

**Public Services and Procurement
Canada (PSPC)**

**Landside Storm Drainage Network
Upgrade at Sept-Iles Airport**

Client Ref.: R.116436.600

TECHNICAL SPECIFICATIONS

SR5 - ISSUED FOR TENDER

Prepared for:
PSPC

Prepared by:
Stantec Consulting Ltd.

June 17, 2022

Ref.: 159400366

Version 00

Public Services and Procurement Canada (PSPC)
Landside Storm Drainage Network Upgrade at Sept-Iles Airport
Client Ref.: R.116436.600

TECHNICAL SPECIFICATIONS

Prepared by:

Olivier Lalonde Renaud, ing., M.Sc.A.
Project Engineer, Airport Infrastructure

Verified by:

Moez Gmach, ing., P. Eng.
Director, Airports

Revision	Description	Author	
00	For tender	OLR/MG	2022/06/17

SR5 - Issued for Tender
"This document shall not be used for Construction"

SPECIFICATIONS

DIVISION	SECTION	NUMBER OF PAGES
DIVISION 01	01 11 00 General Information related to work	3
	01 21 00 Allowances	2
	01 31 19 Project Meetings	3
	01 32 16.16 Construction Progress Schedule - Critical Path Method (CPM)	10
	01 33 00 Submittal Procedures	5
	01 35 13.13 Special Project Procedures for Airport Facilities	4
	01 35 29.06 Health and Safety Requirements	18
	01 35 43 Environmental Procedures	4
	01 45 00 Quality Control	2
	01 52 00 Construction Facilities	5
	01 56 00 Temporary Barriers and Enclosures	2
	01 61 00 Common Product Requirements	4
	01 73 00 Execution	3
	01 74 00 Cleaning	2
	01 74 19 Waste Management and Disposal	3
	01 77 00 Closeout Procedures	2
	01 78 00 Closeout Submittals	6
DIVISION 02	02 41 13 Selective Site Demolition	5
	02 41 13.13 Paving Removal	4
DIVISION 03	03 10 00 Concrete Forming and Accessories	4
	03 20 00 Concrete Reinforcing	4
	03 30 00 Cast-in-Place Concrete	9
DIVISION 31	31 05 16 Aggregates	3
	31 14 13 Soil Stripping and Stockpiling	2
	31 23 33.01 Excavating, Trenching and Backfilling	13
	31 32 19.01 Geotextile	3

DIVISION	SECTION	NUMBER OF PAGES
DIVISION 32	32 11 16.01 Granular Sub-Base	5
	32 11 17 Reshaping Granular Base	2
	32 12 13.16 Tack Coat	5
	32 12 16 Asphalt Pavement	5
	32 91 19.13 Topsoil Placement and Grading	3
	32 92 19.16 Hydraulic Seeding	4
DIVISION 33	33 05 16 Manholes and Catch Basin Structures	4
	33 41 00 Storm Utility Drainage Piping	9
	33 42 13 Pipe Culverts	5

CIVIL DRAWINGS

NUMBER	TITLE	NUMBER OF PAGES
R.116436.600_C100	Cover Page	1
R.116436.600_C101	Site Organisation – Aviation Generale Est Road Ditch	1
R.116436.600_C102	Site Organisation – Aerogare Road Storm Drainage	1
R.116436.600_C103	Existing Conditions and Demolition – Aviation Generale Est Road Ditch	1
R.116436.600_C104	Proposed Plan and Profile – Aviation Generale Est Road Ditch – 1 of 2	1
R.116436.600_C105	Proposed Plan and Profile – Aviation Generale Est Road Ditch – 2 of 2	1
R.116436.600_C106	Existing and Proposed Plan and Profile – Aerogare Road Storm Drainage	1
R.116436.600_C107	Details	1

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 All sections of the technical specifications.

1.2 TERMINOLOGY

- .1 Airport in operation: Period for which flights have been scheduled and the airport is in operation.
- .2 Contractor: General Contractor responsible for completing Work in following contractual documents.
- .3 Professional: Refers to the design engineer.
- .4 Departmental Representative or PSPC Representative: The Departmental Representative refers to the one representing the Public Services and Procurement Canada (PSPC).

1.3 WORK SEQUENCE

- .1 Perform the work in stages, so as not to interfere with normal operations of the Airport and the tenants during the work.
- .2 Co-ordinate Progress Schedule with the Departmental Representative.
- .3 Work schedule is as follows:
 - .1 Work groundside: Day work, from 7 a.m. to 6 p.m. on weekdays.
- .4 To carry out all the work, the Contractor must consider a maximum execution time of six (6) consecutive weeks from the beginning of the work. He must begin the work within two (2) weeks of the date of award of the contract.
- .5 All work must be done before the end of the week of October 31, 2022.

1.4 CONTRACTOR USE OF PREMISES

- .1 Limit use of premises for Work, to allow:
 - .1 Departmental Representative occupancy.
 - .2 Work by other contractors.
 - .3 Public usage.
- .2 Co-ordinate use of premises under direction of the Departmental Representative.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by the Departmental Representative.
- .6 Ensure that operations conditions of exiting work at completion are still the same, equal to or better than that which existed before new work started.

- .7 Maintain fire access/control.

1.5 DEPARTMENTAL REPRESENTATIVE USE OF PREMISE

- .1 The Departmental Representative will occupy premises for the entire duration of Work and will continue normal activities during this period.
- .2 Collaborate with the Departmental Representative in establishing the work schedule, in order to reduce conflicts and facilitate the use of the site by the latter.

1.6 EXISTING SERVICES

- .1 Before interrupting utility services, inform the Departmental Representative as well as the utility companies concerned, and obtain the necessary authorizations.
- .2 If work must be carried out near existing pressurized pipes, give the Departmental Representative a 48-hour notice before the scheduled network interruption. Keep the duration of interruptions as short as possible. Carry out the work at the times fixed by the competent local authorities, with the least possible interference with vehicle traffic and the operation of the site.
- .3 Establish location and extent of service lines in area of work before starting Work and notify the Departmental Representative of findings.
- .4 Submit schedule for approval by the Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .5 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .6 Where unknown services are encountered, immediately advise the Departmental Representative and confirm findings in writing.
- .7 Protect, relocate or maintain existing active services. When inactive services are encountered immediately advise the Departmental Representative.
- .8 Record locations of maintained, re-routed and abandoned service lines.

1.7 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy of each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Change Orders.
 - .7 Other Modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Approved Work Schedule.
 - .10 Health and Safety Plan and Other Safety Related Documents.
 - .11 Other documents as specified.

1.8 REFERENCE STANDARDS

- .1 All reference standards presented in the technical specifications must be considered according to the most recent edition or modification.
- .2 In the case of a cancelled or discontinued standard, the latest published version should be considered.

Part 2 Products

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 Special Project Procedures for Airport Facilities - Section 01 35 13.13.
- .2 Construction Facilities - Section 01 52 00.
- .3 Excavating, Trenching and Backfilling - Section 31 23 33.01.

1.2 MONETARY ALLOWANCES

- 1. Include the monetary allowance indicated in the contract price.
- 2. Unless otherwise specified, the monetary allowance covers the net cost to the Contractor of products, services, construction materials and equipment, transportation, handling, unloading, storage and other authorized expenses incurred in carrying out the work or services.
- 3. The contract price, not the monetary allowance, covers the Contractor's overhead costs and profits in connection with the monetary allowance.
- 4. Submit supporting documents showing costs incurred to Departmental Representative. The contract price will be adjusted in written order, to consider any excess or deficit in relation to the planned monetary allowance.
- 5. If the actual costs exceed the amount of the monetary allowance, the Contractor will receive compensation for the additional costs incurred that he can justify, in addition to an allowance established for overheads and profits, according to the terms defined in the contractual documents.
- 6. Advance payments made for authorized work subject to a monetary allowance will be included in the monthly payment certificate issued by the Representative of the Ministry.
- 7. A schedule must be prepared jointly by the Departmental Representative and the Contractor to indicate when the work packages subject to monetary allowances must be approved by the Departmental Representative for the placing of orders, so that the progress of the work is not delayed.
- 8. The amounts of each allowance granted for the work or services prescribed in the relevant sections of the estimate are set out below:
 - .1 An allowance of \$10,000 is provided for the provision of airport escort services according to the requirements and information of section 01 35 13.13.
 - .2 An allowance of \$15,000 is specified for the management and disposal of contaminated soils >C according to the requirements and information in section 31 23 33.01.
- 1. An allowance of \$1,500 is provided for the printing of the billboard poster according to the requirements and information of section 01 52 00.

Part 2 Products**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 Submittal Procedures - Section 01 33 00.
- .2 Special Project Procedures for Airport Facilities - Section 01 35 13.13.
- .3 Construction Facilities - Section 01 52 00.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 All costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Not applicable.

1.4 PRECONSTRUCTION MEETING

- .1 Within ten (10) days after award of Contract, the Departmental Representative will organize a meeting of parties in Contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors are to be in attendance.
- .3 Departmental Representative will establish time and location for the meeting and notify concerned parties at least five (5) days before the meeting.
- .4 The Departmental Representative will prepare the minute for this meeting and forward them to the participants as well as the concerned parties that were absent, within three (3) days of its holding.
- .5 Agenda to include the following:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work, Construction Progress Schedules.
 - .3 Requirements review of section 01 35 13.13 – Special Procedures for Airport Facilities.
 - .4 Submittal schedule of shop drawings, product samples and colour samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .5 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
 - .6 Production and delivery schedule of materials.
 - .7 Site security.

- .8 Proposed changes, order of changes, procedures, required approvals, permitted mark-up percentages, time extensions, overtime and other administrative procedures.
- .9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .10 Monthly progress claims, administrative procedures, photographs, hold backs.
- .11 Appointment of inspection and testing agencies or firms.
- .12 Insurances, transcript of policies.

1.5 PROGRESS MEETINGS

- .1 Departmental Representative will establish a calendar for periodic meetings during the work progress.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 Departmental Representative will notify parties at least five (5) days before the meetings.
- .4 Departmental Representative will prepare minutes for these meetings and circulate to attending parties and affected parties not in attendance within three (3) days after meeting.
- .5 Agenda to include the following:
 - .1 Review and approval of minute for the previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems and conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Review of construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules of required documents and samples; Expedite the procedure as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes and their effect on the Work schedule and the completion date.
 - .12 Other business.

Part 2 Products

2.1 NOT APPLICABLE

- .1 Not applicable.

Part 3 Execution

3.1 NOT APPLICABLE

.1 Not applicable.

END OF SECTION

2022-06-17

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Not applicable.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 All costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Not applicable.

1.4 DEFINITIONS

- .1 Activity: Distinct, scheduled portion of work performed during course of a project.
- .2 Activity Duration: Time in calendar units between start and finish of a scheduled activity. See also Duration.
- .3 Assumption: Factor in planning process that is considered true, real, or certain without proof or demonstration.
- .4 Bar Chart (Gantt Chart): Graphic display of schedule-related information.
 - .1 In typical bar chart, schedule activities or Work Breakdown Structure components are listed down left side of chart, dates are shown across the top, and activity durations are shown as date-placed horizontal bars.
- .5 Baseline: Approved version of a work product that can be changed only through formal change control Procedures and is used as a basis for comparison.
- .6 Budget: Approved estimate for a project or Work Breakdown Structure component or schedule activity.
- .7 Cash Flow: Projection of progress payment requests based on cash loaded construction schedule.
- .8 Change Control: Process whereby modifications to documents, deliverables, or baselines associated with a project are identified, documented, approved, or rejected.
- .9 Completion Milestones: They are firstly Interim Certificate.
- .10 Constraint: Scheduled limiting factor that effects execution of a project, program, portfolio, or process.
- .11 Contract: Mutually binding agreement that obligates a seller to provide a specified product or service or result and obligates a buyer to pay for it.
- .12 Control: Comparing actual performance with planned performance, analyzing variance, assessing trends, to effect process improvements, evaluating possible alternatives, and recommending appropriate corrective action as needed.
- .13 Corrective Action: Intentional activity that realigns performance of project work with Project Management Plan.
- .14 Critical Path: Sequence of activities that represents longest path through a project, which determines shortest possible duration.

2022-06-17

- .15 Critical Path Activity: Activity on critical path in a project schedule.
- .16 Critical Path Method (CPM): Method used to estimate minimum project duration and determine amount of scheduling flexibility on logical network of paths within schedule model.
- .17 Data Date: Point in time when the status of the project is recorded.
- .18 Decomposition: Technique used for dividing and subdividing project scope and project deliverables into smaller, more manageable parts.
- .19 Deliverable: Unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project.
- .20 Duration: Total number of work periods (not including holidays or other non-working periods) required to complete a schedule activity or Work Breakdown Structure component.
 - .1 Usually expressed as workdays or work weeks.
- .21 Early Finish Date (EF): In Critical Path Method, earliest possible point in time when uncompleted portions of schedule activity can finish based on schedule network logic, data date, and schedule constraints.
 - .1 Early finish dates can change as Project progresses and changes are made to Project plan.
- .22 Early Start Date (ES): In Critical Path Method, earliest possible point in time when uncompleted portions of a schedule activity can start based on schedule network logic, data date, and schedule constraints.
 - .1 Early start dates can change as Project progresses and changes are made to Project Plan.
- .23 Execute: Directing, managing, performing, and accomplishing project work; providing deliverables and work performance information.
- .24 Finish Date: Point in time associated with a schedule activity's completion.
 - .1 Usually qualified by one of following: Actual, planned, estimated, scheduled, early, late, baseline, target, or current.
- .25 Float: (also known as slack) Amount of time a schedule activity can be delayed without delaying early start date of a successor or violating a schedule constraint.
- .26 Forecast: Estimate or prediction of conditions and events in project future based on information and knowledge available at time of forecast.
 - .1 Information is based on projects past performance and expected future performance, and includes information that could impact project in future, a such as estimate at completion and estimate to complete.
- .27 Gantt Chart: See Bar Chart.
- .28 Impact Analysis: Schedule analysis technique that adds a modeled delay to an accepted construction schedule to determined possible outcome of that delay on project completion.
- .29 Imposed Date: A fixed date imposed on a schedule activity or schedule milestone, usually in form of a "start no earlier than" and "finish no later than" date.
- .30 Lag: Amount of time whereby a successor activity is required to be delayed with respect to a predecessor activity.

2022-06-17

- .31 Late Finish Date (LF): In critical path method, latest possible point in time when uncompleted portions of a schedule activity can finish based on schedule network logic, project completion date, and schedule constraints.
- .32 Late Start Date (LS): In critical path method, latest possible point in time when uncompleted portions of a schedule activity can start based on schedule network logic, project completion date, and schedule constraints.
- .33 Lead: Amount of time whereby a successor activity can be advanced with respect to a predecessor activity.
- .34 Logic Diagram: See Project network diagram.
- .35 Logical Relationship: Dependency between two activities or between an activity and a milestone.
- .36 Master Schedule: Summary-level schedule that identifies major deliverable; work breakdowns structure components, and key schedule milestones.
- .37 Milestone: Significant point or event in a project, program, or portfolio.
- .38 Monitor: Collect project performance data with respect to a plan, procedure performance measures, and report and disseminate performance.
- .39 Network: See Project Schedule Network Diagram.
- .40 Non-Critical Activities: Activities which when delayed, do not affect specified Contract duration.
- .41 Project Control System: Fully computerized system utilizing commercially available software packages.
- .42 Project Management: Application of knowledge, skills, tools, and techniques, to project activities to meet project requirements.
- .43 Project Management Plan: Approved document that describes how project will be executed, monitored, and controlled.
 - .1 Primary uses of Project management plan are to document planning assumptions and decisions, facilitate communication among stakeholders, and document approved scope, cost, and schedule baselines.
 - .2 Project management plan may be summary or detailed.
- .44 Project Management Planning: Development and maintenance of Project Management Plan.
- .45 Project Management Planning, Monitoring and Control System: Overall system operated to enable monitoring of Project Work in relation to established milestones.
- .46 Project Schedule: Planned dates for performing activities and planned dates for meeting milestones.
- .47 Project Schedule Network Diagram: Graphical representation of logical relationships among project schedule activities.
 - .1 Always drawn from left to right to reflect Project chronology.
- .48 Project Scope: Work performed to deliver a product, service, or result with specified features and functions.
- .49 Quantified Days Duration: Working days based on 5-day work week, discounting statutory holidays.

2022-06-17

- .50 Risk: Uncertain event or condition that, if it occurs, has positive or negative effect on one or more project objectives.
- .51 Schedule: See Project Schedule.
- .52 Schedule Data: Collection of information for describing and controlling schedule.
- .53 Scope: See Project Scope.
- .54 Start Date: Point in time associated with activity's start, usually qualified by one of following: actual, planned, estimated, scheduled, early, late, target, baseline, or current.
- .55 Work Breakdown Structure (WBS): Hierarchical decomposition of total scope of work to be carried out by project team to accomplish project objectives and create the required deliverables.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Project Meeting:
 - .1 Meet with Departmental Representative within 15 working days of Award of Contract date, to establish Work requirements and approach to project construction operations.
 - .2 Participate in regular project progress meetings with Departmental Representative specifically intended to discuss update of detailed schedule and contract changes.
- .2 Scheduling:
 - .1 Ensure that planning process is iterative and results in generally top-down processing with more detail being developed as planning progresses, and decisions concerning options and alternatives are made.
 - .2 Ensure project schedule efficiencies through monitoring of project in detail to ensure integrity of Critical Path, by comparing actual completions of individual activities with their scheduled completions, and review progress of activities that has started but are not yet completed.
 - .3 Monitor sufficiently often so that causes of delays can immediately be identified and mitigated.
- .3 Project Monitoring and Reporting:
 - .1 Keep team aware of changes to schedule, and potential consequences as project progresses.
 - .2 Use narrative reports to provide advice on seriousness of challenges and measures to overcome them.
 - .3 Begin narrative reporting with statement on general status of project followed by summarization of delays, potential problems, corrective measures and project status criticality.
- .4 Critical Path Method (CPM) Requirements:
 - .1 Ensure Master Plan and Detail Schedule are practical and remain within specified contract duration.
 - .2 Revise Master Schedule and Detail Schedule deemed impractical by Departmental Representative and resubmit for approval.

2022-06-17

- .3 Change to Contract Duration:
 - .1 Acceptance of Master Schedule and Detail Schedule showing scheduled Contract duration shorter than specified Contract duration does not constitute change to Contract.
 - .2 Duration of Contract may only be changed through bilateral Agreement.
- .4 Consider Master Schedule and Detail Schedule deemed practical by Departmental Representative, showing Work completed in less than specified Contract duration, to have float.
- .5 First Milestone on Master Schedule and Detail Schedule will identify start Milestone with an Early Start, ES, constraint date equal to Award of Contract date.
- .6 Calculate dates for completion of milestones from Plan and Schedule using specified time periods for Contract.
- .7 Substantial Completion with Late Finish, LF, constraint equal to calculated date.
- .8 Calculations on updates such that if early finish of Interim Certificate falls later than specified Contract duration then float calculation to reflect negative float.
- .9 Delays to non-critical activities with float may not be basis for time extension.
- .10 Do not use float suppression techniques such as software constraints, preferential sequencing, extended activity times, imposed dates other than required by Contract, special lead/lag logic restraints.
- .11 Allow for adverse weather conditions normally anticipated and show in Master Plan and Detail Schedule.
 - .1 Specified Contract duration has been predicated assuming normal amount of adverse weather conditions.
- .12 Provide necessary crews and manpower to meet schedule requirements for performing Work within specified Contract duration.
 - .1 Simultaneous use of multiple crews on multiple fronts on multiple critical paths may be required.
- .13 Arrange participation on and off site of subcontractors and suppliers, as required by Departmental Representative, for purpose of network planning, scheduling, updating and progress monitoring.
 - .1 Approvals by Departmental Representative of original networks and revisions do not relieve Contractor from duties and responsibilities required by Contract.
- .14 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this Contract.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative Project Control System for planning, scheduling, monitoring, and reporting of project progress.
- .3 Submit Project Control System to Departmental Representative for approval.
 - .1 Failure to comply with each required submission, may result in progress payment being withheld in accordance with Federal Government's GC 5 Terms of Payment.
- .4 Include costs for execution, preparation, and reproduction of schedule submittals in bid documents.

2022-06-17

- .5 Submit letter ensuring that schedule has been prepared in co-ordination with major sub-contractors.
- .6 Refer to article PROGRESS MONITORING AND REPORTING of this Specification Section for frequency of Project control system submittals.
- .7 Submit impact analysis of schedule for changes that result in extension of contract duration.
 - .1 Include draft schedule update and report as outlined in article PROGRESS MONITORING AND REPORTING.
- .8 Submit Project planning, monitoring, and control system data as required by Departmental Representative in following form:
 - .1 Electronic files in original scheduling software Microsoft Project containing schedule and cash flow information, labelled with data date, specific update, and person responsible for update;
 - .2 Master Schedule Bar Chart;
 - .3 Construction Detail Schedule Bar Chart;
 - .4 Listing of project activities including milestones and logical connectors, networks (sub-networks) from Project start to end. Sort activities by activity identification number and accompany with descriptions. List early and late start and finish dates together with durations, codes, and float;
 - .5 Criticality report listing activities and milestones with total float used as first sort for ready identification of critical paths through entire project. List early and late starts and finishes dates, together with durations, codes, and float for critical activities;
 - .6 Progress report in early start sequence, listing for each trade, activities due to start, underway, or finished within two (2) months from monthly update date. List activity identification number, description and duration. Provide columns for entry of actual start and finish dates, duration remaining, and remarks concerning action required.

1.7 QUALITY ASSURANCE

- .1 Use experienced personnel, fully qualified in planning and scheduling to provide services from start of construction to Final Certificate, including Commissioning.

1.8 WORK BREAKDOWN STRUCTURE (WBS)

- .1 Prepare construction Work Breakdown Structure (WBS) within 15 working days of Award of Contract date.
 - .1 Develop WBS through at least five (5) levels: Project, stage, element, sub-element, and work package.

1.9 PROJECT MILESTONES

- .1 Mandatory and recommended project milestones form targets for both Master Schedule and Detail Schedule of CPM construction network system.
- .2 Particular execution conditions for this project:
 - .1 Ensure that runway lighting is maintained throughout the duration of the work.
 - .2 Work in the air movement will be carried out during the air movement area closure periods so to allow for airport operations.

2022-06-17

- .3 Excavations in airport areas must be backfilled and the backfill material compacted before each period of operation.
- .4 An open trench of a maximum length of 60 meters is permitted at a time.

1.10 MASTER SCHEDULE

- .1 Structure and base CPM construction networks system on WBS coding in order to ensure consistency throughout Project.
- .2 Prepare comprehensive construction Master Schedule (CPM logic diagram) and dependent Cash Flow Projection to confirm validity or alternates of identified milestones.
 - .1 Master Schedule will be used as baseline.
 - .1 Revise baseline as conditions dictate and as required by Departmental Representative.
 - .2 Departmental Representative as Project progresses will review and return revised baseline within five (5) workdays.
- .3 Reconcile revisions to Master Schedule and Cash Flow Projections with previous baseline to provide continuous audit trail.
- .4 Initial and subsequent Master Schedule will include:
 - .1 USB Drive containing schedule and cash flow information, clearly labelled with data date, specific update, and person responsible for update.
 - .2 Bar chart identifying coding, activity durations, early/late and start/finish dates, total float, completion as percentile, current status, and budget amounts.
 - .3 Network diagram showing coding, activity sequencing (logic), total float, early/late dates, current status, and durations.
 - .4 Actual/projected monthly cash flow: Expressed monthly and annually and shown in both graphical and numerical form.

1.11 DETAIL SCHEDULE

- .1 Provide detailed project schedule (CPM logic diagram) within 15 working days of Award of Contract date showing activity sequencing, interdependencies and duration estimates. Include listed activities as follows:
 - .1 Shop drawings.
 - .2 Samples.
 - .3 Approvals.
 - .4 Procurement.
 - .5 Construction.
 - .6 Installation.
 - .7 Site works.
 - .8 Testing.
 - .9 Commissioning and acceptance.
- .2 Detail CPM schedule to cover entire length of Project.
 - .1 Show remaining activities for CPM construction network system up to Final Certificate and develop complete detail as project progresses.

2022-06-17

- .3 Relate Detail Schedule activities to basic activities and milestones developed and approved in Master Schedule.
- .4 Clearly show sequence and interdependence of construction activities and indicate:
 - .1 Start and completion of all items of Work, their major components, and interim milestone completion dates.
 - .2 Activities for procurement, delivery, installation and completion of each major piece of equipment, materials and other supplies, including:
 - .1 Time for submittals, resubmittals and review.
 - .2 Time for fabrication and delivery of manufactured products for Work.
 - .3 Interdependence of procurement and construction activities.
 - .3 Include enough detail to assure adequate planning and execution of Work.
- .5 Provide level of detail for project activities such that sequence and interdependency of Contract tasks are demonstrated and allow co-ordination and control of project activities. Show continuous flow from left to right.
- .6 Ensure activities with no float are calculated and clearly indicated on logical CPM construction network system as being, whenever possible, continuous series of activities throughout length of Project to form Critical Path. Increased number of critical activities is seen as indication of increased risk.
- .7 Insert Change Orders in appropriate and logical location of Detail Schedule. After analysis, clearly state and report to Departmental Representative for review effects created by insertion of new Change Order.
- .8 Maintain updated version of project schedule in accordance with actual project execution conditions.

1.12 REVIEW OF CONSTRUCTION DETAIL SCHEDULE

- .1 Allow minimum five (5) workdays for review by Departmental Representative of proposed construction Detail Schedule, unless otherwise specified.
- .2 Upon receipt of reviewed Detail Schedule make necessary revisions and resubmit to Departmental Representative for review within maximum five (5) workdays, unless otherwise specified.
- .3 Promptly provide additional information to validate practicability of Detail Schedule as required by Departmental Representative.
- .4 Submittal of Detail Schedule indicates that it meets Contract requirements and will be executed generally in sequence.

1.13 COMPLIANCE WITH DETAIL SCHEDULE

- .1 Comply with reviewed Detail Schedule.
- .2 Proceed with significant changes and deviations from scheduled sequence of activities that cause delay, only after receipt of approval by Departmental Representative.
- .3 Identify activities that are behind schedule and causing delay. Provide measures to regain slippage.
 - .1 Corrective measures may include:
 - .1 Increase of personnel with more experience/qualifications on site for effected activities or work package.

2022-06-17

- .2 Increase in equipment and materials.
- .3 Overtime work and additional work shifts.
- .4 Submit to Departmental Representative, justification, project schedule data and supporting evidence for approval of extension to Contract completion date or interim milestone date when required. As part of supporting evidence, include:
 - .1 Written submission of proof of delay based on revised activity logic, duration and costs, showing time impact analysis illustrating influence of each change or delay relative to approved Contract schedule.
 - .2 Prepared schedule indicating how change will be incorporated into overall logic diagram. Demonstrate perceived impact based on date of occurrence of change and include status of construction at that time.
 - .3 Other supporting evidence requested by Departmental Representative.
 - .4 Do not assume approval of Contract extension prior to receipt of written approval from Departmental Representative.
- .5 In event of Contract extension, display in Detail Schedule that scheduled float time available for work involved has been used in full without jeopardizing earned float.
 - .1 Departmental Representative will determine and advise Contractor number of allowable days for extension of Contract based on project schedule updates for period in question, and other factual information.
 - .2 Construction delays affecting project schedule will not constitute justification for extension of Contract completion date.

1.14 PROGRESS AND REPORTING

- .1 On an ongoing basis, Detail Schedule on job site to show "Progress to Date". Arrange participation on and off site of subcontractors and suppliers, as, and when necessary, for purpose of network planning, scheduling, updating and progress monitoring. Inspect Work with Departmental Representative at least once monthly to establish progress on each current activity shown on applicable networks.
- .2 Update and reissue project Work Breakdown Structure and relevant coding structures as project develops and changes.
- .3 Perform Detail Schedule update monthly with status dated (Data Date) on last working day of month. Update to reflect activities completed to date, activities in progress, logic and duration changes.
- .4 Do not automatically update actual start and finish dates by using default mechanisms found in project management software.
- .5 Submit to Departmental Representative copies of updated Detail Schedule.
- .6 Requirements for monthly progress monitoring and reporting are basis for progress payment request.
- .7 Submit monthly written report based on Detail Schedule, showing Work to date performed, comparing Work progress to planned, and presenting current forecasts. Report summarize progress, defining problem areas and anticipated delays with respect to Work schedule, and critical paths. Explain alternatives for possible schedule recovery to mitigate potential delay. Include in report:
 - .1 Description of progress made.

