



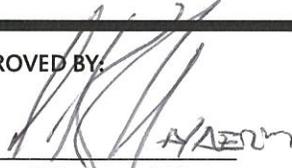
**Public Works and
Government Services Canada**

Requisition No. EZ899-150553/A

SPECIFICATIONS
for
LITTLE GOLD PORT OF ENTRY, YUKON
DRAINAGE IMPROVEMENTS

Project No. #R.065811.001
July 2014

APPROVED BY:


Regional Manager, AES

July 10/2014.
Date


Construction Safety Coordinator

2014-07-03
Date

TENDER:


Project Manager

July 03, 2014
Date

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PART 1 - SUMMARY OF
WORK

1.1 WORK COVERED BY
CONTRACT DOCUMENTS

- .1 The work proposed is construction of drainage improvements at the Little Gold Port of Entry. The specific works items include excavation, storm drainage collection piping, site grading, and miscellaneous site work and remedial work as indicated, located at the Little Gold Port of Entry on the Yukon and Alaska Border along the Top of the World Highway

1.2 CONTRACTOR'S USE
OF PREMISES

- .1 Contractor has controlled use of site within the construction area, for Work, storage, and access as directed by the Departmental Representative.

PART 2 - WORK
RESTRICTIONS

- .1 Notify, Departmental Representative of intended interruption of services and provide schedule for review. Schedule major disruption of power during approved times.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 72 hours of notice for necessary interruption of services throughout course of work. Keep duration of interruptions to a minimum. Coordinate interruptions with Departmental Representative.
- .3 Provide for access by pedestrian and vehicular traffic on and around site where work is in progress.
- .4 Construct barriers in accordance with Temporary Barriers and Enclosures clause.
- .5 Security Requirements: refer to Section 01 14 10 - Security Requirements.
- .6 Hours of work:
 - .1 Perform work between hours 08:00 to 16:00, Monday through Friday except holidays. Work may be performed after normal working hours of the Port of Entry, Monday through Friday, on weekends and holidays, with a minimum seventy-two (72) hours advance notice and approval of the Departmental Representative. Provide schedule for prior approval of Departmental Representative.
 - .2 Allow for delays due to security protocol when work interferes with security operations. See 01 14 10 for Security Requirements.

PART 3 - CONSTRUCTION
WORK SCHEDULE

- .1 Commence work immediately upon official notification of contract award and complete the work within four (4) weeks from the date of such notification.
- .2 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Substantial Certificate and Final Certificate as defined times of completion are of essence of this contract.
- .3 Submittal:
 - .1 Submit to Departmental Representative within five (5) working days of Award of Contract Bar a (GANTT) Chart as Master Plan for planning, monitoring and reporting of construction progress.
 - .2 Identify each trade or operation.
 - .3 Show dates for delivery of items requiring long lead time.
 - .4 Departmental Representative will review schedule and return one copy.
 - .5 Re-submit two (2) copies of finalized schedule to Departmental Representative within five (5) working days after return of reviewed preliminary copy.
- .4 Project Scheduling Reporting:
 - .1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.
 - .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.
- .5 Project Meetings:
 - .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
 - .2 Weather related delays with their remedial measures will be discussed and negotiated.
 - .3 Before submitting first progress claim submit breakdown of Contract price in detail as directed by Departmental Representative and aggregating contract price. After approval by Departmental Representative cost breakdown will be used as basis for progress payments.

PART 4 - SUBMITTAL
PROCEDURES

- .1 Administrative:
 - .1 Submit to Departmental Representative submittal listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
 - .2 Do not proceed with work 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 submittal prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittal not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
 - .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
 - .7 Verify field measurements and affected adjacent Work are coordinated.
 - .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative review of submittal.
 - .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
 - .10 Keep one reviewed copy of each submission on site.
- .2 Shop Drawings:
 - .1 Drawings to be originals prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate appropriate portion of work; showing fabrication, layout, setting or erection details as specified in appropriate sections.
- .3 Product Data:
 - .1 Certain specification Sections specify that

manufacturer's standard schematic drawings, catalogue sheets, diagrams, schedules, performance charts, illustrations and other standard descriptive data will be accepted in lieu of shop drawings, provided that the product concerned is clearly identified. Submit in sets, not as individual submissions.

