621-905. The plant shall be equipped with an appropriate device for the incorporation of flake ice during concreting operations in hot weather.

.2 Delivery and acceptance.

.1 Transport time: the concrete must be delivered to the site and unloaded within 120 minutes of mixing.

1. Any changes to the maximum transit time must be agreed to in writing by the Test House Representative and the concrete producer, as specified in the latest CSAA23.1 standard.

2. Deviations must be submitted to the Departmental Representative for review.

.2 Concrete delivery: ensure that the concrete plant ensures continuous delivery of concrete in accordance with BNQ 2621-905 certification protocol.

.3 No water may be added to the site during concrete pours.

PART 2 PRODUCTS

2.1 Materials

.1 Type GU or GUb-SF Portland Cement, in accordance with CSA-A3001. Latest version in force.

.2 Water: Conforms to CAN/CSA-A23.1. Latest version in force.

.3 Aggregates: conform to CAN/CSA-A23.1. Latest version in force.

.1 Do not use Portland Cement alkali-reactive aggregates (as determined by the CAN/CSA-A23.2 test) unless the equivalent amount of alkali in the proposed mix is

less than 2.4 kg/m³ for moderately reactive aggregates or 1.8 kg/m³ for highly reactive aggregates.

.2 Coarse aggregate.

1. The coarse aggregate must come from a quarry.
2. Grain size: according to CAN/CSA-A23.1, table 11, group 1. Nominal size: 20-5 mm.
3. The aggregate must meet the following requirements:

Test	Standard	Requirement
Micro-Deval (M.D.)	LC 21-070	≤ 15 %
Abrasion and impact loss	LC 21-400	≤ 35 %
Flat particles	(Procedure B)	≤ 25 %.
Elongated particles	CSA-A23.2-13A-14 (Procedure B)	≤ 40 %
Cleanliness	CSA-A23.2-5A-14	≤ 3 %
MgSO4 loss	CSA-A23.2-9A-14	≤ 12 %.

.3 Fine aggregate.

1. Grain size: according to CAN/CSA-A23.1, table 10, GF1.
2. The fine aggregate must be natural sand.
3. The aggregate must meet the following requirements:

Test	Standard	Requirement
Micro-Deval (M.D.)	CSA-A23.2-23A-09	≤ 20
Light Particulate Matter	CSA-A23.2-4A-09	≤ 0.5
Colorimetric index	CSA-A23.2-7A-09	≤ 3
Cleanliness	CSA-A23.2-5A-09	≤ 3
Modulus of fineness	CSA-A23.1-09 2	.3 - 3.1
Clay clods and friable particles	CSA-A23.2-3A-09	≤ 1
MgSO4 loss	CSA-23.2-9A-09	≤ 16 %.

.4 Air entrainer: conforms to ASTM C260.

.5 Chemical admixtures: in accordance with ASTM C494. The Departmental Representative shall approve accelerators or retarders for use during cold or hot weather concreting.

.6 Non-shrink grout: Sika Grout 212 or an equivalent approved by the Departmental Representative.

.7 Dry mortar: a premixed or unmixed product containing non-metallic aggregate, portland cement and sufficient water to hold its shape when pelletized in the hands, and capable of achieving a compressive strength of 50 MPa at 28 days.

.8 Curing agent: white, conforms to ASTM C309 and CAN/CSA-A23.1 standards.

.9 Bonding Agent: Sikatop Armatec 110 Epocem or equivalent approved by the Departmental Representative.

2.2 Batching formula - 35 MPa concrete

.1 Normal density concrete shall be prepared in accordance with CAN/CSA-A23.1 to produce a mixture with the following properties:

Sidewalk, curb, walkway and island

The concrete structures listed above shall meet the following requirements:

.1 Type GU Portland cement.

.2 Minimum compressive strength at 28 days: 35 MPa.

.3 Minimum cementitious material content: 410 kg/m3.

.4 Maximum water/cement ratio: 0.40.

.5 Nominal coarse aggregate size: 5-20 mm.

.6 Maximum application temperature: 25 °C.

.7 Slump at time and point of discharge: 80 mm ± 30 mm (120 mm ± 30 mm after addition of superplasticizer).

.8 Air content: 5 to 8%.

.9 Air bubble network, max spacing factor: 230 µm.

.2 Ensure that the admixtures used are compatible and that they are incorporated into the concrete according to the manufacturer's instructions. If an admixture is found to be harmful or ineffective, replace it immediately with a substitute and assume the cost.

PARTIE 3 EXECUTION

3.1 Preparation

.1 Have the Departmental Representative approve the concreting sequences and methods before proceeding with this work.

.2 Pumping of concrete will only be permitted after the material and mix have been accepted.

.3 Prior to commencing concreting, obtain approval from the Departmental Representative for the proposed method of protecting the concrete during placement and during curing in inclement weather.

.4 Maintain a concreting logbook that accurately records the date and location of each pour, the characteristics of the concrete, the air temperature and the samples taken.

3.2 Implementation

.1 Perform concreting in accordance with CAN/CSA-A23.1.

.2 Obtain permission from the Departmental Representative prior to pouring concrete and give 24 hours notice of the work to be done.

.3 Immediately prior to placing the concrete, clean and remove all detritus and debris of any kind from the space the concrete will occupy.

.4 Ensure that reinforcement and embedded parts are not displaced during the placing of the concrete.

.5 No loads shall be imposed on new concrete elements until authorized by the Department Representative.

3.3 Setting up

.1 Take the necessary precautions to avoid impact to the formwork and the freshly placed concrete.

.2 Use appropriate tools and methods to produce smooth concrete surfaces free of defects, joints and stones.

.3 Wet the forms well before placing the concrete.

.4 Place the concrete in the forms in horizontal beds and as close as possible to its final position. Place in beds of not more than 0.3 m at a time.

.5 Prevent segregation of concrete at free fall heights greater than 1.5 metres by using trunks or pumps where the fall height exceeds this height.

.6 Before placing fresh concrete on top of hardened concrete, the surface of the old concrete must be removed, cleaned, moistened and brushed with a clear paste of pure cement.

.7 Take all necessary precautions to prevent deterioration of the freshly poured concrete in adverse weather conditions.

3.4 Vibration of concrete

.1 Internal type vibrators with a minimum frequency that meets the requirements of CAN/CSA-A23.1 are mandatory.

.2 Avoid moving the steel or formwork by contact with the vibrators.

.3 The Departmental Representative reserves the right to require additional crews to vibrate the concrete, if he finds that the vibration is not sufficient. The Contractor shall be responsible for such additional costs.

3.5 Curing and protection of concrete

.1 Keep exposed surfaces of freshly placed concrete wet for at least seven (7) consecutive days.

.2 All concrete shall be protected so that the surface temperature does not drop below the temperatures specified in Section 3.6 - Cold and Hot Weather Concreting.

.3 Protect surfaces from damage due to weather conditions and nearby work.

.4 Protect exposed surfaces from sunlight, dry winds, cold, excessive heat and dripping water.

.5 Use clean water for curing concrete, free of any material that could stain or discolour the concrete.

.6 Curing compounds may be used where it is not possible to keep the freshly placed concrete surface wet. Use a product that complies with ASTM C309 that does not affect the appearance of the concrete.

.7 Apply the curing compound in two coats at the rate prescribed by the manufacturer of the product.

.8 Concrete for small structures must have a minimum strength of 15 MPa before any work is done in the vicinity.

3.6 Concreting in cold or hot weather

.1 Refer to CAN/CSA-A23.1.

.2 Calcium chloride shall not be used as a constituent of concrete or as a de-icing agent.

.3 Cold weather concrete placement: in addition to the requirements of CAN/CSA-A23.1, Chapter 7.4.1.5, the Contractor shall follow the following guidelines:

.1 No concrete pours shall be undertaken without the approval of the Departmental Representative when the outside temperature is below 5°C.

.2 When the outside temperature is at or below 5°C or when, in the opinion of the Departmental Representative, it is likely to fall below 5°C during the placing of the concrete, the temperature of the concrete shall not be less than 15°C nor more than 30°C; the water and, if necessary, the aggregates shall be heated before being incorporated into the mix.

.3 Before placing the concrete, the walls and bottoms of the forms shall be cleaned of any snow that may have accumulated and any ice that may have adhered to them; the forms shall be heated for this purpose. Concrete shall not be placed on or against a surface where the temperature is below 5°C. Heating of the forms shall be started before placing the concrete to reach this temperature.

.4 During the first seven (7) days, the temperature at the surface of the concrete must not be lower than 15°C nor higher than 27°C.

.5 At the end of the prescribed protection periods, the temperature of the concrete must be lowered gradually at a maximum of 3°C per day until the outside temperature is reached.

.6 No water may be added to the site during concrete pours.

.7 If a shelter is built around freshly poured concrete to facilitate heating, the Contractor shall, if necessary, moisten the ambient air so as to keep the concrete and forms continuously moist. Combustion heaters may be used provided they are constructed and located so that the combustion gases do not come in contact with the fresh concrete surfaces.

.8 No concrete pours will be accepted when the outside temperature is below -15°C, unless the structure is covered by a heated shelter.

.4 Concrete placement in hot weather: in addition to the requirements of CAN/CSA-A23.1, Chapter 7.4.1.4, the Contractor shall follow the following guidelines:

.1 Hot weather concreting requirements apply when the ambient temperature exceeds 25°C.

.2 The time interval between the mixing of the concrete and the discharge should not exceed 75 minutes, and the temperature of the concrete placed should not exceed 25°C.

.3 Form surfaces and reinforcing steel shall be sprayed with cold water just prior to placing the concrete. No accumulation of water at the bottom of the forms shall be allowed.

.4 Special protection will be required to prevent the concrete from drying out too quickly, especially when windy conditions prevail.

.5 Slabs should be kept continuously wet for the first 24 hours. After that, normal curing procedures should be followed.

.6 No concrete placement will be accepted when the outside temperature is above 30°C, unless the structure is protected from wind and sunlight, during and after placement.

.5 All concreting in cold or hot weather shall be carried out under the supervision of the laboratory and subject to their recommendations.

3.7 Sleeves and walnut elements

.1 After obtaining approval from the Departmental Representative, provide openings and install sleeves, fasteners, hangers and other embedded components as shown on the drawings or as specified elsewhere. Sleeves and openings larger than 100 x 100 mm not shown shall be approved by the Departmental Representative.

.2 No reinforcement shall be removed or relocated to install hardware. If the items to be embedded in concrete cannot be placed in the specified locations, have any changes approved by the Departmental Representative prior to pouring the concrete.

.3 Check the location and dimensions of the sleeves and openings shown on the drawings.

.4 Place the special elements to be countersunk for strength testing as indicated and required by the non-destructive concrete testing methods.

.5 Anchor bolts.

.1 Fasten anchor bolts to the templates under the supervision of the appropriate tradesperson prior to placing the concrete.

3.8 Finish

.1 Finish concrete surfaces in accordance with CAN/CSA-A23.1 specifications.

3.9 Tolerances

.1 The tolerance for finishing concrete surfaces shall be in accordance with CAN/CSA-A23.1.

3.10 Quality control on site

.1 Inspection and testing of the concrete and its constituents shall be performed by the testing laboratory designated by the Departmental Representative in accordance with CAN/CSA-A23.1.

.2 If he deems it necessary, the Departmental Representative will require that additional specimens be taken during cold weather concreting. The curing of these specimens shall be done at the work site, under the same conditions as the concrete from which they were taken.

.3 If the Departmental Representative accepts the use of non-destructive testing of concrete, it shall be in accordance with CAN/CSA-A23.2.

.4 Inspection and testing by the Departmental Representative is not a substitute for or in addition to the Contractor's quality control and does not relieve the Contractor of his contractual responsibilities in this regard.

.5 Any additional concrete strength testing required to expedite the work shall be at the Contractor's expense.

3.11 Defective concrete

.1 The concrete shall have a good appearance, be free of honeycombs, cold joints, cracks, burrs or other defects. Should any defects occur, the Contractor shall be responsible for the cost of repairing or replacing the defective surfaces. No surface repairs shall be undertaken until the Departmental Representative is aware of the defects to be repaired, which shall be corrected by skilled tradesmen.

.2 Any defective, soiled or debris-containing concrete shall be repaired as directed by the Department Representative. Honeycombs, voids, etc., discovered during stripping shall not be corrected until examined by the Departmental Representative. All such voids shall be pitted to the solid concrete to a minimum depth of 10 mm. The edges of the concrete shall be trimmed to sharp and even edges, if necessary, with a saw. Surfaces should be thoroughly cleaned and cavities should first be coated with an epoxy-based concrete adhesive and then filled with a repair mortar, held in place, if necessary, by forms. Edges, burrs, etc., caused by imperfections in the formwork should be ground away.

.3 The Contractor shall patch any damaged portions of the work during the course of the work as directed by the Departmental Representative.

.4 Wherever concrete is to remain exposed, the Contractor shall be particularly careful in placing the concrete and demanding in the quality of the forms (new forms). If concrete surfaces on removal are unsatisfactory, require too much rework, and show too much color variation, the Department Representative may require a cement-based coating on all exposed surfaces at no additional cost.

.5 The Contractor shall break the edges left by the open joints of the forms with a chisel.

.6 All excess concrete in formwork joints and other irregularities should be ground away to achieve the desired smooth surfaces.

.7 The Contractor shall protect those parts of the structure where the concrete remains exposed to prevent damage that may occur during the Contractor's work or the work of subcontractors.

.8 Any otherwise defective or cracked concrete work shall be reworked at the Contractor's expense. Final acceptance of the work shall be made by the Department Representative who will make appropriate recommendations.

.9 If deemed appropriate, the Departmental Representative may retain non-conforming work in whole or in part in which case the work involved will be paid for at 50% of the Schedule price.

END OF SECTION

PART 1 GENERAL

1.1 General

.1 Install small signage according to plans.

1.2 Related requirements

.1 Section 26 05 00 - Electrical - General Requirements for the Results of the Work.

1.3 Prices and payment terms

Refer to the section "Description of Slip Items".

1.4 Reference standards

.1 ASTM International.

.1 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM A276-10, Standard Specification for Stainless Steel Bars and Shapes.

.3 ASTM B209M-10, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate Metric.

.4 ASTM B210M-05, Standard Specification for Aluminum-Alloy Drawn Seamless Tubes Metric.

.5 ASTM B211M-03, Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod and Wire Metric.

.6 CSA G40.20/G40.21-04 (R2009), General requirements for rolled or welded structural steel.

.2 Ministère des Transports du Québec.

1. Article 1.13.1 of Volume V - Road Signs of the Ministère des Transports du Québec, and notwithstanding the specifications of the first paragraph of article 1.13.4 of the same work.

1.5 Documents/samples to be submitted for approval/information

.1 Submit the required documents/samples in accordance with Section 01 33 00 - Documents and Samples to be Submitted.

.2 Technical data sheets.

.1 Submit the required data sheets, instructions and manufacturer's documentation for the signage materials in question. The data sheets shall include product specifications, performance criteria, dimensions, limitations and finish.

.3 Workshop drawings.

.1 Shop drawings submitted shall bear the seal and signature of a qualified engineer recognized or licensed to practice in the Province of Quebec.