2022-06-17

- .2 Pending items and status of: Shop drawings, permits, possible time extensions and change orders.
- .3 Status of Contract completion date and milestones.
- .4 Current and anticipated problem areas, potential delays, and corrective measures.
- .5 Review of progress and status of Critical Path activities.

Part 2 Products

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 Not applicable.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 All costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Not applicable.

1.4 ADMINISTRATIVE

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

1.5 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Canada.

- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Unless specified otherwise, allow ten (10) days for the Departmental Representative's review of each submission.
- .5 Adjustments made on shop drawings by the Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the Departmental Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as the Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify the Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions include:
 - .1 Identification of submission according to discipline: letter followed by sequential number and revision date.
 - .2 Date and revision dates.
 - .3 Project title and number.
 - .4 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .5 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .6 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.

- .9 After the Departmental Representative's review, distribute copies.
- .10 Submit three (3) printed and one (1) electronic copy of shop drawings for each requirement requested in specification Sections and as the Departmental Representative may reasonably request.
- .11 Submit three (3) printed and one (1) electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by the Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit three (3) printed and one (1) electronic copies of test reports for requirements requested in specification Sections and as requested by the Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within three (3) years of date of contract award for project.
- .13 Submit three (3) printed and one (1) electronic copies of certificates for requirements requested in specification Sections and as requested by the Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit three (3) printed and one (1) electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by the Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit three (3) printed and one (1) electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by the Departmental Representative.
 - .1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .16 Submit three (3) printed and one (1) electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by the Departmental Representative.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.

- .19 If upon review by the Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, printed copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .20 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.
- .1 This review shall not mean that the Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
- .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.6 SAMPLES

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

1.7 MOCK-UPS

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

1.8 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of colour digital photography in .jpg format, high resolution weekly with progress statement as directed by the Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: Five (5) minimum. However, the number can vary according to the progress and complexity of Work. The Departmental Representative will determine with the Contractor the desired number of viewpoints.

- .4 Frequency of photographic documentation: Daily as directed by the Departmental Representative.
 - .1 Upon completion of excavation, foundation, of Work, framing and services before concealment, as directed by the Departmental Representative.

1.9 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit documents required by la Commission des norms, de l'équité, de la santé et de la sécurité au travail (CNESST).
- .2 Submit transcription of insurance immediately after award of Contract.

Part 2 Products

2.1 NOT APPLICABLE

- .1 Not applicable.

Part 3 Execution

3.1 NOT APPLICABLE

- .1 Not applicable.

END OF SECTION

2022-06-17

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Allowances - Section 01 21 00.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Airport escort services:
 - .1 Airport escort services are payable via a payment allowance. The allowance shall be paid in accordance with the provisions of section 01 21 00 – Allowances as well as in accordance with the following details:
 - .1 The Contractor must pay directly to the escort provider the direct costs and expenses associated with the escort services (static or mobile).
 - .2 It is possible that before the start of the work that the Airport Representative decides to provide the escort service himself. In such a case, this item of the slip will be cancelled without further compensation to the Contractor.
 - .3 The allowance provided for in the slip is for a duration of work in a restricted area of two (2) weeks. In the event that the duration of the work in the restricted area exceeds the expected deadlines, the Contractor will have to assume the additional costs of escort, even if the service is provided by the Airport.
 - .2 All other costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Not applicable.

1.4 DEFINITIONS

- .1 Restricted Area: Any area within an airport enclosure that is marked as prohibited by a sign or is otherwise controlled by any sign is a restricted area.
- .2 Aircraft Movement Area: The portion of an airport used for the movement of aircraft, including maneuvering areas (runway and taxiway) and apron areas.
- .3 Static escort: Security guard who does not move.
- .4 Mobile escort: Mobile security guard.

1.5 RESPONSIBILITIES OF THE GENERAL CONTRACTOR

- .1 Read the airport and airport safety regulations "Airport Traffic Regulations" and the Construction Exploitation Plan (CEP) specific to this Project so to inform employees and subcontractors.
- .2 The Departmental Representative will provide a copy of the CEP approved by the appropriate authorities.
- .3 The regulations can be found at: <https://tc.canada.ca/acts-regulations> under "Government Land Traffic Act".

2022-06-17

- .4 Be responsible for personnel, construction vehicles, and subcontractors involved in the Project and required to enter restricted areas.
- .5 Provide the Departmental Representative with a list of responsible personnel, including an escort officer, who, in case of emergency, can be reached after working hours.
- .6 Designate, among employees, a responsible person who will maintain constant with the airport escort.
- .7 Ensure that runway lighting is maintained throughout the duration of the work.

1.6 AIRPORT ESCORTS

- .1 Airport escort services may be provided by the airport operator or an accredited firm.
 - .1 Airport escort is always required to coordinate the movement of Contractor's personnel within the airport restricted area, the rest of the time, these personnel must be assigned to the barrier. access leading to the runway side to control access.
 - .2 This staff when acting as guard at the gate, should be in constant contact with the team leader directing work on the airfield as well as with the flight information station.
- .2 Any vehicle or person that must enter a restricted area must be accompanied by an escort and each vehicle must be equipped with an amber rotating beacon. The access barrier to the airfield side of the installations should always be closed, except for passages authorized by the airport operator, the Departmental Representative, and the Contractor.
- .3 Access to the site by Contractor's vehicles and equipment will be limited to the secure entry points. These access points always require a security staff during the periods of work and will be provided by the Contractor.
- .4 No vehicles or other modes of transportation related to the work will use or travel on the paved surfaces (runway, taxiway, and apron) located outside the limits of the designated work sites without an authorized security service escort.
- .5 At all times, no tracked machinery (even rubber) can circulate on paved surfaces (runway, taxiway and apron). This machinery must be loaded on a tanker to cross these surfaces.
- .6 The Contractor and his employees must immediately comply with escort instructions.
- .7 The Contractor shall notify the airport operator at least 24 hours in advance of any changes to the schedule or work program previously approved by the Departmental Representative when escorts are required. This requirement is necessary to plan the work schedules of the staff assigned to escort services.
- .8 The Contractor must have written approval of the Departmental Representative, on a daily basis, for the registration of time allocated for work tasks.

1.7 WORK TIMETABLE

- .1 Runway closure schedules may vary depending on airline delays and weather conditions.
- .2 The period of closure of the movement area may, however, be carried over, delayed, or modified over time, so to take in account contingencies related to air traffic.
- .3 The contractor shall validate daily the flight schedule with the Departmental Representative as the operation periods of the airport may vary.

2022-06-17

- .4 Perform work in stages and progress in the manner provided in the Contract to allow the day-to-day operations of the airport schedule.

1.8 SECURITY MEASURES

- .1 Do not interfere with airport operations without the authorization of the Departmental Representative.
- .2 Take any necessary temporary security measures for the transportation of the public, personnel, pedestrians, equipment, and vehicular traffic.
- .3 Place barriers where indicated by Departmental Representative.
- .4 Parking of equipment and storage of materials will only be permitted in the area designated by the Departmental Representative.

1.9 MOVEMENT OF EQUIPMENT AND PERSONNEL

- .1 If Work is performed in areas of the airport open to air traffic:
 - .1 Submit the Work Schedule to the Departmental Representative for approval.
 - .2 Control movement of equipment and personnel in accordance with the Departmental Representative's instructions.
 - .3 The Contractor and the Contractor's employees shall comply immediately with the Departmental Representative's instructions.
 - .4 Radios are required for communications between the Contractor, the escort, the Departmental Representative, and Transport Canada Representative will be provided by the Contractor.
 - .5 At the end of each shift, all equipment and materials shall be moved to a location within the airport enclosure following approval by the Departmental Representative in cooperation with the airport's operational personnel.

1.10 UNSERVICEABLE AREAS

- .1 Indicate clearly the areas which cannot be used by aircraft during the work provided for in this contract, by placing highly visible danger signs.
- .2 Open flames and flammable fuels are not permitted.

1.11 DAILY SECURITY

- .1 No work with an open flame, nor fire and smoking on the deck is permitted, and any contravening of airport regulation regarding this is under the penalty of a fine. This is due to the omnipresence of fuel lines and vapors.
- .2 Ensure at the end of each workday that the barrier is locked and there are no breaches in the airport's perimeter fence.
- .3 The Contractor must provide security for access to the airport enclosure for the entire period of the execution of Work.
- .4 It is forbidden to eat on airport maneuvering areas.

2022-06-17

1.12 TRENCHING

- .1 It is prohibited to dig more than 30 meters of trench before installing the elements to be buried, and the length of trench not backfilled must not exceed 15 meters, at the end of a working day. If the weather is expected to be bad, no trenches should be left open at the end of a working day.

1.13 PUBLIC SERVICE NETWORKS AT THE AIRPORT

- .1 In the first 75 meters on either side of the center line of the runway, no excavation can be left open at the end of the shift. The land must be leveled and compacted without any depression or pile of earth.
- .2 The Departmental Representative will stake or indicate the approximate location of the airport's underground utilities (cables, pipes, conduits, etc.).
- .3 The Contractor will have to identify the exact location of underground service networks using an exploratory search carried out by hand if necessary.
- .4 Notify the Departmental Representative at least 48 hours in advance of the location of the Work to be done, so to allow time to locate underground utilities.

1.14 DAILY SPECIAL PROCEDURES FOR THE COORDINATION OF WORK

- .1 Verification of Daily Flight Schedules:
 - .1 The Contractor will coordinate with the Airport Manager to obtain confirmation of flight times (arrival and departure) at Sept-Îles airport. For airside work, airport operations will always take precedence over the Contractor's work, so this work may have to be carried out at night.
- .2 Arrangement of Equipment:
 - .1 The Contractor must obtain the authorizations required by the competent authorities (Land Holding) to develop safe, including the guarding of its equipment storage site and materials.
- .3 Daily Work Program:
 - .1 The Contractor shall submit daily for approval the detailed work program.

Part 2 Products**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 Submittal Procedures - Section 01 33 00.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 All costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCES

- .1 Province of Québec.
 - .1 Loi sur la santé et la sécurité du travail L.R.Q., c. S-2.1 (Act respecting Occupational Health and Safety).
 - .2 Code de sécurité pour les travaux de construction L.R.Q., c. S-2.1, r.4 (Safety Code for the Construction Industry).

1.4 GENERAL NOTE

- .1 In this Section, the term "site" includes all the facilities located at the site where the Work is taking place (construction site, buildings, access, infrastructure, parkings, docks, etc.).

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative, and the CNESST the site-specific prevention program, as outlined in the article "GENERAL REQUIREMENTS", at least 10 days prior to the start of Work.
- .3 Departmental Representative will review Contractor's site-specific prevention program and provide comments to Contractor within ten (10) days after receipt of the document. Revise plan as appropriate and resubmit to Departmental Representative within five (5) days after receipt of comments from Departmental Representative. Departmental Representative reserves the right not to authorize the start of work on the construction site as long as the content of the prevention program is not satisfactory. The Contractor must then update his prevention program and resubmit it to the Departmental Representative if the scope of work changes or if the working methods of the Contractor differ from his initial plans or for any other applicable new condition.
- .4 Departmental Representative's review of Contractor's site-specific prevention program should not be construed as approval of the program and does not reduce the Contractor's overall responsibility for Construction Health and Safety during the Work.
- .5 Submit copies of Contractor's authorized representative's construction site health and safety inspection reports to Departmental Representative, at least once a week.
- .6 Submit to Departmental Representative within 24 hours a copy of any inspection report, correction notice or recommendation issued by Federal or Provincial health and safety inspectors.

- .7 Submit to Departmental Representative within 24 hours an investigation report for any accident involving injury and any incident exposing a potential hazard. The investigation report must contain at least the following:
 - .1 Date, time, and place of accident;
 - .2 Name of sub-contractor involved in the accident;
 - .3 Number of persons involved and condition of wounded;
 - .4 Witness identification;
 - .5 Detailed description of tasks performed at the time of the accident;
 - .6 Equipment being used to accomplish the tasks performed at the time of the accident;
 - .7 Corrective measures taken immediately after the accident;
 - .8 Causes of the accident;
 - .9 Preventive measures that have been put in place to prevent a similar accident.
- .8 Submit to Departmental Representative, WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittals. Contractor must also keep one (1) copy of these documents on the construction site.
- .9 Medical Surveillance: Where prescribed by legislation, regulation, or prevention program, submit certification of medical surveillance for construction site personnel prior to commencement of Work, and submit additional certifications for any new construction site personnel to Departmental Representative.
- .10 Submit to Departmental Representative an on-site Emergency Response Plan simultaneously with the prevention program. The Emergency Response plan must contain the elements listed in the article "GENERAL REQUIREMENTS" of this Section.
- .11 Submit to Departmental Representative copies of all training certificates required for the application of the prevention program, in particular (if applicable) for the following:
 - .1 First-aid in workplace and cardiopulmonary resuscitation;
 - .2 Work likely to release asbestos dust (mandatory for all work where asbestos is present);
 - .3 Work in confined spaces (mandatory for all work in confined spaces);
 - .4 Lockout-tagout procedures (mandatory for all work requiring lockout);
 - .5 Safely operating forklift trucks (mandatory for all forklift usage);
 - .6 Safely operating elevating work platforms (mandatory for the use of all elevating platforms);
 - .7 Any other requirement of Regulations or the Safety Program.
- .12 In addition, the certifications of the *Cours de santé et sécurité générale pour les chantiers de construction* (General Health and Safety Training for Construction Sites) must be available on demand on the construction site.

- .13 Engineer's drawings and certificates of compliance: Contractor must submit to the Departmental Representative and to the *Commission des normes, de l'équité, de la santé et de la sécurité du travail* (CNESST) a copy signed and sealed by an engineer of all drawings and certificates of compliance required pursuant to the *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety Code for the Construction Industry) or by any other legislation or regulation or by any other clause in the Specifications or in the Contract. The Contractor must also submit a certificate of conformity signed by an engineer once the facility for which these drawings were prepared has been completed and before a person uses the facility. A copy of these documents must always be available on site.

1.6 FILING OF NOTICE OF CONSTRUCTION SITE OPENING

- .1 Notice of construction site opening must be submitted to the CNESST before Work begins. A copy of such notice and acknowledgment of receipt from the CNESST must be submitted to Departmental Representative.
- .2 At the completion of all the work, a notice of construction site closing must be submitted to the CNESST, with a copy to Departmental Representative.
- .3 The Contractor must assume the role of being the Principal Contractor in the limits of the construction site and elsewhere where he must execute work within the framework of this project. The Contractor must recognize the responsibility of being the Principal Contractor of the project and identify himself as such in the notice of the construction site opening he provides to the CNESST.
- .4 The Contractor must always accept to divide and identify the construction site adequately to define time and space throughout the course of the project.

1.7 HAZARD ASSESSMENT

- .1 The Contractor must perform construction site specific safety hazard assessment related to project.

1.8 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
- .2 Contractor's representative with decision power must attend any meetings at which construction site safety and health issues are to be discussed.
- .3 If it is anticipated that there will be 25 workers or more on the construction site at any given time, the Contractor must set up a worksite committee and hold meetings as required by the *Code de sécurité pour les travaux de construction* (S-2.1, r. 4) (Safety Code for the Construction Industry). A copy of the minutes of the meetings of the committee must be provided to the Departmental Representative no later than five (5) days after the committee meeting.

1.9 REGULATORY REQUIREMENTS

- .1 Comply with all legislation, regulations, and Standards applicable to the construction site and its related activities.
- .2 Comply with specified standards and regulations to ensure safe operations on a site containing hazardous or toxic materials.

- .3 Always use the most recent version of the standards specified in the *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety Code for the Construction Industry), notwithstanding the date indicated in that *Code*.

1.10 COMPLIANCE REQUIREMENTS

- .1 Comply with the *Loi sur la santé et la sécurité du travail* (L.R.Q., c. S-2.1) (Act Respecting Occupational Health and Safety) and the *Code de sécurité pour les travaux de construction* (S-2.1, r. 4.) (Safety Code for the Construction Industry) in addition to respecting all the requirements of this specification manual.

1.11 RESPONSIBILITIES

- .1 The Contractor must acknowledge and assume all the tasks and obligations which customarily devolve upon a principal Contractor under the terms of the *Loi sur la santé et la sécurité du travail* (L.R.Q., ch. S-2.1) (Act Respecting Occupational Health and Safety) and the *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety Code for the Construction Industry).
- .2 The Contractor must be responsible for health and safety of persons on construction site, safety of property on construction site and for the protection of persons adjacent to construction site and the environment to the extent that they may be affected by conduct of the work.
- .3 No matter the size or location of the construction site, the Contractor must clearly define the limits of the construction site by physical means and respect all specific regulation requirements applicable in this regard. The means chosen to define the limits of the construction site must be submitted to the Departmental Representative.
- .4 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific prevention Plan.

1.12 GENERAL REQUIREMENTS

- .1 Before undertaking the work, prepare a site-specific prevention program based on the hazards identified according to the article "HAZARD ASSESSMENT" and the article "RISKS INHERENT TO THE WORKSITE" in this Section. Apply this program in its totality from the start of the project until demobilization of all personnel from the construction site.
- .2 The prevention program must take into consideration the specific characteristics of the project and cover all the work to be executed on the construction site.
- .3 The safety program must include at least the following:
 - .1 Company safety and health policy;
 - .2 Description of the stages of the work;
 - .3 Total costs, schedule and projected workforce curves;
 - .4 Flow chart of safety and health responsibilities;
 - .5 Physical and material layout of the construction site;
 - .6 Risk assessment for each stage of the work, including preventive measures and the procedures for applying them;
 - .7 Identification of the preventive measures relative to the specific risks inherent to the worksite indicated in the article "RISKS INHERENT TO THE WORKSITE";

- .8 Identification of preventive measures for health and safety of employees and / or public works site as indicated in the article "SPECIFIC REQUIREMENTS FOR THE HEALTH AND SAFETY OF OCCUPANTS AND PUBLIC";
 - .9 Training requirements;
 - .10 Procedures in case of accident/injury;
 - .11 Written commitment from all parties to comply with the safety program;
 - .12 Construction site inspection checklist based on the preventive measures;
 - .13 Emergency response plan which must contain at least the following:
 - .1 Construction site evacuation procedures;
 - .2 Identification of resources (police, firefighters, ambulance services, etc.);
 - .3 Identification of persons in charge of the construction site;
 - .4 Identification of the first-aid attendants;
 - .5 Communication organizational chart (including the person responsible for the site and the Departmental Representative);
 - .6 Training required for those responsible for applying the plan;
 - .7 Any other information needed, in the light of the construction site's characteristics.
 - .14 If available, the Departmental Representative will provide the evacuation procedures to the Contractor who must then coordinate the construction site procedure with that of the site and submit it to the Departmental Representative.
- .4 Departmental Representative may respond in writing, where deficiencies or concerns are noted in the prevention program and may request resubmission with correction of deficiencies or concerns.
 - .5 In addition to the prevention program, during the course of the work the Contractor must elaborate and submit to the Departmental Representative specific written procedures for any work having a high risk factor of accident (for example: Demolition procedures, specific installation procedures, hoisting plan, procedures for entering a confined space, procedures for interrupting electric power, etc.) or at the request of the Departmental Representative.
 - .6 The Contractor must plan and organize work to eliminate the danger at source or ensure collective protection, thereby minimizing the use of personal protective equipment.
 - .7 Equipment, tools, and protective gear which cannot be installed, fitted, or used without compromising the health or safety of workers or the public, must be deemed inadequate for the work to be executed.
 - .8 All mechanical equipment (for example, but not limited to: Hoisting devices for persons or materials, excavators, concrete pumps, concrete saws) must be inspected before delivery to the construction site. Before using any mechanical equipment, the Contractor must obtain a certificate of compliance signed by a qualified mechanic dated less than a week prior to the arrival of each piece of equipment on the construction site; the certificate must remain on the construction site and transmitted to the Departmental Representative on demand.
 - .9 Ensure all inspections (daily, periodic, annual, etc.) for the hoisting devices for persons or materials required by the current standards are carried out and be able to provide a copy of the inspection certificates to the Departmental Representative on demand.

- .10 The Departmental Representative can always, if he suspects a malfunction or the risk of an accident, order the immediate stop of any item of equipment and require an inspection by a specialist of his choice.
- .11 The Departmental Representative must be consulted for the location of storing gas cylinders and tanks on the construction site.

1.13 RISKS INHERENT TO THE WORKSITE

- .1 In addition to the risks related to the tasks to be carried out, personnel responsible for the execution of the work on the construction site will be exposed to the following risks inherent to the area where the work will be executed.
- .2 At the worksite there may in particular be the presence of the following:
 - .1 Overhead power lines;
 - .2 Underground services (electric, gas, vapour, water system, etc.);
 - .3 Trees and landscaping to preserve and protect;
 - .4 Barbed wire fences;
 - .5 Aircrafts in movement.
- .3 The Contractor must process to a risk assessment of the site to validate this information and see if other risks are present on the site. He must include in his prevention program all risks that have been identified.

1.14 SPECIFIC REQUIREMENTS FOR THE HEALTH AND SAFETY OF OCCUPANTS AND PUBLIC

- .1 Worksite may be occupied by employees and/or the public, even if they do not have access to the Contractor's worksite. The Contractor must consider the following specific requirements for the protection of employees and / or the public:
 - .1 Construct interior and exterior temporary partitions in compliance with regulations.
- .2 These requirements must be included in the Contractor's site-specific safety plan as well as any other measures provided by the Contractor to protect the health and safety of employees and / or the public on the site.

1.15 UNFORESEEN HAZARDS

- .1 Whenever a source of danger not defined in the Specifications or identified in the preliminary construction site inspection arises as a result of or in the course of the work, the Contractor must immediately suspend work, notify the person responsible for health and safety on the construction site, take appropriate temporary measures to protect the workers and the public and notify Departmental Representative, both verbally and in writing. Then the Contractor must do the necessary modifications to the prevention program or apply the security measures required in order to resume work.

1.16 PERSON IN CHARGE OF HEALTH AND SAFETY

- .1 If the construction site meets the requirements of article 2.5.3 of the *Code de la sécurité pour les travaux de construction* (S-2.1, r.4) (Safety Code for the Construction Industry), the Contractor needs to hire a competent person authorized as a safety officer and appoint this person full time from the beginning of the work. This person's tasks must solely be dedicated to the management of health and safety on the construction site. This safety officer must have the following qualifications:
 - .1 Have a safety officer certificate issued by the CNESST since at least one (1) year;

- .2 Have site-related working experience specific to the activities associated with the present project;
 - .3 Have working knowledge of occupational health and safety regulations in the workplace;
 - .4 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter the construction site to perform work;
 - .5 Be responsible for implementing, enforcing in detail and monitoring site-specific Contractor's Health and prevention program;
 - .6 Always be on construction site during execution of work;
 - .7 Inspect the work and ensure compliance with all regulatory requirements and those indicated in the Contract Documents or the site-specific prevention program.
 - .8 Keep a daily log of actions taken and submitting a copy to Departmental Representative each week.
- .2 The safety officer's certificate must be submitted to the Departmental Representative before the start of the Work.
 - .3 When the hiring of a safety officer is not required or if this person is hired by the Departmental Representative, the Contractor must designate a competent person to supervise and take responsibility for health and safety, no matter the size of the construction site or how many workers are present at the workplace. This person must always be on construction site and be able to take all necessary measures to ensure the health and safety of persons and property at or in the immediate vicinity of the construction site and likely to be affected by any of the work. The Contractor must submit the name of this person to the Departmental Representative before the start of work.

1.17 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices, and orders are posted in conspicuous location on construction site in accordance with Acts and Regulations of the Province, and in consultation with Departmental Representative.
- .2 At a minimum, the following information and documents must be posted in a location readily accessible to all workers:
 - .1 Notice of construction site opening;
 - .2 Identification of principal Contractor;
 - .3 Company OSH policy;
 - .4 Site-specific prevention program;
 - .5 Emergency plan;
 - .6 Minutes of worksite committee meetings;
 - .7 Names of worksite committee representatives;
 - .8 Names of the first-aid attendants;
 - .9 Action reports and correction notices issued by the CNESST.

1.18 INSPECTION OF THE CONSTRUCTION SITE AND CORRECTION OF NON-COMPLIANCES

- .1 Inspect the construction site and complete the construction site inspection checklist and submit it to the Departmental Representative in accordance with the article "ACTION AND INFORMATIONAL SUBMITTALS" in this Section.

- .2 Immediately take all necessary measures to correct any situations deemed non-compliant during the inspections mentioned in the previous paragraph or noticed by the Authorities Having Jurisdiction or the Departmental Representative or his agent.
- .3 Submit to Departmental Representative written confirmation of all measures taken to correct the situation in case of non-compliance in matters pertaining to health and safety.
- .4 The Contractor must give the safety officer or, where there is no safety officer, the person assigned to safety and health responsibilities, full authority to order cessation and resuming of work as and when deemed necessary or desirable in the interests of safety and health. This person should always act so that the safety and health of the public and construction site workers and environmental protection take precedence over cost and scheduling considerations.
- .5 The Departmental Representative or his agent may order cessation of work if the Contractor does not make the corrections needed to conditions deemed non-compliant in matters pertaining to health and safety. Without limiting the scope of the preceding articles, the Departmental Representative may order cessation of work if, in his view, there is any hazard or threat to the safety or health of construction site personnel or the public or to the environment.

1.19 PREVENTION OF VIOLENCE

- .1 Health and safety management of Public Works and Government Services Canada construction sites includes the implementation of measures designed to protect the psychological health of all persons who access the construction site where the work is taking place. Consequently, in addition to physical violence, verbal abuse, intimidation and harassment are not tolerated on the construction site. Any person who demonstrates such actions or behaviors will receive a warning and/or could be expelled from the construction site by the Departmental Representative.

1.20 BLASTING

- .1 Blasting or other use of explosives is not permitted.

1.21 POWDER ACTUATED DEVICE

- .1 Use powder actuated devices only after receipt of written permission from Departmental Representative.
- .2 Any person using an explosive actuated tool must hold a training certificate and meet all requirements of Section 7 of the *Code de sécurité pour les travaux de construction* (S- 2.1, r. 4). (Safety Code for the Construction Industry)
- .3 Any other explosive-actuated device must be used in accordance with the manufacturer's directions and applicable Standards and Regulations.

1.22 USE OF PUBLIC ROADS

- .1 Where it is necessary to encroach on a public road for operational reasons or to ensure the security of the workers, the occupants or the public (for example: Use of scaffolding, cranes, excavation work, etc.), the Contractor must obtain at his own expense any authorizations and permits required by the competent authority.
- .2 The Contractor must install at his own expense any signage, barricades, or other devices needed to ensure the safety and security of the public and the Contractor's own facilities.

1.23 LOCKOUT-TAGOUT

- .1 For all work on electrically or otherwise energized equipment, the Contractor must draw up and implement a general lockout-tagout procedure and submit it to the Departmental Representative.
- .2 Supervisors and all workers concerned by work requiring lockout-tagout must have received training on lockout-tagout procedures by a recognized organization; Contractor must submit training certificates to the Departmental Representative.
- .3 Before starting the lockout-tagout procedure of a item of equipment on an occupied site, Contractor must coordinate his work with the representative of the site if the interruption of the power sources can have an impact on the operations of the site or on its occupants.
- .4 Contractor must designate a qualified person as responsible for the lockout-tagout and must make sure that that person prepares a lockout-tagout data sheet for each piece of equipment involved. The lockout-tagout data sheet must be submitted to the Departmental Representative at least 48 hours before the beginning of the work. The Departmental Representative will review the data sheet with the representative of the site if the work takes place in an existing building.
- .5 The data sheets for lockout-tagout must contain at least the following information:
 - .1 Description of work to carry out;
 - .2 Identification, description, and location of the circuit and/or equipment to lockout-tagout;
 - .3 Identification of energy sources that feeds the equipment;
 - .4 Identification of each cutout point;
 - .5 Sequence of lockout-tagout and the release of residual energy as well as the sequence of unlocking;
 - .6 List of material needed for the lockout-tagout;
 - .7 Method of verification of zero energy implementation;
 - .8 Name and signature of the person who prepared the data sheet.
- .6 When required by the Departmental Representative, Contractor must record all this information on the site's representative form.
- .7 At the time of lockout-tagout, the person responsible must date the data sheet and ensure that each worker involved in the work on the circuit/equipment to lockout-tagout puts his name on the data sheet and signs it.