- .4 Submission Requirements:
 - .1 Schedule submissions at least ten days before dates reviewed submissions will be needed.
 - .2 Submit digital copy (pdf) of product data and all shop drawings.
 - .3 Accompany submissions with transmittal letter in duplicate.
- .5 Coordination of Submissions:
 - .1 Review shop drawings, product data and samples prior to submission.
 - .2 Coordinate with field construction criteria.
 - .3 Verify catalogue numbers and similar data.
 - .4 Coordinate each submittal with requirements of the work of all trades and contract documents.
 - .5 Responsibility for errors and omissions in submittal is not relieved by Departmental Representative's review of submittal.
 - .6 Responsibility for deviations in submittal from requirements of Contract documents is not relieved by Departmental Representative's review of submittal, unless Departmental Representative gives written acceptance of specified deviations.
 - .7 Notify Departmental Representative, in writing at time of submission, of deviations in submittal from requirements of Contract documents.
 - .8 Make any changes in submissions which Departmental Representative may require consistent with Contract Documents and re-submit as directed by Departmental Representative.
 - .9 After Departmental Representative's review, distribute copies.
 - .10 Shop Drawings Review:
 - .1 Review of shop drawings by Departmental Representative is for the sole purpose of ascertaining conformance with the general concept.
 - .2 The Departmental Representative's review does not mean that PWGSC approves the detail design inherent in the shop drawings, responsibility remains with the contractor submitting same, and such review will not relieve the Contractor of responsibility

for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and contract documents.

- .3 Without restricting the generality of the foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation, and for co-ordination of the work of all subtrades.

PART 5 - HEALTH AND SAFETY

- .1 Specified in Section 01 35 33.

PART 6 - ENVIRONMENTAL PROCEDURES

- .1 Fires and burning of rubbish on site not permitted.
- .2 Do not bury rubbish and waste materials on site unless approved by Departmental Representative.
- .3 Control emissions from equipment to local authorities' emission requirements.
- .4 Do not dispose of waste or volatile materials such as oil, paint thinner or mineral spirits into waterways, storm or sanitary systems.
- .5 Provide temporary drainage and pumping as necessary to keep excavations and site free from water during excavation and grading activities.
- .6 Control disposal of run-off of water containing suspended materials or other harmful substances in accordance with local authority requirements. Construct settlement ponds and silt fences as required by the Provincial Environmental authority.
- .7 Safely dispose of wet concrete and pipe grout offsite in accordance with Municipal, Provincial and Federal authorities requirements.
- .8 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
- .9 Under no circumstances dispose of rubbish or waste materials on property or CBSA waste bins.
- .10 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.

PART 7 - REGULATORY
REQUIREMENTS

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

PART 8 - QUALITY
CONTROL

- .1 Inspection:
 - .1 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.
 - .2 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.
 - .3 Provide digital photographs to the Departmental Representative showing the various stages of construction including completed excavations, drain rock placement, piping, backfilling and completed installation. Photographs to be provided within 14 days of completion of work.
 - .4 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.
- .2 Independent Inspection Agencies:
 - .1 Provide independent Inspection/Testing Agencies for purpose of inspecting and/or testing portions of Work as specified in relevant sections. Cost of materials testing and density tests will be borne by the Contractor. Cost of geotechnical engineering review of retaining wall, subgrade evaluations and infiltration system will be paid for under separate contract by the Departmental Representative.

- .2 Provide equipment required for executing inspection and testing by appointed agencies.
 - .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
 - .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no extra cost to Contract. Pay costs for retesting and re-inspection.
- .3 Procedures:
- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
 - .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
 - .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.
- .4 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.
- .5 Reports:
- .1 Submit (4) four copies or scanned pdf copy of inspection and test reports to Departmental Representative.
- .6 Tests and Mix Designs:
- .1 Furnish test results and mix designs as may be requested.
- PART 9 - TEMPORARY UTILITIES
- .1 Installation and Removal:
 - .1 Provide temporary utilities controls in order to execute work expeditiously.
 - .2 Remove from site all such work after use.
 - .2 Dewatering:

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.
- .3 Water Supply:
 - .1 Existing water supply system may be used for construction purposes provided that damaged components are replaced when damaged. Provide own hoses from source.