1.6 Transportation, storage and handling

.1 Transport, store and handle materials and equipment in accordance with the manufacturer's written instructions.

.2 Delivery and acceptance: deliver materials and equipment to the site in their original packaging, which must be labelled with the name and address of the manufacturer.

.3 Storage and handling.

.1 Store materials and equipment off the ground and in accordance with the manufacturer's recommendations in a clean, dry, well-ventilated area.

.2 Replace defective or damaged materials and equipment with new materials and equipment.

PART 2 PRODUCT

2.1 Materials/materials

.1 Panel supports.

.1 Steel posts: CSA G40.21 compliant steel channels, U-shaped with flanged edges, 4 m long by 65 mm wide by 30 mm deep. Metal shall be 4.5 mm thick and hot dipped galvanized to ASTM A123/A123M.

.2 Standard tubular supports for small panels: in accordance with ASTM B210M.

.3 Aluminum flanges: conform to ASTM B211M.

.4 Anchor and fixing bolts, U-shaped fixing flanges and various hardware for panels on gantries made of grade 304 stainless steel, in accordance with ASTM A276.

.5 Fasteners, including bolts, nuts, washers and other hardware for roadside signs: cast aluminum alloy or galvanized steel.

.2 Traffic signs.

.1 Aluminum sheet: in accordance with ASTM B209M standard, cut to the required dimensions, according to the indications provided on the drawings.

.2 Aluminum elements: conform to ASTM B209M.

.3 Ink for screen printing.

.1 Clear or opaque inks: selected by the Departmental Representative, or as directed.

.4 Reflective film and tape: in accordance with CGSB 62-GP 11M. The adhesive used in the manufacture of the reflective product and the reflectivity and colour of the reflective product shall be as specified.

.5 Transparent tape: smooth-surfaced, flexible, moisture-resistant and self-adhesive.

.3 Posts type L6X.

.1 The posts and accessories are hot-dip galvanized in accordance with ASTM - A123.

.2 The Contractor shall ensure that posts, anchors, fasteners and other accessories are installed in accordance with the manufacturer's recommendations.

.4 Panel fastener.

.1 New and existing panels shall be installed using new fasteners. All fasteners, bolts, nuts, brackets and other accessories required to secure the signs shall be aluminum or 304 stainless steel and shall comply with the Department's standards as outlined in Section 1.14 of Volume V Highway Signage, Chapter 1. The Contractor shall provide for installations on "U" shaped posts by bolting directly to them.

PART 3 EXECUTION

3.1 Installation

.1 The Contractor shall install small signs as shown on the plans. The installation of the signs shall be done in accordance with the specifications defined in the Ministère's standards. As specified in section 1.13.1 of Volume V - Road Signage of the Ministère des Transports du Québec, and notwithstanding the specifications of the first paragraph of section 1.13.4 of the same work. The signs may be installed on the same supports as the parking regulation signs.

.2 The Contractor shall be responsible for the installation of signs at the elevations, levels, orientations and distances from the edge of the roadway in accordance with the plans and specifications and the Department's standards. If the Contractor is unable to comply with these requirements, he shall immediately notify the Departmental Representative.

.3 When installing signs on an existing pole, if an existing pole is too short and does not meet the minimum clearance height under the signs, if its orientation does not allow for proper installation, or if it is damaged prior to installation so that it is no longer usable, the Contractor shall replace it with a new pole only after obtaining approval from the Department Representative.

.4 Prior to the planting of a new pole, the Contractor is responsible for requesting the necessary excavation information for the location of buried infrastructures including the location of street lighting wires. He will have to assume the costs of specialized firms to do so or an electrician.

.5 Installation of posts.

.1 The Contractor shall install the poles according to the manufacturer's recommendations.

.2 Three (3) foot long sleeves must be used.

.3 Poles shall be installed within the right-of-way line and, where not shown on the plans, on the lot lines. If this is not possible, the Contractor shall notify the Departmental Representative.

.4 When the pole is to be installed in loose soil, it must be firmly fixed, taking care to keep it vertical when planting.

.5 When the top of the soil is made loose by the planting operation, it is not permitted to compensate for the lack of stop with an increase in the planting depth. Instead, the post must be removed and replaced if damaged, at the Contractor's expense.

.6 The Contractor shall ensure that the length of the posts is adequate to meet the minimum sign clearance height as required by the Department of Transportation Tome.

.6 Small signage to be removed.

.1 The Contractor shall remove, salvage and store small signs, poles and anchor systems for future use during the performance of the work. Any materials found to be damaged by the Departmental Representative, prior to removal, transportation and storage shall be replaced by the Contractor.

.7 Small signs to be moved.

.1 The Contractor shall relocate small signs by removing, salvaging, storing and reinstalling the existing signs, posts and anchoring systems at the locations indicated on the plans or by the Department Representative. All fasteners and accessories required to complete the installation of signs shall be new.

.8 New small signage.

.1 The Contractor shall furnish and install all small signage items, consisting of new materials, at the locations indicated on the plans or by the Department Representative.

3.2 Correction of defects

.1 Correct any deficiencies identified by the Departmental Representative, with respect to display text, reflectivity, colour or illumination uniformity. Modify the angle of the sign and adjust the orientation of the luminaire to optimize the nighttime performance of the installation to the satisfaction of the Departmental Representative.

3.3 Cleaning

.1 Cleaning during the work: carry out the cleaning work.

.1 Leave the premises clean at the end of each working day.

.2 Final clean-up: on completion of the work, remove excess materials, waste, tools and equipment from the site.

.3 Waste management: sorting waste for reuse.

.1 Carefully dismantle the facility and salvage any wood, aluminum, or steel for reuse/recycling.

.2 The Contractor shall do whatever is required by the Departmental Representative

3.4 Protection

.1 Protect the installed components from damage during construction.

.2 Repair damage to adjacent materials and equipment by installing signage and related appurtenances and by salvage operations.

END OF SECTION

PART 1 GENERAL

1.1 Laboratory testing standards

.1 CAN/BNQ Standard 2501-255 "Determination of the Maximum Density - Moisture Content Relationship Modified Proctor Test".

.1 Scope of application.

.1 CAN/BNQ 2501-255 is applicable to soils or soil-aggregate mixtures where the fraction between the 20 and 80 mm sieves does not exceed 30% of the total mass.

.2 CAN/BNQ Standard 2501-062 is applicable to free draining pulverulent soils with a particle size not exceeding 80 mm and a fraction passing the 0.08 mm sieve of less than 10 % of the total mass.

.1 This method does not allow the determination of the optimum compaction water content. Table 1 of LC 22-001 shows the values of optimal compaction water content generally observed for different standard sizes of aggregates.

1.2 Reference board at the construction site

.1 Standard LC 22-001 "Determination of the maximum density of a granular material using a reference plate".

.1 Scope of application.

.1 LC 22-001 applies to 20 mm and 112 mm size aggregates used as sub-base and granular pavement base material.

.2 This method does not allow the determination of the optimum compaction moisture content. Table 1 of the standard shows the values of optimal water content generally observed for different standard sizes of aggregates.

PART 2 PRODUCT

2.1 Not applicable

.1 Not applicable.

PART 3 EXECUTION

3.1 Not applicable

.1 Not applicable.

END OF SECTION

PART 1 GENERAL

1.1 Related requirements

.1 Section 31 23 33.01 - Excavation, trenching and backfilling.

.2 Section 32 11 16.01 - Granular Subgrade.

.3 Section 32 12 16 - Asphalt concrete pavement.

1.2 Documents/samples to be submitted for approval/information

.1 Technical data sheets.

.1 Submit the required data sheets and manufacturer's instructions and documentation for the aggregates. Data sheets shall include product characteristics, performance criteria, dimensions, limits and finish.

.2 Samples.

.1 Arrange for the continuous sampling of aggregates by the Departmental Representative during their production.

.2 Provide the Departmental Representative with access to the source of supply and prepared materials for sampling.

.3 Establish sampling stations at the outlet of the aggregate preparation conveyor for the Departmental Representative to take representative samples. Stop the conveyor, upon request of the Departmental Representative, to allow the Departmental Representative to take a sample from each side of the material being transported.

.4 Provide a front-end loader or other suitable device and, if required, the services of a heap sampling operator. Move samples to a storage location as directed by the Departmental Representative.

.5 Provide new or clean sample bags or containers that are suitable for holding the aggregates.

.6 Pay for the cost of sampling and testing of aggregates if they do not meet the prescribed requirements.

.7 Provide water, electricity and propane gas to the Ministry Representative's mobile laboratory at the production site.

1.3 Transportation, storage and handling

.1 Transport, store and handle materials and equipment in accordance with the manufacturer's written instructions.

.2 Transportation and handling: transport and handle aggregates in a manner that prevents segregation, contamination and degradation.

.3 Storage: Store washed or excavated material under water for at least 24 hours to allow free water to drain and to equalize the water content in the material.

PART 2 PRODUCT

2.1 Materials

.1 Aggregate characteristics: homogeneous, good quality, hard, tough, free of platelets, needles, soft or flaky particles, organic material, clay lumps, minerals, adhering films, harmful amounts of disintegrated pieces or other harmful substances.

.2 Platelets and needles, in the case of coarse aggregates: as specified in ASTM D4791.

.1 Elements whose largest face is at least five (5) times larger than the smallest face.

.3 Fine aggregate meeting the requirements of the relevant section shall consist of one or a mixture of the following materials

.1 Screenings from the crushing of quarry blocks, boulders, gravel or slag.

.2 Reclaimed asphalt pavement.

.3 Reclaimed concrete.

.4 Coarse aggregate meeting the requirements of the relevant section shall consist of one or a mixture of the following materials

.1 Crushed rock.

.2 Gravel and crushed gravel made of natural stone particles.

.3 Lightweight aggregate, including slag and expanded shale.

.4 Reclaimed asphalt pavement.

.5 Reclaimed concrete.

2.2 Quality control at the source

.1 Inform the Departmental Representative of the proposed source of supply for the aggregates and provide access for sampling at least four (4) weeks prior to the start of production.

.2 If materials from the proposed source of supply do not meet the prescribed requirements or cannot reasonably be prepared to meet them, find an alternate source of supply.

.3 Notify the Departmental Representative at least four (4) weeks prior to any change in aggregate supply.

.4 A material accepted at its source of supply may nevertheless be rejected later if it does not meet the specified requirements, if the quality or properties of the material delivered are not uniform, or if the performance of the material on the job site is not satisfactory.

PART 3 EXECUTION

3.1 Review

.1 Verification of conditions: ensure that conditions are acceptable for topsoil removal.

.1 Conduct a visual inspection of surfaces/supports in the presence of the Departmental Representative.

.2 Immediately inform the Departmental Representative of any unacceptable conditions found.

.3 Begin removing topsoil only after unacceptable conditions have been corrected and written approval has been received from the Departmental Representative.

3.2 Preparation

.1 Preparation of aggregates.

.1 Handle and transport aggregates in a uniform manner, using methods that prevent contamination, segregation and degradation.

.2 Where necessary, a mixture of aggregates, including salvaged materials that meet the physical requirements of the specification, is permitted to provide the specified particle size, particle shape or percentage of crushed particles.

.1 Use only methods and equipment approved in writing by the Departmental Representative.

.2 Where stratified deposits are present, use equipment and excavation methods that will result in homogeneous and uniform aggregate sizes.

.3 Where necessary, screen, crush, wash, grade and process aggregates with appropriate equipment as required.

.1 Use only materials approved in writing by the Departmental Representative.

.4 Piling up.

.1 Unless otherwise directed by the Departmental Representative, stockpile aggregates on the job site in the areas indicated. Do not stockpile aggregates on hard surfaced areas.

.2 Piling up enough aggregate to meet the construction's schedule.

.3 Aggregates must be stockpiled on level, well-drained ground with sufficient bearing capacity and stability to support the stockpiled materials and handling equipment.

.4 Unless the material is stockpiled on an acceptable stabilized surface, the base of the stockpile should be a layer of compacted sand at least 300 mm thick to prevent contamination of the aggregate. Place the aggregate in a pile on the ground, but do not incorporate the 300 mm thick layer of material at the base of the pile into the work.

.5 To avoid mixing of aggregates, heaps of different aggregates should be spaced sufficiently far apart or separated by means of strong, full-height partitions.

.6 Mixed or contaminated materials shall not be used. Remove and dispose of rejected materials within 48 hours of rejection as directed by the Departmental Representative.

.7 Pile the material in uniform layers to a thickness that meets the following requirements.

.1 In the case of coarse aggregate and base course materials: not more than 1 m.

.2 In the case of fine aggregates and sub-base materials: not more than 2 m.

.3 In the case of all other materials: not more than 1.5 m.

.8 Finish spreading each layer of stockpiled material over the entire extent of the storage area before beginning to spread the next layer.

.9 Unload the aggregates delivered to the pile by truck into uniform heaps and shape the piles as required.

.10 It is forbidden to build cone-shaped piles or to have material fall on either side of the pile.

.11 Do not use stacking conveyors.

.12 When working in winter, prevent ice and snow from mixing with the material in or out of the pile.

3.3 Cleaning

.1 Cleaning during the work: carry out the cleaning work

.1 Leave the premises clean at the end of each working day.

.2 Final clean-up: remove excess materials/materials, waste, tools and equipment from the site,

.3 Clean the area where the aggregate was stockpiled to leave a clean, well-drained area free of standing water.

.4 Carefully place unused aggregate in compacted piles as directed by the Departmental Representative.

END OF SECTION

PART 1 GENERAL

1.1 Related works

.1 Section 02 41 13 - Selective Demolition of Site Development Works.

.2 Section 31 05 10 - Corrected Maximum Dry Density - Backfill Materials.

.3 Section 31 23 33.01 - Excavation, trenching and backfilling.

1.2 Definitions

.1 Classes of cuttings: Only two (2) classes of cuttings will be recognized: **ordinary cuttings** and **rock cuttings**.

.1 **Rock cuttings**: Material from excavation work in massive, igneous, sedimentary or metamorphic rock masses other than friable shale that, prior to being cleared, formed a whole with the rock mass, as well as blocks of stone and rock fragments having an individual volume greater than 1 m^3 that cannot be moved or excavated with heavy construction equipment.

.2 **Ordinary cuttings**: All materials of various kinds, other than solid rock, including dense boulders, compacted clay, friable shale, frozen materials and partially cemented materials that can be cleared and excavated with heavy machinery. Concrete slabs and other related concrete items are also included in the regular cuttings.

.2 Compaction: Two (2) classes of soils are recognized for compaction purposes: **powdered soil** and **cohesive soil**.

.1 Powdered soil:

.1 Soil with less than 20% of the material passing the 0.080 mm sieve, regardless of the plasticity index of the fine elements.

.2 Soil in which the percentage of material passing the 0.080 mm sieve is between 20% and 50%, the liquid limit being less than 25 and the plasticity index less than 6 according to ASTM test D4 318-84.

.2 Consistent soil:

.3 Soil that does not have the characteristics required to be classified as a powdered soil.

.3 Topsoil.

.1 Any material that is suitable for plant growth and can be used as a soil supplement or for landscaping and seeding.

.4 Waste materials.

.1 Materials not recovered or reused by others on the site and other materials identified by the Departmental Representative.