1.24 ELECTRICAL WORK

- .1 Contractor must ensure that all electrical work is executed by qualified employees in accordance with the provincial regulation respecting vocational training and qualification.
- .2 Contractor must respect all requirements of Standard CSA Z462 *Workplace Electrical Safety Standard*.
- .3 No repairs or alterations must be carried out on any live equipment, except where complete disconnection of the equipment is not feasible.
- .4 Contractor must respect all requirements prescribed in paragraph "LOCKOUT-TAGOUT" in this Section.

- .5 Contractor must advise in writing the Departmental Representative of all work which cannot be done with de-energized equipment and obtain his authorization. Contractor must demonstrate to the Departmental Representative that it is impossible to do the work with de-energized equipment and provide all the information necessary to request and obtain an energized electrical work permit (indicate working procedures, arc flash hazard analysis, protective perimeter, protective equipment, etc.) before the beginning of the work, excluding for the exceptions indicated in Standard CSA Z462 - Workplace Electrical Safety.
- .6 The energized electrical work permit on must contain at least the following elements:
 - .1 Description of the circuit and equipment and its location;
 - .2 Justification d for having to do the work in an energized condition;
 - .3 Description of safe work practices to apply;
 - .4 Results of the shock hazard analysis;
 - .5 Limit of the protective perimeter against electric shocks;
 - .6 Results of the arc flash hazard analysis;
 - .7 Description of the arc flash protection boundary;
 - .8 Description of the personal protective equipment required;
 - .9 Description of the means to limit access to unqualified persons;
 - .10 Proof that an information session has been carried out;
 - .11 Approval signature of the energized electrical work (by a person in authority or by the Owner).
- .7 If for the operational requirements of the occupants of the site the representative of the site requires that the Contractor performs work in an energized condition, the Contractor must obtain all the information required to request and obtain obtain an energized electrical work permit (indicate working procedures, arc flash hazard analysis, protective perimeter, protective equipment, etc.) and have it signed by the representative of the site assigned by the Departmental Representative before the beginning of Work.

1.25 FUNGAL CONTAMINATION

- .1 It is not anticipated that Work covered by the present specifications involves the manipulation of materials contaminated by mould; however, if the Contractor or the Departmental Representative or his agent discover materials which are susceptible of being contaminated by mould, the Contractor must immediately stop the work and advise the Departmental Representative. If more investigation demonstrates that the materials do contain mould, the Contractor must comply with the following requirements.
 - .1 Prior to starting any work where workers are likely to be in contact with materials contaminated by mould, the Contractor must:
 - .1 Provide a written procedure for the work which respects all the requirements of the *Code the sécurité pour les travaux de construction* S-2.1, r- 4, (Safety Code for the Construction Industry), as well as the requirements indicated in the document "*Mould Guidelines for the Canadian Construction Industry*" published by the Canadian Construction Association (<http://www.cca-acc.com/documents/electronic/cca82/cca82.pdf>).
 - .2 Demonstrate that he has all the material and equipment required on hand to respect the procedure and for safely conducting the work.

1.26 EXPOSURE TO SILICA

- .1 Work in wet environment or use tools with the inflow of water in order to reduce dustiness, if not, collect dust at the source and retain it with a high-efficiency filters not to propagate dust in the environment.
- .2 Clean surfaces and tools with water, never with compressed air.
- .3 Sand and pickle surfaces by using an abrasive containing less than 1% of silica (also called amorphous silica).
- .4 Install shields or other containment device to prevent silica dust from migrating toward other workers or the public.
- .5 Wear individual respiratory and ocular protection equipment during all the operations that could generate silica dust in accordance with the requirements of the *Code de sécurité pour les travaux de construction, S-2.1, r.4* (Safety Code for the Construction Industry).
- .6 Wear coveralls to prevent contamination outside the construction site.
- .7 Do not eat, drink, or smoke in a dusty environment.
- .8 Wash the hands and the face before drinking, eating, or smoking.

1.27 EXPOSURE TO ANIMAL'S FECAL DROPPINGS

- .1 Prior to all work where workers are likely to meet materials contaminated by animal's fecal droppings, the Contractor must:
 - .1 Provide a written procedure for the work which respects all the requirements of the *Code de sécurité pour les travaux de construction S-2.1, r-4*, (Safety Code for the Construction Industry), as well as the requirements indicated in the document "*Des fientes de pigeons dans votre lieu de travail: méfiez-vous*" (Pigeon droppings in your workplace: Beware" published by the CNESST (http://www.csst.qc.ca/publications/100/Documents/DC100_1331_1web2.pdf).
 - .2 Demonstrate that he has all the material and equipment required on hand to respect the procedure and for safely conducting the work.

1.28 RESPIRATORY PROTECTION

- .1 Contractor must ensure that all workers who must wear a respirator as part of their duties have received training for that purpose as well as fit testing of their respirator, in accordance with CSA Standard Z94.4 - *Selection, Use and Care of Respirators*. Submit the certificates of the fit testings to the Departmental Representative on demand.

1.29 FALL PROTECTION

- .1 Plan and organize work to eliminate the risk of fall at the source or ensure collective protection, thereby minimizing the use of personal protective equipment. When personal fall protection is required, workers must use a safety harness that complies with CSA Standard CAN/CSA Z-259.10 M90. A safety belt must not be used as fall protection.
- .2 Every person using an elevating platform (scissors, telescopic mast, articulated mast, rotative mast, etc.) must have a training regarding this equipment.
- .3 The use of a safety harness is mandatory for all elevating platforms with telescopic, articulate or rotative mast.
- .4 Define the limits of the danger zone around each elevating platform.

- .5 All openings in a floor or roof must be surrounded by a guardrail or provided with a cover fixed to the floor able to withstand the loads to which it could be exposed, regardless of the size of the opening and the height of the fall it represents.
- .6 Everyone who works within two metres from a fall hazard of 3 metres or more must use a safety harness in accordance with the requirements of the regulation, unless there is a guardrail or another device offering an equivalent safety.
- .7 Despite the requirements of the regulation, the Departmental Representative may require the installation of a guardrail or the use of a safety harness for specific situations presenting a risk of fall less than three metres.

1.30 EXCAVATION WORK

- .1 In addition to the requirements of the *Code de sécurité pour les travaux de construction* (Safety Code for the Construction Industry), the Contractor who performs the digging of trenches or excavations must respect the following requirements:
 - .1 Fill out the following form and submit it to the Departmental Representative before beginning to excavation work;
 - .2 Therefore, submit to the Departmental Representative, as appropriate, the following documents:
 - .1 Drawings and specifications, signed and sealed by an engineer, of the shoring needed to be installed for the excavation work; or
 - .2 Engineer's advice specifying the wall angles of the trench or excavation.



Excavation guidelines

N° _____ of _____

This directive is provided as an example by the Commission de la santé et de la sécurité du travail (CSST). It contains the main instructions that the employer should give to the person responsible for the work on the site and to the operator of the earth-moving machine.

Company name	
Project name	Project no.
Address of the site	Construction start date

Field survey

Chaining or axes : from _____ to _____ Attached plan Plan no. : _____

Working method to use

- While making sure the excavation walls do not pose the risk of landslide
- dig and shore according to the plans and specifications of the engineer ;
 - dig and shore using a trench box ;
 - dig without shoring as long as one of the following conditions is respected:
 - rock is sound;
 - no worker goes down in the trench or excavation;
 - the walls are dug according to the engineer's advice.

Dimensions of excavation (Dig according to the following profile.)

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

	Minimum	Maximum
H Depth		
Wb Width at bottom		
Width at top		

Safety measures

Deposit the materials at a distance of at least 1.2 metre (4 feet) from top of walls.
Do not allowed any vehicle to come closer than 3 metres (10 feet) from top of walls.

- Respect the engineer's plan concerning work in the proximity of an existing facility.
- Follow the location plan to locate the underground infrastructures.
- Install signaling devices prescribed in the traffic plan (barriers, visual references, etc.).
- Assign a flag person or more to control the flow of traffic.
- Respect the procedure prescribes for work near power lines.
- Provide protection devices for the workers, such as concrete crash barriers.

Name	Occupation	
Signature	Date	Telephone no.
Directive submitted		
<input type="checkbox"/> to the responsible of the work on the site <input type="checkbox"/> to the operator of the earth-moving machine		

DCT/06/06/03 (2001-01)

1.31 LIFTING LOADS WITH CRANE OR BOOM TRUCK

- .1 Unless specified otherwise, the Contractor must prepare a hoisting plan and submit it to the Departmental Representative for all lifting operations done with a crane or a boom truck at least five (5) days before these lifting operations begin. The hoisting plan must contain at a minimum the information listed at the end of this article.
- .2 The hoisting plan must be signed and sealed by an engineer for the following lifting operations:
 - .1 Lifting of concrete panels;
 - .2 Lifting mechanical/electrical equipment on a roof or on the floor of a building;
 - .3 Lifting of loads encroaching on the public road;
 - .4 Lifting large dimensions or very heavy loads;
 - .5 All other lifting operation, in accordance with the requirements of the Departmental Representative.
- .3 In addition to the above requirements, the Contractor must plan the hoisting operations in a way as to avoid that the loads pass over the occupied zones on the site. When there is no alternative, the hoisting plan must absolutely be signed and sealed by an engineer and must guarantee the security of the occupants in that zone; the plan must also be approved by the Departmental Representative. The Departmental Representative can, if he deems necessary, require that the work be done at night or on weekends.
- .4 Upon the beginning of the work on the construction site, the Contractor must submit the list of the hoisting plans anticipated for the whole project to the Departmental Representative. That list must be updated as needed if changes occur during the work.
- .5 In addition to the mechanical service inspection certificate, the annual inspection certificate and the crane logbook must be aboard all cranes and boom truck cabs.
- .6 The entire lifting area must be marked off to prevent the entry of non-authorized persons.
- .7 The Contractor must carefully inspect all slings and lifting accessories and make sure that those in poor condition are destroyed and scrapped.
- .8 Compressed-gas cylinders must be lifted with a basket specially designed for this purpose.
- .9 Minimum content of hoisting plan:
 - .1 Sketch indicating at a minimum, the location of the crane, the surrounding facilities, the zone covered by the hoisting operations, the pedestrian's pathways and vehicular routes, the security perimeter, etc.
 - .2 Weight of loads.
 - .3 Dimensions of loads.
 - .4 List of hoisting devices and weight of each.
 - .5 Total weight lifted.
 - .6 Maximum height of obstacles to clear.
 - .7 Height of loads lifting relative to the surface of the roof (in the case of loads to be placed on roofs).
 - .8 Use of guide cables.
 - .9 Type of crane used.
 - .10 Crane capacity.
 - .11 Boom length.

- .12 Boom angle.
- .13 Crane's radius of action.
- .14 Deployment of stabilizers.
- .15 Percentage usage of the crane's capacity.
- .16 Verification confirmation of hoisting equipment.
- .17 Identification of the crane operator and the person responsible for the hoisting operations with date and signatures.

1.32 HOT WORK

- .1 Hot work means any work where a flame is used or a source of ignition may be produced, i.e., riveting, welding, cutting, grinding, burning, heating, etc.
 - .1 Before the beginning of each shift of work and for each sector, the Contractor must obtain a "Hot Work Permit" emitted by the person responsible for the site.
 - .2 A working portable fire extinguisher suitable to the fire risk must be available and easily accessible within a 5 m radius from any flame, spark source or intense heat.
 - .3 The Contractor must appoint an individual to do continuous monitoring of the fire risks for a period of one (1) hour after the end of the shift of hot work. This individual must sign the section for this purpose on the permit and give it to the person in charge of the construction site after the one-hour period.
 - .4 When the hot work is done in areas where there are combustible materials or where the walls, ceilings, or floors are made of or covered with combustible materials, a final inspection of the work area must be scheduled four (4) hours after the work has finished. Unless specified otherwise by the Departmental Representative, the Contractor must assign a person to carry out this monitoring.
- .2 Welding and cutting: In addition to the requirements prescribed in the preceding paragraphs, the Contractor must respect the following requirements:
 - .1 Welding and cutting work must be carried out in accordance with the requirements of the *Code de Sécurité pour les travaux de construction, S-2.1, r.4* (Safety Code for the Construction Industry) and CSA standard W117.2, Safety in Cutting, Welding and Allied Processes;
 - .2 Air extraction system with filters must be used for all welding and cutting work performed inside;
 - .3 Stop all activities producing flammable or combustible gas, vapours, or dust in the vicinity of the welding or cutting work;
 - .4 Store all compressed gas cylinder on a fireproof fabric and make sure that the room is well ventilated;
 - .5 Store all oxygen cylinders more than 6 metres from a flammable gas cylinder (ex: acetylene) or a combustible such as oil or grease, unless the oxygen cylinder is separated from it by a wall made of non-combustible material as mentioned in Article 3.13.4 of the *Code de sécurité pour les travaux de construction, S-2, r. 6* (Safety Code for the Construction Industry);
 - .6 Store the cylinders far from all heat sources;
 - .7 Not to store the cylinders close to the staircases, exits, corridors, and elevators;
 - .8 Do not put acetylene in contact with metals, such as silver, mercury, copper, and alloys of brass having more than 65% copper, to avoid the risk of an explosive reaction;

- .9 Check that welding equipment with electric arc has the necessary tension and are grounded;
- .10 Ensure that the conducting wires of the electric welding equipment are not damaged;
- .11 Place the welding equipment on a flat ground away from the bad weather;
- .12 Install fireproof canvas when the welding work is done in a superposition and where there is the risk of falling sparks;
- .13 Move away or protect the combustible materials which are closer than 15 metres from the welding work;
- .14 Prohibition to weld or cut any closed container;
- .15 Do not perform any cutting, welding, or work with a naked flame on a container, a tank, a pipe, or other container containing a flammable or explosive substance unless:
 - .1 They have been cleaned and air samples indicating that work can be done without danger has been taken; and
 - .2 Provisions to ensure the safety of the workers have been made.

1.33 WORK NEAR OVERHEAD POWER LINES

- .1 When there is an overhead power line in the work zone and that the Contractor chooses to apply paragraph b) of article 5.2.2 of the *Code de sécurité pour les travaux de construction* (2.1, r.4) (Safety Code for the Construction Industry), a copy of the agreement with the electrical power company and a copy of the work process, required in Article 5.2.2 b), must be submitted to the Departmental Representative before the beginning of the work in relation to these documents.

1.34 HEALTH AND SAFETY SUBORDINATION AGREEMENT

- .1 Agreement to fill out next page; a completed and signed copy to be submitted to the Departmental Representative.

HEALTH AND SAFETY SUBORDINATION AGREEMENT	
Project: _____ Address: _____	
EXTERNAL CONTRACTOR	
<p>I, hereby, agree to submit to the authority of (name of the Principal Contractor's business) _____, which is the Principal Contractor for the project indicated above during the entire duration of our work on the construction site. Accordingly, I confirm that I have reviewed the Principal Contractor's prevention program, and I agree to:</p> <ul style="list-style-type: none"> • Inform my employees of the content of the Principal Contractor's prevention program and ensure that its content is complied with at all times; • Apply the prevention program that is specific to the activities that we carry out under this project; • Inform the Principal Contractor of my actions or dealings on the construction site and obtain the Principal Contractor's agreement before the start of work; and • Follow the health and safety directives provided by the representative of the Principal Contractor on the construction site and, depending on requirements, attend training sessions and health and safety meetings organized by the representative of the Principal Contractor. 	
Name of Representative:	Name of Business:
Description of work to be done on the construction site:	
Approximate dates of work (start-end): Start:	End:
_____ Signature	_____ Date
PRINCIPAL CONTRACTOR	
<p>I hereby agree to allow the business (name of external contractor) _____ to perform the work under this project indicated above and, as Principal Contractor, to take the necessary steps to protect the health and safety of workers on the construction site. Should the Contractor repeatedly refuse or fail to comply with my directives, I agree to inform PWGSC's Departmental Representative of this and to provide documentary evidence of my actions or dealings with the Contractor.</p>	
Name of Representative:	Name of Principal Contractor's Business:
Signature: _____ Date: _____	
Submit a completed and signed copy to Departmental Representative	

Part 2 Products

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 Health and Safety Requirements - Section 01 35 29.06.
- .2 Cleaning - Section 01 74 00.
- .3 Waste Management and Disposal - Section 01 74 19.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 All costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Definitions:
 - .1 Pollution and environmental damage: Presence of chemical, physical, or biological elements or agents that have a detrimental effect on the health and well-being of people, which alter the ecological balances important to humans and which constitute an attack on species that play an important role in the latter or degrade the aesthetic, cultural, or historical characteristics of the environment.
 - .2 Protection of the environment: Prevention/control of pollution and disturbance of habitat and environment during construction.
 - .3 U.S. Environmental Protection Agency (EPA)/Office of Water.
 - .1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.
 - .2 EPA General Construction Permit (GCP) 2012.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for FEC and include product characteristics, performance criteria, physical size, finish, and limitations.
 - .2 Submit two (2) copies of WHMIS Safety Data Sheets (SDS) in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.
- .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .6 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.

- .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
- .3 Names and qualifications of persons responsible for training site personnel.
- .4 Descriptions of environmental protection personnel training program.
- .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations, and EPA 832/R-92-005, Chapter 3.
- .6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials, including methods to control runoff and to contain materials on site.
- .7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
 - .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
- .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
- .9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on Project site.
- .12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .13 Wastewater Management Plan identifying methods and procedures for management and discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
- .14 Historical, archaeological, cultural resources biological resources, and wetlands plan.
- .15 Pesticide treatment plan to be included and updated, as required.

1.5 FIRES

- .1 Fires and burning of rubbish onsite are not permitted.

1.6 DRAINAGE

- .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations, EPA 832/R-92-005, Chapter 3 US EPA General Construction Permit.
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.
- .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .4 Ensure pumped water into waterways, sewer, or drainage systems is free of suspended materials.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.7 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures where indicated directed by Departmental Representative.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.8 NON-COMPLIANCE

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

Part 2 Products**2.1 NOT APPLICABLE**

- .1 Not applicable.

Part 3 Execution

3.1 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Bury rubbish and waste materials onsite where directed after receipt of written approval from Departmental Representative.
- .3 Ensure public waterways, storm, and sanitary sewers remain free of waste and volatile materials disposal.
- .4 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - Cleaning.
- .5 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Not applicable.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 All costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Not applicable.

1.4 INSPECTION

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

1.5 INDEPENDENT INSPECTION AGENCIES

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

1.6 ACCESS TO WORK

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

1.7 PROCEDURES

- .1 Notify appropriate Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.8 REJECTED WORK

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

1.9 REPORTS

- .1 Submit an electronic copy of test and inspection reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested manufacturer or fabricator of material being inspected or tested.

1.10 FACTORY TESTS

- .1 Submit certificates of factory tests that are prescribed in the various sections of the Specifications, within a maximum of one (1) week from the date of the tests.

Part 2 Products

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 Allowances - Section 01 21 00.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Printing of the self-adhesive film to be affixed to the panel:
 - .1 The printing and installation of the self-adhesive film to be affixed to the panel is payable via a payment allowance. The allowance will be paid after the installation on site and in accordance with the requirements of section 01 21 00 – Allowances and this section.
- .2 All other costs associated with this section, including all temporary site signage, must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB 1.203-03, Exterior latex wood primer.
- .2 CSA Group (CSA).
 - .1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-0121-M1978 (R2003), Douglas Fir Plywood.
 - .3 CAN/CSA-S269.2-M1987 (R2003), Access Scaffolding for Construction Purposes.
 - .4 CAN/CSA-Z321-96 (R2001), Signs and Symbols for the Occupational Environment.
- .3 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.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit the following documents and samples before commencing the work required under this section.
 - .1 Signal boards for each of the work areas.

1.5 INSTALLATION AND REMOVAL

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

- .5 Remove from site all such work after use.

1.6 HOISTING

- .1 Lifting devices (excavator, cranes and boom truck): The Contractor who uses a lifting device must obtain authorization from the airport seventy-two (72) working hours in advance.
- .2 All lifting equipment (excluding excavators) must have a red obstacle light installed on the end of the boom to indicate the presence of equipment.
- .3 Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .4 Hoists cranes to be operated by qualified operator.

1.7 SITE STORAGE/LOADING

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

1.8 PARKING ON CONSTRUCTION SITE

- .1 Groundside work:
 - .1 Parking will be permitted on site provided it does not disrupt performance of Work.
 - .2 Provide and maintain adequate access to project site.
- .2 Airside work:
 - .1 Parking will not be permitted.
 - .2 Clean airport runways and taxiways where used by Contractor's equipment. Contractor is responsible for cleaning taxiway, apron, and runway before each aircraft movement.

1.9 SECURITY

- .1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.10 OFFICES/OFFICE TRAILERS

- .1 No installation of temporary office or office trailers is permitted airside.
- 1. Provide well ventilated, heated/air-conditioned office of sufficient size to accommodate site meetings and furnished with drawing laydown table. The construction site office must have electricity and a high-speed internet connection (≥ 30 Mbit/s) at all times.
- .2 Provide site trailers in sufficient number and equipped to allow workers to take breaks, wash their hands with soap and eat seated meals while respecting the recommendations for social distances of 2 meters from the health authorities and the latest directives in force from the Standards and Equity Commission of Occupational Health and Safety (CNESST).
- .3 Provide marked and fully stocked first-aid case in a readily available location.

- .4 Provide brown paper and leave a disinfectant solution based on alcohol or bleach in a bottle with a sprayer available to workers at all times.
- .5 Maintain the premises clean and disinfect surfaces likely to be touched/handled, such as handles and tabletops, at least once a day.

1.11 EQUIPMENT, TOOL, AND MATERIAL STORAGE

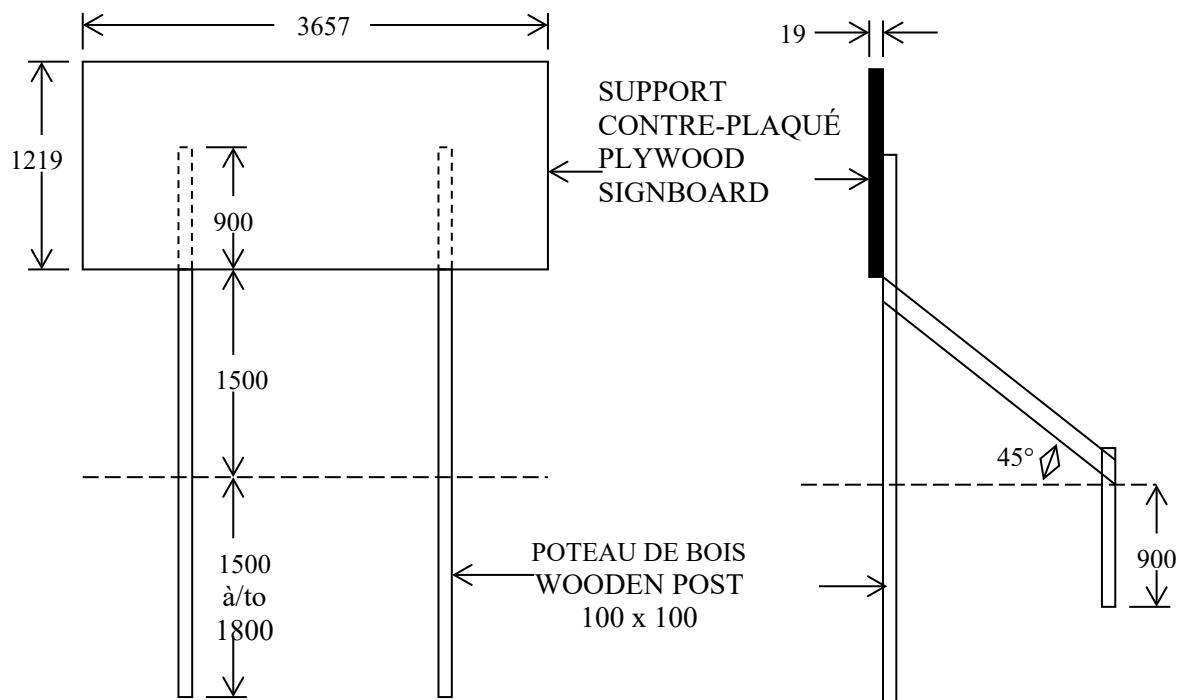
- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment, and material.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.12 SANITARY FACILITIES

- .1 Sanitary facilities must be provided by the Contractor. They must be drained and disinfected at least twice a week.
- .2 At all times, a bottle of hydroalcoholic solution must be available in the sanitary facilities.

1.13 CONSTRUCTION SIGNAGE

- .1 Provide and erect project sign, as shown below, within three (3) weeks of signing Contract, in a location designated by Departmental Representative.
- .2 Construction sign 3.6 m x 1.2 m of wood frame, complying with drawing provided by the Departmental Representative.
- .3 Paint all apparent items:
 - .1 Paint: Latex complies with CAN/CGSB 1.203.
 - .2 Primer: Latex complies with CAN/CGSB 1.203.



- .4 Departmental Representative to provide self-adhesive film to affix to panel.
- .5 No other signs or advertisements, other than warning signs, are permitted on site.
- .6 Signs and notices for safety and instruction in both official languages. Graphic symbols to CAN/CSA-Z321.
- .7 Maintain approved signs and notices in good condition for duration of project and dispose of off site at final acceptance of works.
- .8 Install a contour molding on the panel to prevent the film from being blown off by the wind.

1.14 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads to maintain traffic, as necessary.
- .2 Maintain and protect traffic on affected roads during construction period, except as otherwise specifically directed by Departmental Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watchpersons and flagpersons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs.
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: Responsible for repair of damage to roads caused by construction operations.
- .7 Construct access and haul roads necessary.
- .8 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .9 Dust Control: Adequate to always ensure safe operation.
- .10 Location, grade, width, and alignment of construction and hauling roads: Subject to approval by Departmental Representative.
- .11 Lighting: To assure full and clear visibility for full width of haul road and work areas during night work operations.
- .12 Provide snow removal during period of Work.
- .13 Remove, upon completion of Work, haul roads designated by Departmental Representative.

1.15 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

1.16 WORK ORGANIZATION

- .1 Any item mentioned in this section 01 52 00, which is not specifically mentioned in the bid form, must be included in the fixed price of the item "Work Organization" on the bid form.

Part 2 Products

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 Not applicable.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 All costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Canadian General Standards Board (CGSB).
 - .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
 - .2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 CSA Group (CSA).
 - .1 CSA-O121-M1978 (R2003), Douglas Fir Plywood.

1.4 INSTALLATION AND REMOVAL

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

1.5 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations.
- .2 Provide as required by governing authorities.

1.6 ROADWAY ACCESS

- .1 Site access, including airside, will be coordinated with the appropriate authorities.

1.7 ACCESS ROUTES FOR EMERGENCY VEHICLES

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

1.8 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

1.9 PROTECTION OF BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Departmental Representative locations and installation schedule three (3) days prior to installation.

- .4 Be responsible for damage incurred due to lack of or improper protection.

Part 2 Products

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 Not applicable.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 All costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Reference Standard may be provided in each Section.
- .2 Comply with these Reference Standards, in whole or in part, as specifically requested in specifications.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.4 QUALITY

- .1 Products, materials, equipment, and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, provide evidence as to type, source, and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of Work.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve the Contractor from his responsibility, but simply a precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in Specifications, maintain uniformity of manufacture throughout building.
- .6 Permanent labels, trademarks, and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.5 AVAILABILITY

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

1.6 STORAGE, HANDLING, AND PROTECTION

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

1.7 TRANSPORTATION

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

1.8 MANUFACTURER'S INSTRUCTIONS

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

1.9 QUALITY OF WORK

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

1.10 CO-ORDINATION

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

1.11 REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.12 LOCATION OF FIXTURES

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Departmental Representative of conflicting installation. Install as directed.

1.13 FASTENINGS - GENERAL

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.14 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.15 PROTECTION OF WORK IN PROGRESS

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

1.16 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and pedestrian and vehicular traffic and/or building occupants.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by Authority Having Jurisdiction. Stake and record location of capped service.

Part 2 Products

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 Submittal Procedures - Section 01 33 00.
- .2 Waste Management and Disposal - Section 01 74 19.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 All costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Not applicable.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: In accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Owner or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.5 MATERIALS

- .1 Material/equipment required for identical installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.6 PREPARATION WORK

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.

- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.7 EXECUTION OF WORK

- .1 Implant all the planned works on the ground before their realization. Implement all the limits of connections to the land and other needs for the realization and control of the works according to the requests of the Departmental Representative.
- .2 Execute cutting, fitting, and patching, including excavation and fill, to complete Work.
- .3 Fit several parts together, to integrate with other Work.
- .4 Uncover Work to install ill-timed Work.
- .5 Remove and replace defective and non-conforming Work.
- .6 Remove samples of installed Work for testing.
- .7 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .8 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .10 Restore work with new products in accordance with requirements of Contract Documents.
- .11 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .13 Conduct a survey locating all the infrastructure built as part of the project. The survey must also include the existing underground services left in place that were encountered during the completion of the work.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

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 Waste Management and Disposal - Section 01 74 19.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 All costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Not applicable.