PART 10 - CONSTRUCTION FACILITIES

- .1 Installation and Removal:
 - .1 Provide construction facilities in order to execute work expeditiously.
 - .2 Remove from site all such work after use.
- .2 Site Storage/Loading:
 - .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
 - .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.
- .3 Construction Parking:
 - .1 Make good damage to existing roads used for access to project site.
- .4 Contractor's Site Office and enclosure:
 - .1 Provide office of size to accommodate site meetings and Contractor's operations.
 - .2 Provide a clearly marked and fully stocked first-aid case in a readily available location.
 - .3 Provide temporary fence around any open excavations while the contractor is away from the site and operations.
- .5 Equipment, Tools and Material Storage:
 - .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
 - .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.
- .6 Sanitary Facilities:
 - .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

PART 11 - TEMPORARY BARRIERS AND ENCLOSURES

- .1 Guardrails and Excavations:
 - .1 Provide secure, rigid guard rails and barricades around deep excavations, in

- labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.
 - .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.
- .6 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.
- .7 Co-ordination:
- .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
 - .2 Be responsible for coordination and placement of structures and accessories.
- .8 Remedial Work:
- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
 - .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.
- .9 Fastenings:
- .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.
- .10 Protection of Work in Progress:
- .1 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Departmental Representative.
- .11 Existing Utilities:
- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to pedestrian and vehicular traffic.
 - .2 Before commencing work, establish location and extent of service lines in areas of work and notify Departmental Representative of findings.
 - .3 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
 - .4 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
 - .5 Record locations of maintained, capped and re-routed services lines.
- .12 Contractors Options for Selection of Products:
- .1 Products specified by "Prescriptive" specifications: select any product meeting or exceeding specifications.
 - .2 Products specified under "Acceptable Products" (used for complex Mechanical or Electrical Systems): select any one of the indicated manufacturers, or any other manufacturer meeting or exceeding the Prescriptive specifications and indicated

- Products.
- .3 Products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.
 - .4 Products specified to meet particular design requirements or to match existing materials: use only material specified Approved Product. Alternative products may be considered provided full technical data is received in writing by Departmental Representative in accordance with "Instructions to Bidders".
 - .5 When products are specified by a referenced standard or by Performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent laboratory report showing that the product meets or exceeds the specified requirements.
- .13 Substitution after award of Contract:
- .1 No substitutions are permitted without prior written approval of the Departmental Representative.
 - .2 Proposals for substitution may only be submitted after Contract award. Such request must include statements of respective costs of items originally specified and the proposed substitution.
 - .3 Proposals will be considered by the Departmental Representative if:
 - .1 products selected by tenderer from those specified are not available;
 - .2 delivery date of products selected from those specified would unduly delay completion of Contract, or
 - .3 alternative product to that specified, which is brought to the attention of and considered by Departmental Representative as equivalent to the product specified, and will result in a credit to the Contract amount.
 - .4 Should the proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on the project. Pay for design or drawing changes required as result of substitution.
 - .5 Amounts of all credits arising from approval of the substitutions will be determined by the Departmental Representative, and the Contract price will be reduced accordingly.

AND REPARATION

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.
- .2 Remove abandoned service lines within 2 m of structures. Cap lines at cut-off points.
- .2 Location of Equipment and Fixtures:
 - .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
 - .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
 - .3 Inform Departmental Representative of impending installation and obtain approval for actual location.
 - .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

PART 14 - EXECUTION
REQUIREMENTS

- .1 Preparation:
 - .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
 - .2 After uncovering, inspect conditions affecting performance of Work.
 - .3 Beginning of cutting or patching means acceptance of existing conditions.
 - .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
 - .5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.
 - .6 Provide layout, surveys and grade controls adequate for construction and confirmation by the Departmental Representative.
- .2 Execution:
 - .1 Execute cutting, fitting, and patching, including excavation and fill, to complete Work.
 - .2 Fit several parts together, to integrate with other Work.
 - .3 Uncover Work to install ill-timed Work.
 - .4 Remove and replace defective and non-conforming Work.
 - .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
 - .6 Execute Work by methods to avoid damage to other Work, and which will provide proper

- .7 surfaces to receive patching and finishing. Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .9 Restore work with new products in accordance with requirements of Contract Documents.