.5 Borrowed materials.

.1 Materials from areas outside the area to be excavated and required for the construction of embankments or other parts of the work. These materials must be homogeneous and compactable to the prescribed specifications.

.6 Roadway body.

.1 Combined layers comprising a granular sub-base, a granular foundation and a surface coating of asphalt concrete or cement concrete.

.7 Infrastructure level.

.1 Level below the roadway body.

PART 2 PRODUCTS

2.1 Materials

.1 Type 3 backfill material (see Section 31 23 33.01): subject to approval by the Departmental Representative. Materials must be homogeneous.

.2 Unsuitable materials.

.1 Highly friable and compressible materials placed under the areas to be paved with asphalt concrete or cement concrete, which are not acceptable to the Departmental Representative.

.2 Materials that are susceptible to freezing that are in piles under areas of pavement.

.3 Rocks and large stones greater than 75 mm in diameter located within 600 mm of the finished grade of the subgrade.

.4 Rocks and large stones greater than 50 mm in diameter within 100 mm of finished grade in graded areas.

PART 3 EXECUTION

3.1 Removal of topsoil

.1 Remove topsoil to a thickness of 100 mm to 150 mm and avoid contamination with underlying materials.

.2 Stockpile topsoil in areas designated by the Departmental Representative. Piles shall not exceed three (3) metres in height.

3.2 Excavation

.1 Ordinary excavation.

.1 Notify the Departmental Representative well in advance of the start of clearing work so that the Departmental Representative can make the initial cross-sections.

.2 Ensure drainage of cleared areas and maintain crowns and cross slopes in a condition to ensure surface water drainage.

.3 Inform the Departmental Representative if unsuitable material is encountered in the cleared areas and remove such material to the depth and extent determined by the Departmental Representative.

.4 The Contractor shall excavate the existing foundation taking every precaution to avoid contamination with unsuitable or underlying materials. The Contractor shall store the excavated foundation at a site provided by the Department Representative and then salvage and reuse it as foundation material, bedding, embedment material and/or trench backfill as directed by the Department Representative.

.5 Where there is a change from cut to fill or from soil to solid rock at the infrastructure level, make the transitions as directed by the Departmental Representative.

.6 Plan excavation operations to backfill excavations with the designated granular base material on the same day. Do not weather or rework the materials on which the pavement body will rest.

.7 Excavation in cohesive soils should be carried out with a shovel equipped with a bucket with or without teeth in such a way as to avoid driving over the soil layer uncovered by the excavation and to avoid reworking the subgrade soil.

.2 Excavation in the rock.

.1 If, during the course of excavation, material is found that appears to meet the definition of rock cut, notify the Departmental Representative in sufficient time to allow the initial volume to be measured.

.2 Ensure that water drains into ditches or drainage systems and that no water is left in the foundation.

.3 Do not move the subgrade materials of adjacent pavements or structures, which must remain in place, particularly at the transitions to be made.

.3 Transport spoil according to its intended use.

.1 Use routes approved by the Departmental Representative for the transportation of excavated material.

.2 Spread and grade cut material as directed by the Departmental Representative. Cover rock cuttings with regular cuttings.

3.3 Backfill

.1 Before removing material from borrow areas, use all appropriate excavation materials approved by the Departmental Representative.

.2 Do not place frozen materials or place materials on frozen surfaces.

.3 Keep the surface cambered throughout the work to ensure runoff. Do not place materials in standing water. Dry out low areas before placing materials.

.4 In off-pavement areas, compact backfill to at least 90% of the maximum corrected dry density as per Section 31 05 10.

.5 In areas paved with cement concrete or asphalt concrete, compact pulverized soil fill to at least 95% of the maximum corrected dry density, and cohesive soil fill to at least 90% of the maximum corrected dry density as per Section 31 05 10.

.6 The last layers of fill at the level of the pavement subgrade require a higher degree of compaction, see section 3.4 "Subgrade profiling and compaction".

.7 Break up the clods to the proper size to allow for proper compaction and mix to achieve uniform moisture content and conditions throughout the thickness of the layer.

.8 Remove unsuitable materials encountered during preparation and compaction work and replace with materials approved by the Departmental Representative.

.9 If the preparation and compaction of the subgrade cannot be accomplished with a single layer of material, temporarily strip the upper portion to the required depth. Remove, replace and compact the material at no additional cost.

.10 Any surface that is unstable or does not have the specified compactness shall be corrected to the satisfaction of the Department Representative.

3.4 Profiling and compacting of the infrastructure

.1 Once the earthwork is complete, scarify and mix the pavement subgrade materials to the required compaction depth.

.1 Compact the first 300 mm of the subgrade consisting of powdered soil to at least 95% of the maximum dry density corrected in accordance with Section 31 05 10.

.2 Compact the first 150 mm of subgrade consisting of cohesive soil to at least 90% of the maximum corrected dry density as per Section 31 05 10.

.2 Provide the soil with the required water content to achieve the specified degree of compaction. If necessary, add water or aerate.

.3 Any surface that is unstable or does not have the specified compactness shall be corrected to the satisfaction of the Department Representative.

.4 Provide the infrastructure with the desired cross-section and grades.

.5 Remove unsuitable materials encountered during preparation and compaction work and replace with suitable materials to the satisfaction of the Department Representative.

.6 On a clay deposit, compact without vibration at least 300 mm above the clay.

3.5 Finish and tolerances

.1 Level finished surfaces so that there are no ruts, depressions, rocks larger than 50 mm in diameter or debris.

.2 Roll the finished surfaces to obtain a closed and dense texture.

.3 The permissible deviation of the finished surfaces is 25 mm from the intended level; however, the deviation may not be uniformly greater or lesser.

.4 The profile of the infrastructure platform must allow for proper drainage of water to catch basins, drains and ditches.

3.6 Special requirements

.1 Install geotextile membrane where required and granular sub-base materials immediately upon acceptance of the finished surfaces by the Departmental Representative.

.2 Maintain finished surfaces in a condition consistent with the requirements of this section until a new layer of material is installed or the work is accepted.

.3 Arrange transitions between materials of different gelation behaviour as directed by the Departmental Representative.

END OF SECTION

PART 1 GENERAL

1.1 Related sections

.1 Section 31 23 33.01 - Excavation, trenching and backfilling.

1.2 Scope of the work

.1 The work, but not limited to, providing the necessary equipment and labor the realization, in accordance with the rules of the art, of the environmental management and the excess excavation in accordance with the Soil Protection Policy guidelines and remediation of the MEFCC contaminated lands and present municipal bylaws, as well as the geotechnical study and brief environmental characterization soil attached to this specification including:

.1 Sampling by an environmental firm.

.2 Chemical analysis of these samples by a MEFCC accredited laboratory.

.3 The parameters analyzed will be: PAHs, HP C10-S50, metals (13 elements, VOC and organochlorine pesticides (DDT).

.4 Excavation, Loading, transport and disposal of excess excavation site in accordance with the guidelines of the Soil Protection and rehabilitation of MEFCC contaminated lands.

.5 Manual segregation and temporary storage of waste in excavated materials,

.6 Installation of temporary batteries if required, including polythene cloths 6 mils above the batteries.

.7 Dispose of contaminated excavated soil at authorized sites or transport them for reuse as directed as directed by the Departmental Representative.

.8 Provision of weighing for each of the ranges listed and the certificate calibration of scales.

.9 Survey of work areas, boundaries and excavation grounds and infilled areas.

.10 Cleaning the truck box.

.11 Permits, authorizations in accordance with MEFCC requirements.

.12 All the work required to fully implement these works.

1.3 References

.1 MEFCC.

.1 Policy for the protection of existing soils and the rehabilitation of contaminated soils.

.2 Interim Contaminated Soil Management Grid.

.3 Contaminated Soil Landfill Regulation.

.4 Regulation respecting the burial and incineration of residual materials (LQE).

.5 Hazardous Materials Regulations.

.6 Any other relevant publications.

.2 Canadian Council of Ministers of the Environment (CCME)

.1 Canadian Environmental Quality Guidelines.

.2 Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health.

.3 Any other relevant publications.

PART 2 PRODUCT

2.1 Sampling

.1 The environmental management of the excavation surplus includes the taking of soil samples by a recognized environmental firm and the chemical analysis of these samples by a laboratory accredited by the MEFCC.

.2 The location of the surveys will be determined by the Departmental Representative at the site.

.3 For each sample, the Contractor shall have the following parameters analyzed:

.1 Petroleum hydrocarbons (C10-C50).

.2 Polycyclic aromatic hydrocarbons (PAH).

.3 Metals (13 elements).

.4 Volatile organic compounds (VOCs).

.5 Organochlorine pesticides (DDT).

.4 The results obtained will have to be compared to the generic contamination criteria of the MEFCC Soil Protection and Remediation Policy for off-site disposal. The analytical results of the soils will have to be compared to the federal criteria (CCME) for reuse in the project.

.5 Excavated material below Criteria A and excavated material located in range A-B may be reused as backfill in the excavation if it meets the criteria listed above.

.6 Excavated materials located in the A-B range[1] that cannot be reused as fill material in this project must be disposed of at a site that complies with the guidelines of the MEFCC's Soil Protection and Contaminated Sites Rehabilitation Policy.

.7 Excavated materials located in the B-C range[2] that cannot be reused as fill in the present project must be disposed of in a site that complies with the directives of the MEFCC's Soil Protection and Contaminated Sites Rehabilitation Policy.

1 According to CCME (federal) criteria
2 According to CCME (federal) criteria

.8 Excavated materials exceeding criteria C must be disposed of in a site that complies with the guidelines of the MEFCC's Soil Protection and Contaminated Sites Rehabilitation Policy.

.9 The Contractor shall perform the sampling and analysis at least one week prior to any excavation work, as no excavation will be permitted until the results are forwarded to the Ministry Representative.

PART 3 EXECUTION

3.1 Disposal of uncontaminated surplus excavation material

.1 The Contractor shall refer to Section 31 23 33.01 - Excavation, Trenching and Backfilling.

3.2 Disposal of contaminated surplus excavation

.1 General.

.1 The management of materials to be excavated and disposed of must be done according to the environmental soil characterization report provided by the Department with the tender documents.

.2 The criterion for the management of contaminated soils that may remain on site is the CCME industrial criterion. Thus, all soils with contamination exceeding the CCME recommended values for an industrial site must be excavated and disposed of off-site. These soils must then be disposed of and treated according to MEFCC requirements.

.3 Even if they have a contamination level below the CCME guidelines, the contaminated excavation surplus will have to be disposed of and treated in accordance with MEFCC requirements.

.4 The selection of disposal sites for dry material and excess spoil is the responsibility of the Contractor but shall be subject to the approval of the Departmental Representative. The Contractor shall be solely responsible for the consequences of refusing to accept material at the disposal or processing site selected by him. The Contractor shall ensure that the acceptability criteria of the materials and the disposal or treatment sites he has chosen are met and, if necessary, assume the costs incurred to ensure this.

.2 Abbreviations and definitions.

.1 Waste: means any material to be excavated by the Contractor as defined under the Solid Waste Regulation or the Hazardous Materials Regulation administered by the MEFCC.

.2 Soils to be excavated: means all soils to be excavated by the Contractor, at locations and depths designated by the Department Representative.

.3 A-B soils: refers to soils with contaminant concentrations in the A-B range of the generic criteria of the MEFCC's Soil Protection and Remediation Policy for Contaminated Sites.

.4 B-C soils: refers to soils with contaminant concentrations in the B-C range of the generic criteria of the MEFCC's Soil Protection and Rehabilitation Policy for Contaminated Sites.

.5 Soils >C and < CSR standards: refers to soils with contaminant concentrations above the generic C criteria of the MEFCC Soil Protection and Rehabilitation Policy for Contaminated Sites and below the standards of the regulation respecting the burial of contaminated soils (RESC).

3.3 Temporary storage

.1 It is important to note that the work site must be used for the temporary storage of excavated soil piles. Never pile up excavated soil more than 1 m high, for reasons of visibility and safety of the establishment, except on a one-time basis within a single workday.

3.4 Excavation of contaminated soil

.1 If contaminated soils are present, the Contractor shall carry out the excavation work methodically, in order to allow the control required for environmental monitoring. He shall proceed, according to the directives of the Ministry Representative, to selective excavations.

.2 The Contractor shall consider that the Ministry Representative must be present throughout the excavation work and that he may, at any time, stop the work in a sector to carry out observations, sampling and analyses. The Contractor shall cooperate fully in the proper conduct of the work to ensure that all contaminated soil is removed and disposed of properly. To this end, it is possible that changes may occur and that the elevations of the contaminated soil horizons to be excavated may be modified as the excavation work progresses.

3.5 Management of excavated materials

.1 When required, excavated soils shall be temporarily stored on polythene sheeting. Soils shall be covered with a polythene sheet. The cloths must be of "extra strong" gauge, 6 mils thick and be well anchored.

.2 Never stack spoil more than 1 m high, for reasons of visibility and safety of the establishment, except on a one-off basis within a single working day.

3.6 Security

.1 The Contractor shall, at his own expense, prevent excavations from collapsing. To this end, he shall maintain stable slopes necessary for the proper execution of the work and the protection of site personnel.

.2 The Contractor shall take the necessary measures to ensure that the piles of materials and the work do not impede traffic and transportation. He shall use a work method that allows him to confine contaminated soil to specific areas so as to limit the risks of contamination of clean areas.

3.7 Disposal or treatment of contaminated soil

.1 Contaminated soils that cannot be reused as backfill on site must be shipped to a licensed site. Depending on the nature of the contamination, this will be either a landfill or a treatment site. Weigh tickets issued to the driver by the treatment or landfill site shall be forwarded to the Departmental Representative.

.2 Truck boxes must be equipped with removable hoops and waterproof covers securely attached to the walls.

END OF SECTION

PART 1 GENERAL

1.1 Related requirements

.1 Section 26 05 00 - Electrical - General Requirements for the Results of the Work.

.2 Section 31 05 16 - Aggregate Materials.

.3 Section 31 22 13 - Levelling Works Summary.

.4 Section 02 41 13 - Selective Demolition of Site Development Works.

.5 Section 03 30 00 - Cast-in-Place Concrete.

.6 Section 31 05 10 - Corrected Maximum Dry Density - Backfill Materials.

1.2 Definitions

.1 Rock cuttings: materials from excavation work in massive, igneous, sedimentary or metamorphic rock masses other than friable shale and which, prior to being excavated, formed a whole with the rock mass, as well as blocks of stone and rock fragments having an individual volume greater than 1 m^3 and which cannot be moved or excavated with heavy construction equipment.

.2 Ordinary cuttings: all materials of various kinds, other than solid rock, including dense boulders, compacted clay, friable shale, frozen materials and partially cemented materials that can be cleared and excavated with heavy machinery. Concrete slabs and other related concrete items are also included in the regular cuttings.

.3 Topsoil: any material that is suitable for plant growth and can be used as topsoil or for landscaping and seeding.

1.3 Documents/samples to be submitted for approval/information

.1 Quality control :

.1 Submit a report on existing conditions as defined in the EXISTING CONDITIONS section.

.2 Submit the proposed dewatering method to the Departmental Representative for review in accordance with PART 3 of this section.