1.4 WORKSITE CLEANLINESS

- .1 Maintain worksite in tidy condition, free from accumulation of waste products and debris, other than those caused by Departmental Representative or other Contractors. Protect materials and other components from movement caused by wind so as not to present risk to aircrafts.
- .2 Remove waste materials from site daily after each work shift or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide, onsite, containers for collection of waste materials and debris.
- .5 Provide and use marked separate bins for recycling. Refer to section 01 74 19 - Waste Management and Disposal.
- .6 Dispose of waste materials and debris off site at designated dumping areas on Crown properties.
- .7 Clean interior areas prior to start of finishing work and maintain areas free of dust and other contaminants during finishing operations.
- .8 Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.5 FINAL CLEANING

- .1 When work is substantially performed, remove surplus products, tools, construction machinery, and equipment not required for performance of remaining work.
- .2 Remove waste products and debris other than that caused by others and leave worksite clean and suitable for occupancy.

- .3 Prior to final review, remove surplus products, tools, construction machinery, and equipment.
- .4 Remove waste products and debris other than including that caused by Owner or other contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials onsite, unless approved by Departmental Representative.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Remove stains, spots, marks, dust, and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.
- .8 Clean lighting reflectors, lenses, and other lighting surfaces.
- .9 Wax, seal, shampoo, or prepare floor finishes, as recommended by manufacturer.
- .10 Inspect finishes, fitments, and equipment and ensure specified workmanship and operation.
- .11 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .12 Remove dirt and other disfiguration from exterior surfaces.
- .13 Sweep and wash clean paved areas.
- .14 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse recycling in accordance with section 01 74 19 - Waste Management and Disposal.

Part 2 Products

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 Project Meetings - Section 01 31 19.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 All costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Not applicable.

1.4 DEFINITIONS

- .1 Clean Waste: Untreated and unpainted; not contaminated with oils, solvents, sealants, or similar materials.
- .2 Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling operations, repair, and demolition.
- .3 Hazardous: Exhibiting the characteristics of hazardous substances including properties such as ignitability, corrosiveness, toxicity or reactivity.
- .4 Non-hazardous: Exhibiting none of the characteristics of hazardous substances, including properties such as ignitability, corrosiveness, toxicity, or reactivity.
- .5 Non-toxic: Not poisonous to humans either immediately or after a long period of exposure.
- .6 Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- .7 Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- .8 Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form; recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Return: To give back reusable items or unused products to vendors for credit.
- .10 Reuse: To reuse a construction waste material in some manner on the project site.
- .11 Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- .12 Sediment: Soil and other debris that has been eroded and transported by storm or well production run off water.
- .13 Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- .14 Toxic: Poisonous to humans either immediately or after a long period of exposure.
- .15 Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

- .16 Volatile Organic Compounds (VOCs): Chemical compounds common in and emitted by many building products over time through outgassing:
 - .1 Solvents in paints and other coatings.
 - .2 Wood preservatives; strippers and household cleaners.
 - .3 Adhesives in particleboard, fiberboard, and some plywood; and foam insulation.
 - .4 When released, VOCs can contribute to the formation of smog and can cause respiratory tract problems, headaches, eye irritations, nausea, damage to the liver, kidneys, and central nervous system, and possibly cancer.
- .17 Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate waste management requirements with all Divisions of the Work for the project and ensure that requirements of the Construction Waste Management Plan are followed.
- .2 Preconstruction Meeting: Arrange a pre-construction meeting in accordance with Section 01 31 19 - Project Meetings before starting any Work of the Contract attended by the Departmental Representative, the Contractor, and Subcontractors, to discuss the Construction Waste Management Plan and to develop mutual understanding of the requirements for a consistent policy towards waste reduction and recycling.

1.6 QUALITY ASSURANCE

- .1 Resources for Development of Construction Waste Management Report (CWM Report): The following sources may be useful in developing the Draft Construction Waste Management Plan:
 - .1 Recycling Haulers and Markets: Investigate local haulers and markets for recyclable materials and incorporate into CWM Plan.
 - .2 Waste-to-Energy Systems: Investigate local waste-to-energy incentives where systems for diverting materials from landfill for reuse or recycling are not available.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Storage Requirements: Implement a recycling/reuse program that includes separate collection of waste materials as appropriate to the project waste and the available recycling and reuse programs in the project area.
- .2 Handling Requirements: Clean materials that are contaminated before placing in collection containers and ensure that waste destined for landfill does not get mixed in with recycled materials:
 - .1 Deliver materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
 - .2 Arrange for collection by or delivery to the appropriate recycling or reuse facility.
- .3 Hazardous Waste and Hazardous Materials: Handle in accordance with applicable Regulations.

Part 2 Products

2.1 NOT APPLICABLE

- .1 Not applicable.

Part 3 Execution

3.1 CWM PLAN IMPLEMENTATION

- .1 Manager: Contractor is responsible for designating an onsite party or parties responsible for instructing workers and overseeing and documenting results of the CWM Plan for the project.
- .2 Distribution: Distribute copies of the CWM Plan to the job site foreman, each Subcontractor, the Departmental Representative, and other site personnel, as required, to maintain CWM Plan.
- .3 Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, composting and return methods being used for the Project to Subcontractor's at appropriate stages of the Project.
- .4 Separation Facilities: Lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, composting, and return:
 - .1 Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
 - .2 Hazardous wastes shall be separated, stored, and disposed of in accordance with local Regulations.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Cleaning - Section 01 74 00.
- .2 Waste Management and Disposal - Section 01 74 19.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 All costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Canadian Environmental Protection Act (CEPA).
 - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor must conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative's inspection.
 - .2 Departmental Representative's Inspection:
 - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: Submit written certificates that tasks have been performed as follows:
 - .1 Work: Completed and inspected for compliance with Contract Documents.
 - .2 Defects: Corrected and deficiencies completed.
 - .3 Equipment and systems: Tested, balanced adjusted, and fully operational.
 - .4 Certificates required by Utility companies submitted.
 - .5 Work: Complete and ready for final inspection.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Departmental Representative and Contractor.
 - .2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

1.5 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools, and equipment.
- .2 Waste Management: Separate waste materials for recycling reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

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 Project Meetings - Section 01 31 19.
- .2 Submittal Procedures - Section 01 33 00.
- .3 Quality Control - Section 01 45 00.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 All costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Canadian Environmental Protection Act (CEPA).
 - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to contract completion with Departmental Representative, in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify Project requirements.
 - .2 Review warranty requirements manufacturer's installation instructions.
 - .2 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Provide name, telephone number, and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide spare parts, maintenance materials, and special tools of same quality and manufacture as products provided in Work.
- .3 Provide evidence, if requested, for type, source, and quality of products supplied.

1.6 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: Vinyl, hard covered, 3 "D" ring, loose leaf, 219 x 279 mm, with spine and face pockets.

- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .4 Cover: Identify each binder with type or printed title "Project Record Documents"; list title of project and identify subject matter of contents.
- .5 Arrange content by process flow, systems, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: Manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files, in dwg format, on CD.

1.7 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: Provide title of project.
 - .1 Date of submission; names.
 - .2 Addresses, name, and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses, and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: Mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: As required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.8 AS-BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative, one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.

- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry, and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.9 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: Mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 Referenced Standards to related shop drawings and modifications.
- .5 Specifications: Mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: Maintain field test records, inspection certifications, manufacturer's certifications, required by individual specifications sections.
- .7 Provide digital photos, if requested, for site records.

1.10 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .1 Provide information for re-ordering custom manufactured products.

- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional Requirements: As specified in individual Specification.

1.11 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit Warranty Management Plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.
- .3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain enough detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing;
 - .2 List of subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible designated by each one;
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten (10) days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Conduct joint 12-month warranty inspection, measured from time of acceptance, with Departmental Representative.
- .9 Include information contained in Warranty Management Plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers, or suppliers involved.
 - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, motors, pumps, HVAC balancing, transformers, sprinkler systems, lightning protection systems, alarm systems, commissioned systems fire protection.

- .3 Provide list for each warranted equipment, item, feature of construction or system, indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses, and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: Include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to continue warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
 - .11 Organization, names and phone numbers of persons to call for warranty service.
 - .12 Typical response time and repair time expected for various warranted equipment.
- .4 Contractor's plans for attendance at 12-month post-construction warranty inspections.
- .5 Procedure and status of tagging of equipment covered by extended warranties.
- .6 Post copies of instructions near selected items of equipment where operation is critical for warranty and/or safety reasons.
- .10 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .11 Written verification to follow oral instructions.
 - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.12 WARRANTY TAGS

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water-resistant tag approved by Departmental Representative.
- .2 Attach tags with copper wire and spray with waterproof silicone coating.
- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
 - .1 Type of product/material;
 - .2 Model number;
 - .3 Serial number;
 - .4 Contract number;
 - .5 Warranty period;
 - .6 Inspector's signature;

.7 Contractor's signature.

Part 2 Products

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 Submittal Procedures - Section 01 33 00.
- .2 Cleaning - Section 01 74 00.
- .3 Waste Management and Disposal - Section 01 74 19.
- .4 Excavating, Trenching and Backfilling - Section 31 23 33.01.
- .5 Granular Sub-Base - Section 32 11 16.01.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Removal and off-site disposal of concrete curb:
 - .1 The removal of concrete edges is measured by the linear meter removed.
 - .2 The unit price shall include the removal and off-site disposal of the curb in accordance with the information presented in the plans and the requirements of this section of the specification and section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Removal and off-site disposal of concrete medians:
 - .1 The removal of medians is measured per square meter removed.
 - .2 The unit price shall include the removal and off-site disposal of the medians in accordance with the information presented in the plans and the requirements of this section of the specification and section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .3 Removal and reinstallation of guardrail on steel post:
 - .1 The removal and reinstallation of guardrail is measured by the linear meter removed.
 - .2 The unit price shall include the removal and reinstallation of the guardrail in accordance with the information presented in the plans and the requirements of this section of the specification and section 31 23 33.01 - Excavating, Trenching and Backfilling.
 - .3 The contractor must plan to replace all post and hardware required for the reinstallation. The price must also include the off-site disposal of non-reused parts.
- .4 Removal and reinstallation of the perimeter fence:
 - .1 The removal and reinstallation of the perimeter fence is measured by the linear meter removed.
 - .2 The unit price shall include the removal and reinstallation of the fences in accordance with the information set out in the plans and the requirements of this section of the specification and section 31 23 33.01 - Excavating, Trenching and Backfilling.
 - .3 The contractor must plan to replace all concrete poles and hardware required for the relocation. The price must also include the off-site disposal of non-reused parts.

- .5 Removal and off-site disposal of reinforced concrete storm sewer lines of varying diameters, including excavation and backfill:
 - .1 The Contractor must provide a price per linear meter for the removal and off-site disposal of storm or sanitary sewer lines as indicated in the plans.
 - .2 The work is measured and paid for per linear meter of pipe removed, measured horizontally from manhole to manhole or from manhole to the end of the sawed pipe. The Contractor must provide a price per linear meter regardless of the diameters prescribed in this item of the price schedule.
 - .3 The price includes, but is not limited to, the excavation, pumping and dewatering of excavations, the propping of trench walls, the demolition and removal of existing pipes, as well as the transport and disposal off-site of works and other materials according to the information presented in the plans as well as the requirements of this section of specifications and section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .6 Removal and off-site disposal of manholes including excavation and backfill:
 - .1 The Contractor must provide a unit price for the removal and off-site disposal of manhole according to the indications in the plans.
 - .2 The price includes, but is not limited to, the excavation, pumping and dewatering of excavations, the shoring of trench walls, demolition, removal, and off-site disposal of manholes and embedding, as well as the transport and off-site disposal of works and other materials according to the information presented in the plans as well as the requirements of this section of specifications and section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .7 Removal and off-site disposal of culverts of varying diameters, including excavation and backfilling
 - .1 The Contractor must provide a price per linear meter for the removal and off-site disposal of culverts as indicated in the plans.
 - .2 The work is measured and paid for per linear meter of culvert removed, measured horizontally from one end of the pipe to the other. The Contractor must provide a price per linear meter regardless of the diameters prescribed in this item of the price schedule.
 - .3 The price includes, but is not limited to, the excavation, pumping and dewatering of excavations, the shoring of trench walls, the demolition, removal and off-site disposal of culverts and beveled ends and seats, as well as the off-site transportation and disposal of works and other materials according to the information presented in the plans and the requirements of this section of the specification and section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .8 All other costs associated with this quote section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Health Canada - Workplace Hazardous Materials Information System (WHMIS):
 - .1 Safety data sheets (SDS)

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Have the Departmental Representative approve, prior to the start of the work, the demolition method that the Contractor wishes to use. The method must describe the organization plan and the means recommended to limit the circulation on the existing base course. It must also include the weather protection means of exposed granular and stabilized surfaces.
- .3 Shop Drawings
 - .1 Submitted shop drawings must bear the seal and signature of a qualified engineer qualified or licensed to practice in Canada, in the province of Quebec.
 - .2 If required by competent authorities, submit for approval drawings, diagrams or details showing order of demolition, shoring and rework work and items used. to do this.
- .4 Hazardous materials
 - .1 Provide a description of hazardous materials and provide advice to the appropriate authorities prior to commencing work.
- .5 Certificates
 - .1 Provide, when requested by the Departmental Representative, certified receipts from authorized landfills and reuse and recycling centers, for all materials removed from the site.

1.5 QUALITY ASSURANCE

- .1 Regulators' requirements: ensure that all work is carried out in accordance with all relevant provincial regulations.

1.6 TRANSPORT, STORAGE AND HANDLING

- .1 Store and manage hazardous materials in accordance with current standards.
- .2 Transportation of demolition materials
 - .1 The transportation of demolition materials in the airport area must be done with trucks covered so that no material can escape.
 - .2 Provincial restrictions and regulations on trucking also apply within the airport limits.
- .3 Storage and protection
 - .1 Protect existing structures that must remain in place as well as those that must be recovered. If they suffer damage, replace, or repair them immediately, to the satisfaction of the Departmental Representative, at no additional cost.
 - .2 Remove and store, without damaging them, materials to be recovered.
 - .3 Store and protect materials to ensure maximum preservation.
 - .4 Handle the recovered materials as new.

1.7 CONDITIONS OF IMPLEMENTATION

- .1 Environmental Requirements
 - .1 Ensure that selective demolition work has no adverse effect on adjacent watercourses, groundwater and wildlife and does not generate excessive levels of air pollution or pollution. by the noise.

- .2 Do not discharge volatile waste materials such as mineral spirits, oils, petroleum-based lubricants or toxic cleaning solutions into waterways, storm, or sanitary sewers.
 - .1 Enforce appropriate disposal methods for this type of waste throughout the duration of the work.
- .3 Do not discharge water containing suspended solids into waterways, storm sewers, sanitary sewers, or adjacent lands, by pumping or otherwise.
- .4 Ensure the disposal of stormwater containing suspended solids or other harmful substances in accordance with the instructions of the Departmental Representative.
- .5 Protect vegetation (trees, plants, shrubs, foliage) in the field and adjacent properties as indicated.

Part 2 Products

2.1 EQUIPMENT

- .1 Use equipment with adequate characteristics and specifications to carry out the work efficiently while achieving the desired level of precision.
- .2 Machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 EXAMINATION

- .1 With the Departmental Representative, inspect the site and verify the location and extent of works that must be removed, disposed of, recovered, recycled, recovered, and those that must remain in place.
- .2 Identify and protect utility lines. Protect existing service lines that pass through the site to keep them in good working order.
- .3 Before commencing demolition work, notify and obtain approval of utility companies.

3.2 REMOVAL AND DEMOLITION OPERATIONS

- .1 Remove items as indicated.
- .2 Disruption of items designated to remain in place is not permitted. The Contractor shall use a demolition and removal technique accordingly. This technique will have to be submitted for approval by the Departmental Representative.
- .3 Salvage
 - .1 Dismantle items containing materials for salvage and stockpile salvaged materials at locations as indicated.
- .4 Disposal of Material
 - .1 Dispose of materials not designated for salvage or reuse on site as instructed by Departmental Representative.

- .2 If the demolitions are eliminated on the construction site itself, rehabilitate the areas used for this purpose, to the satisfaction of the Departmental Representative.

3.3 STOCKPILING

- .1 No depositing is allowed in the work area. The demolition and excavation materials must be disposed of off site as and when required by the Departmental Representative.

3.4 REMOVAL FROM SITE

- .1 Any materials not recovered or not reused by others at the site and other materials identified by the Departmental Representative are considered as scrap. The Contractor must remove, transport, and dispose of them off site in locations that meet environmental requirements.
- .2 Ordinary excavation will be removed, transported, and disposed off site in accordance with environmental regulations and requirements.
- .3 Demolished asphalt and concrete pavements must be transported offsite unless otherwise specified by the Departmental Representative.

3.5 REPAIR

- .1 Return surfaces and structures outside demolition areas as they were before work commenced.
- .2 Use only soil treatment methods and products that are not harmful to health or harmful to vegetation, and do not endanger wildlife, adjacent watercourses, and the underground water table.

3.6 CLEANING

- .1 Cleaning During Work: Perform cleaning according to Section 01 74 00 - Cleaning.
 - .1 Leave the premises clean at the end of each working day.
 - .2 Upon completion, remove debris, sweep surfaces, and leave site clean.
 - .3 Surfaces and structures outside the demolition areas must be returned to the condition they were in before the start of the work.
- .2 Use cleaning solutions and methods that are neither harmful to health nor harmful to vegetation, and do not endanger wildlife, adjacent watercourses, and groundwater.
- .3 Final cleaning: remove surplus materials/materials, waste, tools and equipment from the site in accordance with section 01 74 00 - Cleaning.
- .4 Waste management: sort waste for reuse/re-use and recycling, in accordance with 01 74 19 - Waste management and disposal.
 - .1 Remove recycling bins and dumpsters from the job site and dispose of materials at the appropriate facilities.

3.7 PROTECTION

- .1 Repair damage to adjacent materials, equipment, or property by selective demolition of site development.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Cleaning - Section 01 74 00.
- .2 Waste Management and Disposal - Section 01 74 19.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Removal and off-site disposal of the asphalt pavement until the granular foundation, thickness of ± 100 mm, including saw cuts at the boundaries of the pavement to be rebuilt
 - .1 The removal of the asphalt pavement is measured in square meters of coating removed.
 - .2 The unit price shall include the removal and off-site disposal of the pavement in accordance with the information presented in the plans and the requirements of this section of the specifications.
 - .3 The unit price must also include the operations required to transport and heap the indicated cladding materials, as well as off-site disposal at a location approved by the MELCC.
 - .4 The thickness of ± 100 mm is given as an indication. If thicknesses greater than 125 mm are encountered, the unit cost per square meter will be proportionally increased in relation to the thickness observed.
- .2 All other costs associated with this section must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

- .1 Canada Green Building Council (CaGBC)
 - .1 LEED® Reference Guide for Building Design and Construction, Version 4.
- .2 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
 - .2 Canadian Environmental Protection Act, 1999 (CEPA), c. 33.
- .3 United States 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.

1.4 DEFINITIONS

- .1 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.
- .2 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed, removed and salvaged, or removed and reinstalled
- .3 Draft Construction Waste Management Plan (Draft CWM Plan): Detailed inventory of materials in building indicating estimated quantities of reuse, recycling and landfill,

prepared in accordance with Section 01 74 19 - Construction Waste Management and Disposal and as follows:

- .1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project.
- .4 Waste Management Coordinator (WMC): Contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .5 Construction Waste Management Plan (CWM Plan): Written plan addressing opportunities for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19 - Waste Management and Disposal.
- .6 Construction Waste Management Report (CWM Report): Written report identifying actual materials that formed CWM Plan for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19 - Waste Management and Disposal.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate requirements for Waste Management and Disposal for materials being re used or recycled in accordance with Section 01 74 19 - Waste Management and Disposal:
 - .1 Divert excess materials from landfill.
 - .2 Separate materials identified for recycling place in identified areas in accordance with Waste Management Plan.
 - .3 Label location of salvaged material's storage areas and provide barriers and security devices.
 - .4 Remove materials that cannot be salvaged for re use or recycling and dispose of in accordance with applicable codes at licensed facilities.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Action Submittals: Provide following submittals before starting work of this Section:
 - .1 Shop Drawings: Submit shop drawings indicating diagrams or details showing sequence of demolition work.
- .2 Informational Submittals: Provide following submittals during course of work:
 - .1 Certificates: Submit copies of certified weigh bills, bills of lading or receipts from authorized disposal sites and re use and recycling facilities for material removed from site.
 - .3 Sustainable Design Submittals:
 - .1 Erosion and sediment control: submit one (1) copy of the erosion and sediment control plan in accordance with the competent authorities.
 - .2 Construction Waste Management: Submit project CWM Plan highlighting recycling and salvage requirements in accordance with Section 01 74 19 - Waste Management and Disposal.

1.7 QUALITY ASSURANCE

- .1 Regulatory Requirements: ensure Work is performed in compliance with applicable Provincial/Territorial regulations.

- .2 Comply with hauling and disposal regulations of Authority Having Jurisdiction.

1.8 SITE CONDITIONS

- .1 Protect existing site features to remain or identified for salvage or re use; make repairs and restore to a similar condition to existing where damage to these items occurs as directed by Departmental Representative and at no additional cost.
 - .1 Remove and store salvaged materials to prevent contamination.
 - .2 Store and protect salvaged materials as required for maximum preservation of material.
 - .3 Handle salvaged materials same as new materials.
- .2 Perform pavement removal work to prevent adverse effects to adjacent watercourses, groundwater, and wildlife, and to prevent excess air and noise pollution:
 - .1 Do not pump water containing suspended materials into watercourses, storm, or sanitary sewers or onto adjacent properties.
 - .2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Authorities Having Jurisdiction.
- .3 Protect existing site features and structures, trees, plants and foliage on site and adjacent properties.

Part 2 Products

2.1 NOT APPLICABLE

- .1 Not applicable.

Part 3 Execution

3.1 PREPARATION

- .1 Verify extent and location of asphalt identified for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities, preserve active utilities traversing site in operating condition.
- .3 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .4 Prior to beginning removal operation, inspect and verify with the Departmental Representative areas, depths, and lines of asphalt pavement to be removed.

- .5 Protection: protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of the Departmental Representative at no additional cost.

3.2 REMOVAL

- .1 Sawing on the full depth around the edge of the asphalt pavement to be removed. The pavement should be sawn on all sides, even if a milling machine is used for the removal of pavement.
- .2 Remove existing bituminous coating in accordance with the limits and level ratings indicated or established on site by the Departmental Representative.
- .3 Demolition of pavements, curbs, and gutters:
 - .1 Square up adjacent surfaces to remain in place by saw cutting or other method acceptable to Representative on site.
 - .2 Protect adjacent joints and load transfer devices.
 - .3 Protect underlying and adjacent granular materials where they are exposed and identified to remain.
 - .4 Prevent contamination with base coarse aggregates, when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving.
- .4 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.
- .5 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
- .6 Suppress dust generated by removal process.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – Cleaning.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Submittal Procedures - Section 01 33 00.
- .2 Cleaning - Section 01 74 00.
- .3 Concrete Reinforcing - Section 03 20 00.
- .4 Cast-in-Place Concrete - Section 03 30 00.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 This section of specification is not the subject of any item on the bid form. The costs associated with the requirements of this section shall be included in the relative items.

1.3 REFERENCE STANDARDS

Latest edition of the following documents:

- .1 Canadian Standards Association (CSA) / CSA International
 - .1 CAN / CSA-A23.1, Concrete - Components and Execution of Work.
 - .2 CAN / CSA-O86, Calculation rules for allowable stresses of timber frames.
 - .3 CSA O121 Douglas Fir Plywood.
 - .4 CSA O151, Canadian Softwood Plywood.
 - .5 CSA O153, Poplar Plywood.
 - .6 CAN / CSA-O325, Intermediate Construction Coatings.
 - .7 CSA S269.1-16 Falsework for Construction Purposes.
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN / ULC-S701 Standard for Polystyrene Thermal Insulation, Panels and Pipe Coatings.
- .3 Safety Code for Construction Work
 - .1 R.Q.C, S-2.1, r.6, Québec Official Publisher
- .4 CNESST Standards

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings of formwork and temporary shoring works.
 - .1 The drawings must bear the seal and signature of a competent engineer recognized or licensed to practice in Canada, in the province of Quebec.
- .3 The shop drawings must indicate, show or understand the construction method and schedule of work, the procedures for shoring, stripping and repositioning the props, the materials, the particular architectural features of the work. finished apparent surfaces, the arrangement of joints, tie rods and lining elements, and the location of embedded temporary parts. Comply with CSA S269.1 for drawings of temporary shoring.

- .4 Shop drawings must indicate, show or understand formwork calculation data such as allowable speed and temperature of concrete placement in formwork.
- .5 Specify the order of assembly and dismantling of formwork and temporary shoring works, as directed by the Departmental Representative.
- .6 If slipforms are used, submit details of materials and procedures to Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Formwork Materials
 - .1 For the placement of concrete that does not have special architectural features, use wood and wood products formwork in accordance with CSA O121, CAN / CSA-O86 and CSA O153.
 - .2 For the placement of concrete with specific architectural features, use formwork materials in accordance with CSA-A23.1.
- .2 Formwork ties
 - .1 Use removable or quick release wire ties of fixed or adjustable length, with no devices that could leave holes larger than 25 mm on the concrete surface.
- .3 Formwork liner
 - .1 Plywood: Douglas fir complying with CSA O121 Medium Density Coated Standard Grade with 20 mm thick squared edges.
- .4 Release agent: an active chemical agent containing compounds that react with free lime in concrete to form water-insoluble soaps that prevent concrete from adhering to the form.
- .5 Release oil: colorless, non-toxic, biodegradable, low VOC mineral oil, kerosene-free, having a viscosity of 15 to 24 mm² / s at a temperature of 40°C, and having a point of open crucible flash is at least 150°C.
- .6 Temporary Materials: to CSA-S269.1.
- .7 Formwork for tubular pilasters: circular formwork consisting of laminated fibreboard, forming spirals with a smooth interior finish that does not show the spirals after stripping, and coated with a stripping product on the inside.

Part 3 Execution

3.1 FABRICATION AND ERECTION

- .1 Before commencing construction of formwork and temporary shoring, check lines, levels and centers, and ensure dimensions match those shown on drawings.
- .2 Obtain Departmental Representative authorization before pouring concrete directly into the ground or pouring into the forms, openings that are not shown on the drawings.
- .3 Before pouring the concrete directly into the ground, erect the walls and bottom of the excavated area, and remove the loose soil.

- .4 Fabricate temporary shoring and install in accordance with CSA S269.1.
- .5 The soles and props placed on the ground must not be mounted on a frozen surface.
- .6 Ensure the drainage of the ground so as to prevent the training of the soil on which the soles and props placed on the ground rest.
- .7 Fabricate and install formwork in accordance with CAN / CSA-S269.1, to obtain finished concrete structures of the form, size and level as indicated and located in the locations indicated; meet the tolerances specified in CSA-A23.1.
- .8 Align form joints and make them watertight.
 - .1 Minimize number of joints.
- .9 Unless otherwise specified, use 25 mm chamfer strips for projecting angles and / or 25 mm strips for re-entrant angles of formwork joints.
- .10 Unless otherwise indicated, provide each joint with a spanner 50 mm deep and 1/3 of the width of the walls or slabs.
- .11 Grooves, slots, openings, drips, recesses and expansion and removal joints shall be as indicated.
- .12 Control joints to be in accordance with instructions.
- .13 Incorporate anchors, sleeves and other embedded parts required for works specified in other sections.
 - .1 Ensure that anchors and embedded parts do not protrude on surfaces to be coated with a finishing product, such as a coat of paint.
- .14 Before pouring concrete, clean formwork in accordance with CSA-A23.1.
- .15 If slipforms are used, submit details in accordance with "Action and Informational Submittals" in Part 1.
- .16 The oiling of the formwork must be done before the laying of reinforcing steel.