PART 15 - CLEANING

- .1 Project Cleanliness:
 - .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
 - .2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
 - .3 Provide on-site containers for collection of waste materials and debris.
 - .4 Provide and use clearly marked separate bins for recycling. Refer to Construction /Demolition Waste Management And Disposal.
 - .5 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
 - .6 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .2 Final Cleaning:
 - .1 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
 - .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
 - .3 Prior to final review, remove surplus products, tools, construction machinery and equipment.
 - .4 Remove waste products from site.
 - .5 Inspect Work and ensure specified workmanship and operation.
 - .6 Sweep and wash clean paved areas used during work of this contract.

PART 16 -
CONSTRUCTION/
DEMOLITION WASTE
MANAGEMENT AND
DISPOSAL

- .1 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and/or recyclable materials and waste. Separate non-salvageable materials from salvaged items. Handle waste materials not reused, salvaged, or recycled in accordance with

appropriate regulations and codes. Transport and deliver non-salvageable items to licensed disposal facility.

- .2 Provide containers to deposit reusable and/or recyclable materials. Locate containers in locations, to facilitate deposit of materials without hindering daily operations. Provide containers to deposit reusable and/or recyclable materials.
- .3 Collect, handle, store on-site and transport off-site, salvaged materials in separate condition. Transport to approved and authorized recycling facility and/or users of material for recycling.
- .4 Locate waste and salvage bins on site as directed by Departmental Representative.

PART 17 - CLOSEOUT
PROCEDURES

- .1 Inspection and Declaration:
 - .1 Contractor's Inspection: Conduct an inspection of Work with all subcontractors, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .2 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
 - .3 Request Departmental Representative's Inspection.
- .2 Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .3 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
 - .4 Certificates required engineering authority have been submitted.
 - .5 Operation of systems have been demonstrated to Department's personnel.
 - .6 Work is complete and ready for Final Inspection.
- .4 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative. If Work is deemed

incomplete by Departmental Representative, complete outstanding items and request re-inspection.

PART 18 - CLOSEOUT
SUBMITTAL

- .1 Record Drawings:
 - .1 As work progresses, maintain accurate records to show all deviations from the Contract Drawings. Note on as-built drawings as changes occur. At completion supply:
 - .1 Two (2) sets of marked up as-built drawings.
 - .2 Submit sets of marked up as-built drawings to Departmental Representative.
 - .3 Contractor may place on the upper right-hand title block area a small company logo, the text "AS-BUILT" and the date of submission.

PART 19 -
DEMONSTRATION AND
TRAINING

- .1 Demonstration and Training:
 - .1 Demonstrate operation and maintenance of equipment and systems to maintenance personnel following interim Completion and prior to date of final certificate of completion
 - .2 Departmental Representative will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon times.

-----END OF SECTION-----

- PART 1 - PURPOSE .1 To ensure that both the construction project and the Port of Entry operations may proceed without undue disruption or hindrance and that the security of the Border is maintained at all times.
- PART 2 - DEFINITIONS .1 "Contraband" means:
(a) an intoxicant, including alcoholic beverages, drugs and narcotics
(b) a weapon or a component thereof, ammunition for a weapon, and anything that is designed to kill, injure or disable a person or that is altered so as to be capable of killing, injuring or disabling a person, when possessed without prior authorization,
(c) an explosive or a bomb or a component thereof,
(d) any item not described in paragraphs (a) to (d) that could jeopardize the security of a Port of Entry or the safety of persons, when that item is possessed without prior authorization.
- .2 "Commercial Vehicle" means any motor vehicle used for the shipment of material, equipment and tools required for the construction project.
- .3 "CBSA" means Canada Border Services Agency.
- .4 "Construction employees" means persons working for the general contractor, the sub-contractors, equipment operators, material suppliers, testing and inspection companies and regulatory agencies.
- .5 "Departmental Representative" means the Public Works and Government Services Canada representative defined in General Conditions.
- PART 3 - PRELIMINARY PROCEEDINGS .1 At construction start-up meeting:
.1 Discuss the nature and extent of all activities involved in the Project.
.2 Establish mutually acceptable security procedures in accordance with this instruction and the institution's particular requirements.
- .2 The contractor's responsibilities:
.1 Ensure that all construction employees are aware of the CBSA security requirements.
.2 Co-operate with CBSA personnel in ensuring that security requirements are observed by all construction employees.
- PART 4 - CONSTRUCTION EMPLOYEES .1 Entry to the Property will be refused to any person there may be reason to believe may be a security risk.