.3 Notify the Departmental Representative, in writing, at least seven (7) days prior to the commencement of excavation to ensure that cross-sections are established.

.4 Notify the Departmental Representative, in writing, when the bottom of the excavation is reached.

.5 Submit to the Departmental Representative the results of tests, inspections and/or reports in accordance with PART 3 of this section.

.2 Documents/samples to be submitted prior to work.

.1 Prior to commencing work under this section, submit a list of the major equipment and materials to be used in the work.

.2 Submit records of the location of underground utilities, which must include or indicate the following: location plan of existing utilities on the property.

.3 Samples.

.1 Submit the required samples in accordance with Section 01 33 00 - Documents and Samples to be Submitted.

.2 At least four (4) weeks prior to the commencement of work, notify the Departmental Representative of the proposed source of supply for the backfill material and ensure access to the source for sampling.

.3 Submit 70 kg samples of each type of prescribed backfill material and representative samples of excavated material.

.4 Ship samples to the Departmental Representative in tightly sealed containers to avoid contamination and exposure to the weather.

1.4 Quality Assurance

.1 Submit calculations and related data at least two (2) weeks prior to the start of the work.

.2 The calculations and related data submitted must bear the seal and signature of a Representative of the appropriate department recognized or licensed to practice in the Province of Quebec.

.3 Keep a copy of the calculations and related data on site.

.4 Retain the services of a Departmental Representative recognized or licensed to practice in the Province of Quebec where the work is to be carried out, to be responsible for the design and inspection of cofferdams, shoring, shoring and underpinning structures used during the course of the work.

.5 Do not use soil until the written report of the test results is accepted by the Departmental Representative.

.6 Health and safety.

.1 Take the necessary measures in terms of health and safety in construction in accordance with the standards of the Committee on standards, equity, health and safety at work (CNESST).

1.5 Waste management and disposal

.1 Sort waste for reuse or recycling.

.2 Direct excess aggregates suitable for reuse to a local quarry or recycling facility authorized by the Departmental Representative.

1.6 Existing conditions

.1 Review the environmental soil characterization report provided by the Departmental Representative with the tender documents.

.2 Buried utility lines.

.1 Before starting work, check the location of utility lines on or near the job site.

.2 Arrange with the appropriate authorities to redirect buried pipelines that may interfere with the execution of the work, and assume the costs of such work.

.3 Remove obsolete buried pipes within 2 m of the foundation and seal the cut sections with female plugs.

.4 Details of the size, location and depth of burial of structures and utility lines are for guidance only and are not necessarily accurate or complete.

.5 Prior to commencing excavation, determine the location and condition of existing underground structures and systems and notify the Ministry Representative. Clearly mark these locations to avoid disruption of service while work is in progress.

.6 Confirm the location of underground utility lines by carefully performing test excavations.

.7 Maintain and protect from damage water, sewer, gas, electrical and telephone lines and other identified pipes or structures.

.8 Obtain appropriate direction from the Departmental Representative prior to removing or rerouting any utility line or structure identified in the excavation area. The Departmental Representative will be responsible for the cost of this work.

.9 Note the location of retained, rerouted or abandoned underground pipelines.

.10 Confirm the location of recent excavations in the vicinity of the work area.

.3 Buildings and elements present on the site.

.1 In the presence of the Departmental Representative, check the condition of buildings, trees and other vegetation, lawns, fences, utility poles, cables, railway tracks, pavement, boundary markers and benchmarks that may be affected by the work.

.2 During the execution of the work, protect buildings and other features on the site from damage. In the event of damage, immediately restore the affected items as directed by the Departmental Representative.

.3 If it is necessary to cut roots or branches in preparation for excavation, proceed as directed by the Departmental Representative.

1.7 Choice of excavation methods

.1 The Contractor is solely responsible for the choice of excavation methods used. Submit these methods in advance to the Departmental Representative.

1.8 Protective measures

.1 Comply with the requirements of the specifications and regulations of the authorities.

.2 Keep excavations dry and protected from freezing.

.3 Take the necessary measures to reduce dust.

.4 Set up barricades, fences, etc. as required by the specifications.

PART 2 PRODUCTS

2.1 Materials/materials

.1 Type 1 backfill (MG20b) - (granular base and cover) :

.1 Crushed stone MG-20b meeting the requirements of Section 31 05 16 - Aggregate

.2 When an electrical or telecommunication cable is not protected by a conduit 100% of the material must pass the 5 mm screen.

.2 Type 2 backfill (granular backfill) :

.1 All-round or sifted sand, crushed stone, composed of hard, resistant particles and free of clods of clay, hydraulic, organic or frozen materials, as well as any other deleterious substances.

.2 When tested according to the BNQ standard, the particle size of the materials must remain within the following limits:

Type 2 backfill (granular backfill) :

Screen	% passing
112 mm	100
5 mm	35 - 100
80 µm	8 – 17

.3 The CBR value of Type 2 backfill material shall be greater than or equal to 20 (CBR ≥20) per ASTM 1883-15-15.

.4 Type 2 materials shall not contain cement concrete or bituminous concrete, except for the pulverization residue of existing pavement structures to be demolished. MTQ type MR materials (BNQ 2560-600) are not accepted.

.3 Type 3 backfill (trench backfill and earthworks) :

.1 Approved materials, selected from excavated material or from another source, not frozen and free of clinker, stones larger than 75 mm, ashes, turf, waste and other deleterious materials and having the optimum natural water content necessary to achieve the prescribed density.

.2 Materials from other sources than excavated material must have similar permeability and freeze/thaw behavior to natural materials in place.

.4 Cast-in-place concrete for the construction of duct banks according to section 03 30 00.

PART 3 EXECUTION

3.1 Erosion and sediment control means

.1 Implement temporary erosion and sediment control measures designed to prevent the loss of soil from stormwater runoff or wind erosion and the washing of soil onto properties, adjacent walkways, and adjacent waterways. These means shall be consistent with the erosion and sediment control plan guidance set forth in EPA 832/R-92-005 published by EPA.

.2 Inspect, maintain and repair existing control measures as necessary until permanent vegetation is well established.

.3 Remove the control media at the appropriate time and restore and stabilize the areas disturbed during this work.

3.2 Preparatory work

.1 Remove obstructions, snow and ice from surfaces in the excavation area to the extent indicated.

.2 Carefully cut pavement and sidewalks along the lines of the proposed excavation so that the surface breaks up cleanly and evenly, as per Section 02 41 13 - Selective Demolition of Site Development Works.

3.3 Preparation/protection

.1 Protect existing features in accordance with applicable municipal by-laws and to the satisfaction of the Departmental Representative.

.2 Keep excavations clean, free of standing water and friable soil.

.3 Where the soil may vary significantly in volume due to fluctuations in moisture content, cover and protect the soil to the satisfaction of the Departmental Representative.

.4 Protect natural and man-made features that must remain in place. Unless otherwise indicated or unless located in a building zone, protect existing trees from damage.

.5 Protect utility lines that must remain in place.

3.4 Stripping of topsoil

.1 Begin removal of topsoil in areas indicated on the plan or by the Departmental Representative, once the grass, weeds, and brush have been removed and cleared from the site.

.2 Remove topsoil to the depth determined by the Departmental Representative.

.1 Do not mix topsoil with subsoil materials.

.3 Place topsoil in locations designated by the Departmental Representative.

.1 Do not stack soil more than 2 m high and protect piles from erosion.

.4 Dispose of unused topsoil at a location designated by the Departmental Representative.

3.5 Deposit

.1 Place the fill material in storage at locations designated by the Departmental Representative.

.1 Place granular materials in a manner that prevents segregation.

.2 Protect backfill materials from contamination.

.3 Take appropriate erosion and sedimentation control measures to prevent migration of sediment from the work site and into watercourses.

3.6 Dewatering of excavations, stream diversion and heave prevention

.1 Keep the excavations dry throughout the work.

.2 Submit to the Departmental Representative details of proposed methods for dewatering excavations or preventing heave, such as dikes, filter points and sheet pile re-piling.

.3 Protect open excavations from flooding and damage by runoff.

.4 Discharge water in a manner that will not endanger public or private property, or any part of the completed or ongoing work.

3.7 Excavation

.1 Notify the Departmental Representative at least one week prior to the start of the work and take natural ground levels where necessary in his presence.

.2 Performs excavation work according to specified layouts, levels and dimensions or as directed.

.3 During excavation, remove concrete structures, masonry, pavement, abandoned pipes, demolished foundations and rock and any obstructions.

.4 Unless authorized in writing by the Departmental Representative, no more than 30 m of trench shall be dug in advance and no more than 15 m of trench shall be left open at the end of a working day. If bad weather is forecast, no trench shall be left open at the end of a working day.

.5 Excavation work must not affect the load-bearing capacity of adjacent foundations in any way.

.6 Spoil and deposited material shall be deposited at a sufficient distance from the trench as directed by the Departmental Representative.

.7 Limit work with construction equipment in the immediate vicinity of unfilled trenches.

.8 Transport unsuitable or surplus spoil as directed in Section 02 41 13- Selective Demolition of Site Development Works.

.9 Avoid obstructing the flow of surface water or natural watercourses.

.10 The bottom of the excavations shall be level and shall consist of undisturbed soil free of loose, soft or organic material. The bottom shall not be disturbed and shall be free of blocks exceeding 300 mm in any dimension.

.11 If the soil at the bottom of the excavation appears unsuitable, notify the Departmental Representative and proceed as directed.

.12 Inform the Departmental Representative when the intended bottom level is reached.

.13 Once excavations are completed, have them approved by the Departmental Representative.

.14 Clear the bottom of the trenches of all unsuitable material to the extent and depth determined by the Departmental Representative.

.15 When excavations are too deep, backfill unauthorized excavations with Type 1 backfill material and compact to a minimum of 95% of the maximum corrected dry density as per Section 31 05 10.

.16 Complete excavations by hand, firm up the walls and remove all loose material and debris. Where the bottom of the excavation has been reworked, compact the bottom of the excavation to a density at least equal to that of the undisturbed soil Clean out cracks in the rock and fill them with concrete mortar or grout to the satisfaction of the Department Representative.

.17 Maintain excavation slopes to prevent settlement and differential behavior.

.18 Protect excavation slopes from erosion and freezing.

3.8 Backfill material and compaction

.1 Backfilling of trenches shall be done with cut and/or excavated material approved by the Department Representative. If the cut and excavation materials are not sufficient to fill the backfill volumes, the Contractor shall backfill the trenches with borrow material.

.2 Backfilling of trenches.

.1 Backfilling of trenches with materials of similar frostbite behavior to existing materials shall be done with a minimum slope of 2 H:1 V from 1.8 m below the proposed final grade of the pavement, or as indicated on the drawings.

.2 Backfilling of trenches with materials of different frost behavior than the existing materials must be done with a minimum slope of 3 H:1 V from 1.8 m below the proposed final grade or as indicated on the drawings.

.3 Backfill around structures (pipes, manholes and sumps) shall be done with Type I backfill material.

.3 Use backfill material of the type indicated. Unless otherwise specified, compact to the densities shown below:

.1 Type 1: 95 % of the maximum corrected dry density, according to section 31 05 10.

.2 Type 2: 95 % of the maximum corrected dry density, according to section 31 05 10.

.3 Type 3: 90 % of the maximum corrected dry density, according to section 31 05 10.

.4 The final layers of backfill at the subgrade level of the pavements shall be in accordance with Section 31 22 13 - Levelling Works Summary.

.4 Use approved mechanical compaction equipment or compact by hand to achieve the prescribed degree of compaction.

3.9 Backfill

.1 Do not begin backfilling until the structures have been inspected and approved by the Departmental Representative.

.2 Areas to be backfilled shall be free of debris, snow, ice, water or frozen ground.

.3 Do not use backfill material that is frozen or contains snow, ice or debris.

.4 Backfill around the structures :

.1 Place backfill around the structures in accordance with the requirements of the associated sections.

.2 Do not place backfill material around or over cast-in-place concrete structures within 24 hours of pouring the concrete or until the concrete has reached sufficient strength as directed by the Department Representative.

.3 Place the backfill material simultaneously on both sides of the structures to balance the load. The difference between the backfill heights should not exceed 0.4 m.

.4 Where the earth is likely to temporarily exert uneven pressure on walls or other structures:

.1 Allow concrete to cure for a minimum of 14 days, or until it is strong enough to withstand the pressure of backfilling and compaction and is approved by the Departmental Representative.

.2 If approved by the Departmental Representative, install props or struts to counteract uneven pressure and leave them in place until the Departmental Representative authorizes their removal.

.5 Place backfill material by hand under, around and over the structures according to the plans. It is forbidden to dump the material directly onto the structures to be backfilled.

.5 Backfill of the trench.

.1 Place the backfill material in uniform layers not exceeding 150 mm in thickness compacted to subgrade level. Compact each layer before placing the next layer.

.2 The profiling and compaction of the subgrade must comply with the articles of section 31 22 13 - Levelling Works Summary.

.3 Restore the profile of the infrastructure to allow for water drainage.

3.10 Restoration of the premises

.1 Upon completion of the work, remove waste materials and debris, adjust grades and correct defects as directed by the Departmental Representative.

.2 Replace topsoil as directed by the Departmental Representative.

.3 Restore the lawns to the level they were at prior to the start of the excavation.

.4 Restore the affected pavement to the condition and grade it was in prior to the start of the work, ensuring that the original thickness of the pavement is maintained.

.5 Clean up and restore areas affected by the work as directed by the Departmental Representative.

.6 During the first 24 hours, use temporary shoring to support traffic loads on dimensionally stabilized embankments.

.7 Protect newly graded areas from erosion, prevent traffic and keep them free of trash or debris.

END OF SECTION

PART 1 GENERAL

1.1 Related requirements

.1 Section 31 05 10 - Corrected Maximum Dry Density - Backfill Material.

.2 Section 31 05 16 - Aggregates.

.3 Section 31 23 33.01 - Excavation, trenching and backfilling.

.4 Section 32 12 16 - Asphalt concrete pavement.

1.2 Transportation, storage and handling

.1 Transport, store and handle materials and equipment in accordance with the manufacturer's written instructions.

.2 Storage and handling.

.1 Store materials and equipment according to manufacturer's recommendations.

.2 Replace defective or damaged materials and equipment with new materials and equipment.

PART 2 PRODUCT

2.1 Materials

.1 Granular subbase materials shall conform to the requirements of Section 31 05 16 - Aggregates and those set out below.

.1 The aggregates constituting the granular foundation must be derived (100%) exclusively from the crushing of quarry rock and composed of hard, resistant, angular particles and free of clods of clay, hydraulic, organic or frozen materials, as well as any other deleterious substance.

.2 The aggregates used in the granular foundation must meet the requirements of BNQ Standard 2560-114 - Civil Engineering Works - Aggregates.