3.2 REMOVAL AND RESHORING

- .1 The formwork must remain in place at least three (3) days after concreting of a structure, with the exception of the formwork on shoring which must remain in place until the shoring is removed.
- .2 Formwork is considered removed when it is loose and part of it is no longer in contact with the concrete. The requirements for concrete cure should apply as the formwork is removed if it is removed before the end of the cure period.
- .3 Do not remove formwork unless concrete has reached at least 70% of its specified strength at 28 days after the minimum curing period indicated, and immediately re-install the appropriate struts.
- .4 Replace required props when it is necessary to quickly remove formwork or if framing may be subject to additional loads during construction of the structure.
- .5 The maximum spacing of the props returned in each of the main thrust axes is 3,000 mm.
- .6 Reuse formwork and temporary shoring, subject to the requirements of CSA-A23.1.
- .7 Remove metal tie rods used to retain formwork and plug holes with cement mortar.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Submittal Procedures - Section 01 33 00.
- .2 Cleaning - Section 01 74 00.
- .3 Concrete Forming and Accessories - Section 03 10 00.
- .4 Cast-in-Place Concrete - Section 03 30 00.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 This section of specification is not the subject of any item on the bid form. The costs associated with the requirements of this section shall be included in the relative items.

1.3 REFERENCE STANDARDS

- .1 American Concrete Institute (ACI)
 - .1 SP-66-04, ACI Detailing Manual 2004.
- .2 ASTM International (ASTM)
 - .1 ASTM A123/A123M - [15] Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .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 A775/A775M-17, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
 - .4 ASTM A1064/A1064M-17, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- .3 CSA Group (CSA)
 - .1 CSA A23.1-[14] /A23.2-[14], Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA A23.3-[14], Design of Concrete Structures.
 - .3 CSA G30.18-[09 (R2014)], Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA G40.20/G40.21-[13 (R2014)], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CSA W186-[M1990 (R2016)], Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC-[2004], Reinforcing Steel Manual of Standard Practice.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit the required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Reinforcement drawings must be executed in accordance with the IAAC's Recommended Standards Manual.
- .3 Shop Drawings
 - .1 The drawings must bear the seal and signature of a recognized Departmental Representative engineer or licensee to practice in Canada, in the province of Quebec.
 - .1 The drawings must indicate the details of placement of reinforcement and the following:
 - .1 Bending details of rebars.
 - .2 List of reinforcement.
 - .3 Number of reinforcements.
 - .4 Size, spacing and location of reinforcements, and mechanical joints necessary if approved for use by the Departmental Representative. The reinforcements shown therein must be marked with an identification code which makes it possible to locate them without the need to consult the structural drawings.
 - .5 Drawings must also indicate dimensions, spacing and location of chairs, spacers and supports.
 - .6 Unless otherwise specified, straight seal lengths and bar overlap lengths shall be in accordance with CAN / CSA-A23.3.
 - .7 Unless otherwise specified, provide type C tension overlap joints.
- .4 No work shall begin without receiving the drawings approved by the Departmental Representative.

1.5 ACTION AND QUALITY ASSURANCE

- .1 At least four (4) weeks prior to reinforcement placement, provide the Departmental Representative with a certified copy of the factory steel reinforcement test report containing the results of the physical and chemical analysis of the steel. frame.
- .2 Inform the Departmental Representative of the proposed source of supply for reinforcing materials to be supplied.

1.6 TRANSPORT, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with manufacturer's written instructions.
- .2 Deliver materials and materials to 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 materials on pieces of wood so that they do not rest on the ground in a clean, dry and well-ventilated area as recommended by the manufacturer.
 - .2 Replace damaged frames with new reinforcements.
 - .3 Locate steel to protect against the movement of people and machinery.

Part 2 Products**2.1 MATERIALS**

- .1 Any replacement of rebars with bars of different sizes must be authorized in writing by the Departmental Representative.
- .2 Reinforcing steel: high-adhesion bars made of billet steel, grade 400, in accordance with CSA-G30.18.
- .3 Tie Wire: Annealed and cold drawn steel wire in accordance with ASTM A1064 / A1064M.
- .4 Reinforcing wire: high adherence steel wire for reinforcing concrete, to ASTM A1064 / A1064M.
- .5 Welded wire reinforcement mesh made of high strength welded steel wire in accordance with ASTM A1064 / A1064M.
 - .1 Mesh must be supplied as flat sheets only.
- .6 Epoxy Protective Coating for Non-Prestressed Reinforcement: to ASTM A775 / A775M.
- .7 Galvanized Protective Coating for Non-Prestressed Reinforcement: to ASTM A123 / A123M.
- .8 Bar Supports, Lateral and Inner Spacers: in accordance with Clause 6.6.7 of CSA-A23.1 / A23.2. No brick or concrete block is accepted.
- .9 The reinforcement shall be installed and fixed accurately, and supported by means of bar supports, internal form spacers and spacers made of steel or plastic. No brick or concrete block is accepted.
- .10 Mechanical Fittings: Subject to Departmental Representative Authorization.
- .11 Round and smooth bars: in accordance with CSA-G40.20 / G40.21.

2.2 FABRICATION

- .1 Steel reinforcement shall be shaped in accordance with CSA-A23.1, SP-66, Reinforcing Steel and Recommended Standards Manual, published by the Reinforcing Steel Institute. of Canada (IAAC).
- .2 The Departmental Representative must approve the location of junctions other than those indicated on the installation drawings.
- .3 As soon as approved by Departmental Representative, reinforcements shall be welded in accordance with CSA W186.
- .4 Shipment batches shipped shall be clearly marked with an identification code, in accordance with the list of required reinforcing bars and the details of their folding.
 - .1 Epoxy coated bars to be shipped in accordance with ASTM A775 / A775M.

Part 3 Execution**3.1 FIELD BENDING**

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by the Departmental Representative.

- .2 When field bending authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars, which develop cracks or splits.

3.2 REINFORCEMENT PROTECTION

- .1 Unless specified otherwise in the drawings, Reinforcement covering must comply with the requirements of CSA A23.1.

3.3 PLACING REINFORCEMENT

- .1 Install reinforcement as indicated in placing drawings in accordance with CSA-A23.1.
- .2 In concrete structures, use round and smooth bars as moving couplers.
 - .1 Apply a coat of bituminous paint on the part of the couplers that must move in hardened concrete.
 - .2 When paint is dry, apply evenly a thick layer of mineral lubricating grease.
- .3 Ask the Departmental Representative to accept the reinforcements and their installation before pouring the concrete.
- .4 Ensure reinforcement bars and stud baskets are covered with sufficient concrete thickness when pouring concrete.
- .5 Fasten and secure bars and stud baskets to prevent displacement during casting of concrete.

3.4 FIELD TOUCH-UP

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

3.5 CLEANING

- .1 Work in progress: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave the premises clean at the end of each working day.
- .2 Final Cleaning: Upon completion, remove surplus materials, rubbish, tools and equipment from site in accordance with Section 01 74 00 - Cleaning.
- .3 Clean reinforcement before pouring concrete.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Submittal Procedures - Section 01 33 00.
- .2 Cleaning - Section 01 74 11.
- .3 Concrete Forming and Accessories - Section 03 10 00.
- .4 Concrete Reinforcing - Section 03 20 00.
- .5 Excavating, Trenching and Backfilling - Section 31 23 33.01.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Concrete edge construction:
 - .1 Concrete edge construction is measured by the linear meter built.
 - .2 The price includes the protection of existing services, the excavation of the trench, the off-site disposal of surplus excavation materials or materials deemed unusable, the dewatering of excavations and the control of sediment propagation, the construction of the concrete edge according to the information presented in the plans as well as the requirements of this section of specifications and section 31 23 33.01 - Excavation, trenching and backfilling.
- .2 Construction of a concrete median:
 - .1 The construction of a concrete median is measured per square meter built.
 - .2 The price includes the protection of existing services, the excavation of the trench, the off-site disposal of surplus excavation materials or materials deemed unusable, the drying of excavations and the control of sediment propagation, the construction of the concrete median according to the information presented in the plans as well as the requirements of this section of specifications and section 31 23 33.01 - Excavation, trenching and backfilling.

1.3 REFERENCE STANDARDS

Latest edition of the following documents:

- .1 ASTM International
 - .1 ASTM C260 / C260M-REVA, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Concrete Curing.
 - .3 ASTM C494 / C494M, Standard Specification for Chemical Admixtures for Concrete.
- .2 Canadian Standards Association (CSA) / CSA International
 - .1 CSA-A23.1 / A23.2, Concrete: Constituents and Performance of Work / Test Methods and Standard Practices for Concrete.
 - .2 CSA-A3000 Compendium of Bonding Materials.
- .3 Quebec Bureau of Standardization

- .1 BNQ 2621-905: Ready-mixed Concrete - Certification Program (developed from the requirements of Chapters 4, 5 and 8 of CSA-A23.1 / A23.2-09).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 At least four (4) weeks prior to commencing work, advise the Departmental Representative of the proposed source of supply for aggregates, and allow access to the Contractor for sampling.
- .3 At least four (4) weeks prior to start of work, submit Concrete Dosage Form to Departmental Representative for verification.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 The plant and the delivery equipment must hold a certificate of conformity issued by the Bureau de normalization du Québec in accordance with the certification protocol BNQ 2621-905. The plant must be equipped with an appropriate device for the incorporation of flake ice during concreting operations in hot weather.
- .2 Delivery and acceptance
 - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 If applicable, any change in maximum transit time must be accepted in writing by the Test Laboratory Representative and Concrete Producer, as indicated in the latest CSA-A23.1.
 - .2 Deviations must be submitted to the Departmental Representative for review.
 - .2 Delivery of concrete: ensure that the concrete batching plant ensures continuous delivery of concrete, in accordance with the latest version of the BNQ 2621-905 certification protocol.
 - .3 It is not allowed to add water to the site during concrete pouring.

Part 2 Products

2.1 MATERIALS

- .1 GU-type general-purpose Portland cement or GUB-SF compliant with latest CSA-A3001 standard. GUB-SF cement must contain at least 8% silica fume.
- .2 Water: according to the latest CSA-A23.1 standard.
- .3 Aggregates: According to the latest CSA-A23.1 / A23.2 standard.
 - .1 Do not use alkali-reactive aggregates of Portland cement (as determined by CSA-A23.2-14A test) unless the equivalent amount of alkali in the proposed mixture is less than 3 kg / m³.
 - .2 Coarse aggregate
 - .1 The coarse aggregate must come from a quarry.
 - .3 Fine aggregate
 - .1 Fine aggregate must be natural sand.

- .4 Adjuvants
 - .1 Air entrainers: according to ASTM C260.
 - .2 Chemical admixtures: according to ASTM C494. The Departmental Representative must accept the accelerators or retarders used during concrete work in cold weather or hot weather.
 - .3 Ensure that adjuvants used are compatible and incorporated into concrete as directed by the manufacturer. If an adjuvant proves to be harmful or inefficient, replace it immediately with a substitute, assume the costs.
- .5 Non-shrink grout: premixed product containing a non-metallic aggregate, cement Portland, a plasticizer and a water reducer, Sika Grout 212 type or equivalent approved by the Departmental Representative.
- .6 Unmixed Dry Grout: Portland cement product containing non-aggregates metal and enough water to keep its shape when it is rolled with the hands, and can reach a compressive strength of 35 MPa at 28 days.
- .7 Curing compound: white, in accordance with ASTM C309.
- .8 Bonding Adhesive: Sikatop Armatec 110 Epocem or equivalent approved by the Departmental Representative.
- .9 Chemical anchorage: Hilti HIT-HY 100 or an equivalent approved by the Departmental Representative.

2.2 MIXES

- .1 35 MPa Concrete
 - .1 Concrete of normal density shall be prepared in accordance with the most recent CSA-A23.1 standard, in order to achieve a blend with following for concrete used in all works:

.1	Type of binder	GUb-SF
.2	Minimum compressive strength at 28 days	35 MPa
.3	Minimum cement content	340 kg / m ³ of concrete
.4	Maximum water / cement ratio	0.45
.5	Nominal size of coarse aggregate	20 mm
.6	Maximum temperature for pouring	26 °C
.7	Slump at the moment and at the point discharge	80 mm ± 30 mm (120 mm ± 30 mm after adding the super-plasticizer)
.8	Air content	5 to 8%
.9	Network of air bubbles maximum spacing factor of	230 µm
- .2 20 MPa Concrete
 - .1 Concrete of normal density shall be prepared in accordance with the most recent CSA-A23.1 standard, in order to achieve a blend with following for concrete used in all works:

.1	Type of binder	GU
----	----------------	----

.2	Minimum compressive strength at 28 days	20 MPa
.3	Minimum cement content	290 kg / m ³ of concrete
.4	Maximum water / cement ratio	0.60
.5	Nominal size of coarse aggregate	10 mm
.6	Slump at the moment and at the point discharge	120 mm ± 30 mm
.7	Air content	5 to 8%
.3 15 MPa Concrete		
.1	Concrete of normal density shall be prepared in accordance with the most recent CSA-A23.1 standard, in order to achieve a blend with following for concrete used in all works:	
.1	Type of binder	GU
.2	Minimum compressive strength at 28 days	15 MPa
.3	Minimum cement content	200 kg / m ³ of concrete
.4	Maximum water / cement ratio	0.78
.5	Nominal size of coarse aggregate	20 mm
.6	Slump at the moment and at the point discharge	120 mm ± 30 mm
.7	Air content	5 to 8%

Part 3 Execution

3.1 PREPARATION

- .1 Before beginning the concreting, have the Departmental Representative approve the sequences and concreting methods.
- .2 Place reinforcement according to section 03 20 00 - Concrete Reinforcement.
- .3 Observe the following instructions during concrete work:
 - .1 Do not make recovery joints.
 - .2 Ensure that transportation and handling of concrete is carried out in a to minimize interventions during its implementation and to avoid causing damage to the existing structure or structures.
- .4 Concrete pumping will only be permitted once materials and dosage formula are available approved.
- .5 Before pouring the concrete, obtain the Departmental Representative's permission for the method proposed to protect the concrete during the setting up and cure in bad weather.
- .6 Protect existing structures against soiling.
- .7 Clean concrete surfaces and remove stains before applying products finishing.
- .8 Keep a record of concreting work accurately indicating the date and the location of each tempered, the characteristics of the concrete, the ambient temperature and the samples taken.

- .9 Where new concrete is bonded to an existing structure, drill holes in the existing concrete. Insert steel studs into the drilled holes with epoxy grout in order to anchor and maintain them at the indicated positions.

3.2 INSTALLATION/APPLICATION

.1 General

- .1 Execute poured concrete in accordance with standard CSA A23.1 / A23.2.
- .2 Obtain the written authorization of the Departmental Representative before placing the concrete.
 - .1 Provide at least 24 hours notice prior to commencement of work.
- .3 Immediately before putting concrete in place, clean and remove all detritus and debris of all kinds of space that will occupy the concrete.
- .4 Ensure reinforcements and embedded parts are not moved during the placement of concrete.
- .5 No load shall be exerted on new concrete elements before that the Departmental Representative did not allow it. Regarding looks and sumps, no traffic will be allowed on them until the concrete has reached 80% specified compressive strength.
- .6 Do not backfill electrical and electrical conduit protection base for housings for recessed lights only after obtaining resistance concrete of at least 15 MPa.
- .7 Do not backfill manholes and sumps until after obtaining a concrete strength of at least 25 MPa.

.2 Setting up

- .1 Take the necessary precautions to avoid impacts to the formwork and freshly set concrete.
- .2 Use tools and methods to produce concrete surfaces smooth and without defects.
- .3 Lay concrete in formwork in horizontal beds and as close as possible of his final position. Deposit in beds of no more than 0.3 meters at a time.
- .4 Before depositing fresh concrete on concrete that has been set, remove the laitance, clean, wet and brush the surface of the old concrete with a clear paste of pure cement.
- .5 Take all necessary precautions to prevent deterioration of freshly poured concrete if weather conditions are unfavorable.

.3 Vibration of concrete

- .1 Mandatory use of internal type vibrators having a minimum frequency meeting the requirements of the latest CSA-A23.1 standard.
- .2 Avoid moving steel or formwork by contact with vibrators.
- .3 The Departmental Representative reserves the right to require additional teams to vibrate the concrete, if he finds that the vibration is not sufficient. The Contractor will be responsible for these additional costs.

.4 Concrete cure and protection

- .1 Apply two-coats of curing compound at rate prescribed by the manufacturer of the product. Use a product that does not affect the appearance of the concrete.

- .2 All concrete shall be protected so that the surface temperature does not decrease below the temperatures specified in section 3.2.5 "Cold or Hot Concreting" of this section.
 - .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 The concrete of small structures must have reached a minimum strength of 15 MPa before work is carried out nearby.
 - .1 For structural concrete, the strength must have reached 80% of its specified compressive strength at 28 days.
 - .6 For concrete structures to receive architectural products, do not apply curing agent but make a cure in water, as directed by the Departmental Representative.
- .5 Concreting in cold or hot weather
- .1 Refer to the latest CSA-A23.1 standard.
 - .2 It is forbidden to use calcium chloride as part of the concrete or as a deicing agent.
 - .3 Cold weather concrete placement: In addition to the requirements of CSA-A23.1, the Contractor must follow the following guidelines:
 - .1 No concrete pouring shall be undertaken without the permission of the Departmental Representative, when the outside temperature is below 5°C;
 - .2 When the outside temperature is maintained at or below 5°C or when it is likely to fall below 5°C during concrete placement, the concrete temperature must not be less than 10°C or greater than 26°C. The water and if necessary, the aggregates must be heated before being incorporated into the mixture;
 - .3 Before placing the concrete, the walls and bottoms of the formwork must be cleaned of any snow that may have accumulated and any ice that may have adhered to it. Forms must be heated for this purpose. It is not allowed to deposit concrete on or against a surface whose temperature is lower than 5°C. The heating of the formwork must begin before the setting of the concrete to reach this temperature;
 - .4 During the first seven (7) days, the surface temperature of the concrete shall not be less than 10°C;
 - .5 At the end of the prescribed protection periods, the concrete temperature shall be gradually lowered to a maximum of 20°C per day until the outside temperature is reached;
 - .6 If a shelter is built around the freshly poured concrete to facilitate heating, the Contractor shall, if necessary, moisten the ambient air so as to keep the concrete and formwork continuously moist. Combustion heaters may be used provided they are constructed and placed so that the flue gases do not come into contact with the fresh concrete surfaces;
 - .7 No concrete pouring will be accepted when the outside temperature is below -15°C, unless the work is covered with a heated shelter.
 - .4 Concrete Placement in Hot Weather: In addition to the requirements of CSA-A23.1, the Contractor must follow the following guidelines:
 - .1 Hot weather concreting requirements apply when ambient temperature exceeds 25°C;

- .2 Formwork surfaces and reinforcement steels should be sprinkled with cold water just prior to placing concrete. No accumulation of water at the bottom of the formwork will be allowed;
- .3 Special protection will be required to prevent too rapid dewatering of concrete, particularly when wind conditions prevail;
- .4 Concrete placement will not 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 cold or hot weathering will be done under the supervision of the laboratory and subject to its recommendations.
- .6 Sleeves and elements to be embedded
 - .1 Do not lay any sleeves, ducts or pipes and make any openings through beams or columns unless indicated or authorized by the Departmental Representative.
 - .2 After obtaining the permission from the Departmental Representative, arrange openings and place sleeves, fasteners, hangers and other embedded elements indicated on the drawings or specified elsewhere.
 - .3 Sleeves and openings larger than 100 mm x 100 mm which are not indicated must be examined by the Departmental Representative.
 - .4 Do not remove or move frames to install hardware. If the elements to be drowned in the concrete can not be placed in the prescribed places, have all the modifications accepted by the Departmental Representative, in writing, before pouring the concrete.
 - .5 Confirm location and dimensions of sleeves and openings shown on drawings.
 - .6 Place the special elements to be drown, for the purposes of the strength tests, according to the indications and requirements of the methods used for non-destructive testing of concrete.
- .7 Anchor bolts
 - .1 Fasten anchor bolts to jigs, in conjunction with appropriate trades, before pouring concrete.
 - .2 Only after having obtained authorization from the Departmental Representative, grout the anchor bolts installed in pre-drilled holes or drilled after the concrete has set.
 - .1 The diameter of the holes drilled after the setting of the concrete must be at least 25 mm larger than the bolts used and in accordance with the manufacturer's recommendations.
 - .3 Prevent water, snow and ice from accumulating in holes for anchor bolts.
- .8 Finishing
 - .1 Finish concrete surfaces to the latest CSA-A23.1 and in accordance with the specifications of Section 32 13 13 - Concrete Pavements.
 - .2 Use methods reviewed to the satisfaction of the Departmental Representative or methods defined in CSA-A23.1 to remove excess bleed water. Take care not to damage the surfaces of the concrete elements.
 - .3 Unless otherwise indicated, rub the exposed sharp edges with a carborundum brick until a radius of 3 mm is obtained.

3.3 TOLERANCES OF IMPLEMENTATION

- .1 Construction tolerances for concrete surfaces to be in accordance with latest CSA-A23.1 standard.

3.4 DEFECTIVE CONCRETE

- .1 Concrete should look good, be free of honeycombs, cold joints, cracks or other defects. If certain defects occur, the Contractor must bear the cost of repair or replacement of defective surfaces. No surface repair should be undertaken until the Departmental Representative is aware of the defects to be repaired, which must be corrected by specialized workers.
- .2 Any defective, soiled or debrided concrete must be repaired as directed by the Departmental Representative. Honeycombs, voids and the like discovered on release should not be corrected until they have been examined by the Departmental Representative. All these voids must be stitched down to solid concrete, a minimum of 10 mm deep. The edges of the concrete must be cut to obtain sharp and even edges, if necessary, with a saw. The surfaces must be well cleaned, and the cavities must first be coated with an epoxy-based concrete glue, then filled with a repair mortar, held in place, if necessary, by formwork. Edges and other, due to imperfections of the formwork must grinded.
- .3 The Contractor shall repair any damaged part of the work during the work as directed by the Departmental Representative.
- .4 At all places where concrete must remain visible, the Contractor must be particularly careful in the placement of concrete and demanding in the formwork quality (new formwork). If formwork concrete surfaces are unsatisfactory, require too much rework and exhibit too much color variation, the Departmental Representative may require a cement-based coating on all exposed surfaces at no additional cost to Departmental Representative.
- .5 The Contractor shall break with chisels the edges left by the open joints of the formwork.
- .6 All excess concrete formwork joints and other irregularities must be ground to obtain desired solid surfaces.
- .7 The Contractor must protect the parts of the structure where the concrete remains visible to prevent any damage that may occur during its work or the work of sub-contractors.
- .8 Any concrete work that is otherwise defective or cracked must be resumed at the expense of the Contractor. Final acceptance of the work must be done by the Departmental Representative who will make appropriate recommendations to the Departmental Representative.

3.5 QUALITY CONTROL

- .1 The inspection and testing of the concrete and its components will be carried out by the Departmental Representative's designated testing laboratory, to the satisfaction of the Departmental Representative, in accordance with the latest CSA-A23.1 / A23.2 and the requirements of this section.
- .2 If deemed necessary, the Departmental Representative will require the removal of additional test specimens during cold weather concreting work. The cure of these specimens must be done on site, under the same conditions as the tempered concrete from which they are extracted.

- .3 If the Departmental Representative accepts the use of non-destructive testing of concrete, these shall be performed in accordance with the methods described in the latest CSA-A23.1 / A23.2.
- .4 The inspection and tests performed by the Departmental Representative can neither replace nor supplement the Contractor's quality control nor release him from his contractual responsibilities in this respect.
- .5 Any additional concrete strength test required to accelerate the work is at the expense of the Contractor.

3.6 CLEANING

- .1 Perform cleaning in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Submittal Procedures - Section 01 33 00.
- .2 Cleaning - Section 01 74 11.
- .3 Cast-in-Place Concrete - Section 03 30 00.
- .4 Granular Sub-Base - Section 32 11 16.01.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 This section of specification is not the subject of any item on the bid form. The costs associated with the requirements of this section shall be included in the relative items.

1.3 REFERENCE STANDARDS

Latest edition of the following documents:

- .1 Quebec Bureau of Standardization (BNQ)
 - .1 BNQ 2560-114 Civil works - Aggregates.
- .2 Direction of the pavement laboratory of the Ministère des Transports du Québec
 - .1 Compendium of Test Methods LC, Section 1 - Aggregates.
- .3 International Organization for Standardization
 - .1 ISO 3310-1 Test sieves - Technical requirements and checks - Part 1: Test sieves of metallic fabrics.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Data Sheets
 - .1 Submit specifications, manufacturer's instructions, and documentation for aggregates. The data sheets must indicate the characteristics of the products, the performance criteria, the dimensions, the limits, and the finish.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with manufacturer's written instructions.
- .2 Transportation and Handling: Transport and handle aggregates to prevent segregation, contamination and degradation.
- .3 Storage: Store washed or excavated material under water for at least 24 hours to allow free water to flow and to level the water content in these materials.

Part 2 Products**2.1 MATERIALS**

- .1 Characteristics of aggregates: good quality, hard, resistant, free from soft or flaked particles, organic materials, clumps of clay, minerals, adhering films, harmful amounts of disintegrated pieces or other harmful substances.
- .2 Aggregates (coarse and fine) must meet the requirements of the relevant section of NQ 2560-114 for the intended use.

2.2 SOURCE QUALITY CONTROL

- .1 Inform the Departmental Representative of the proposed source of supply for aggregates and allow them access for sampling at least two (2) weeks before the start of production.
- .2 If materials from the proposed source of supply do not meet the prescribed requirements or can not reasonably be prepared to meet them, find alternative source of supply, or demonstrate that materials from the source of supply in question may be prepared to meet the specified requirements.
- .3 Notify the Departmental Representative at least two (2) weeks prior to any change in source of aggregates.
- .4 A material accepted at its source of supply may nevertheless be refused later if it does not meet the specified requirements if the quality or properties of the delivered material are not uniform or if the performance of the latter on the site is not satisfactory. The quality of the materials is determined, accepted, or refused after final implementation.

Part 3 Execution**3.1 PREPARATION**

- .1 Preparation of aggregates
 - .1 Prepare aggregates in a uniform manner, using methods that prevent contamination, segregation and degradation.
 - .2 If required, a mixture of aggregates is permitted to provide particle size, particle shape or percentage of crushed particles prescribed.
 - .1 Use only methods and materials approved in writing by the Departmental Representative.
- .2 In the presence of stratified deposits, use excavation equipment and methods that will produce aggregates of uniform and uniform grain size.
- .3 If required, screen, crush, wash, classify and treat aggregates with appropriate equipment as required.
 - .1 Only use materials approved in writing by the Departmental Representative.

3.2 STACKING

- .1 Unless otherwise specified by the Departmental Representative, place the aggregates in a pile at the site in the places indicated. Do not put aggregates in piles on hard surfaces.
- .2 Stack sufficient aggregate to be able to meet work schedule.

- .3 Aggregates must be stockpiled on level, well-drained land with sufficient bearing capacity and stability to support stockpiled materials and material handling equipment.
- .4 Unless the materials are stacked on an acceptable stabilized surface, the base of the pile shall consist of a layer of compacted sand at least 300 mm thick to prevent contamination of aggregates. Put the aggregates in a heap on the ground, but do not incorporate the layer of 300 mm thick material at the base of the pile into the structure.
- .5 To avoid aggregate mixtures, sufficiently separate the piles of different aggregates or separate them by means of sturdy and full height partitions.
- .6 The use of mixed or contaminated materials is prohibited. Remove and dispose of rejected materials within 48 hours of rejection, as directed by the Departmental Representative.
- .7 Finish spreading each layer of pile material throughout the storage area before spreading the next layer.
- .8 Unload uniform aggregates brought to the pile by truck and form piles according to instructions.
- .9 It is forbidden to mount cone-shaped piles or to tumble materials on each side of the pile.
- .10 Do not use stacking conveyors.
- .11 During winter work, prevent ice and snow from mixing with heaped material or heaps.

3.3 CLEANING

- .1 Work in progress: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave the premises clean at the end of each working day.
- .2 Final Cleaning: remove surplus materials, rubbish, tools and equipment from site, in accordance with Section 01 74 11 - Cleaning.
- .3 Clean up the area where the aggregates have been heaped to leave a clean, well-drained area with no stagnant water accumulation.
- .4 Carefully put unused aggregates in compact heaps as directed by the Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Cleaning - Section 01 74 00.
- .2 Installation of topsoil and finishing leveling - Section 32 91 19.13.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Stripping of the natural terrain and stacking, thickness of ± 100 mm:
 - .1 The stripping of the natural terrain is measured by the square meter stripped
 - .2 The unit price shall include stripping, transport and stacking according to the information presented in the plans and the requirements of this section of specifications.