- .5 Any person employed on the construction site will be subject to immediate removal from CBSA Property if they:
 - 1. appear to be under the influence of alcohol, drugs or narcotics.
 - 2. behave in an unusual or disorderly manner.
 - 3. are in possession of contraband.

PART 5 - VEHICLES

- .1 All unattended vehicles on CBSA property must have windows closed; fuel caps locked, doors and trunks locked and keys removed. The keys must be securely in the possession of the owner or an employee of the company that owns the vehicle.
- .2 The Departmental Representative may limit at any time the number and type of vehicles allowed on CBSA property.
- .3 Drivers of delivery vehicles for material required by the project must remain with their vehicle the entire time that the vehicle is on CBSA property. The Departmental Representative may require that these vehicles be escorted by CBSA staff or PWGSC Construction Escorts while on the property.

PART 6 - PARKING

- .1 The parking area(s) to be used by construction employees will be designated by the Department Representative. Parking in other locations will be prohibited and vehicles may be subject to removal.

PART 7 - SHIPMENTS

- .1 To avoid confusion with shipments, address all shipments of project material, equipment and tools in the Contractors name and have a representative on site to receive any deliveries or shipments. CBSA or PWGSC staff will NOT accept receipt of deliveries or shipments of any material equipment or tools for the contractor.

PART 8 - WORK HOURS

- .1 Work hours are to conform to Section 01 01 50 - General Instructions.
- .2 Work is not permitted during weekends and statutory holidays without the permission of the Department Representative. A minimum of seven days advance notice will be required to obtain the required permission. In case of emergencies or other special circumstances, this advance notice may be waived by the Departmental Representative.

PART 9 - OVERTIME
WORK

- .1 Provide 72 hours advance notice to Department Representative for all work to be performed after normal working hours. Notify Department

Representative immediately if emergency work is required, such as to complete a concrete pour or make the construction site safe and secure.

- PART 10 - SMOKING RESTRICTIONS .1 Smoking is not permitted onsite
- .2 Persons in violation of this policy will be requested to immediately cease smoking. If they persist will be directed to leave the site.
- PART 11 - CONTRABAND .1 Weapons, ammunition, explosives, alcoholic beverages, drugs and narcotics are prohibited on CBSA property.
- .2 The discovery of contraband on the construction site and the identification of the person(s) responsible for the contraband shall be reported immediately to the Departmental Representative.
- PART 12 - SEARCHES .1 All vehicles and persons entering the property may be subject to search.
- PART 13 - ACCESS TO AND REMOVAL FROM CBSA PROPERTY .1 Construction personnel and commercial vehicles will not be admitted to the property after normal working hours, unless approved by the Department Representative.

-----END OF SECTION-----

PART 1 - GENERAL

- 1.1 RELATED SECTIONS
- .1 Section 32 11 23-Aggregate Base Courses.
 - .2 Section 32 11 16-Granular Sub-Base.
- 1.2 REFERENCES
- .1 Manual of Uniform Traffic Control Devices for Streets and Highways for Canada, Transportation Association of Canada.
- 1.3 PROTECTION OF PUBLIC TRAFFIC
- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
 - .2 When working on travelled way:
 - .1 Place equipment in position to minimize interference and hazard to travelling public.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
 - .3 Do not close any PIL lanes without approval of Departmental Representative seven (5) working days required. Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in Part D of UTCD. Refer to Section 01 14 00 - Work Restrictions.
 - .4 As directed by Departmental Representative, provide lane detours to facilitate passage of traffic around restricted construction area.
- 1.4 INFORMATIONAL AND WARNING DEVICES
- .1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
 - .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in Part D, Temporary Conditions Signs and Devices of UTCD manual.
 - .3 Place signs and other devices in locations recommended in the UTCD Manual.
 - .4 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Departmental Representative.
 - .5 Continually maintain traffic control devices in use by:

- .1 Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
- .2 Removing or covering signs which do not apply to conditions existing from day to day.

1.5 CONTROL OF
PUBLIC TRAFFIC

- .1 Provide competent flag persons, trained in accordance with, and properly equipped as specified in the reference manuals in following situations:
 - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
 - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
 - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .5 For emergency protection when other traffic control devices are not readily available.
 - .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
 - .7 At each end of restricted sections where pilot cars are required.
 - .8 Delays to public traffic due to contractor's operators: maximum 15 minutes.
- .2 Where roadway, carrying two-way traffic, is restricted to one lane, for 24 hours each day, provide portable traffic signal system. Adjust, as necessary, and regularly maintain system during period of restriction. Signal system to meet requirements of the reference manuals.