.3 During tests carried out in accordance with standard LC 21-040, the particle size of the materials must remain within the limits prescribed in BNQ 2560-114:

Sieve designation	MG 20 % passing	MG 56 % passing	MG 112 % passing
112 mm	-	-	100
80 mm	-	100	-
56 mm	-	82-100	-
31.5 mm	100	55-85	-
20 mm	90-100	-	-
14 mm	68-93	-	-
5 mm	35-60	25-50	12-100

Sieve designation	MG 20 % passing	MG 56 % passing	MG 112 % passing
1.25 mm	15-38	11-30	-
315 µm	5-17	4-18	-
80 µm	2-7	2-7	0-10

.4 The physical and mechanical properties of the aggregates in the granular foundation must meet the following requirements:

		Requirements		
Test	Test standard	MG 20	MG 56	MG 112
Micro-Deval (M.D.)	LC-21-070	35% max	35% max	40% max
Los Angeles (L.A.)	LC-21-400	50 % max	50 % max	50% max
M.D. + L.A.	LC-21-070 + LC-21-400	80 % max	80 % max	85% max
Fragmentation	LC-21-200	50 % max	50 % max	N.A.
Organic matter	LC-31-228	0.8% max	0.8% max	0.8% max
Methylene blue value	LC-21-255	0.20% max	0.20% max	0.20% max
C.B.R. Index	ASTM D-1883	100 min	100 min	N.A.
Proportion of bituminous aggregates	LC-21-901	0 % max	0 % max	0% max

.5 Other characteristics of the materials used:

.1 Liquidity limit: no more than 25, according to ASTM D4318-05.

.2 Plasticity index: not more than 6, according to ASTM D4318-05.

.3 The minimum CBR, measured according to ASTM D1883-15 of the aggregates shall be at least 100.

.4 The materials must not contain more than 3% of particles finer than 20 µm according to ASTM D422.

PART 3 EXECUTION

3.1 Review

.1 Verification of Conditions: Before proceeding with the installation of the granular base course, ensure that the condition of surfaces/substrates previously installed under other sections or contracts is acceptable and allows the work to be performed in accordance with the manufacturer's written instructions.

.1 Conduct a visual inspection of surfaces/supports in the presence of the Departmental Representative.

.2 Immediately inform the Departmental Representative of any unacceptable conditions found.

.3 Begin installation work only after unacceptable conditions have been corrected and written approval has been received from the Departmental Representative.

3.2 Preparation

.1 Temporary erosion and sediment control.

.1 Implement temporary erosion and sediment control measures to prevent soil loss and to prevent the deposition of runoff sediment or windblown dust and particles on adjacent properties and walkways in accordance with the site-specific erosion and sediment control plan prepared in accordance with the requirements of EPA document 832/R-92-005.

.2 Inspect, maintain and repair existing control measures as necessary until permanent vegetation is established.

.3 Remove the control media, then restore and stabilize the areas disturbed during this work.

3.3 Setting up

.1 Upon delivery to the job site and prior to spreading, the granular material shall have a moisture content between 0% and +2% of the optimum moisture content obtained from the corrected maximum dry density test in accordance with Section 31 05 10.

.2 Spread materials only on a clean, unfrozen, perfectly shaped and compacted surface, free of snow and ice.

.3 Begin spreading the subgrade material at the high point of the crown of the pavement or on the higher side of a single slope pavement.

.4 Spread the granular base using methods that prevent segregation and degradation. Aggregates should be at a moisture content close to the optimum for compaction. Wetting of the aggregate should be done immediately prior to placement. Watering after spreading aggregates that are too dry is prohibited. Only light watering to adjust and maintain the water content at the optimum is permitted.

.5 Spread the material to the thicknesses and grades indicated in the standard sections after compaction. The material shall be spread across the full width of the granular base to produce uniform layers not exceeding 200 mm in compacted thickness. The Departmental Representative may permit thicker layers if the prescribed degree of compaction can be achieved.

.6 Before spreading the next layer of material, give each layer a uniform profile and compact it to the specified density.

.7 Remove and replace the portion of the layer where material segregation has occurred during application.

.8 The granular foundation placement operations must be carried out in such a way as not to damage and destabilize the underlying pavement structure and subgrade.

3.4 Compaction and reprofiling

.1 The compaction equipment must be capable of producing materials with the prescribed density.

.2 Compact the granular base to the percentages of maximum dry density in accordance with Section 31 05 10 - Corrected Maximum Dry Density - Backfill Materials and as indicated on the drawings.

.3 Ensure that the compaction effort does not damage the underlying granular layer. On sensitive soils, reduce the thickness of the layers and compact without vibration. The first layer of foundation must be compacted in a static manner and the Contractor must take all necessary precautions to avoid destabilizing the underlying cohesive materials.

.4 Alternate shaping and rolling to obtain a smooth, even and uniformly compacted granular base.

.5 The water content of the material during compaction operations must not be less than the optimum water content, but not more than 2%.

.6 In areas where rolling equipment cannot be used, compact the material to the required density using mechanical rammers approved by the Departmental Representative. In these areas, the thickness of individual layers shall be reduced to a maximum of 150 mm.

3.5 Tolerances

.1 The permissible deviation of the granular subbase, after compaction, is 25 mm above or below the prescribed level and profile; however, the deviation may not be uniformly above or below the entire surface of the subbase.

.2 The permissible deviation of the upper granular base, after compaction, is 6 mm more or less than the prescribed level and profile; however, the deviation may not be uniformly greater or less.

.3 Correct surface irregularities by loosening the soil and adding or removing material until the surface level is within the prescribed tolerance.

3.6 Protection

.1 Maintain the finished subgrade in a condition consistent with this section until the next subgrade is completed or the work is accepted by the Department Representative.

3.7 Quality control

.1 The grading and compactness test is performed at three (3) randomly located points representing three (3) sections of equal area for a lot. Samples for the grading test are taken in accordance with test method LC 21-010.

3.8 Rolling test

.1 When requested by the Departmental Representative, the Contractor shall perform a bearing test on the foundation or sub-base.

.2 The rolling test shall be performed in the presence of the Laboratory, using the methods and equipment specified in Section 26 05 00 - Electrical - General Requirements for the Results of Work.

.3 Use a dump truck loaded to its maximum capacity as recommended by the Laboratory.

.4 Perform proof compaction at the elevations indicated for the subgrade.

.5 If proof compaction reveals defects in any part of the subgrade, proceed as follows:

.1 Remove subgrade and subgrade materials to the depth and area specified by the Laboratory.

.2 Backfill the excavated portion of the subgrade with subgrade material and compact in accordance with this section.

.3 Replace the subgrade materials and compact them.

.6 If proof compaction reveals defects in any portion of the subgrade, remove and replace the unsuitable material in accordance with this section at no additional cost.

3.9 Cleaning

.1 Cleaning during the course of the work: carry out the cleaning work.

.1 Leave the premises clean at the end of each working day.

.2 Final clean-up: remove excess materials and equipment, waste, tools and equipment from the site.

END OF SECTION

PART 1 GENERAL

1.1 Related work

.1 Section 32 11 16.01 - Granular Sub-Base.

.2 Section 32 12 16 - Asphalt concrete pavement.

1.2 References

.1 American Association of State Highway and Transportation Officials (AASHTO).

.1 AASHTO M081-92-UL-04, Standard Specification for Cutback Asphalt (Rapid-Curing Type).

.2 ASTM International.

.1 ASTM D140/D140M-15, Standard Practice for Sampling Bituminous Materials.

.2 ASTM D633-11, Standard Volume Correction Table for Road Tar.

.3 ASTM D1250-08, Standard Guide for Use of the Petroleum Measurement Tables.

.3 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-16.2-M89, Emulsified Bitumen, Anionic Type, for Road Purposes.

.4 Ministère des Transports du Québec (MTQ).

.1 Standard 4101, Volume VII - Materials, Standards - Roadworks.

1.3 Definitions

.1 Bonding Binder: applied to an asphalt concrete or cement concrete surface prior to the application of a new asphalt concrete overlay or between two layers of asphalt overlay.

1.4 Certification of materials

.1 Submit the required data sheets and manufacturer's instructions and documentation for the tack coat. Data sheets shall include product characteristics, performance criteria, dimensions, limitations and finish.

.2 At the request of the Departmental Representative, submit test results and a certificate issued by the manufacturer guaranteeing that the bonding agent meets the requirements of this section

1.5 Transportation, storage and handling

.1 Transport materials and equipment in accordance with the manufacturer's written instructions.

.2 Delivery and Acceptance: Deliver materials and equipment to the job site in their original packaging, which must be labeled with the manufacturer's name and address.

.1 Determine delivery points and quantity to be shipped with the supplier.

.2 Make deliveries during normal working hours.

.3 Include a copy of the orders and instructions for shipment at the request of the Departmental Representative.

.4 Include adequate unloading facilities and unload the bonding agent as directed by the Departmental Representative.

.5 Provide an area for the storage of bonding agent, maintain it and restore it to its original condition upon completion of the work.

PART 2 PRODUCTS

2.1 Materials

.1 CRS 1 emulsified asphalt bonding binder in accordance with standard 4105 of the Quebec Ministry of Transport (MTQ).

.2 Water: potable, clean and free of foreign matter.

2.2 Material

.1 The equipment required for the work covered by this section must be in good working order and maintained throughout the duration of the work.

.2 Pressure spreading equipment.

.1 Designed, equipped, maintained and operated so that the bituminous material can meet the following conditions

.1 Be maintained at a constant temperature.

.2 To be applied uniformly on surfaces of variable width equal to or less than 5 m.

.3 Be applied under uniform pressure at a preset rate and set between 0.2 and 5.4 L/m2, with a maximum permissible variation of 0.1 L/m2.

.4 Be applied in a uniform stream, without spraying, and at the required temperature.

.2 Equipped with a meter to record the number of meters traveled per minute, said meter to be carefully placed in view of the driver to enable the driver to maintain the constant speed required to apply the bituminous material at the prescribed rate.

.3 Equipped with a pump, the flow meter of which is carefully placed in view of the driver and is graduated in units of not more than 5 L per minute of bituminous material delivered to the nozzles.

.1 The pump must be driven by an autonomous motor unit, independent of the truck's.

.4 Equipped with an accurate, easy to read and sensitive measuring device to record the temperature of the liquid in the tank.

.1 Measure the temperature to the nearest whole number.

.5 Equipped with an accurate volumetric meter or a calibrated tank.

.6 Equipped with nozzles of the same brand and size, adjustable to the desired width and orientation of the jets.

.7 Equipped with a sprinkler boom, the height of which can be adjusted in 0.6 m increments upwards or downwards.

.8 Cleaned after the use of any bituminous material incompatible with the material to be spread.

PART 3 EXECUTION

3.1 Review

.1 Verification of conditions: Before proceeding with the installation of the bond coat, ensure that the condition of the surfaces/substrates previously installed under other sections or contracts is acceptable and allows the work to be completed in accordance with the manufacturer's written instructions.

.1 Conduct a visual inspection of surfaces/supports in the presence of the Departmental Representative.

.2 Immediately inform the Departmental Representative of any unacceptable conditions found.

.3 Begin installation work only after unacceptable conditions have been corrected and written approval has been received from the Departmental Representative.

3.2 Implementation

.1 Heat the bonding agent to between 32°C and 43°C for pumping and spreading.

.2 Have the surface accepted by the Departmental Representative prior to applying the bond coat.

.3 Clean the surface with a mechanical rotary broom and complete with a manual sweep if necessary. The surface must be free of dust, contaminants, loose particles, foreign matter, oil and grease.

.4 Apply the bonding coat only on a clean and dry surface.

.5 Each time the bonding agent is installed, notify the Departmental Representative before the work begins and at the end of the work, so that he can take a reading of the meter.

.6 Dilute bituminous emulsion with water at a ratio of 1:1.

.1 Mix thoroughly by pumping or other method approved by the Departmental Representative.

.7 Apply the tack coat uniformly at a residual rate of at least 0.2 L/m^2 between two (2) layers of asphalt and at a residual rate of at least 0.7 L/m^2 on cement concrete slabs that are paved.

.8 Cover the contact surfaces of curbs, gutters, drains, manholes, catch basins and similar structures with a thin, uniform layer of bonding material.

.9 Proceed with the work only when the outside temperature is above 5°C and no rain is expected within the next two (2) hours.

.10 Apply the bonding agent only to surfaces that are not frozen.

.11 Do not apply bonding agents to surfaces that will be exposed after the coating is completed.

.12 Sweep the surface to evenly distribute any excess tack coat deposited on the pavement as directed by the Departmental Representative.

.13 Do not allow any traffic on the coated surfaces until the binder has cured.

.14 Touch up surfaces that have become dirty or whose bonding agent has been significantly damaged.

.15 Wait until the curing of the tack coat has been completed before applying the bituminous pavement.

.16 Submit a summary report no later than seven (7) days after the implementation date; the report must contain the following information

.1 The total surface area covered with bonding agent.

.2 The amount of bonding agent used.

.3 The average application rate.

.4 The actual amount of product used when using pressure application equipment.

.5 Measurements taken with a graduated gauge or electronic copies are accepted.

.17 Take measurements in the presence of the Departmental Representative if requested.

.18 Inspect the applied bond coat for uniformity.

.1 Re-spray tack coat where insufficient or uneven coverage exists as directed by the Departmental Representative.

.2 Ensure that the bond coat applied with hand tools is consistent in appearance with the adjacent areas where the material was machine applied.

3.3 Cleaning

.1 Cleaning during the work: carry out the cleaning work

.1 Leave the premises clean at the end of each working day.

.2 Final clean-up: remove excess materials/materials, waste, tools and equipment from the site.

END OF SECTION

PART 1 GENERAL

1.1 Related work

.1 Section 32 11 16.01 - Granular Sub-Base.

.2 Section 32 12 16 - Asphalt concrete pavement.

1.2 References

.1 ASTM International.

.1 ASTM D140/D140M-15, Standard Practice for Sampling Bituminous Materials.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-16.1-M89, Cutback Asphalt for Roads.

.2 CAN/CGSB-16.2-M89, Emulsified Bitumen, Anionic Type, for Road Purposes.

.3 Ministry of Transports (MTQ).

.1 Standard 4101, Volume VII - Materials, Standards - Roadworks.

1.3 Definitions

.1 Impregnating Binder: applied to a granular surface prior to the application of a new asphalt concrete overlay.

1.4 Certification of materials

.1 Submit the required data sheets and manufacturer's instructions and documentation for the impregnating binder coat. Data sheets shall include product characteristics, performance criteria, dimensions, limitations and finish.

.2 At the request of the Departmental Representative, submit test results and a certificate issued by the manufacturer guaranteeing that the impregnating binder meets the requirements of this section.

1.5 Transportation, storage and handling

.1 Transport materials and equipment in accordance with the manufacturer's written instructions.

.2 Delivery and Acceptance: Deliver materials and equipment to the job site in their original packaging, which must be labeled with the manufacturer's name and address.

.1 Determine delivery points and quantity to be shipped with the supplier.

.2 Make deliveries during normal working hours.

.3 Include a copy of the orders and instructions for shipment at the request of the Departmental Representative.

.4 Include adequate unloading facilities and unload the impregnating binder in agreement with the Departmental Representative.

.5 Provide an area for storage of the impregnating binder, maintain it and restore it to its original condition upon completion of the work.

PART 2 PRODUCTS

2.1 Materials

.1 CSS 1HD impregnating binder diluted to 40%, in compliance with the Ministry of Transport (MTQ) 4105 standard.