1.3 REFERENCE STANDARDS

- .1 United States Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

Part 2 Products

2.1 NOT APPLICABLE

- .1 Not applicable.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

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

3.2 STRIPPING OF TOPSOIL

- .1 Ensure that procedures are conducted in accordance with applicable Provincial and Municipal requirements.
- .2 Remove topsoil before construction procedures commence to avoid compaction of topsoil.
- .3 Handle topsoil only when it is dry and warm.

- .4 Remove vegetation from targeted areas by non-chemical means and dispose of stripped vegetation by alternative disposal.
- .5 Remove brush from targeted area by non-chemical means and dispose of through alternative disposal.
- .6 Pile topsoil in berms in locations as directed by the Departmental Representative.
 - .1 Stockpile height not to exceed 2.5 m.
 - .2 The surface of the piles must be "sealed" to limit wind erosion.
- .7 Dispose of unused topsoil by alternative disposal in location as indicated by the Departmental Representative.
- .8 Protect stockpiles from contamination and compaction.
- .9 Cover topsoil that has been piled for long term storage, with trefoil or grass to maintain agricultural potential of soil.

3.3 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools, and equipment.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Allowances - Section 01 21 00.
- .2 Submittal Procedures - Section 01 33 00.
- .3 Health and Safety Requirements - Section 01 35 29.06.
- .4 Environmental Procedures - Section 01 35 43.
- .5 Quality Control - Section 01 45 00.
- .6 Temporary Barriers and Enclosures - Section 01 56 00.
- .7 Cleaning - Section 01 74 11.
- .8 Waste Management and Disposal - Section 01 74 19.
- .9 Selective Site Demolition - Section 02 41 13.
- .10 Cast-in-Place Concrete - Section 03 30 00.
- .11 Aggregates for Earthwork - Section 31 05 16.
- .12 Geotextile - Section 31 32 19.01.
- .13 Storm Utility Drainage Piping - Section 33 41 00.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Exploration Trench
 - .1 The Contractor shall provide a price per cubic meter for exploration trenches based on the information presented in the plans as well as the requirements of this section of specifications.
 - .2 The price includes saw strokes in the coatings, when required, removal of pavement, hand excavations, propping, trench drying, environmental characterization (if required), disposal of surplus excavation materials, supply of Type 1 crushed stone for backfilling, backfilling and compaction, rehabilitation of the existing surface structure and reclamation of the premises.
- .2 Excavation of a ditch, including adjacent earthworks
 - .1 The Contractor must provide a price per linear meter for the construction of a ditch according to the information presented in the plans as well as the requirements of this section of specifications.
 - .2 The price includes, but is not limited to, environmental characterization, excavation and sediment propagation control, water pumping and diversion, ditch profiling and finishing, as well as all surfaces affected by the work as well as transportation, development, and removal of an access road as required and off-site disposal of excavated materials.
- .3 Excavation of the landfill ditch, including deforestation and earthworks
 - .1 The Contractor shall provide a price per linear meter for the construction of a discharge ditch according to the information presented in the plans as well as the requirements of this section of specifications.

- .2 The price includes, but is not limited to, environmental characterization, excavation and sediment propagation control, water pumping and diversion, ditch profiling and finishing, as well as all surfaces affected by the work as well as transportation, development and removal of an access road as required and off-site disposal of excavated materials.
- .4 Insulation of a water pipe, including excavation and backfill
 - .1 The Contractor must provide a unit price for the insulation of a water main according to the information presented in the plans as well as the requirements of this section of specifications.
 - .2 The price includes, but is not limited to, excavation, pumping and dewatering and sediment propagation control, water pumping and diversion, pipe location, Type 4 extruded rigid insulation, complete backfill and summary earthworks, and off-site transportation and disposal of excavated material.
- .5 Granular pavement, MG-20b, 300 mm thick
 - .1 The Contractor must provide a price per metric ton to be paid according to the tickets of weighing received at the construction site, for the supply and installation of MG-20b granular pavement according to the information presented in the plans as well as the requirements of this section of specifications.
 - .2 The price includes the supply, transport and placement of the crushed stone, profiling, and compaction according to the standard cuts, watering if required to obtain the required compaction and dust control during handling or unloading.
- .6 >C contaminated soil allocation
 - .1 An allocation is provided for the transport and disposal of contaminated soil. The allowance shall be paid in accordance with the provisions of section 01 21 00 – Allocation as well as in accordance with the following details:
 - .1 Following the environmental characterization of the excavated material, if contaminated soils (>C) are observed, the allocation will be used to pay for the additional costs associated with the additional transportation and disposal costs related to the presence of contaminated soils according to the requirements of this specifications.
 - .2 Transportation will be calculated per ton-kilometer according to the MTQ scales. The disposition will be paid according to the invoices transmitted by the contractor. It should be noted that excavation and backfill for the construction of the works are part of other items on the bid form. The contractor will therefore not receive any additional compensation for those activities.
- .7 Rip rap for ditch protection, 100-200 mm, 300 mm thick
 - .1 The Contractor must provide a price per square meter for the supply and installation of rip rap for ditch protection, 100-200 mm for 300 mm thick according to the information presented in the plans as well as the requirements of this section of specifications.
 - .2 The price includes the supply, transport and placement of the crushed stone, profiling, and compaction according to the standard cuts, watering if required to obtain the required compaction and dust control during handling or unloading.
- .8 All other costs associated with this section, including all temporary of existing underground services, must be included in the "Site Organization" item.

1.3 REFERENCE STANDARDS

Latest edition of the following documents:

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .2 ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.
 - .3 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Quebec Bureau of Standardization
 - .1 BNQ 2560-114 / 2014: Civil engineering works - Aggregates
 - .2 NQ 2560-600 Recycled materials made from concrete residues, bituminous mixes and bricks - Classification and characteristics
- .3 International Organization for Standardization
 - .1 ISO 3310-1 Test sieves - Technical requirements and checks - Part 1: Test sieves of metallic fabrics.
- .4 Canadian Standards Association (CSA) / CSA International
 - .1 CAN / CSA-A3000-13 Compendium of Bonding Materials.
 - .2 CSA-A23.1 / A23.2-14, Concrete: Constituents and Performance of Work / Test Methods and Standard Practices for Concrete.

1.4 DEFINITIONS

- .1 Excavation Classes: Two (2) classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock: solid material in excess of 1.00 m³ and which cannot be removed by means of heavy-duty mechanical excavating equipment with 0.95 to 1.15 m³ bucket. Frozen material not classified as rock.
 - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .2 Any material reasonably free of subsurface materials, clay clods, brush, noxious weeds and other debris, and free of pebbles, stumps, roots and other harmful materials greater than 25 mm.
- .3 Waste Material: Excavated material unsuitable for use in Work or surplus to requirements.
- .4 Borrow Material: Material obtained from locations outside area to be graded, required for construction of fill areas or for other portions of Work.
- .5 Recycled Fill Material: Material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
- .6 Unsuitable Materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials:

- .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.1 and CAN/CGSB-8.2.

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

- .2 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.
- .7 Unshrinkable fills: Very weak mixture of cement, concrete aggregates, and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 A working method for placement of embankment concrete without shrinkage must be submitted for approval by the Departmental Representative. Following the acceptance of the method of work, a test plate must be made.
- .3 Quality control: according to section 01 45 00 - Quality control.
- .1 Notify the Departmental Representative, in writing, when the bottom of the excavation is reached.
- .4 Documents/samples to be submitted before the work.
- .1 Before commencing the work referred to in this section, submit a list of the main apparatus and equipment that will be used to carry out the work.

1.6 QUALITY ASSURANCE

- .1 Certificate of Competency: Submit a document proving that an insurance policy has been provided for in the Department Representative Liability Chapter.
- .2 Shoring, propping, and underpinning
- .1 The Contractor must be aware that excavation work must not create displacements or settlement of the surrounding soil. To this end, he must adopt working procedures, such as excavation slopes, short lead time and protection of the walls to prevent decohesion, erosion and / or loss of bearing capacity of adjacent materials.
- .2 Comply with all laws and regulations governing the construction industry.
- .3 Retain the services of an engineer member of the Order of Engineers of Quebec, for the design and inspection of bracing, bracing and reinforcement works required for the work.
- .4 At least four (4) weeks prior to the start of work, submit to the Departmental Representative for verification the design documents and related technical data.
- .5 The design documents and related technical data submitted must bear the seal and signature of an engineer member of the Ordre des ingénieurs du Québec.
- .6 Keep a copy of calculations and related data on site.
- .7 Repair any damage and pay for poorly executed work.

- .3 Selection of excavation methods
 - .1 Unless otherwise indicated in the contract documents, the Contractor may choose his excavation methods.
 - .2 Submit these methods in advance to the Departmental Representative.
- .4 Protective measures
 - .1 Comply with specification requirements, authority regulations and environmental clauses of tender documents.
 - .2 Keep excavations dry and protected from freezing.
 - .3 Take the necessary measures to reduce dust.
 - .4 Set up barricades, fences, etc. according to the requirements of the quote.
 - .5 Protect walls against erosion and dewatering by means of waterproof tarpaulins.
- .5 Health and safety.
 - .1 Take the necessary health and safety measures in construction in accordance with section 01 35 29.06 - Health and Safety.

1.7 EXISTING CONDITIONS

- .1 Examine soil report if Departmental Representative makes it available to Contractor.
- .2 Buried services:
 - .1 Before commencing work verify location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: Pay costs of relocating services.
 - .3 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .4 Prior to beginning excavation Work, notify applicable Departmental Representative and Authorities Having Jurisdiction to establish location and state of use of buried utilities and structures.
 - .5 Conduct test excavations if required to confirm the location of the pipes.
 - .6 Maintain and protect from damage water, sewer, gas, electricity and telephone lines, as well as other pipelines or other structures identified as indicated.
 - .7 Obtain from the Departmental Representative the appropriate instructions before rerouting or removing a utility line or work identified in the excavation area.
 - .8 Note the location of underground pipelines that have been retained, re-routed or abandoned for "as-built" plans.
 - .9 Confirm location of recently completed excavations near the work area.
- .3 Existing buildings and surface features:
 - .1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey benchmarks, and monuments which may be affected by Work.
 - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

Part 2 Products**2.1 MATERIALS**

.1 Type 1 Fill: 20-0 crushed stone and the following requirements:

- .1 Crushed, pit run or screened stone, gravel;
- .2 The granulometry of the materials after compaction must remain within the following limits when they are tested according to the standard of the Bureau de Normalization du Québec (BNQ), and the granulometric curve drawn on a semi-logarithmic diagram must be continuous and progressive.

Table: Specification Rack - Crushed stone or gravel 20-0 gauge

<u>Sieve</u>	<u>% Passing</u>
31,5 mm	100
20 mm	90 - 100
14 mm	68 - 93
5 mm	35 - 60
1,25 mm	15 - 38
315 µm	5 - 17
80 µm	2 – 7 (after compaction)

.2 Type 2 fill (sand fill):

- .1 Crushed or sieved sand, consisting of hard particles, resistant and free of clods of clay, hydraulic materials, organic or frozen, as well as any other deleterious substance.

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

<u>Designation of sieves</u>	<u>% passing</u>
112 mm	100
5 mm	12 - 100
80 µm	0 – 10

.3 Type 3 fill:

- .1 Approved materials selected from excavated or non-excavated material, unfrozen and free of clinker, stones greater than 75 mm, ashes, sod, refuse and other deleterious materials and with a natural moisture content of optimal value needed to obtain the specified density.
- .2 Material from a source other than excavated material must have permeability and freeze / thaw behavior similar to natural materials in place.

.4 MG-20b materials (granular pavement):

- .1 Comply with the requirements of section 31 05 16 - Aggregates.

.5 Unshrinkable Fill:

- .1 The non-shrink fill must be able to flow into the excavation to fill the entire space without air voids under the horizontal projections or other locations within the

excavation or trench. The material must be free from sagging or deformation (settlement) in the long term and easily removed with excavation equipment.

.1	Type of binder	GU
.2	Minimum compressive strength at 28 days	0.4 to 3.0 MPa
.3	Minimum cement content	50 kg / m ³ of concrete
.4	Nominal size of coarse aggregate	20 mm
.5	Coarse aggregate	Crushed stone
.6	Fine aggregate	Natural sand
.7	Slump at the moment and at the point discharge	150 mm minimum

The size of the backfill without shrinkage must remain within the following limits:

<u>Designation of sieves</u>	<u>% passing</u>
20 mm	90-100
14 mm	68 - 93
5 mm	35 - 50
1.25 mm	19-38
315 µm	9-17
80 µm	0-4

- .2 The placement of backfill without shrinkage shall be performed in accordance with the requirements of CSA A23.1.
- .6 Lean concrete seating for pipes and for certain manholes and sumps:
 - .1 15 MPa resistance.
 - .2 Refer to detail of plans or Departmental Representative specifications and refer to 03 30 00 – Cast-in-place concrete in place.
- .7 Geotextiles: according to section 31 32 19.01 - Geotextiles.
- .8 Rigid insulation: Rigid extruded insulation type 4 according to CAN/ULC S701.1 and having a thermal resistance R10.
- .9 Rip rap: complies with MTQ standard 14501.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of Authorities Having Jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 SITE PREPARATION

- .1 Remove obstructions, ice, and snow, from surfaces to be excavated within limits indicated.
- .2 If required, cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly per 02 41 13 – Selective Site Demolition.

3.3 PREPARATION/PROTECTION

- .1 When utilities are in the vicinity of the excavations, the Contractor must carry out trenches for manual exploration or hydro-excavation. Services must be identified before excavation work begins.
- .2 Protect existing elements in accordance with section 01 56 00 - Temporary Access and Protective Works and relevant municipal by-laws.
- .3 Keep excavations clean, free from standing water and loose soil.
- .4 Where the soil may vary significantly in volume due to fluctuations in moisture content, cover and protect to the satisfaction of the Departmental Representative.
- .5 Protect utility lines that must remain in place.

3.4 STRIPPING OF TOPSOIL

- .1 Begin topsoil stripping of areas as required for Work after area has been cleared of brush, grasses, weeds, and sod, and removed from site.
- .2 Strip topsoil to depths as indicated.
 - .1 Do not mix topsoil with subsoil.
- .3 Stockpile in locations as directed by Departmental Representative.
 - .1 Stockpile height not to exceed 2 m and should be protected from erosion.
- .4 Dispose of unused topsoil off site.

3.5 STOCKPILING

- .1 Deposit embankment materials at locations designated by the Departmental Representative.
 - .1 Deposit granular materials to prevent segregation.
- .2 Protect backfill material against contamination.
- .3 Take appropriate control measures against erosion and sedimentation to prevent the migration of sediments out of the construction site and into waterways.

3.6 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Health and Safety Requirements.
 - .1 Where conditions are unstable, the Departmental Representative is to verify and advise methods.
- .2 Obtain the appropriate permit from the competent authorities if it is necessary to temporarily divert a watercourse.
- .3 Construct temporary Works to depths, heights and locations as indicated.

- .4 During backfill operation:
 - .1 Unless otherwise indicated or directed by Departmental Representative, remove sheeting and shoring from excavations.
 - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
 - .3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.
- .5 When sheeting is required to remain in place, cut off tops at elevations, as indicated.
- .6 Upon completion of substructure construction:
 - .1 Remove cofferdams, shoring and bracing.
 - .2 Remove excess materials from site and restore watercourses as directed and as indicated Departmental Representative.

3.7 DEWATERING AND HEAVE PREVENTION

- .1 Keep the excavations dry during the work.
- .2 Submit to the Departmental Representative, for authorization, details of proposed methods for drying out excavations or preventing uplift, such as the construction of dikes, the installation of filtering points and the removal of sheet piles.
- .3 If there is a risk of leaking or lifting, avoid excavation below the water table.
 - .1 To prevent the lifting of pipes or the bottom of the excavation, reduce the level of the water table or use other appropriate means.
- .4 Protect open pit excavations against flooding and damage caused by runoff.
- .5 Dispose of water in accordance with section 01 35 43 - Environmental protection in a manner that does not pose a risk to public or private property, or to any part of the work completed or in progress.

3.8 EXCAVATION

- .1 Notify Departmental Representative at least seven (7) days before excavation begins so that initial cross sections can be established.
- .2 Excavate according to dimensions, routes, dimensions and levels indicated or as directed.
- .3 During excavation, remove concrete, masonry, pavement, abandoned pipe, rubble and demolished foundations, and any other obstructions, in accordance with Section 02 41 16 - Structure Demolition.
- .4 Excavation work shall in no way affect the bearing capacity of adjacent foundations.
- .5 Unless otherwise authorized by the Departmental Representative in writing, it is forbidden to dig more than 30 meters of trench before proceeding with the installation of the elements to be buried, and the length of trench not backfilled must not exceed 15 meters, at the end of a working day. If bad weather is anticipated, no trenches should be left open at the end of a working day.
- .6 Cuttings and materials placed in storage must be placed at a sufficient distance from the trench, as indicated by the Departmental Representative.
- .7 Limit work performed with construction equipment in the immediate vicinity of un-filled trenches.

- .8 Avoid obstructing the flow of runoff or natural watercourses.
- .9 The earthen excavation pit must be level and consist of undisturbed earth, free from organic matter and loose or non-resistant substances. The bottom must not be reworked and must be free of blocks exceeding 300 mm in one of its dimensions.
- .10 Inform the Departmental Representative when the level expected as bottom of search is reached.
- .11 If the soil at the bottom of the excavations seems inappropriate, notify the Departmental Representative and proceed as directed.
- .12 Completed excavations must be approved by the Departmental Representative.
- .13 Clear the trench bottom of any unsuitable material, including materials below the required grade, over the extent and depth determined by the Departmental Representative.
- .14 Off-profile excavation must be corrected according to the methods described below:
 - .1 Pour 15 MPa concrete under the support surfaces and footings. Place a Type 1 backfill and compact to at least 100 % of the maximum dry density corrected according to the normal Proctor test.
 - .2 In other places, place a type 1 backfill and compact to at least 95 % of the maximum dry density corrected according to the normal Proctor test
- .15 Profile excavations by hand, firm the walls and remove all non-adherent materials and debris from them.
 - .1 If the materials at the bottom of the excavation have been stirred, compact them until a density at least equal to that of the unmarred soil is obtained.
 - .2 Clean cracks found in the rock and fill them with concrete grout or mortar, to the satisfaction of the Departmental Representative.
- .16 Maintain excavation slopes to prevent settlement and differential behavior.
- .17 Protect excavation slopes from erosion, drying and freezing.
- .18 If required, install geotextiles in accordance with Section 31 32 19.01 - Geotextiles.

3.9 PREPARATION OF THE TRENCH BOTTOM

- .1 Compact bottom of trenches to a degree of compactness at least equal to that of surrounding soil.

3.10 PRESENCE OF CONTAMINATED SOIL

- .1 Contaminated soil must be managed in accordance with the Intervention Guide – Soil Protection and Rehabilitation of Contaminated Land, the Environment Quality Act (CQLR, chapter Q-2) and the regulations made under it, in particular the Regulation respecting the protection and rehabilitation of land (CQLR, chapter Q-2, r. 37), the Regulation respecting the storage and transfer centers of contaminated soil (CQLR, chapter Q-2, r. 46) and the Regulation respecting the burial of contaminated soil (CQLR, chapter Q-2, r. 18).

3.11 SERVICES INSPECTION BEFORE THE PLACEMENT OF THE WORKS

- .1 Before starting work on structures such as ducts, pipes, sewers, ensure that trenches have been inspected and approved.

3.12 FILLING MATERIALS AND COMPACTION

- .1 Off-road trench fill must be excavation and / or excavation material approved by the Departmental Representative. If excavation and excavation materials are not enough to fill the volumes to be backfilled, the Contractor will have to backfill the trenches with borrow material.
- .2 In either case, clay plugs shall be installed at a regular distance of approximately 100 m or as directed by the Departmental Representative.
- .3 Backfilling of trenches:
 - .1 Backfilling of trenches with materials of similar gelivity behavior to existing materials shall be made with a minimum slope of 2 H: 1 V from 2 m below the proposed final level.
 - .2 Backfilling of trenches with materials of different gelivity behavior to existing materials shall be performed with a minimum slope of 3 H: 1 V from 2 m below the proposed final level.
- .4 Use approved mechanical compacting devices or compact by hand to obtain the prescribed degree of compactness.

3.13 EMBEDDING AND BEDDING MATERIALS FOR UNDERGROUND PIPES

- .1 Place granular materials for the embedding and bedding of underground utilities and compact as indicated and in accordance with Section 33 41 00 - Storm Water Piping.
- .2 Installed embedding and bedding materials must not be frozen.

3.14 BACKFILLING

- .1 Do not backfill before:
 - .1 Inspection and approval of facilities by the Departmental Representative.
 - .2 Inspection and approval of facilities below final ground level by the Departmental Representative.
 - .3 Inspection, testing, approval, and documentation of underground utility systems.
 - .4 Removal of concrete formwork.
 - .5 Removal of shoring and squeezing structures; backfilling of voids with an acceptable material.
- .2 Backfill areas must be free of debris, snow, ice, water and frozen earth.
- .3 Do not use backfill material that is frozen or that contains snow, ice or debris.
- .4 Spread backfill material in uniform layers not exceeding 150 mm thickness after compaction to specified levels. Compact each layer before spreading the next layer.
- .5 Backfilling around the works:
 - .1 Install bedding and embedding materials in accordance with drawings.
 - .2 Do not backfill around or overcast concrete structures within 48 hours after pouring concrete and before concrete reaches 70% of specified strength or sufficient strength as directed by Departmental Representative.
 - .3 Lay fill layers simultaneously on both sides of installed structures to balance loads. The difference in height between the embankments must not exceed 0,4 m;

- .4 Where the earth is likely to exert temporary uneven pressure on walls or other structures, use one of the following methods:
 - .1 Allow concrete to cure for at least fourteen (14) days, or wait until it is strong enough to withstand the pressures of backfill and compaction, and has been examined by the Departmental Representative;
 - .2 If authorized by Departmental Representative, install struts or struts to compensate for pressure differences, and leave these devices in place until the Departmental Representative authorizes removal.
- .5 Hand fill materials below, around and above structures according to plans. It is forbidden to dump the material directly on the works to be backfilled.
- .6 Filling a trench:
 - .1 Place backfill material in uniform layers not exceeding 150 mm of compacted thickness to the level of the infrastructure. Compact each layer before laying the next layer;
 - .2 The profiling and compacting of the infrastructure must comply with the articles of section 31 22 14 - Aerodrome Leveling Work;
 - .3 Maintain a profile of the infrastructure to allow the dripping of water away from the work.
- .7 Make dimensionally stabilized embankments in indicated locations.
- .8 Consolidate and level these dimensionally stabilized embankments with internal vibrators.
- .9 Install the drainage system in the embankment, as directed by the Departmental Representative.

3.15 SITE REHABILITATION

- .1 Once the work is complete, remove scrap materials and debris in accordance with section 01 74 19 - Waste Management and Disposal, refill slopes and correct defects as directed by the Departmental Representative.
- .2 Replace topsoil as directed by Departmental Representative.
- .3 Replace lawns where they were before excavation began.
- .4 Clean and repair areas affected by work as directed by Departmental Representative.
- .5 Protect newly graded areas from erosion, prevent traffic and keep them free of debris or debris.

3.16 CLEANING

- .1 Work in progress: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave the premises clean at the end of each working day.
- .2 Final Cleaning: remove surplus materials, rubbish, tools and equipment from site, in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Submittal Procedures - Section 01 33 00.
- .2 Cleaning - Section 01 74 11.
- .3 Excavating, Trenching and Backfilling - Section 31 23 33.01.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 This section of specification is not the subject of any item on the bid form. The costs associated with the requirements of this section shall be included in the relative items.

1.3 REFERENCE STANDARDS

Latest edition of the following documents:

- .1 ASTM International
 - .1 ASTM A123 / A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 Bureau de normalisation du Québec (BNQ)
 - .1 BNQ 7009–210 2017, Geotextiles used in road engineering — Classification, characteristics, and test methods.
- .3 CSA International
 - .1 CSA G40.20 / G40.21, General Requirements for Rolled or Welded Structural Quality Steel / Structural Steels.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Data Sheets
 - .1 Submit technical data sheets and manufacturer's instructions and documentation for geotextiles. The data sheets must indicate the characteristics of the products, the performance criteria, the dimensions, the limits and the finish.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect geotextiles from direct sunlight and UV rays.
 - .3 Replace defective or damaged materials with new.

Part 2 Products**2.1 MATERIAL**

- .1 Geotextiles: webs of woven or non-woven synthetic fibers, supplied in rolls.
- .2 Synthetic fibers must be rot-proof and resistant to oil and salt water and attack by insects and rodents.
- .3 Do not use polyester membranes in the case of membranes in contact with concrete concrete structures or in contact with crushed concrete. In these cases, use only polyethylene or polypropylene membranes.
- .4 Geotextile separation membrane:
 - .1 Grade S1-F2 according to BNQ 7009–210.
- .5 Geotextile filtration membrane for draining trench and coating of perforated drains and culverts in fine soils >50% passing the sieve of 80 µm
 - .1 Grade S1-F2 according to BNQ 7009–210.
- .6 Draining trench and coating of perforated drains, culverts and sewer lines in coarse soils
 - .1 Grade F1 according to BNQ 7009–210.
- .7 Anchors: to CSA G40.21, grade 300 W, hot dipped galvanized and zinc coated to a minimum of 600 g / m², to ASTM A123 / A123M.
- .8 Factory-made seams: sewn together according to manufacturer's recommendations.
- .9 Stitched Joint Thread: Resistant to chemical and biological agents equal to or greater than geotextile.

Part 3 Execution**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for geotextile material installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform the Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the Departmental Representative.

3.2 INSTALLATION

- .1 Dry the trench or surface before placing the geotextiles.
- .2 Place the geotextiles by unrolling them at the bottom of the trench and hold them in place.
- .3 Place geotextiles in order to obtain a smooth surface free of wrinkles, buckles and live areas.

- .4 On sloping surfaces, place geotextiles in continuous strips from the foot of the slope to the expected upper limit.
- .5 Overlap each strip of geotextile on the previously laid strip, to a minimum width of 600 mm and in the direction of flow of the surface.
- .6 Fasten successive strips of geotextile using anchors and anchor washers as specified by the manufacturer.
- .7 Prevent movement of geotextiles and protect them from damage or deterioration before, during and after placement of embankment layers.
- .8 Replace damaged or deteriorated geotextiles to the satisfaction of the Departmental Representative.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.4 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Submittal Procedures - Section 01 33 00.
- .2 Cleaning - Section 01 74 00.
- .3 Aggregates - Section 31 05 16.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Granular base course, MG-20, 300 mm thick:
 - .1 The Contractor shall provide a price per metric ton, payable according to the weighing tickets received at the site, for the supply and installation of MG-20 crushed stone granular base according to the requested thicknesses, the information presented in the plans as well as the requirements of this section of estimates.
 - .2 The price includes the supply, transport and placement of the crushed stone, profiling, and compaction according to the standard cuts, watering if required to obtain the required compaction and dust control during handling or unloading.
- .2 Subgrade course, MG-112, 400 mm thick:
 - .1 The Contractor shall provide a price per metric ton, payable according to the weighing tickets received at the site, for the supply and installation of MG-112 subbase according to the requested thicknesses, the information presented in the plans as well as the requirements of this section of estimates.
 - .2 The price includes the supply, transport and placement, profiling, and compaction according to the standard cuts, watering if required to obtain the required compaction and dust control during handling or unloading.

1.3 REFERENCE STANDARDS

Latest edition of the following documents:

- .1 ASTM International
 - .1 ASTM D1883, Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils.
 - .2 ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian Standards Association (CSA) / CSA International
 - .1 CSA A23.1 / A23.2 Concrete - Components and Execution of Work / Concrete Testing.
- .3 Direction of the pavement laboratory of the Ministère des Transports du Québec
 - .1 Compendium of Test Methods LC, Section 1 - Aggregates and Section 2 - Soils.
- .4 Quebec Bureau of Standardization
 - .1 BNQ 2560-114, Civil engineering works - Aggregates.
 - .2 BNQ 2501-025 Particle size analysis by sedimentometry.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

Part 2 Products**2.1 MATERIALS**

- .1 Granular materials to comply with Section 31 05 16 - Aggregates and be new materials. The use of recycled materials is prohibited.
- .2 The physical and mechanical properties of the large aggregates of the subbase must meet the requirements of category 3, according to BNQ 2560-114.
- .3 When tested according to LC 21-040, the particle size of the materials before compaction shall remain within the following limits and the particle size curve plotted on a semi-logarithmic diagram shall be continuous and not broken.