1.6 OPERATIONAL
REQUIREMENTS

- .1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified and approved by Departmental Representative to protect and control public traffic.
- .2 Maintain existing conditions for traffic crossing right-of-way.
- .3 Remain within the designated work areas. Movement within CBSA restricted areas must be approved and may require to be escorted by CBSA staff.

- .4 Do not interfere with border inspection processes. Move away from CBSA officials interacting with the travelling public to avoid overhearing potentially sensitive and personal conversations.
- .5 Be accountable for tools/equipment at all times. Do not leave tools unattended and/or within reach of the travelling public.
- .6 Act professionally at all times. No foul language or rude behavior.
- .7 Do not interact with the travelling public, unless authorized to do so where required.
- .8 Obey uniformed CBSA officers when given operational directives (these may include being instructed to move off site during a dangerous situation or to stop work because of operational requirements. Report to the Departmental Representative when such instructions have been given, as early as is convenient). Do not take directions from uniformed officers of PWGSC building maintenance regarding project construction issues.
- .9 Traffic lane closures:
 - .1 Request for lane closure requires a minimum of seven (7) working days notice and must be approved by Departmental Representative. During lane closure, provide wayfinding signage for pedestrian and vehicular traffic.
- .10 Security Cameras:
 - .1 Security cameras to be remain operational. Cameras requiring temporary relocation to be serviced as directed by Departmental Representative.
- .12 Communication Antennae:
 - .1 Communication antennae to remain operational. Antennae requiring temporary relocation to be serviced

-----END OF SECTION-----

PART 1 - REFERENCES

- .1 Government of Canada:
 - .1 Canada Labour Code - Part II
 - .2 Canada Occupational Health and Safety Regulations.
- .2 National Building Code of Canada (NBC):
 - .1 Part 8, Safety Measures at Construction and Demolition Sites.
- .3 Canadian Standards Association (CSA):
 - .1 CSA Z797-2009, Code of Practice for Access Scaffold.
- .4 Fire Protection Engineering Services, HRSDC:
 - .1 FCC No. 301, Standard for Construction Operations.
- .5 American National Standards Institute (ANSI):
 - .1 ANSI A10.3, Operations - Safety Requirements for Powder-Actuated Fastening Systems.
- .6 Yukon Territory
 - .1 Occupational Health and Safety Regulations. Yukon Workers Compensation Health and Safety Board, Occupational Health and Safety Act

PART 2 - RELATED SECTIONS

- .1 General Instructions: Section 01 01 50
 - .1 Submittals Procedures, Temporary Utilities, Construction Facilities and Temporary Barriers and Enclosures.

PART 3 - WORKERS' COMPENSATION BOARD COVERAGE

- .1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.
- .2 Maintain Workers' Compensation Health and Safety Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

PART 4 - COMPLIANCE WITH REGULATIONS

- .1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.
- 2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

PART 5 - SUBMITTALS

- .1 Make submittals in accordance with Section 01 01 50-General Instructions, Submittal Procedures.

- .2 Submit the following:
 - .1 Site Specific Health and Safety Plan.
 - .2 Copies of reports or directions issued by federal and provincial health and safety inspectors.
 - .3 Copies of incident and accident reports.
 - .4 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
 - .5 Emergency procedures.
- .3 The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 7 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative for review upon request.
- .4 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.
- .5 Submission of the site specific Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:
 - .1 Be construed to imply approval by the Departmental Representative.
 - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
 - .3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

PART 6 -
RESPONSIBILITY

- .1 Assume responsibility as the Prime Contractor for work under this contract and appoint a qualified coordinator for the purpose of ensuring the coordination of health and safety activities for the location.
- .2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable federal, provincial, territorial and

local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan

PART 7 - HEALTH AND SAFETY COORDINATOR

- .1 The Health and Safety Coordinator (Registered Occupational Hygienist, Certified Industrial Specified Hygienist) must:
 - .1 Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.
 - .2 Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.
 - .3 Be on site during execution of work.

PART 8 - GENERAL CONDITIONS

- .1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
- .2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.
 - .1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.
 - .2 Secure site after working hours in accordance with Section 01 14 10 - Security Requirements.