.2 Water: potable, clean and free of foreign matter.

2.2 Material

.1 The equipment required for the work covered by this section must be in good working order and maintained throughout the duration of the work.

.2 Pressure spreading equipment.

.1 Designed, equipped, maintained and operated so that the bituminous material can meet the following conditions

.1 Be maintained at a constant temperature.

.2 To be applied uniformly on surfaces of variable width equal to or less than 5 m.

.3 Be applied under uniform pressure at a preset rate and set between 0.2 and 5.4 L/m2, with a maximum permissible variation of 0.1 L/m2.

.4 Be applied in a uniform stream, without spraying, and at the required temperature.

.2 Equipped with a meter to record the number of meters traveled per minute, said meter to be carefully placed in view of the driver to enable the driver to maintain the constant speed required to apply the bituminous material at the prescribed rate.

.3 Equipped with a pump, the flow meter of which is carefully placed in view of the driver and is graduated in units of not more than 5 L per minute of bituminous material delivered to the nozzles.

.1 The pump must be driven by an autonomous motor unit, independent of the truck's.

.4 Equipped with an accurate, easy to read and sensitive measuring device to record the temperature of the liquid in the tank.

.1 Measure the temperature to the nearest whole number.

.5 Equipped with an accurate volumetric meter or a calibrated tank.

.6 Equipped with nozzles of the same brand and size, adjustable to the desired width and orientation of the jets.

.7 Equipped with a sprinkler boom, the height of which can be adjusted in 0.6 m increments upwards or downwards.

.8 Cleaned after the use of any bituminous material incompatible with the material to be spread.

PART 3 EXECUTION

3.1 Review

.1 Verification of Conditions: Before applying the impregnating binder coat, ensure that the condition of the surfaces/substrates previously applied under other sections or contracts is acceptable and allows the work to be performed in accordance with the manufacturer's written instructions.

.1 Conduct a visual inspection of surfaces/supports in the presence of the Departmental Representative.

.2 Immediately inform the Departmental Representative of any unacceptable conditions found.

.3 Begin installation work only after unacceptable conditions have been corrected and written approval has been received from the Departmental Representative.

3.2 Implementation

.1 Have the surface accepted by the Departmental Representative before applying the impregnating binder coat.

.2 Apply the impregnating binder only after receiving written approval of the granular base course surface from the Departmental Representative.

.3 Whenever the Contractor installs impregnating binder, the Contractor shall notify the Departmental Representative prior to the commencement of the work as well as upon completion of the work so that the Departmental Representative may take a reading of the meter.

.4 Fluidized bitumen.

.1 Heat the impregnating binder to between 32°C and 43°C for pumping and spreading.

.2 Apply the impregnating binder to the granular base coat at a residual rate of at least 1.2 l/m² or as directed by the Departmental Representative.

.3 Unless otherwise directed by the Departmental Representative, apply asphalt only to dry surfaces.

.5 Anionic bituminous emulsion.

.1 Dilute the bituminous emulsion in clean water at a ratio of 1:1.

.2 Mix thoroughly by pumping or other method approved by the Departmental Representative.

.3 Apply the thinned bituminous emulsion to the granular base course at a residual rate of at least 1.2 L/m2 or as directed by the Departmental Representative.

.4 Unless otherwise directed by the Departmental Representative, apply diluted bituminous emulsion only to wet surfaces.

.6 Apply the impregnating bitumen layer only on surfaces that are not frozen.

.7 Proceed with the work only when the outside temperature is above 5°C and no rain is expected within the next two (2) hours.

.8 Coat the contact surfaces of curbs, gutters, catch basins, manholes, catch basins and similar structures with a thin, even layer of impregnating binder.

.9 Carry out the work in several applications if traffic cannot be interrupted and spread the impregnating bitumen over no more than half the width of the pavement to be constructed.

.10 Avoid overlaps at joints.

.11 Do not apply impregnating binder to surfaces that will be exposed after the coating is completed.

.12 Apply an additional layer of asphalt where the applied materials are not of sufficient thickness, as directed by the Departmental Representative.

.13 Do not allow any traffic on the coated surfaces until the impregnating binder has cured.

.14 Wait until the impregnating binder layer has cured before applying the bituminous pavement. Allow at least 24 hours for curing.

3.3 Cleaning

.1 Cleaning during the work: carry out the cleaning work

.1 Leave the premises clean at the end of each working day.

.2 Final clean-up: remove excess materials/materials, waste, tools and equipment from the site.

END OF SECTION

PART 1 GENERAL

1.1 Related requirements

.1 Section 31 05 10 - Corrected Maximum Dry Density - Backfill Material.

.2 Section 31 05 16 - Aggregates.

.3 Section 31 23 33.01 - Excavation, trenching and backfilling.

.4 Section 32 11 16.01 - Granular Sub-Base.

1.2 Reference standards

.1 Bureau de normalisation du Québec (BNQ).

.1 BNQ 2560-114 "Civil Engineering Works - Aggregates".

.2 Quebec Ministry of Transport (MTQ).

.1 Standard 4101 "Bitumen" of Volume VII - Materials of the Quebec Ministry of Transport (MTQ) Standards - Roadworks collection.

.2 Standard 4202 "Hot mix asphalt formulated according to the Pavement Laboratory des chaussées formulation method" in Volume VII - Materials of the Quebec Ministry of Transport (MTQ) Standards - Roadworks collection.

.3 American Association of State Highway and Transportation Officials (AASHTO).

.1 AASHTO M320-17, Standard Specification for Performance Graded Asphalt Binder.

.2 AASHTO R29-15, Standard Specification for Grading or Verifying the Performance Graded of an Asphalt Binder.

.3 AASHTO T245-15, Standard Method of Test for Resistance to Plastic flow of Bituminous Mixtures Using Marshall Apparatus.

.4 Asphalt Institute (AI).

.1 AI MS-2-2015 Edition, Asphalt Mix Design Methods.

.5 ASTM International.

.1 ASTM C88-18, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.

.2 ASTM C117-17, Standard Test Method for Material Finer Than 0.075mm (No.200) Sieve in Mineral Aggregates by Washing.

.3 ASTM C123/C123M-14, Standard Test Method for Lightweight Particles in Aggregate.

.4 ASTM C127-15, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.

.5 ASTM C128-15, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate.

.6 ASTM C131/C131M-14, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.7 ASTM C136/C136M-14, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.

.8 ASTM C207-18, Standard Specification for Hydrated Lime for Masonry Purposes.

.9 ASTM D2419-14, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

.10 ASTM D3203/D3203M-17, Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.

.11 ASTM D4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.6 U.S. Environmental Protection Agency (EPA) / Office of Water.

.1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

.7 Direction of the Roadway Laboratory of the Quebec Ministry of Transport.

.1 LC Test Method Book, Section 1 - Aggregates

.2 LC Test Method Book, Section 4 - Asphalt

1.3 Documents/samples to be submitted for approval/information

.1 Technical data sheets.

.1 Submit the required data sheets and manufacturer's instructions and documentation for the bituminous mixtures and aggregates. Data sheets shall include product characteristics, performance criteria, dimensions, limits and finish.

.2 Submission of the dosage formula.

.1 At least two (2) weeks prior to commencing paving operations, submit to the Department Representative for approval the mix design for each of the asphalt mixes, together with all specified test results for the mixes and constituents.

1.4 Transportation, handling and storage

.1 Transport, store and handle materials and equipment in accordance with the manufacturer's instructions.

.2 The mixture must be transported to the construction site in clean vehicles free of foreign substances.

.3 The Contractor takes note that the cleaning of the bottom of the truck body after its unloading must be done outside the construction site and not on the road.

.4 The use of diesel as a release agent and for cleaning paving equipment and metal truck bodies is prohibited. The use of environmentally friendly "Soap" type release agent is permitted provided that the quantity used is reasonable and does not compromise the quality of the asphalt delivered to the site. In this sense, the use of such an agent twice a day (at the beginning and at mid-day) is generally considered acceptable. In addition, the agent should never be spilled or puddled on or in asphalt pavement, nor should it puddle in the bottom of paving equipment or truck beds.

PART 2 PRODUCT

2.1 Materials

.1 Bitumen: Bitumen shall comply with the requirements of the Quebec Ministry of Transport (MTQ) standard 4101 "Bitumen", specified by the performance classes in the following table:

Table 1- Characteristics by type of asphalt

Type of asphalt	Bitumen performance class	Use	Number of layers	PPC	Rutting test
ESG-10	PG 64H-28	Surface	1	Not required	Not required
ESG-14	PG 64H-28	Base	1	Not required	Not required

2.2 Mixture dosing formula

.1 Aggregates: Aggregates must meet the requirements of BNQ Standard 2560-114 "Civil Engineering Works - Aggregates", Part V.

Surface layer: ESG-10 - Base layer: ESG-14.

.1 Asphalt mixes must be manufactured by a company operating an asphalt mixing plant that holds a registration certificate attesting that the quality system meets the requirements of the ISO standard. Recycled materials are not permitted in asphalt mixes.

.2 The formulas shall be approved by the Department Representative. The Contractor shall provide the Department's Representative with the theoretical and final formulas for hot mix asphalt formulated according to the Pavement Laboratory's formulation method, which contain the information prescribed in section 5.3.4 of MTQ Standard 4202 "Hot mix asphalt formulated according to the Pavement Laboratory's formulation method", as well as all the results of tests and calculations performed.

.1 Physical requirements of mixtures: Asphalt mixtures shall comply with the requirements of Table 1 of Standard 4202. The rutting resistance test requirements are applicable for the base and surface courses.

.3 Do not change the composition of the mix without the approval of the Departmental Representative. If a change in the source of supply of a material is proposed, a new mix design must be verified by the Departmental Representative.

.4 During the processing of the material, fines recovered from the plant shall be reincorporated into the mix in an amount acceptable to the Departmental Representative.

.5 Where there is more than one mixing plant supplying the asphalt, the source of aggregate should be the same for all plants.

2.3 Material

.1 Mechanical spreader: Use a self-propelled mechanical spreader with automatic level control capable of spreading the mixture to the specified line, slope and crown and within the prescribed tolerance.

.2 Hydraulic extensions to the spreader are not permitted unless they are equipped with augers, heating plates and vibrators. Augers must be within 0.5 m of the outer edge of the extension.

.3 One (1) roller of suitable type to obtain a compacted mixture at the prescribed density.

.4 Trucks: use trucks of such size, speed and condition as to ensure continuous and orderly operations, with the following characteristics:

.1 Tanks with watertight metal bottoms, free of dust, screenings, petroleum-based hydrocarbons or any other material that could deteriorate the asphalt.

.2 Tarpaulins of sufficient size and thickness to cover and protect the entire asphalt, slow down cooling and protect it from the weather.

.3 The use of petroleum-based hydrocarbons as a release agent is prohibited.

.5 Hand tools.

.1 For spreading and finishing work, use scrapers or rakes with covered tines.

.2 Steel tampers with a minimum mass of 12 kg and a maximum bearing surface of 310 cm2 shall be used to compact material along structures inaccessible to rollers. Mechanical compaction equipment approved by the Supervisor may also be used.

.3 Use a 3 m long levelling rod to check the level of the base and surface layers.

PART 3 EXECUTION

3.1 Review

.1 Verification of Conditions: Prior to laying the bituminous pavement, ensure that the condition of surfaces/substrates previously laid under other sections or contracts is acceptable and allows the work to be performed in accordance with the manufacturer's written instructions.

.1 Conduct a visual inspection of surfaces/supports in the presence of the Departmental Representative.

.2 Immediately inform the Departmental Representative of any unacceptable conditions found.

.3 Begin installation work only after unacceptable conditions have been corrected and written approval has been received from the Departmental Representative.

After the supervisor has accepted the surface to be covered, the Contractor is authorized to proceed with the coating work. The Contractor shall remain responsible for any damage that may occur to the surface to be covered.

3.2 Plant and mixing requirements

.1 All asphalt plants shall comply with ASTM-D995 "Standard Specifications for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures" and shall be equipped with a dust collection system that meets the requirements of the Environmental Quality Act.

.1 The Contractor shall submit to the Departmental Representative, for the asphalt plant, a compilation of at least 20 results for a similar production formula for the current or previous year. The results shall demonstrate that the production is within the allowable variances.

.2 The production of the plant must be such that the mix supplied conforms to the final formula.

.3 The piping that connects the tank to the mixing system's bitumen incorporation device must be equipped with a valve that allows sampling of the bitumen at all times. This valve must be easily accessible and equipped with a heating system to ensure its proper operation.

.2 The aggregates taken from the various piles must be fed to the cold elevators in separate hoppers.

.1 No frozen material should be loaded into the hoppers.

.3 Supply the asphalt plant with the required quantities of cold aggregate to ensure continuous operation.

.4 Adjust the hopper door opening and conveyor speed to achieve the desired mixing ratio.

.5 Prior to mixing, dry the aggregate to a moisture content not exceeding 1% by mass, or to a lower moisture content if necessary, to meet the requirements of the mix design. After incorporating the reclaimed asphalt into the mix, heat the mix to the temperature required to achieve the mixing temperature determined by the Departmental Representative.

.6 Immediately after drying, the aggregates are sieved in the hot storage hoppers, following the particle sizes that will allow them to be re-combined to obtain a mixture of the required particle size for the prescribed dosage formula.

.7 Heat the asphalt binder and aggregates to the mixing temperature specified by the Departmental Representative. Do not heat the asphalt binder above 160 degrees Celsius.

.8 Ensure that viscosity charts of the asphalt binder used are available for review in the vicinity of an asphalt plant. Because the Departmental Representative is aware of the viscosity of the asphalt binder being used, the Departmental Representative will need to approve the temperature of the mix as it leaves the asphalt plant and paver, taking into account the transportation and placement conditions.

.9 During mixing, limit the temperature difference between the materials and the prescribed temperature to within 5 degrees Celsius.

.10 Mixing time.

.1 In a batch-type asphalt plant, the dry and wet mixing times shall be in accordance with the Departmental Representative's instructions. Continue wet mixing as long as necessary to achieve a uniform mix, but not less than 30 seconds and not more than 75 seconds.

.2 In a continuous type asphalt plant, the mixing time shall be as directed by the Department Representative but shall not be less than 45 seconds.

.3 The mixing time shall be as required by the Departmental Representative.

.11 Temporary storage of the hot mixture.

.1 Ensure storage in skips of appropriate capacity to allow continuous operation of the plant and designed to prevent segregation of materials.

.2 Bituminous mixes shall not be stored for more than three (3) hours prior to placement.

.3 When producing bituminous mix for this work, do not produce mix for other users unless there are separate storage and pumping facilities for the material supplied for this work.

.12 During the period of production of the bituminous mixture for this work, do not produce mixture for other users, unless separate storage and pumping facilities can be used for the material supplied for this work.

.13 Mixing tolerances.

.1 Individual permissible deviations between the grading of the mixtures supplied and the formula are those specified in standard 4202.

.2 The characteristics of the production mix shall be as specified in Table 4202-1 of Standard 4202.

3.3 Preparatory work

.1 Lay tack coat layers as specified in Section 32 12 13.16 – Asphalt Tack coat.

.2 Before starting the application work, clean and remove loose or foreign substances from the surfaces to be coated.