- .1 Crushed stone MG-20

<u>Sieve</u>	<u>% passing</u>
31,5 mm	100
20 mm	90 – 100
14 mm	68 – 93
5 mm	35 – 60
1,25 mm	15 – 38
315 µm	5 – 17
80 µm	2,0 – 5,0

- .2 Crushed stone or gravel MG-112

<u>Sieve</u>	<u>% passing</u>
112 mm	100
5 mm	35 – 100
80 µm	0 – 10,0

- .3 The particle size of MG-20 materials after compaction must comply with the following limits:

<u>Sieve</u>	<u>% passing</u>
50 mm	100
38,1 mm	70 – 100
20 mm	50 – 70

<u>Sieve</u>	<u>% passing</u>
10 mm	40 – 60
5 mm	25 – 50
1,25 mm	10 – 30
315 µm	4 – 18
80 µm	3 – 7
20 µm	≤ 3

- .4 After compaction, the crushed stone must not demonstrate segregation and the surface must be stable.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of conditions: prior to the installation of the granular sub-base, ensure that the condition of previously installed surfaces / supports under other sections or contracts is acceptable and written instructions from the manufacturer.
- .1 Visually inspect surfaces / supports in the presence of the Departmental Representative.
- .2 Inform the Departmental Representative immediately of any unacceptable conditions found.
- .3 Begin installation work only after correcting unacceptable conditions and receiving written approval from Departmental Representative.

3.2 PREPARATION

- .1 Temporary means of erosion and sediment control
- .1 Implement temporary erosion and sediment control to prevent soil loss and to prevent sediment from being deposited by runoff or dust and wind-blown particles.
- .2 Inspect, maintain and repair facilities, as required, until permanent vegetation is established.
- .3 Remove erosion and sediment control and restore and stabilize surfaces disturbed during this work.

3.3 PLACING

- .1 Place materials of granular sub-base once form layer is inspected and approved by Departmental Representative.
- .2 Make the granular sub-base in the indicated locations at the prescribed depth and level.
- .3 Ensure that no frozen material is put in place.
- .4 Place materials in a clean, unfrozen area, free of snow and ice.
- .5 Begin spreading base material at the top of the crown of the roadway or the highest side, in the case of a single slope pavement.

- .6 Place granular subbase materials using methods that prevent segregation or degradation.
- .7 Use graders equipped with rulers or adjustable templates to ensure uniform material spreading according to required thickness.
- .8 Spread materials over the entire width of the work to be done, in uniform layers of not more than 150 mm thick after compaction.
 - .1 Departmental Representative may allow thicker layers, provided the proposed thickness does not preclude the required degree of compactness.
- .9 Before placing the next layer, give each layer a solid profile and compact it to the specified density, complete sections of at least 1000 m² before proceeding to the next layer.
- .10 Remove and replace any part of a layer in which there has been segregation of materials during placement.
- .11 Carry out granular base installation operations so as not to damage and destabilize the underlying or adjacent pavement structure and infrastructure.

3.4 COMPACTION

- .1 Compaction equipment must provide materials having the density required for this work.
- .2 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from the Departmental Representative before use.
- .3 Equipped with device that records hours of actual work, not motor running hours.
- .4 Compact granular base to 98% of maximum dry density.
- .5 Compact subbase to 95% of maximum dry density.
- .6 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
- .7 Add, during compaction, the water required to obtain the specified density.
- .8 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by the Departmental Representative.
- .9 Correct surface irregularities by loosening soil and adding or removing material until surface level complies with prescribed tolerances.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

3.6 SITE TOLERANCES

- .1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

3.7 PROTECTION

- .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by the Departmental Representative.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Aggregates for Earthwork - Section 31 05 16.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Granular base leveling and reloading, MG-20, variable thickness
 - .1 The Contractor shall provide a price per metric ton, payable according to the weighing tickets received at the site, for leveling and reloading of MG-20 crushed stone granular base, the information presented in the plans as well as the requirements of this section of estimates.
 - .2 The price includes scarification, supply, transport and placement of the crushed stone, profiling, and compaction according to standard cuts, watering if required to obtain the required compaction and dust control during handling or unloading.

1.3 REFERENCE STANDARDS

Latest edition of the following documents:

- .1 ASTM International (ASTM)
 - .1 ASTM C117-[03], Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131-[03], Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136-[01], Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D698-[00a], Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600kN-m/m³).
 - .5 ASTM D4318-[00], Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-8.1-[88], Sieves Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-[M88], Sieves Testing, Woven Wire, Metric.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Excess materials are to be diverted from landfill to site approved by the Departmental Representative.

Part 2 Products**2.1 MATERIALS**

- .1 Granular base material: to Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Crushed stone or gravel consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material and other deleterious materials.

Part 3 Execution**3.1 SEQUENCE OF OPERATION**

- .1 Compaction equipment:
 - .1 Compaction equipment capable of obtaining required material densities.
 - .2 Provide the Departmental Representative] with proof of equipment efficiency for unspecified equipment.
 - .1 Efficiency of proposed equipment equal to specified equipment.
 - .2 Obtain approval from the Departmental Representative before use.
 - .3 Equip with device that records hours of actual work, not motor running hours.
- .2 Compacting:
 - .1 Compact to at least to 98% of maximum dry density in accordance with ASTM D698.
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compaction to obtain specified density.
 - .4 Use mechanical tampers, approved by the Departmental Representative to compact areas not accessible to rolling equipment to specified density.
- .3 Repair of soft areas:
 - .1 Correct soft areas by removing defective material to depth and extent directed by the Departmental Representative. Replace with material acceptable to the Departmental Representative and compact to specified density.
 - .2 Maintain reshaped surface in condition conforming to this section until succeeding material is applied or until acceptance by the Departmental Representative.

3.2 SITE TOLERANCES

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

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Submittal Procedures - Section 01 33 00.
- .2 Cleaning - Section 01 74 11.
- .3 Asphalt Pavement - Section 32 12 16.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 This section of the specifications is not the subject of any item on the bid form. The costs associated with the requirements of this section shall be included the items of section 32 12 16.

1.3 REFERENCE STANDARDS

Latest edition of the following documents:

- .1 American Association of State Highway and Transportation Officials (AASHTO)
 - .1 AASHTO T315, Standard Method of Test for Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer (DSR).
- .2 ASTM International
 - .1 ASTM D140/D140M Standard Practice for Sampling Bituminous Materials.
 - .2 ASTM D633, Standard Volume Correction Table for Road Tar.
 - .3 ASTM D1250 Standard Guide for Use of the Petroleum Measurement Tables.
- .3 Ministère des Transports du Quebec (MTQ)
 - .1 Norme 4105, tome VII – Matériaux, Normes – Ouvrages routiers.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Data Sheets
 - .1 At least four (4) weeks prior to start of work, submit manufacturer's material data sheets for proposed materials and instructions and documentation for application method of impregnating binder layer. The data sheets must indicate the characteristics of the materials, the performance criteria and the limits.
 - .2 The method of application must indicate the equipment used, include certificates of maintenance and calibration of equipment, the plan of application on surfaces (dimensions and limits), the means to control the rate of application, the means for ensuring the binder maturing and the means of protection of the sectors where the binder has been applied until the laying of the bituminous layer.
 - .3 Provide certificates of compliance for each batch of impregnating binder prior to shipment to the work site. Each certificate must contain all the information specified in standard 4105 of Volume VII, Materials of the MTQ.
 - .4 Provide proof that the manufacturer of the impregnating binder holds a registration certificate attesting that the quality system meets the requirements of

ISO 9001 "Quality Management System". The certification must be valid for the period of the work.

1.5 QUALITY ASSURANCE

- .1 At the request of the Departmental Representative, submit the results of the tests and the certificate issued by the manufacturer to ensure that the impregnating binder meets the requirements of this section in accordance with Section 01 33 00 - Submittal Procedures.
- .2 The impregnating binder must be produced by a manufacturer whose plant holds a registration certificate attesting that the quality system meets the requirements of ISO 9001 "Quality Management Systems".
- .3 For each delivery of impregnating binder, the Contractor must provide the supervisor with a certificate of compliance, as specified in MTQ Materials Standard 4104 or 4105, Volume VII.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Transport, store, and handle materials in accordance with ASTM D140 and in accordance with manufacturer's written instructions.

Part 2 Products

2.1 MATERIAL

- .1 CRS bitumen emulsion respecting the following performances:
 - .1 Compatible with aggregates used in the manufacture of asphalt mix and aggregates of the existing base.
 - .2 Not adherent to vehicle tires or to the tracks of pavers used for the installation of asphalt.
 - .3 Allow installation in spring and fall periods.
 - .4 Comply with the requirements of standard 4105 of Volume VII Materials of the MTQ.

2.2 EQUIPMENT

- .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 Be applied uniformly on surfaces of variable width equal to or less than 5 m;
 - .3 Be applied under uniform pressure;
 - .4 Be spread in a uniform spray, without spraying, and at the required temperature.
 - .2 Equipped with a meter used to record the number of meters traveled per minute, said meter to be placed in plain view of the driver in order to allow the latter to

maintain the constant speed required to apply the bituminous material at the prescribed rate.

- .3 Equipped with a pump whose flow meter placed in view of the driver is sufficiently graduated to allow control of the application rate with precision. The pump must be actuated by an autonomous motor group, independent of that of the truck.
- .4 Equipped with a precise, easy-to-read measuring device used to record the temperature of the emulsion contained in the tank.
 - .1 Measure temperature to the nearest whole number.
- .5 Equipped with an accurate volumetric counter.
- .6 Equipped with a pressure distribution manifold with sprinklers of the same brand and dimensions, adjustable according to the desired width and orientation. All the sprinklers must operate and the parallelism of the boom with respect to the surface to be covered must be ensured. The height of the nozzles must allow the jets to overlap on the surface so as to obtain a double or triple overlap.
- .7 For vertical surfaces a manual sprayer with sprinklers must be used.
- .8 Cleaned after the use of any material incompatible with the material to be spread.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of conditions: before proceeding with the installation of the impregnation bitumen layer, ensure that the condition of the surfaces / supports previously implemented under other sections or contracts is acceptable and achieves the work in accordance with the written instructions of the manufacturer.
 - .1 Visually inspect surfaces / supports in the presence of the Departmental Representative.
 - .2 Inform the Departmental Representative immediately of any unacceptable conditions found.
 - .3 Inform the Departmental Representative immediately of any unacceptable conditions found.
 - .4 Drain the liquid accumulate in the boom after long shutdowns without use or in cold weather to avoid contamination of the material inside the spreader tank.
 - .5 Verify the operation of the spreading equipment and adjust the nozzles to obtain the intended application rate.
 - .6 Start binder application only after correcting unacceptable conditions and receiving written approval from Departmental Representative.

3.2 APPLICATION

- .1 Have the existing surface accepted by the Departmental Representative before applying the tie coat. On the stabilized base, the bonding binder must be applied immediately after leveling and cleaning the surface to be covered.
- .2 Heat the bonding binder at the temperatures prescribed by the manufacturer for pumping and spreading.

- .3 Clean the surface using a mechanical broom with rotary movements and supplement if necessary by manual sweeping. The surface must be free of dust, contaminating elements, free particles, foreign bodies, oil and grease.
- .4 Apply the coat of bonding binder only on a clean and dry surface.
- .5 Before the start of each application of the bonding binder, notify the Departmental Representative, so that the latter can take the meter reading, as well as at the end of spreading.
- .6 Apply the coat of bonding binder uniformly using the pressure distribution manifold previously adjusted and verified in the presence of the Departmental Representative:
 - .1 at a residual rate of at least 0.20 l / m² on a new asphalt.
 - .2 at a residual rate of at least 0.25 l / m² on a used asphalt or smooth concrete surface.
 - .3 at a residual rate of at least 0.30 l / m² on a leveled asphalt or rough concrete surface.
 - .4 at the residual rate of 0.10 to 0.25 l / m² on the existing stabilized base.
 - .5 before each application, the Contractor must first assess and adjust the residual rate according to site conditions to obtain a good bonding of the layers over the entire surface, without excess and without tearing off by vehicle tires or the tracks of the pavers. The tolerance for the application rate is 10%.
- .7 Vertical surfaces in contact with the asphalt must be coated with an adhesive sealant, hot applied according to the manufacturer's recommendations, and tested by the MTQ.
- .8 The spreading of the bonding binder must be done when the ambient air temperature is higher than the temperature recommended by the manufacturer and rain is not expected within two (2) hours.
- .9 It is prohibited to apply a bonding binder during rain, on a wet or frozen surface.
- .10 Do not coat with bonding adhesive adjacent surfaces already covered or which are not to be covered.
- .11 Sweep the surface so as to uniformly distribute any excess bonding agent deposited on the roadway, according to the Departmental Representative's directives.
- .12 Prohibit all circulation on coated surfaces until curing of the binder is complete.
- .13 Touch up surfaces that have been soiled or whose bonding agent has been damaged.
- .14 Wait for the curing of the bonding layer to be completed before proceeding with the implementation of the bituminous coating.
- .15 The Contractor must inspect the applied bonding layer to ensure its uniformity.
 - .1 Spread again, using a spray, the bonding binder where the layer is insufficient or not uniform, according to the indications of the Departmental Representative.
 - .2 Ensure that the layer of bonding binder applied manually is uniform and sufficient.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Submittal Procedures - Section 01 33 00.
- .2 Cleaning - Section 01 74 00.
- .3 Aggregates - Section 31 05 16.
- .4 Reshaping Granular Base - Section 32 11 17.
- .5 Tack Coat - Section 32 12 13.16.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Asphalt pavement type ESG-14, 60 mm thick
 - .1 The Contractor shall provide a price per metric ton, based on the weighing tickets received at the site, for the supply and installation of ESG-14, PG 58S-28, lower course HMA, prepared and hot-installed according to the information presented in the plans as well as the requirements of this section of specifications.
 - .2 The price submitted includes the supply of bitumen, the supply of asphalt, loading, weighing, transportation, installation, compaction, final cleaning and any incidental expenses for a complete and ready-for-use work. The price also includes the tack coat when applicable according to section 32 12 13.16 of the technical specifications.
- .2 Asphalt pavement type ESG-10, 40 mm thick
 - .1 The Contractor must provide a price per metric ton, based on the weighing tickets received at the site, for the supply and installation of ESG-10, PG 58S-28 surface course HMA, prepared and hot-installed according to the information presented in the plans as well as the requirements of this section of the specifications.
 - .2 The price submitted includes the supply of bitumen, the supply of asphalt, loading, weighing, transportation, installation, compaction, final cleaning and any incidental expenses for a complete and ready-for-use work. The price also includes the tack coat when applicable according to section 32 12 13.16 of the technical specifications.
- .3 Pavement marking
 - .1 The Contractor must include all costs associated with temporary and permanent pavement marking in the item "Site Organisation" according to the information presented in the plans as well as the requirements of this section of specifications.
 - .2 The activity must include the supply of paint, marking as well as all required equipment.

1.3 REFERENCE STANDARDS

- .1 International Organization for Standardization
 - .1 ISO 3310-1:2016 - Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth

- .2 Bureau de la normalisation du Québec
 - .1 BNQ 2560-114, Travaux de génie civil- Granulats.
- .3 Direction du laboratoire des chaussées et normes – Ouvrages routiers, du Ministère des Transports du Québec (MTQ)
 - .1 Recueil des méthodes d'essais LC, Section 1 – Granulats.
 - .2 Recueil des méthodes d'essais LC, Section 3 – Liants hydrocarbonés.
 - .3 Recueil des méthodes d'essais LC, Section 4 – Enrobés.
 - .4 Tome VII Matériaux – Norme 4101 : Bitumes.
 - .5 Tome VII Matériaux – Norme 4105 : Émulsions de bitume.
 - .6 Tome VII Matériaux – Norme 4202 : Enrobés formulés à chaud selon la méthode de formulation du Laboratoire des chaussées.
- .4 Gouvernement du Québec, Transports Québec
 - .1 Cahier des charges et devis généraux (CCDG) - Infrastructure routières - Construction et réparation, édition 2022.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Data Sheets and Methods of Work
 - .1 At least four (4) weeks prior to start of work, submit product data sheets, instructions and manufacturer's literature regarding asphalt mix manufacturing: asphalt mixing plants, capacity, calibration certificates for balances, process calibrations. skips, thermometers, etc.
 - .2 At least four (4) weeks prior to start of work, submit product data sheets, manufacturer's instructions and documentation for asphalt mixes, aggregates, bitumen and sealant. The data sheets must indicate the characteristics of the materials, the performance criteria, the type of materials, the origin and the limits.
- .3 Certificates
 - .1 At least four (4) weeks prior to start of work, provide complete bitumen compliance certificates, as specified in MTQ Materials, Volume MTQ Standard 4101, as well as the viscosity-temperature graph of the proposed bituminous binder, indicating either the Saybolt Furol viscosity in seconds, or the kinematic viscosity in centistokes, for a temperature range of 105 to 175 degrees Celsius.
 - .2 At least four (4) weeks before the start of work, provide proof that the bitumen manufacturer holds a registration certificate attesting that the quality system meets the requirements of ISO 9001 "Quality Management System". . The certification must be valid for the period of the work.
 - .3 At least four (4) weeks before the start of work, provide a copy of the ISO registration of the asphalt mixing plant and the quality plan for the manufacture of bituminous mixes.

- .4 Mixing formulas, test and evaluation reports
 - .1 At least four (4) weeks before the start of the work, submit to the Departmental Representative, for verification, the dosage formula for each type of asphalt required and the results of the tests specified in the specifications on each mixture and on the constituents. The results must come from tests conducted during the current calendar year for all characteristics of the constituents and mixtures.

1.5 QUALITY ASSURANCE

- .1 Asphalt mixes must be manufactured by a company operating a coating plant with a registration certificate attesting that the quality system meets the requirements of the ISO standard.
- .2 Bitumen used in the manufacture of asphalt must be produced by a manufacturer whose plant holds a certificate of registration attesting that the quality system meets the requirements of the ISO 9001 standard "Quality Management Systems".
- .3 The company responsible for warehousing and shipping must hold a registration certificate attesting that the quality system meets the requirements of ISO 9001 "Quality Management Systems".
- .4 For each delivery of asphalt the Contractor must provide the supervisor with a certificate of conformity, as specified in Standard 4101 of Volume VII, MTQ Materials.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 When necessary to blend aggregates from one or more sources to produce required gradation, do not blend in stockpiles.
- .2 Stockpile fine aggregate separately from coarse aggregate, although separate stockpiles for more than two (2) mix components are permitted.
- .3 Submit to the Departmental Representative copies of freight and waybills for asphalt cement as shipments are received.
 - .1 The Departmental Representative reserves right to check weights as material is received.

Part 2 Products

2.1 MATERIALS

- .1 Bitumen for base, surface layers:
 - .1 PG 58S-28, compliant with MTQ standard 4101. A higher grade of bitumen may be offered as an equivalence. In all cases, it must comply with MTQ Standard 4101.
- .2 Reclaimed asphalt
 - .1 The use of recycled materials such as recovered bituminous aggregates (GBR) is accepted in a maximum proportion of 20%.

- .3 Aggregates: comply with section 31 05 16 - Aggregates and the following requirements:
 - .1 Crushed stone composed only of hard, angular particles free of clay clods, hydraulic, organic or frozen materials and any other deleterious substance. Limestones and other easily polishable petrographic facies are prohibited.
 - .2 Aggregates used in the manufacture of bituminous asphalt must meet the particle size requirements set out in BNQ 2560-114, Part 5: HMA. The required aggregate categories are 2b-1;
- .4 Mineral filler:
 - .1 Ensure that finely ground limestone particles, slaked limestone, Portland cement or non-plastic mineral materials approved by Departmental Representative are perfectly dry and free of lumps.
 - .2 Mineral fines must be added to the mixture as needed to meet the size requirements of the prescribed mixture or to improve the characteristics of the mixture as directed by the Departmental Representative.
 - .3 Ensure mineral fines are dry and free flowing when incorporated into aggregates.
- .5 Road markings
 - .1 Water-based paint in accordance with MTQ standard 10204.

2.2 MIX DESIGN

- .1 Mixes must be formulated according to the formulation method of the Pavement Laboratory (LC), the MTQ, the Contractor must provide all the information required in MTQ standard 4202.
- .2 The composition of the mixture must not be modified without the prior approval of the Departmental Representative. If a change in the source of a material is proposed, a new blending formula must be submitted and accepted by the Departmental Representative.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt paving in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of the Departmental Representative.
 - .2 Inform the Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the Departmental Representative.

3.2 PAVEMENT CONSTRUCTION

- 1. Preparation of the surface of the coating: according to the CCDG.
- 2. Application of the tack coat: according to section 32 12 13.23.
- 3. Realization of asphalt pavement: according to the CCDG.

3.3 TRAFFIC MARKINGS

- .1 Paint parking space divisions and other pavement markings in accordance with manufacturers recommendations and as indicated.
- .2 Use paint thinner in accordance with manufacturer's requirements.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Submittal Procedures - Section 01 33 00.
- .2 Cleaning - Section 01 74 1.
- .3 Hydraulic Seeding - Section 32 92 19.16.

1. MEASUREMENT FOR PAYMENT PURPOSES

- .1 Re-installation of onsite piled topsoil, 100 mm thick:
 - .1 The Contractor must provide a price per square meter for the installation of topsoil according to the information presented in the plans as well as the requirements of this section of estimates.
 - .2 The price includes loading, transporting, setting up, levelling and compaction of the piled topsoil as well as weather protection.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.

1.3 SCHEDULE OF WORK

- .1 Topsoil application and finishing earthworks must be done in a timely manner to allow grassing and seeding to be done in the best possible conditions.
- .2 Do not provide soil under frost, moisture or mud conditions.

Part 2 Products**2.1 RECOVERED TOPSOIL**

- .1 Is defined as the topsoil layer of identified areas that have been stripped and stockpiled for recovery.
- .2 The Contractor must protect the stacks for storing topsoil against the weather, up to the handling for spreading.

Part 3 Execution**3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

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

- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 STRIPPING OF TOPSOIL

- .1 Do not move topsoil when wet or frozen and do not carry out any operation that could alter the soil structure in any way.
- .2 Begin topsoil stripping of areas as indicated on plans. The disposal of materials (organic and vegetable) must be done in a composting site accredited by the Ministry of Sustainable Development, Environment and the Fight Against Climate Change (MELCC).
- .3 Strip topsoil to depths as directed by the Departmental Representative. Avoid mixing up topsoil with subsoil. The thickness of the topsoil generally varies between 100 and 200 mm.

3.3 PREPARATION OF EXISTING GRADE

- .1 Grade soil, eliminate uneven areas and low spots, ensure positive drainage as indicated on plans. Remove soil contaminated with toxic materials. Dispose of excavated material as directed by the Departmental Representative.
- .2 Loosen to a depth of 100 mm the entire surface of the base layer to receive topsoil. Repeat where the earth transport and spreading equipment has compacted the foundation layer.
- .3 Check the ground level to make sure it is adequate. In case of discrepancy, notify the Departmental Representative and do not undertake the work before having received the authorization of the latter.
- .4 Remove debris, roots, branches, stones over 50 mm in diameter and other deleterious substances.

3.4 PLACING AND SPREADING OF TOPSOIL

- .1 Place topsoil after the Departmental Representative has accepted subgrade.
- .2 Spread topsoil in an even layer 100 mm thick after compaction and compaction at 80%. Make sure the topsoil contains enough water.

3.5 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
 - .1 Prepare loose friable bed by means of cultivation and subsequent raking.
 - .2 Scarify the soil to a depth of 25 mm and remove pebbles and other foreign matter that may affect seeding and protrude more than 50 mm.
- .2 Consolidate topsoil to required bulk density using equipment approved by the Departmental Representative.
 - .1 Leave surfaces smooth, uniform and firm against deep foot printing.

3.6 ACCEPTANCE

- .1 The Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.7 SURPLUS MATERIAL

- .1 Dispose of surplus materials, except topsoil, where directed by the Departmental Representative.

3.8 CLEANING

- .1 Proceed with cleaning in accordance with Section 01 74 00 - Cleaning.
- .2 Upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Submittal Procedures - Section 01 33 00.
- .2 Cleaning - Section 01 74 11.
- .3 Topsoil Placement and Grading - Section 32 91 19.13.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Hydraulic seeding:
 - .1 The Contractor must provide a price per square meter for the installation of hydraulic seeding on all surfaces to be seeded according to the information presented in the plans as well as the requirements of this section of specifications.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Data Sheets
 - .1 Submit data sheets no later than one (1) week after contract award.
 - .2 Provide data sheets for the following products:
 - .1 Seeds;
 - .2 Mulch;
 - .3 The fixing agent;
 - .4 Fertilizers;
 - .5 Anti-erosion cover.
- .3 Submit the following information in writing to the Departmental Representative, no later than one (1) week after contract award:
 - .1 Descriptive list of equipment;
 - .2 The quantity of products to be used for each type of seed and seeding.

1.4 SCHEDULE OF WORK

- .1 Plan seeding to coincide with preparation of surfaces to be treated. Provide and approve the schedule of work indicating the date on which seeding will begin.

Part 2 Products**2.1 MATERIALS**

- .1 Fertilizer: minimum ratio of 1:3:1 (N :P 2O5:K2O).
- .2 Seeds of the grass and legume ground cover mixture: complies with the specifications, weed-free and at the minimum germination rate of 85 % and a minimum purity rate of 97 %.

- .3 Mulch:
 - .1 Straw must come from oats, barley or wheat and must be free of weeds and substances harmful to the growth of grasses, legumes and other herbaceous plants.
 - .2 Free of growth inhibitors.
 - .3 Able to disperse in water to form a homogeneous mixture.
 - .4 Able to form an absorbent soil cover allowing the percolation of water.
- .4 Fixing agent: Fixing agents are products specially designed to fix the mulch used for sowing. They can be derived from asphalt emulsions, thermoplastic resins or other similar products. They must be fluid enough to be vaporized evenly into droplets. The asphalt emulsion product must comply with CAN/CGSB-16.2 "Bitumen emulsions, anionic type for road use", type SS-1.
- .5 Water: free of impurities that could prevent germination and growth.

2.2 MIXTURE TO BE APPLIED

- .1 Fertilizer: minimum of 25kg/ha nitrogen (N), 75kg/ha phosphorus (P₂O₅) and 25kg/ha potassium (K₂O).
- .2 Standard grass mixture 250kg/ha composed of:
 - .1 50% tracing red fescue (*Festuca rubra* L. var.);
 - .2 30% Kentucky bluegrass (*Poa pratensis* L.);
 - .3 10% d'agrostide commune (*Agrostis capillaris* L) ou 10% d'agrostide blanche (*Agrostis gigantea* Roth);
 - .4 10% of lively ivraie (*Lolium perenne*).
- .3 Mulch: The uniform protection of the seedling using a mulch of wood fiber, cellulose or straw. The application rate is 1400kg/ha. In the case of straw mulch, the contractor must add 1700l/ha of horticultural peat;
- .4 Fixing agent: according to the rate recommended by the manufacturer.

2.3 EQUIPMENT

- .1 Equipment for hydraulic seeding
 - .1 The tank containing the seeding mixture must have a capacity of at least 4,500 liters.
 - .2 Pumps must be able to maintain a continuous and uniform flow.
 - .3 Stirring mixers: of the type providing mechanical agitation and recirculation of the mixture and continuous operation during the loading of the hopper and seeding.
 - .4 Malleable hoses of 50 m.
 - .5 Nozzles to give the spray jet at least six (6) distinct configurations.

Part 3 Execution

3.1 METHOD OF WORK EXECUTION

- .1 The Contractor must perform hydraulic seeding for all surfaces to be seeded.

3.2 PROTECTION OF EXISTING CONDITIONS

- .1 Protect works, signs, guardrails, fences, plants, utility installations and other surfaces on which no product is to be sprayed.
- .2 Immediately remove sprayed material from work and surfaces not to be treated as directed by Departmental Representative.

3.3 SURFACE PREPARATION

- .1 Do not perform work under adverse conditions, such as when wind speed exceeds 10 km/h, or when the ground is frozen or covered with snow, ice or standing water.
- .2 Perform leveling of surfaces to be seeded to eliminate dents and bumps.
 - .1 Ensure surfaces are free of deleterious materials and scrap.
- .3 Loosen to 25 mm depth areas designated as requiring loosening.
- .4 Ensure that the surfaces to be seeded are wet to a depth of 150 mm before starting seeding.
- .5 Have Departmental Representative approve surfaces and thickness of topsoil before beginning seeding.
- .6 For inclined surfaces with a slope greater than 2 H: 1 V:
 - .1 Establish erosion protection as recommended by the manufacturer;
 - .2 The Contractor shall use the type of hydraulic seeding for 2 H: 1 V slopes and embankments.