PART 9 - REGULATORY REQUIREMENTS

- .1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.
- .2 In event of conflict between any provisions of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.

PART 10 - FILING OF NOTICE

- .1 Submit a Notice of Project in accordance with Yukon Workers Compensation Health and Safety Board.
- .2 Submit copy to Departmental Representative.

PART 11 - HEALTH AND SAFETY PLAN

- .1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.

- .2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:
 - .1 Primary requirements:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable compliance obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
 - .4 General safety rules for project.
 - .5 Job-specific safe work, procedures.
 - .6 Inspection policy and procedures.
 - .7 Incident reporting and investigation policy and procedures.
 - .8 Occupational Health and Safety Committee/Representative procedures.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communications and recordkeeping procedures.
 - .2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
 - .3 List hazardous materials to be brought on site as required by work.
 - .4 Indicate engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
 - .5 Identify personal protective equipment (PPE) to be used by workers.
 - .6 Identify personnel and alternates responsible for site safety and health.
 - .7 Identify personnel training requirements and training plan, including site orientation for new workers.
 - .8 Map to the nearest Hospital
- .3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.
- .4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.
- .5 Departmental Representative's review: the review of Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.

PART 12 - EMERGENCY
PROCEDURES

- .1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:
 - .1 Designated personnel from own company.
 - .2 Regulatory agencies applicable to work and as per legislated regulations.
 - .3 Local emergency resources.
 - .4 Departmental Representative.
- .2 Include the following provisions in the emergency procedures:
 - .1 Notify workers and the first-aid attendant, of the nature and location of the emergency.
 - .2 Evacuate all workers safely.
 - .3 Check and confirm the safe evacuation of all workers.
 - .4 Notify the fire department or other emergency responders.
 - .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
 - .6 Notify Departmental Representative.
- .3 Provide written rescue/evacuation procedures as required for, but not limited to:
 - .1 Work at high angles.
 - .2 Work in confined spaces or where there is a risk of entrapment.
 - .3 Work with hazardous substances.
 - .4 Underground work.

PART 13 - HAZARDOUS
PRODUCTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.
- .2 Where use of hazardous and toxic products cannot be avoided:
 - .1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents in accordance with clause 5.2.4.

PART 14 - ELECTRICAL
SAFETY REQUIREMENTS

- .1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits

- and equipment and their operation.
- .1 Before undertaking any work, coordinate required energizing and de-energizing of new and existing circuits with Departmental Representative.
 - .2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

PART 15 - ELECTRICAL
LOCKOUT

- .1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.
- .2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request authorization form. Have procedures available for review upon request by the Departmental Representative.
- .3 Keep the documents and lockout tags at the site and list in a logbook for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

PART 16 - OVERLOADING

- .1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

PART 17 - CONFINED
SPACES

- .1 Carry out work in confined spaces in accordance with Yukon Territorial regulations.

PART 18 - FIRE SAFETY
AND HOT WORK

- .1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.
- .2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

PART 19 - FIRE SAFETY
REQUIREMENTS

- .1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.
- PART 20 - FIRE PROTECTION
- .1 Do not obstruct, shut-off or leave inactive at the end of a working day or shift, the fire protection system.
 - .2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.
 - .3 Be responsible/liable for costs incurred from the fire department, the building owner and the tenants, resulting from false alarms.
- PART 21 - UNFORESEEN HAZARDS
- .1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Departmental Representative verbally and in writing.
- PART 22 - POSTED DOCUMENTS
- .1 Post legible versions of the following documents on site:
 - .1 Health and Safety Plan.
 - .2 Sequence of work.
 - .3 Emergency procedures.
 - .4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.
 - .5 Notice of Project.
 - .6 Floor plans or site plans.
 - .7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
 - .8 Workplace Hazardous Materials Information System (WHMIS) documents.
 - .9 Material Safety Data Sheets (MSDS).
 - .10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.
 - .2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.
 - .3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for

workers and equipment, or as approved by the Departmental Representative.

PART 23 - MEETINGS .1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

PART 24 - CORRECTION OF NON-COMPLIANCE .1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.