.3 When more than one layer of asphalt is required, spread a tack coat between the two (2) layers.

3.4 Transport of the mixture

.1 Transport the mixture to the job site in clean vehicles free of foreign substances.

.2 At least once a day or as required, coat or spray the sides and bottoms of truck bodies with a solution of limewater, soap or detergent, or a commercially available non-petroleum based solution.

.1 Allow the lifted bucket to drain completely to ensure that any excess solution is removed.

.3 Unless the Departmental Representative permits artificial lighting for nighttime placement, schedule delivery so that materials are placed in daylight.

.4 Deposit the mixture from intermediate hoppers or storage only in small quantities to limit segregation of materials.

.1 For the same reason, avoid dropping materials from too great a height.

.5 Supply material to the spreader at a regular rate and in quantities compatible with the capacity of the spreading and compacting equipment.

.6 The materials must be delivered continuously in covered vehicles and then spread and compacted immediately. The temperature of the mixture during delivery and laying must be within the prescribed limits.

3.5 Laying of asphalt concrete

.1 Prior to the placement of asphalt concrete, have the subgrade approved by the Departmental Representative.

.2 Place the asphalt concrete according to the lines, thicknesses and levels indicated on the plans.

.3 Conditions of implementation.

.1 Place bituminous mixtures only when the ambient air temperature is at least 10 degrees Celsius.

.2 When the temperature of the surface to be covered is below 10 degrees Celsius, provide additional compactors to compact the mix to the prescribed degree of compaction before it cools.

.3 Do not apply hot mix asphalt when it is raining, if there are puddles of standing water on the surface to be covered or if the surface is wet.

.4 Apply the asphalt mix in layers of the thicknesses shown on the drawings after compaction. The Contractor shall consider that a minimum thickness of 40 mm for a paving layer is required.

.5 Proceed as follows when spreading by hand.

.1 Use approved wood or steel forms that are firmly supported to achieve the intended level and cross-section.

.1 Use measuring blocks and intermediate rods to obtain the desired cross-section.

.2 Distribute the material evenly without using broadcast equipment.

.3 During spreading operations, loosen the material thoroughly and distribute it evenly using covered tine scrapers or smoothers.

.1 Discard material that has clumped together and is difficult to break up.

.4 After spreading, but before rolling, check surfaces with templates and rulers and correct irregularities as necessary.

.5 Provide heating equipment to keep hand tools free of bituminous binder.

.1 Set the temperature so as to avoid burning the materials.

.2 The tools used should never be hotter than the materials being used.

3.6 Compaction

.1 Compact the asphalt pavement continuously to a density of 93% to 98% as measured by LC 26-510 and LC 26-500. Joints shall be compacted to at least 98% by the same methods.

.2 General.

.1 Provide a minimum of two (2) compactors and as many additional compactors as required to achieve the specified density of the asphalt pavement.

.2 Begin compaction as soon as the mix in place can support the weight of the compactors without excessive movement of material or cracking of the surface.

.3 Perform initial compaction slowly so as not to displace the material.

.4 Overlap the successive passes by at least 200 mm and vary the length of the passes.

.5 Do not stop vibratory rollers on pavement while the vibratory mechanism is running. Never stop rollers or other heavy equipment on freshly placed pavement.

.6 Heavy equipment and compactors should never be driven over the finished surface until it has been compacted and completely cooled.

.7 After compacting the longitudinal and transverse joints as well as the outer edges of the pavement, start compacting longitudinally on the lower side and progress towards the upper side.

.1 Ensure that the compaction machine makes approximately the same number of passes at all points across the width of the paved area.

.8 Where compaction has displaced material, immediately loosen the affected areas with scrapers or shovels and restore them to their original profile before re-rolling.

3.7 Seals

.1 General.

.1 Remove any excess material from the surface of the previously applied tape.

.1 Do not place excess material on the surface of the freshly applied tape.

.2 Make the joints between the asphalt concrete pavement and the Portland cement concrete pavement as indicated.

.3 Prior to placing the adjacent pavement, impregnate the contact surfaces of existing structures, such as manholes, curbs and gutters, with a bituminous coating.

.2 Transverse joints.

.1 Stagger the transverse joints of successive layers by at least 600 mm.

.2 Before continuing with the installation of the new pavement, cut the existing pavement to a vertical face and impregnate this face with a thin layer of hot bitumen.

.3 Compact transverse joints to provide a smooth surface course. Use methods required to prevent rounding of joint edges of compacted surfaces.

3.8 Finishing tolerances

.1 Each layer (top and bottom) shall have a uniform texture, a closed, non-slippery surface, be free of segregation and bleeding, be even and conform to the prescribed transverse and longitudinal profiles. The profile shall be such that no water accumulation occurs on the surface of the coatings.

.2 The permissible deviation for finished asphalt concrete pavements is 5 mm from the prescribed level, but this deviation shall not be uniform, plus or minus, over the entire pavement surface.

.3 The finished surface of bituminous pavements shall not show deviations greater than 5 mm when inspected with a 3 m long straight edge, placed in any direction. Any irregularity or depression exceeding 5 mm in 3 m shall be corrected.

3.9 Defective structures

.1 Correct irregularities that have appeared before compaction is complete by loosening the asphalt mixture and adding or removing material as required.

.1 If these irregularities or defects remain even after finish compaction, promptly remove the surface layer, spread a new layer of material to obtain a smooth and level surface, and immediately compact to the prescribed density.

.2 Repair areas that show signs of segregation, cracking and corrugation.

.3 Adjust the operation of the compactors and the spreader rule to prevent ripples and cracks in the pavement.

3.10 Cleaning

.1 Cleaning during the work:

.1 Leave the premises clean at the end of each working day.

.2 Final clean-up: remove excess materials/materials, waste, tools and equipment from the site.

END OF SECTION

PART 1 GENERAL

1.1 Related work

.1 Section 03 10 00 - Concrete forms and accessories.

.2 Section 03 20 00 - Concrete reinforcement.

.3 Section 03 30 00 - Cast-in-Place Concrete.

.4 Section 31 23 33.01 - Excavation, trenching and backfilling.

PART 2 PRODUCTS

2.1 Materials

.1 Portland cement concrete: Conforms to the specifications of Section 03 30 00.

.2 Sealant: conforms to ASTM D1751-04(2013)e1, AASHTO M213-74, non-deforming, resilient and bituminous.

.3 Bituminous joint board as supplied by Sealtight or equivalent approved by the Departmental Representative.

.4 Granular materials for sidewalk and curb base, according to the standard sections of the plans:

.1 Same material as the adjacent granular pavement base or a minimum of 300 mm of 20-0 crushed stone conforming to Section 32 11 16.01-Granular Sub-Base.

.5 Curing agent: white in accordance with CSA-A23.1 and ASTM-C309 standards. Moisture loss must be less than 0.055 g/cm2.

.6 Reinforcements at the joints: in accordance with the standard sections of the plans.

.7 Sleeves at joints: in waxed corrugated cardboard or in CPV. The required lengths and diameters are indicated on the drawings.

.8 Sealant: Sikaflex 2C from Sika or equivalent approved by the Departmental Representative.

.9 Compressible and non-absorbent polyethylene foam pad.

PART 3 EXECUTION

3.1 Site preparation

.1 Excavate for foundations to the depths and widths shown on the plans or as directed by the Departmental Representative.

3.2 Granular foundation materials

.1 Prior to spreading the granular base material, have the subgrade approved by the Ministry Representative.

.2 Spread the foundation materials according to the lines, widths and depths indicated on the plans.

.3 Compact the foundation according to the requirements shown on the plans.

3.3 Placing the concrete

.1 Execute concrete structures in accordance with this section.

.2 Finish surfaces to the determined alignment, level or slope; the permissible deviation is 6 mm per 3 m length measured with a levelling rod.

.3 The consolidation of the concrete must be done with a vibrator in accordance with the CSA-A23.1 standard.

.4 The concrete and its placement shall conform to CSA-23.1 and 23.2 standards.

.5 For curbs, the transition length between two (2) types of curbs is 1 meter.

3.4 Regular pavement finish

.1 Finish the concrete surface with a wood trowel, taking care not to attract laitance to the surface. Follow with a stiff broom to obtain a non-slip finish.

.2 Along the edges and joints, round the edges with a special trowel, called an "edge trowel", which creates a smooth edge along the edge and rounds it to a radius of plus or minus 25 mm.

.3 Install expansion and contraction joints according to the details shown on the plans.

3.5 Shrinkage and expansion joints

.1 Make the joints according to the indications of the standard sections of the plans.

.2 Where required on the plans, install wire mesh, reinforcing and sleeves at the joints, carefully holding them in the required alignment.

.3 Match the joints when the sidewalk and the curb are adjacent.

.4 Where structures are adjacent, provide expansion joints around manholes and catch basins and along curbs, catch basins, buildings or permanent structures.

3.6 Backfill

.1 Before backfilling, wait until the concrete has reached at least 80% of its specified 28-day compressive strength.

.2 Backfill with the material required in Section 31 23 33.01- Excavating, trenching and backfilling to the levels indicated. Compact and grade as directed.

3.7 Cure

.1 Two (2) uniform coats of curing compound shall be applied. The first coat shall be applied within the first 30 minutes after the concrete is placed. The 2nd coat shall be applied 30 minutes after the 1st coat. No bleeding of the curing compound will be tolerated.

3.8 Sealing of joints

.1 Apply the sealant according to the requirements of the plans and the manufacturer's recommendations.

END OF SECTION

PART 1 GENERAL

1.1 Related work

.1 Section 32 12 16 - Asphalt concrete pavement.

1.2 Documents to be submitted

.1 At least four (4) weeks prior to the commencement of the work, provide the Departmental Representative with the technical data sheets for each type of paint.

1.3 References

.1 Green Seal Environmental Standards (GS).

.1 GS-11, Green Seal Standard for Paints and Coatings, Edition 3.1 (2013).

.2 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards.

.1 SCAQMD Rule 1113Architectural Coatings, Amended September 2013.

.3 Canadian General Standards Board (CGSB).

.1 CGSB 1-GP-71 and its June 1983 amendment; 1-GP-71 Methods of Testing Paints and Pigments.

.2 CGSB 1-GP-74M and its amendment of May 1981; Peinture Alkyde De Demarcation Routiere - Modifier 1 Mai 1981, superseded by CGSB 1.74-2001-CAN/CGSB: Standard for: Paint, Traffic, Alkyd - Amendment 1 May 1981; QPL Aug 1986).

.3 CGSB 1-GP-12C and its December 1984 Amendment; Standard Paint Colors , Part I - Color Identification and Selection (Feb. 1991), Part II - Boxed Set of 3 by 5 Inch Chips in Individual Envelopes (Feb. 1991), Part III - Chromaticities and Luminous Reflectances (Apr. 1994).

.4 CGSB 1-GP-5M. Thinner, Petroleum Spirits, Low Flash (R/84).

1.4 Transportation, storage and handling

.1 Transport, store and handle materials and equipment in accordance with the manufacturer's written instructions.

.2 Delivery and acceptance: deliver materials and equipment to the job site in their original packaging, which must be labeled with the name and address of the manufacturer.

.3 Storage and handling.

.1 Store materials and equipment off the ground in a clean, dry, well-ventilated area according to the manufacturer's recommendations.

.2 Replace damaged or poor quality materials and equipment with new or appropriate materials and equipment.

PART 2 PRODUCTS

2.1 Materials

.1 Painting.

.1 Acrylic latex pavement marking paint shall conform to CAN/CGSB 1.74.

.2 Colour: black 512-301, yellow 505308 and white 513-301, in accordance with CGSB 1GP12C -and its December 84 amendment and other colours.

.3 Thinner: in accordance with CGSB 1-GP-5M.

.4 In accordance with the Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations, the maximum concentration of volatile organic compounds (VOCs) in road marking paints (RMR) must not exceed 450 g/L at any time. In addition, from May [1] to October 15, CMAs with VOC concentrations greater than 150 g/L are prohibited.

.2 Temporary marking shall be in accordance with Article 2.1.2 of this section.

PART 2 EXECUTION

3.1 Surface condition examinations

.1 Verification of Existing Conditions: Prior to pavement marking, ensure that the condition of surfaces/substrates previously applied under other sections or contracts is acceptable.

.1 Conduct a visual inspection of surfaces/supports in the presence of the Departmental Representative.

.2 Road surface: dry, free of water, frost, ice, dust, oil, grease and any other harmful material.

.3 Begin marking work only after unacceptable conditions have been corrected.

3.2 Dimensions

.1 The dimensions of the pavement markings are shown on the plans.

3.3 Material

.1 Use an approved, pressure-operated, mobile marking device capable of applying paint uniformly in a continuous line. The equipment must be capable of applying the marking materials uniformly at the specified application rates and dimensions and must be equipped with an effective, fast-acting device to interrupt the spray.

3.4 Implementation

.1 Carry out the marking work according to the layout and the indications of the plans.

.2 Unless otherwise specified by the Departmental Representative, apply paint only when the air temperature is above 10°C and rain is not expected.

.3 Apply the paint evenly and in such a way that it covers 3 m^2/l.

.4 Do not dilute the paint without the permission of the Departmental Representative.

.5 Painted lines should be uniform in hue and density, and demarcations should be sharp.

.6 Thoroughly clean the dispenser tank before filling it with a different color of paint.

.7 Apply the paint using only the prescribed equipment.

3.5 Tolerance

.1 The permissible deviation in the width of the lines painted on the roadway is plus or minus 12 mm from the prescribed dimensions.

3.6 Protection of the marking

.1 Protect the marking until the paint is dry.

END OF SECTION

PART 1 GENERAL

1.1 Related work

.1 Section 31 23 33.01 - Excavation, trenching and backfilling.

1.2 Standards and reference volumes

.1 Volumes 2 and 4.

.2 Agriculture and Agri-Food Canada.

.1 The Canadian System of Soil Classification, Third Edition, 1998.

.3 Canadian Council of Ministers of the Environment.

.1 PN1340-2005, Compost Quality Criteria.

.4 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 Definitions

.1 Compost.

.1 A mixture of soil and decaying organic matter used as a fertilizer, mulch or soil amendment.

.2 Compost is 40% or more treated organic material as determined by Walkley-Black or LOI (loss on ignition) tests.

.3 The product must be sufficiently stable (sufficiently decomposed material) to prevent any adverse effect on plant growth (C/N ratio less than 25) and must not contain toxic elements or growth inhibitors.

.2 Composted biobased solids must meet the Class A compost quality criteria set out in a document published by the Canadian Council of Ministers of the Environment (CCME).

1.4 Documents/samples to be submitted for approval/information

.1 Submit the required documents and samples.

.2 Documents to be submitted for quality control.

.1 Soil testing: submit test reports certifying that the products, materials and equipment meet the physical and performance requirements as outlined in PART 2, SOURCE QUALITY CONTROL.

.2 Certificates: submit documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical and performance requirements.

1.5 Quality control

.1 The Departmental Representative may request the collection and analysis of soil samples or soil mixtures at the source or site.

.2 Notify the Departmental Representative of the proposed sources of supply of topsoil at least fifteen (15) days prior to commencing the work to allow for testing. Only one source of supply will be accepted.