3.4 PREPARATION OF SEEDING MIXTURE

- .1 Measure quantities by weight or volume, using a graduated container according to the weight of the product, to the satisfaction of the Departmental Representative. Provide the necessary equipment for measuring quantities.
- .2 Pour the required amount of water into the hydraulic seed drill. Start the agitator before adding the seeding products. Spray the mulch and pour it slowly into the seeder.
- .3 After the materials have been poured into the seed drill and mixed well, incorporate the fixing agent and mix well.

3.5 APPLICATION OF SEEDING MIXTURE

- .1 Hydraulic seeding equipment must be approved by the Departmental Representative.
- .2 The rooting type fertilizer must be mixed with the seed slurry according to the manufacturer's recommendations prior to application.
- .3 Apply seed and mulch mixes evenly, giving the spray an optimum angle to ensure seed adherence to surfaces and germination.
 - .1 The seed slurry with fertilizer should be applied evenly and with the required nozzles so that the seeds are in direct contact with the topsoil.
 - .2 Mulch mud with fixative should be applied as many times as necessary to mulch the seeded area. The mulch layer should be between 5 to 10 mm thick.
- .4 For even coverage of surfaces, apply 300 mm over adjacent surfaces covered with grasses or grass.

- .5 Redo seeding where application of the mixture is not uniform.
- .6 Remove spraying material from structures and surfaces that are not to be treated.

3.6 CLEANING

- .1 Work in progress: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave the premises clean at the end of each working day.
 - .2 Keep pavements and adjacent surfaces clean and free from mud, dirt and debris at all times.
- .2 Final Cleaning: Remove surplus materials, rubbish, tools and equipment from site in accordance with Section 01 74 11 - Cleaning.
 - .1 Clean and repair areas affected by the work.

3.7 PROTECTION

- .1 Prevent movement on seeded areas until vegetation is established.
- .2 Remove protections as directed by Departmental Representative.

3.8 MAINTENANCE DURING THE IMPLEMENTATION PERIOD

- .1 No maintenance required during the implementation period.

3.9 RECEPTION OF WORK

- .1 The planted areas will be accepted, provisional acceptance, by the Departmental Representative if the following conditions are met:
 - .1 All requirements are met;
 - .2 The Contractor submits all purchase orders certifying the recommended quantities and rates.
- .2 The seeded area will be accepted, final acceptance, the following spring, one (1) month after the start of the growth period, if the conditions required for the acceptance of the work are met.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

1. Submittal Procedures - Section 01 33 00.
2. Cleaning - Section 01 74 00.
3. Concrete Forming and Accessories - Section 03 10 00.
4. Concrete Reinforcing - Section 03 20 00.
5. Cast-in-Place Concrete - Section 03 30 00.
6. Excavating, Trenching and Backfilling - Section 31 23 33.01.
7. Storm Utility Drainage Piping - Section 33 41 00.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Supply and installation of prefabricated manhole, including frame, grate, excavation and backfilling:
 - .1 The Contractor must provide a unit price for the supply and installation of a factory prefabricated sewer manhole.
 - .2 The price includes, but is not limited to:
 - .1 Submission for approval of the method of protection against the spread of sediments in the storm system, in accordance with the environmental plan for civil construction projects, and its implementation.
 - .2 Excavation of the trench according to the specified slopes including environmental characterization and off-site disposal of excavation materials in surplus or deemed unusable by the Departmental Representative.
 - .3 The shoring of trench walls.
 - .4 Pumping, dewatering excavations and controlling sediment propagation.
 - .5 The supply and manufacture of the crushed stone seat according to the details in the drawings.
 - .6 The waterproofing of the manholes including the installation of a geotextile membrane on the outer wall of the sump manhole, on a minimum height of 1.8 meters all around the structure.
 - .7 The embankment of the excavations to the natural terrain to meet the requirements of section 31 23 33.01 of the technical specification.
 - .8 Protection and support of existing services.
 - .9 Environmental characterization, transportation, and disposal of surplus materials off-site.
 - .10 All the materials necessary according to the standard sections for the complete implementation of the works according to this section of the technical specification.

1.3 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM C478 REV A, Standard Specification for Precast Reinforced Concrete Manhole Sections (Metric).
- .2 Bureau de la normalisation du Québec (BNQ)
 - .1 BNQ 1809-300 - Travaux de construction clauses techniques générales - conduites d'eau potable et d'égout
 - .2 NQ 2622-420 - Regards d'égout, puisards et chambres des vannes préfabriquées en béton de ciment.
 - .3 NQ 3221-500 - Cadres, grilles, tampons, trappes de puisard et bouches à clé - moulage en fonte grise ou en fonte ductile pour travaux de génie civil - Caractéristiques et méthodes d'essai.
- .3 Gouvernement du Québec, Ministère des Transports
 - .1 Cahier des charges et devis généraux (CCDG) 2022.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 At least two (2) weeks prior to Work, submit manufacturer's instructions, printed product literature and data sheets for manholes and catch basin structures and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 For fissure injection work inside manholes and catch basins, submit to the Departmental Representative, at least one (1) week before start of Work, a complete description of work method and the concrete mix that will be used, for approval.

1.5 QUALITY ASSURANCE

- .1 Submit manufacturer's test data and certification at least two (2) weeks prior to beginning Work. The certificate must be signed by the manufacturer and must certify that manhole complies with specifications.
- .2 Provide the Departmental Representative with a copy of the manufacturer's installation recommendations.
- .3 Ensure that precast manholes and catch basins hold certification stamps.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect manholes and catch basin structures from nicks, scratches, and blemishes.

- .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Prefabricated manholes and catch basin with sanitary grade trim in accordance with BNQ 2622-420.
- .2 Ladders and anchorages: meeting or exceeding NQ 2622-420 and ASTM C478REV A. All metals used in the manufacture of ladders are galvanized according to ASTM A123.
- .3 Frame and cover:
- .1 Asphalt pavement: Adjustable frame and cover, compliant with BNQ 3221-500
- .2 Natural terrain: Standard frame and cover, compliant with BNQ 3221-500
- .4 Anti-lift geotextile membrane:
- .1 Meeting the following characteristics:

	Propriety	Testing method	Value
Physical	Thickness	ASTM D5199	≥ 5,0 mm
	Surface mass	ASTM D5261	≥ 1025 g/m ²
Mechanical	SM tensile strength	ASTM D4632	1200 N
	ST tensile strength	ASTM D4632	1600 N
	Elongation at break SM and ST	ASTM D4632	80 - 140 %
	SM Tear Resistance	ASTM D4533	400 N
	Tear strength ST	ASTM D4533	610 N
	Punching (CBR)	ASTM D6241	3065 N
	Resistance at low temperature	ASTM D1790	-26° C
Hydraulically	Transmissivity under 8 kPa at a gradient = 1	ASTM D4716	6 x 10 ⁻⁵ m ² /s

Part 3 Execution

3.1 EXCAVATION AND BACKFILL

- .1 Excavate and backfill in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling and as indicated.
- .2 Obtain approval of the Departmental Representative before installing, manholes or catch basins.
- .3 During the removal of manholes and catch basins in pavement that is to be conserved, restore pavement to its existing condition.

3.2 CONCRETE WORK

- .1 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Place formwork in accordance with Section 03 10 00 - Concrete Forming and Accessories.

- .3 Place concrete reinforcement in accordance with Section 03 20 00 - Concrete Reinforcing.
- .4 Position metal inserts in accordance with dimensions and details as indicated.

3.3 INSTALLATION

- .1 Install the manholes and pipes in place and execute the seals in accordance with the BNQ 1809-300.
- .2 Construct units in accordance with details indicated, plumb and true to alignment and grade.
- .3 Complete units as pipe laying progresses.
 - .1 Maximum of three (3) units behind point of pipe laying will be allowed.
- .4 Cover the manholes and sumps with an anti-lift geotextile membrane to a height of at least 1.8m from the base of the frame.
- .5 Dewater excavation and remove soft and foreign material before placing concrete base.
- .6 Installing units in existing systems:
 - .1 Where new unit is installed in existing run of pipe, ensure full support of existing pipe during installation, and carefully remove that portion of existing pipe to dimensions required and install new unit as specified. Make joints watertight between new unit and existing pipe.
 - .2 Where deemed expedient to maintain service around existing pipes and when systems constructed under this project are ready for operation, complete installation with appropriate break-outs, removals, redirection of flows, blocking unused pipes or other necessary work.
- .7 Place frame and cover on top section to elevation as indicated.
- .8 Clean units of debris and foreign materials.
 - .1 Remove fins and sharp projections.
 - .2 Prevent debris from entering system.

3.4 FIELD QUALITY CONTROL

- .1 Leakage Test: by water exfiltration must be done for all new manholes constructed and installed on pipes with nominal diameter of 900 mm or less, as specified by BNQ 1809-300.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

1. Submittal Procedures - Section 01 33 00.
2. Cleaning - Section 01 74 11.
3. Cast-in-Place Concrete - Section 03 30 00.
4. Excavating, Trenching and Backfilling - Section 31 23 33.01.
5. Geotextile - Section 31 32 19.01.
6. Manholes and Catch Basin Structures - Section 33 05 16.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Supply and installation of TBA storm sewer lines, 600 mm dia, class IV, including excavation and backfilling:
 - .1 The Contractor shall provide a price per linear meter for the supply and installation of Class IV TBA pipe, 600 mm diameter according to the information presented in the plans as well as the requirements of this section of specifications.
 - .2 The work is measured horizontally from outer wall to outer manhole wall, or from outer wall to existing pipe end.
 - .3 The price must include:
 - .1 Excavation of the trench according to the specified slopes including environmental characterization and off-site disposal of excavation materials in surplus or deemed unusable by the Departmental Representative.
 - .2 Shoring trench walls, pumping, drying excavations and controlling sediment propagation.
 - .3 The supply and manufacture of type 1 crushed stone seat and coating according to the details in the drawings.
 - .4 The supply and installation of storm sewer lines according to the details in the plans and requirements of this section of the technical specifications.
 - .5 Backfilling of the trench according to the details in the plans and according to the specifications of sections 31 23 33.01 and this section of the technical specification and up to the projected surface, transportation, and disposal of surplus materials off-site.
 - .6 Pumping and diversion of water, protection of existing services.
 - .7 Leak tests (exfiltration and infiltration).
 - .8 All the necessary materials according to the standard sections for the complete implementation of the works.

- .2 Connection of a proposed pipe to an existing manhole, including drilling and joint block:
 - .1 The Contractor must provide a unit price for the drilling and construction of a connecting block between an existing manhole and a new pipe according to the information presented in the plans as well as the requirements of this section of estimates.
 - .2 The price includes, but is not limited to:
 - .1 Excavation of the trench according to the specified slopes including environmental characterization and off-site disposal of excavation materials in surplus or deemed unusable by the Departmental Representative.
 - .2 The shoring of trench walls.
 - .3 Pumping, dewatering excavations and controlling sediment propagation.
 - .4 Sawing as well as all temporary measures in the existing manhole.
 - .5 The supply and manufacture of the crushed stone seat according to the details in the drawings
 - .6 The of the connecting block.
 - .7 The embankment of the excavations to the natural terrain to meet the requirements of section 31 23 33.01 of the technical specification, or to the infrastructure line to meet the requirements of this section of the technical specifications.
 - .8 Protection and support of existing services.
 - .9 Environmental characterization, transportation, and disposal of surplus materials off-site.
 - .10 All the necessary materials according to the standard sections for the complete implementation of the works.

1.3 REFERENCE STANDARDS

- .1 Department of Justice Canada (Jus)
 - .1 SOR/2018-196 Prohibition of Asbestos and Products Containing Asbestos Regulations.
- .2 ASTM International (ASTM)
 - .1 ASTM C14M-[07], Standard Specification for Concrete Sewer, Storm Drain and Culvert Pipe (Metric).
 - .2 ASTM C76M-[10a], Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe (Metric).
 - .3 ASTM C136-[06], Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM C443M-[10], Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
- .3 Bureau de normalisation du Québec (BNQ)
 - .1 BNQ 1809-300 - Travaux de construction clauses techniques générales – conduites d'eau potable et d'égout.
 - .2 NQ 2622-126 - Tuyaux et branchements latéraux monolithiques en béton armé et non armé pour l'évacuation des eaux domestiques et pluviales.

- .4 CSA Group (CSA)
 - .1 CAN/CSA-A3000-[08], Cementitious Materials Compendium.
 - .2 CSA A257 Series-[M92 (R2009)], Standards for Concrete Pipe.
- .5 United States Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 833-R-06-004, Developing Your Stormwater Pollution Prevention Plan, A Guide for Construction Sites.

1.4 SCHEDULING

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

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 At least one (1) week prior to Work, submit manufacturer's instructions, printed product literature and data sheets for pipes, and backfill and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Shop Drawings:
 - .1 Shop drawings to indicate proposed method for installing carrier pipe for undercrossing.
 - .2 Submit drawings stamped and signed by professional engineer registered or licensed in Quebec, Canada.
- .4 Samples:
 - .1 Inform the Departmental Representative at least four (4) weeks prior to beginning Work, of proposed source of bedding materials and provide access for sampling. Follow requirements in accordance with Section 31 23 33.01 - Excavation, Trenching and Backfilling.
- .5 Certification to be marked on pipe.
- .6 Test and Evaluation Reports: submit manufacturer's test data and certification at least two (2) weeks prior to beginning Work.
- .7 Manufacturer's Instructions: submit to the Departmental Representative one (1) copy of manufacturer's installation instructions.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect pipes from damage.

Part 2 Products

2.1 CONCRETE PIPE

- .1 Reinforced circular concrete pipe and fittings: with flexible rubber gasket joints to BNQ 2622-126.
- .2 Pipe class: Class IV.
- .3 Lifting holes: Pipe greater than 900 mm diameter.

2.2 PIPE BEDDING AND EMBEDDING MATERIAL

- .1 Concrete mixes and materials for bedding, cradles, encasement, supports in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Crushed stone of 20-0 caliber in accordance with Section 31 23 33.01 - Excavation, Trenching and backfilling.

2.3 BACKFILL MATERIAL

- .1 Type 3 in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Unshrinkable fill: in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

2.4 JOINT MORTAR

- .1 Portland cement: to CAN/CSA-A3000, normal type 10.
- .2 Mortar: one (1) part Portland cement to two (2) parts clean sharp sand mixed with minimum amount of water to obtain optimum consistency for use intended. Do not use additives.

Part 3 Execution

3.1 PREPARATION

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control drawings.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .2 Clean pipes and fittings of debris and water before installation and remove defective materials from site to approval of the Departmental Representative.

3.2 TRENCHING

- .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Protect trench from contents of sewer.
- .3 Trench alignment and depth to approval of the Departmental Representative prior to placing bedding material and pipe.
- .4 Water jetting of backfill under haunches of corrugated steel pipe may be permitted if recommended by manufacturer and approved by the Departmental Representative.

3.3 GEOTEXTILE

- .1 Install geotextile at the bottom and on the walls of dried trench, if required by the Departmental Representative.

3.4 GRANULAR BEDDING

- .1 Place granular bedding material as indicated or directed.
- .2 Use unfrozen bedding material.
- .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
 - .1 Do not use blocks when bedding pipes.
- .4 When using socketed pipes, prepare transversal depressions to receive socket ends.
- .5 Fill excavation below bottom of specified bedding adjacent to manholes or catch basins with common backfill or bedding material, as directed and in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.5 INSTALLATION

- .1 Lay and join pipes to: BNQ 1809-300.
- .2 Lay and join pipe in accordance with manufacturer's recommendations and to approval of the Departmental Representative.
- .3 Handle pipe using methods approved by the Departmental Representative.
 - .1 Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
- .4 Lay pipes on prepared bed, true to line and grade with pipe inverts smooth and free of sags or high points.
 - .1 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
- .5 Begin laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
- .6 Joint deflection permitted within limits recommended by pipe manufacturer.
- .7 Water to flow through pipes during construction only as permitted by the Departmental Representative.
- .8 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.

- .9 Joints:
 - .1 Concrete pipe:
 - .1 Install gaskets as recommended by manufacturer.
 - .2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
 - .3 Align pipes before joining.
 - .4 Maintain pipe joints free from mud, silt, gravel and other foreign material.
 - .5 Avoid displacing gasket or contaminating with dirt or other foreign material. Remove disturbed or dirty gaskets; clean, lubricate and replace before joining is attempted.
 - .6 Complete each joint before laying next length of pipe.
 - .7 Minimize joint deflection after joint has been made to avoid joint damage.
 - .8 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
 - .9 Mortared joints:
 - .1 Pipe interior: circular pipes 700 mm diameter and larger, and arch or elliptical pipe equivalent to 900 mm diameter or larger shall have interior gap between ends of adjacent pipes filled with mortar.
 - .1 Apply mortar minimum 7 days after backfilling has been completed to allow pipe settlement to occur.
 - .2 Finish interior surface of joints smooth.
 - .2 Pipe exterior: for bell and spigot pipe, use mortar to seal outside of joints. Press and bed mortar into place.
 - .1 Allow mortar to set minimum of 1 hour before backfilling.
 - .10 When any stoppage of Work occurs, restrain pipes as directed by the Departmental Representative, to prevent "creep" during down time.
 - .11 Plug lifting holes with Departmental Representative approved prefabricated plugs, set in shrinkage compensating grout.
 - .12 Cut pipes as required for special inserts, fittings or closure pieces, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
 - .13 Make watertight connections to manholes and catch basins.
 - .1 Use shrinkage compensating grout when suitable gaskets are not available.
 - .14 Use prefabricated saddles or approved field connections for connecting pipes to existing sewer pipes.
 - .1 Joint to be structurally sound and watertight.
 - .15 Temporarily plug open upstream ends of pipes with removable watertight concrete, steel or plastic bulkheads.

3.6 PIPE EMBEDDING

- .1 Place surround material in unfrozen condition.

- .2 Upon completion of pipe laying, and after the Departmental Representative has inspected pipe joints, surround and cover pipes as indicated.
 - .1 Leave joints and fittings exposed until field testing is completed.
- .3 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.
- .4 Place layers uniformly and simultaneously on each side of pipe.
- .5 When field test results are acceptable to the Departmental Representative, place surround material at pipe joints.

3.7 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Place backfill material, above pipe surround, in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
- .3 Place backfill in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.8 UNDERCROSSING

- .1 Excavate working pit [to dimensions indicated,] outside right-of-way to be crossed.
- .2 Excavate working pit to minimum of 0.5 m below lowest invert of encasing pipe.
- .3 Dewater excavation.
- .4 Dewater area of undercrossing.
- .5 Install steel frame backstop.
- .6 Place encasing pipe to exact line and grade as indicated.
- .7 Install encasing pipe by boring or jacking.
- .8 Ensure encasing pipe is not in tension.
- .9 Use welded or mechanical type joints for encasing pipe.
- .10 Place concrete grout levelling pad in encasing pipe. Carefully control level of grout during placing.
- .11 Provide shop drawings showing proposed method of installation for storm sewer pipe.
- .12 Insert storm sewer pipe into encasement pipe, in end with largest opening after placement of levelling pad.
- .13 Use approved blocking method to guide storm sewer pipe in true alignment.
- .14 Clearance between blocks and encasement pipe: maximum 12 mm when storm sewer pipe is in position.
- .15 Join storm sewer pipe one length at time outside encasement pipe. Push or Pull storm sewer pipe into position.
- .16 Couplings of storm sewer pipe: not to rest on levelling pad when carrier pipe is in position.
- .17 Place 20 MPa concrete cradle around storm sewer pipe after it is positioned.
 - .1 Cradle to be minimum of 225 mm and maximum of 300 mm above levelling pad.

- .18 Pressure grout remaining void with grout consisting of one (1) part Portland cement and two (2) parts clean washed sand with only sufficient amount of water added to allow placement.
 - .1 Install pressure grout after storm sewer pipe is secure against flotation.
 - .2 Do not use additives.
- .19 Do field testing before placing concrete cradle and grouting.

3.9 FIELD TESTS AND INSPECTIONS

- .1 Perform leakage and exfiltration test in accordance with BNQ 1809-300 in accordance with the requirements of sanitary or unitary sewer pipes.
- .2 Repair or replace pipe, pipe joint or bedding found defective.
- .3 Draw tapered wooden plug with diameter of 50 mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction directed by the Departmental Representative.
- .4 Remove foreign material from sewers and related appurtenances by flushing with water.
- .5 Television and photographic inspections:
 - .1 Carry out inspection of installed sewers by television camera, photographic camera or by other related means.
 - .2 Provide means of access to permit the Departmental Representative to do inspections.
 - .3 Payment for inspection services in accordance with Price and Payment Procedures in PART 1.
- .6 Perform leak tests (infiltration and exfiltration) as soon as possible after completing joints, bedding and service utilities connections.
- .7 Perform leak tests (infiltration and exfiltration) according to the requirements of the following section and as directed by, and in presence of, the Departmental Representative. Inform the Departmental Representative 24 hours in advance of other proposed tests.
- .8 Perform tests for sewer pipes by verifying, one by one, each segment in between two (2) successive maintenance holes and at each service utility connection
- .9 Install watertight bulkhead to isolate the tested segment from the rest of the pipe.
- .10 Exfiltration test
 - .1 Fill the tested segment with water while allowing air to exit pipe. Maintain nominal water depth for a period of 24 hours prior to recording test results, to ensure that pipe walls are well soaked with water.
 - .2 Prior to tests, fill pipe with water until water column surpasses 1 m above the top of pipe inner wall, measured from the highest point in test segment, or until water level in maintenance hole is 1.0 m above groundwater level, whichever is higher.
 - .3 Exfiltration test must last two (2) hours.
 - .4 Water loss from exfiltration at the end of the test period must not exceed maximum allowable loss for each segment of pipe in between two (2) successive maintenance holes.

- .11 Infiltration test
 - .1 Proceed with infiltration test rather than the exfiltration test when groundwater level exceeds 750 mm above the top of pipe, measured from the highest point in test segment.
 - .2 Seal upstream end of test segment with watertight plug.
 - .3 Interrupt pumps at least three (3) days prior of recording test results.
 - .1 During this period, one third of the inner section of the pipe must be covered with water.
 - .4 Protect pipes and bedding material from any damage that can be caused by flotation of pipes or erosion.
 - .5 At each maintenance hole, at invert elevation of sewer pipe, install weir with a 90 mm V-shaped notch or other measuring device approved by the Departmental Representative.
 - .6 Measure flow for a period of at least one (1) hour. Two (2) recordings must be done at a ten (10) minutes interval. The results must appear in the test reports.
- .12 The allowable infiltration or exfiltration rate must not exceed the following limits:
 - .1 The allowable loss is 18.5 L/mm of inner pipe diameter per km of pipe for 24 hours. The minimum pressure is the one generated by the water head equivalent to final grading elevation (i.e. final elevation of maintenance hole cover) plus 0.6 meters.
 - .2 Allowable loss calculations must account for main pipe and laterals.

3.10 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Submittal Procedures - Section 01 33 00.
- .2 Cleaning - Section 01 74 00.
- .3 Excavating, Trenching and Backfilling - Section 31 23 33.01.

1.2 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Supply and installation of R320 HDPE culvert, including excavation and backfilling:
 - .1 The Contractor shall provide a price per linear meter for the supply and installation of R320 HDPE culverts according to the information presented in the drawings as well as the requirements of this section of specifications.
 - .2 The work is measured horizontally from the end of one pipe to the other, removing the lengths associated with the presence of a beveled end.
 - .3 The price must include:
 - .1 Excavation of the trench according to the specified slopes including environmental characterization and off-site disposal of excavation materials in surplus or deemed unusable by the Departmental Representative.
 - .2 Shoring trench walls, pumping, drying excavations and controlling sediment propagation.
 - .3 The supply and manufacture of type 1 crushed stone seat and coating according to the details in the drawings.
 - .4 The supply and installation of storm sewer lines according to the details in the plans and requirements of this section of the technical specifications.
 - .5 Backfilling of the trench according to the details in the plans and according to the specifications of sections 31 23 33.01 and this section of the technical specification and up to the projected surface, transportation, and disposal of surplus materials off-site.
 - .6 Pumping and diversion of water, protection of existing services.
 - .7 All the necessary materials according to the standard sections for the complete implementation of the works.
- .2 Culvert end construction, including beveled end:
 - .1 The Contractor must provide a unit price culverts end construction, regardless of the diameter, according to the information presented in the drawings as well as the requirements of this section of specifications.
 - .2 The price must include:
 - .1 Excavation of the trench according to the specified slopes including environmental characterization and off-site disposal of excavation materials in surplus or deemed unusable by the Departmental Representative;
 - .2 Shoring trench walls, pumping, drying excavations and controlling sediment propagation.

- .3 The supply and manufacture of type 1 crushed stone seat and coating according to the details in the drawings.
- .4 The supply and installation of the beveled end.
- .5 Backfilling of the trench according to the details in the plans and according to the specifications of sections 31 23 33.01 and this section of the technical specification and up to the projected surface, transportation, and disposal of surplus materials off-site.
- .6 The supply and installation of the protective coating according to the specifications of the detail as well as this section.
- .7 Pumping and diversion of water, protection of existing services.
- .8 All the necessary materials according to the standard sections for the complete implementation of the works.

1.3 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C14M-[07], Standard Specification for Nonreinforced Concrete Sewer, Storm Drain and Culvert Pipe (Metric).
 - .2 ASTM C76M-[10a], Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe (Metric).
 - .3 ASTM C117-[04], Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .4 ASTM C136-[06], Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .5 ASTM C144-[04], Standard Specification for Aggregate for Masonry Mortar.
 - .6 ASTM C443M-[10], Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
 - .7 ASTM D698-[07e1], Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³(600 kN-m/m³)).
 - .8 ASTM D1248-[05], Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable.
 - .9 ASTM F667-[06], Standard Specification for Large Diameter Corrugated Polyethylene Pipe and Fittings.
- .2 Bureau de normalisation du Québec (BNQ):
 - .1 BNQ 2560-114 : Travaux de génie civil – Granulats
 - .2 BNQ 1809-300 - Travaux de construction clauses techniques générales - conduites d'eau potable et d'égout,
 - .3 NQ 2622-126 - Tuyaux et branchements latéraux monolithiques en béton armé et non armé pour l'évacuation des eaux domestiques et pluviales.
- .3 CSA Group (CSA)
 - .1 CSA A3000-[08], Cementitious Materials Compendium.
 - .2 CSA A257 Series-[09], Standards for Concrete Pipe and Manhole Sections.
 - .3 CAN/CSA G401-[07], Corrugated Steel Pipe Products.
- .4 Ministère des transports du Québec
 - .1 Norme 14501, Enrochement et revêtement en pierres (2018)

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for pipes and backfill and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Certification: to be marked on pipe.
- .4 Test and Evaluation Reports:
 - .1 Submit manufacturer's test data and certification at least four (4) weeks prior to beginning Work.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section [with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect pipes from damage.
 - .3 Replace defective or damaged materials with new.

Part 2 Products**2.1 HDPE PIPES R320**

- .1 Non-perforated HDPE R320 pipes: compliant with BNQ 3624-120.
- .2 Fittings: compliant with BNQ 3624-120.
- .3 Seals: compliant with BNQ 3624-120.
- .4 Beveled end: compliant with BNQ 3624-120.

2.2 GRANULAR BEDDING AND EMBEDDING

- .1 Refer to section 31 23 33.01 - Excavation, trenching and backfilling.

2.3 RIP RAP

- .1 Refer to section 31 23 33.01 - Excavation, trenching and backfilling.

Part 3 Execution**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for pipe culvert installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of the Departmental Representative.
 - .2 Inform the Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the Departmental Representative.

3.2 PREPARATION

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TRENCHING

- .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.4 BEDDING

- .1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition.
- .2 Place 150 mm minimum thickness, for pipes with diameters 600 mm or lower, and 200 mm minimum thickness, for pipes with diameters between 675 mm and 1,200 mm, of approved granular material on bottom of excavation and compact to 90% minimum of maximum density to ASTM D698.
- .3 Place bedding in unfrozen condition.

3.5 LAYING CONCRETE PIPE CULVERTS

- .1 Begin at downstream end of culvert with flanged end of first pipe section facing upstream.
- .2 Ensure barrel of each pipe is in contact with shaped bed throughout its length.
- .3 Allow water to flow through pipes during construction only as permitted by the Departmental Representative.

3.6 PIPE CONNECTION

- .1 Gasket:
 - .1 Place the seals according to the manufacturer's written recommendations.

- .2 Make sure the end is properly inserted into the flanged end.

3.7 BACKFILLING

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

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

END OF SECTION