.3 The Subcontractor is responsible for soil testing and determining the need for soil amendments to promote turf growth. The Subcontractor shall provide, at its own expense, an analysis from an independent and recognized soil laboratory with agronomic recommendations, if required. This must be done at least fifteen (15) days prior to the start of the work.

.4 Obtain approval of the topsoil and Certificate of Compliance prior to commencing land application work. All topsoil amendment work necessary to meet topsoil requirements is at the Contractor's expense.

1.6 Construction schedule

.1 Topsoil spreading and finishing earthworks must be carried out in good time to allow seeding work to be undertaken in the best possible conditions.

PART 2 PRODUCTS

2.1 Topsoil

.1 Topsoil: a mixture of particles, micro-organisms and organic matter that provides a favourable environment for the growth of desired plants.

.1 Texture based on the Canadian System of Soil Classification: soil consisting of 20-70% sand, at least 7% clay and 4-10% organic matter by weight and a pH between 6 and 7 (Walkley Black method).

.2 Fertility: soil containing the main nutrients in the following proportions:

- Calcium (Ca): 1001 ppm minimum.
- Magnesium (Mg): 151 ppm minimum.
- Phosphorus (P): 26 ppm minimum.
- Potassium (K): 126 ppm minimum.
- Sulphur and trace elements present in balanced proportions to promote germination or establishment of desired vegetation containing no toxic elements or growth inhibitors.

.3 Ph value: 6.0 to 7.0.

.4 Contains no toxic elements or growth inhibitors.

.5 Free of:

.1 Debris and stones over 50 mm in diameter.

.2 Coarse vegetative material 10 mm in diameter and 100 mm in length and occupying more than 2% of the soil volume.

.3 Debris and stones 10 to 50 mm in diameter and occupying more than 1% by volume of the recovered and amended topsoil mixture.

.6 The mixture of reclaimed and amended topsoil must have the following particle size composition:

Sieve size	Total mass passing the sieve in %.
50 mm	100
10 mm	99-100
5 mm	98-99
1.25 mm	90 à 97
630 µm	80 à 95
315 µm	50 à 85
160 µm	35 à 65
80 µm	15 à 35

.7 Topsoil containing crabgrass, quackgrass or any other noxious weeds will be refused. The use of herbicides must comply with current environmental laws.

.8 Consistency: crumbly soil when wet.

2.2 Soil conditioners

.1 Fertilizer.

.1 A complete, slow-acting synthetic commercial fertilizer containing at least 35% soluble nitrogen.

.2 Composition: 1-4-4. 10-6-4.

.3 Bone powder: finely ground and containing at least 3 % nitrogen and 20 % phosphoric acid.

.2 Peat moss.

.1 Consists of different varieties of partially decomposed sphagnum moss.

.2 Elastic and homogeneous consistency, brown in colour.

.3 Free of wood and pests that may inhibit growth.

.4 Composed of shredded particles at least 5 mm in diameter.

.3 Sand.

.1 Natural sand only, free of any impurities, chemicals or organic matter.

.2 Grain size according to class A specifications.

.4 Compost.

.1 Made of 100% composted product.

.2 Important contribution in phosphorus (1,2 % dry basis).

.3 Free of colloidal residues and woody debris of 25 mm.

.4 Containing at least 30 % by weight of organic matter and having a maximum moisture content of 15 %.

.5 Note: Material (organic and vegetative) from the removal of existing turf will be considered a compost product as long as the product is free of 25 mm divots and 90% decomposed.

.5 Lime.

.1 Ground agricultural lime containing the equivalent of at least 85% calcium carbonate.

.2 Sieve size requirements (% passing by weight): 90% of the lime must pass through a 1.0 mm sieve, and 50% through a 0.125 mm sieve.

.6 Black earth.

.1 Consists of partially decomposed product.

.2 Elastic and homogeneous consistency, brown in colour.

.3 Free of colloidal residues, wood, sulphur and iron.

.4 Containing at least 60 % by weight of organic matter and having a maximum moisture content of 15 %.

.5 Composed of shredded particles at least 5 mm in diameter.

2.3 Quality control at the source

.1 The Subcontractor is responsible for testing the soil before and after amendment and screening and shall adjust the chemical and organic amendment requirements to provide topsoil that meets the specifications. As a reference, the Subcontractor shall plan to add 40% borrow material (25% black soil, 25% plant compost and 50% sand) to the volume of soil recovered.

.2 Provide the Departmental Representative with the proposed source of supply for the topsoil to be added to the reclaimed topsoil and provide access to the Departmental Representative so that the Departmental Representative can test the material. Acceptance of the amended topsoil mixture will be dependent on the results of the soil

testing and inspection. Do not commence work until the amended topsoil has been accepted following a chemical and particle size soil test by the Departmental Representative.

.3 The Contractor shall protect the stockpiles of reclaimed topsoil from the weather until they are handled for screening and spreading.

PART 3 EXECUTION

3.1 Temporary erosion and sediment control

.1 Install temporary erosion and sediment control measures to prevent the loss of soil from stormwater runoff or wind erosion and the entrainment of soil into waterways. These measures must comply with the requirements of the competent authorities.

.2 Inspect, maintain and repair existing control measures as necessary until permanent vegetation is well established.

.3 Remove control devices at the appropriate time and restore and stabilize areas disturbed during the work.

3.2 Stripping of topsoil

.1 Do not move topsoil when it is wet or frozen and do not perform any operation that may alter the soil structure in any way.

.2 Begin removing topsoil in the areas indicated, once the brush has been removed and cleared from the site.

.3 Remove topsoil to the depth specified by the Departmental Representative. Avoid mixing topsoil to be recovered with subsoil. The thickness of the topsoil will generally vary between 100 mm and 200 mm.

.4 Pile the recovered topsoil and avoid excessive compaction. Piles shall not exceed 2 m in height and shall be placed in an elevated or well drained area approved by the Department Representative. The Contractor shall provide for the necessary measures to protect against weed establishment.

.5 The recovered topsoil shall be analyzed and shall meet the requirements of the specification. The sample shall be taken from a minimum of ten (10) samples taken from around the pile at regular intervals with a small shovel. The sample shall be taken at the mid-point of the pile and between 200 mm and 400 mm from the surface. The Contractor shall mix these samples in a clean container.

3.3 Preparation of the floor

.1 Level the ground, fill in low spots and slope the soil to allow for proper drainage as indicated on the plans. Remove soil that has been contaminated with toxic materials. Dispose of spoil as directed by the Departmental Representative.

.2 Loosen to a depth of 100 mm the entire surface of the subgrade intended to receive the topsoil. Repeat the operation where the soil transport and spreading equipment has compacted the subgrade.

.3 Check the ground level to ensure that it is adequate. If there are any discrepancies, notify the Departmental Representative and do not proceed with the work until you have received authorization from the Departmental Representative.

.4 Remove debris, roots, branches, stones larger than 50 mm and other deleterious substances.

.1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.

.2 Remove debris that is 75 mm above the ground surface.

.3 Dispose of all removed material off site.

3.4 Placement and spreading of the recovered and amended topsoil

.1 Once the Department Representative has accepted the existing subgrade, place the topsoil in place.

.2 Spread the topsoil in a uniform layer not exceeding 150 mm in thickness, after settling and compacting to 80%. Ensure that the topsoil contains sufficient water.

3.5 Soil amendment

.1 Incorporate amendment materials, fertilizer and lime, in the prescribed amounts as determined from the results of the soil samples.

.2 Penetrate the amendment materials to the full thickness of the reclaimed and amended topsoil before incorporating the fertilizer and lime.

3.6 Spreading fertilizer

.1 Apply fertilizer at least one (1) week after lime application.

.2 Spread the fertilizer evenly over the entire surface of the topsoil in the quantities determined from the results of the sample analysis.

.3 Work the fertilizer well into the entire topsoil layer.

3.7 Finishing levelling

.1 Level the ground to eliminate hollows and unevenness and to promote good water drainage.

.1 Create a layer of crumbly soil by loosening the soil and raking it.

.2 Scarify the soil to a depth of 25 mm and remove stones and other foreign matter that could interfere with seeding and that protrude more than 50 mm.

.2 Firm the topsoil to the prescribed bulk density using equipment approved by the Departmental Representative.

.1 Leave the surfaces smooth, even and firm so that no deep marks are formed under the weight of a person.

3.8 Reception

.1 The Departmental Representative will review and have the placed topsoil analyzed and determine if the finish grading is acceptable.

3.9 Surplus materials

.1 Dispose of excess material, except topsoil, at the location specified by the Departmental Representative.

END OF SECTION

PART 1 GENERAL

1.1 Related work

.1 Section 32 91 19.13 - Topsoil Placement And Grading.

1.2 Reference standards

.1 The work shall include all surface soil preparation and cleaning, sodding and maintenance of grassed areas. All such work shall be in accordance with NQ 0605-100/2001 - Landscaping with Plants, Part II - Surface Preparation and Part IV - Sodding, unless otherwise specified.

.2 Comply with federal and provincial legislation (Environmental Quality Act and Pesticides Act) regarding the use of pesticides.

1.3 Documents/samples to be submitted

.1 Submit one sample of each type of turf grass specified.

.2 Samples must be approved by the Departmental Representative.

1.4 Quality Assurance

.1 Test reports: submit test reports certifying that the products, materials and equipment meet the physical and performance requirements.

.2 Certificates: submit documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical and performance requirements.

.3 Pre-implementation meeting: hold a meeting to review the work requirements, implementation instructions and warranty terms.

1.5 Work schedule

.1 Schedule sod installation to coincide with surface preparation.

.2 Protect the sod from heat, drying out and freezing from the time of removal to the time of installation.

.3 Lay the sod within 48 hours of collection, except in cool, rainy weather.

.4 Sod should be taken and planted between August 15 and June 15 during periods when the soil is not excessively dry and the temperature is above 0°C.

1.6 Waste management and disposal

.1 Take unused soil conditioner (fertilizer) to an approved hazardous material collection site approved by the Departmental Representative.

.2 No unused soil conditioner (fertilizer) shall be discharged into a sewer, watercourse, lake, land or any other place where it may pose a risk to health or the environment.

1.7 Warranty

.1 Guarantee the turf areas for a period of one year (12 months) from the date of provisional acceptance of the work. Rework of defective work will be warranted for an additional period equivalent to the initial warranty.

1.8 Measurement for payment purposes

.1 The supply and installation of turf includes topsoil.

PART 2 PRODUCTS

2.1 Materials

.1 Sod: Regular sod, grown primarily from certified Kentucky bluegrass seed and registered cultivars. Shall be Class I, produced in Quebec and conform to NQ 0605-300-XIV/2001 - Turfgrass Classification and Characteristics.

.2 Topsoil: as per Section 32 91 19.13 - Topsoil Placement And Grading of these specifications.

.3 Water: potable, supplied by the Contractor.

.4 Fertilizers :

.1 Fertilizers that comply with the Fertilizers Act and the Canada Fertilizer Regulations.

.2 Formula 8-30-12 which contains: 8% nitrogen from two sources, one of which is ammonium sulphate, 30% phosphorus from simple superphosphate and monoammonium phosphorus, 12% potassium, some of which is in the form of sulphate, magnesium, sulphur and minor elements.

2.2 Quality control at the source

.1 Sod material must be approved at the source of supply by the Departmental Representative.

.2 Once the source of sod is approved, no other source may be used without written authorization from the Departmental Representative.

PART 3 EXECUTION

3.1 Preparatory work

.1 Ensure that the soil is properly shaped and that the areas to be sodded are prepared in accordance with Section 32 91 19.13 - Topsoil Placement And Grading. Inform the Departmental Representative of any deviations from the drawings and await instructions from the Departmental Representative before starting the work.

.2 Do not perform work under adverse conditions such as frozen or wet ground, snow, ice or

standing water.

.3 Finish grade the surfaces to a smooth, uniform slope, free of depressions and bumps, according to the curves and grades shown, to within 8 mm for cultivated turf, to promote natural drainage of the surfaces.

.4 Remove all contaminated soil, weeds, debris, stones 50 mm in diameter and larger, soil contaminated with oil, gasoline or other deleterious materials from the site to a location approved by the Departmental Representative.

3.2 Laying of turf

.1 Lay the turf within 24 hours of being lifted if air temperature exceeds 20 degrees Celsius.

.2 Place the grass sheets in parallel strips, making staggered joints. Press them together so that there are no gaps, but they do not overlap. Cut narrow or irregularly shaped sheets with sharp tools.

.3 Roll the turf with a light roller 320 kg/m² to 540 kg/m² (0.5 psi to 0.8 psi) to adhere the grass roots to the soil. If the surface soil is dry, the turf should be watered before rolling.

.4 As soon as the turf is in place, it should be watered, in a light rain, to ensure wetting of up to 100 mm in the soil.

3.3 Fertilization program

.1 Apply fertilizer during the establishment and warranty periods of the lawn.

3.4 Maintenance during the settlement period

.1 Perform the following maintenance from the date of sod installation to the date of acceptance of the work. Maintenance includes watering, cutting and all other horticultural care necessary to establish the sod and keep the area clean and looking good.

.2 Water turf areas in sufficient quantity and frequency to maintain optimum moisture levels in the lawn, to a depth of 75 mm.

.3 Mow the grass to 60 mm in height when it reaches 75 mm or earlier and remove any clippings that may smother the grassed area as directed by the Departmental Representative. Grass clippings shall be cut when the lawn is dry. In all cases, respect the standards for lawn mowing prepared by the Association of responsible for municipal green spaces in Quebec. Delay mowing if the sods are not solidly anchored.

.4 Keep turf areas 95% weed free.

.5 Apply fertilizer to turf areas according to the established fertilization program. Apply half of the required amount of fertilizer in one direction, then apply the remainder perpendicularly; water well to ensure penetration of the fertilizer into the soil.

3.5 Acceptance of work

.1 Commercial grade turf areas will be accepted by the Department Representative if the

following conditions are met:

.1 Grassed areas are adequately established.

.2 The degree of visibility of the soil after mowing the lawn to a height of 60 mm is acceptable.

.3 Grassed areas are free of dead grass and bare spots, and the amount of visible weeds is acceptable.

.4 The grassy areas have been mowed at least twice.

.5 Two (2) times prior to acceptance of the work.

.6 The grassed areas have been fertilized at least once in accordance with the established fertilization program.

.2 Fall turf areas will be accepted the following spring, one month after the start of the growing season, if the above conditions are met.

3.6 Cleaning

.1 When work is completed, remove excess materials, waste materials, tools and safety barriers from the site.

3.7 Maintenance during the warranty period

.1 Carry out the maintenance work listed below from the date of provisional acceptance until the end of the warranty period.

.1 Repair and re-turf dead grass and bare areas to the satisfaction of the Department Representative.

.2 Mow seeded areas as directed by the Departmental Representative.

.3 Mow fine fescue turf areas as requested by the Department Representative. The Contractor shall schedule a minimum of three (3) mowing for the maintenance period.

.2 Fertilization: turf areas according to the established fertilization program. Apply half of the required fertilizer in one direction, then apply the other half perpendicularly; water well to ensure penetration of the fertilizer into the soil.

END OF SECTION