.3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

-----END OF SECTION-----

PART 1 - GENERAL

- 1.1 RELATED SECTIONS
- .1 Section 01 01 50-General Instructions.
 - .2 Section 31 23 10-Excavating, Trenching and Backfilling.
- 1.2 SAMPLES
- .1 Submit samples in accordance with Section 01 01 50-General Instructions, Submittal Procedures.
 - .2 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.
- 1.3 WASTE MANAGEMENT AND DISPOSAL
- .1 Divert unused granular materials from landfill to local facility with all applicable licenses and permits and provide a copy of those license and permits to the Department Representative

PART 2 - PRODUCTS

- 2.1 NATIVE MATERIAL
- 1. To be any workable soil free of organic or foreign matter; any material obtained within limits of Contract may be approved by the Department Representative. Native material content or compact to specified density.
- 2.2 PIT RUN GRAVEL
- .1 To be well graded granular material, substantially free from clay lumps, organic matter and other extraneous material, screened to remove all stones in excess of maximum diameter specified in material description (300 mm Pit Run Gravel, 200 mm Pit Run Gravel, 100 mm Pit Run Gravel). Material to compact to specified density and conform to following gradations:

Sieve Designation	Percent Passing
(300mm dia)	(100)
(200mm dia)	(100)
(100mm dia)	(100)
75mm	100
50mm	70-100
25mm	50-100
4.75mm	22-100
2.36mm	10-85
0.075mm	2-8

Recycled concrete free from contaminated and other extraneous material, conforming to the specified

gradations may be used as pit run gravel.

2.3 PIT RUN SAND

1. To be well graded pit run sand, free from organic materials and conform to following gradations:

Sieve Designation	Percent Passing
12.5mm	100
4.75mm	35-100
2.36mm	20-70
1.18mm	13-50
0.600mm	8-35
0.300mm	5-25
0.150mm	2-15
0.075mm	0-6

2.4 RIVER SAND

1. River sand, to be used only where shown on Contract Drawings or otherwise specified and approved by Department Representative, to be free of organic material, salt and foreign objects and conform to following gradations:

Sieve Designation	Percent Passing
19mm	100
4.75mm	80-100
0.600mm	20-80
0.150mm	0-20
0.075mm	0-8

2.5 DRAIN ROCK

- .1 To consist of clean round stone or crushed rock conforming to the following gradations:

Sieve Designation	Percent Passing	
	Course	Fine
25.0mm	100	
19.0mm	0-100	
9.5mm	0-5	100
4.75mm	0	50-100
2.36mm		5-15
1.18mm		15-38
0.600mm		0-8
0.300mm		0-5
0.150mm		0-2
0.075mm		0

- .2 Drain rock to be used only where specified on Contract Drawings. Use of drain rock other than as specified requires approval of DEPARTMENT Representative after examination of soils against which drain rock will be placed.

2.6 GRANULAR PIPE BEDDING .1
 AND SURROUND
MATERIAL

Crushed or graded gravels to conform to following gradations:

Sieve Designation	Percent Passing	
	Type 1*	Type 2*
25.0mm	100	100
19.0mm	90-100	90-100
12.5mm	65-85	70-100
9.5mm	50-75	
4.75mm	25-50	40-70
2.36mm	10-35	25-52
1.18mm	6-26	15-38
0.600mm	3-17	6-27
0.300mm		3-20
0.075mm	0-5	0-8

Type 1* standard gradation
 Type 2* to be used only in dry trench conditions and with Departmental Representative's prior approval

Recycled concrete free from contaminated and other extraneous material, conforming to the Type 1 gradations, may be used as pipe bedding and surround material.

- .2 Other permissible materials: only where shown on Contract Drawings or directed by Departmental Representative shall drain rock, pit run sand or approved native material be used for bedding and pipe surround.

2.7 SELECT GRANULAR SUB-BASE

1. To be well graded granular material, substantially free from lumps and organic matter, screened if required to conform to following gradations:

Sieve Designation	Percent Passing
75mm	100
25mm	50-85
0.150mm	0-15
0.075mm	0-8

2.8 CRUSHED GRANULAR SUB-BASE

- .1 To be 75mm crushed gravel conforming to following gradations:

Sieve Designation	Percent Passing
80mm	
75mm	100
38mm	60-100
25.0mm	-

19.0mm	35-80
12.5mm	-
9.5mm	26-60
4.75mm	20-40
2.36mm	15-30
1.18mm	10-20
0.60um	5-15
0.30um	3-10
0.18um	-
0.15um	-
0.075um	0-5

2.9 GRANULAR BASE

- .1 To be 19mm crushed gravel conforming to following gradations:

Sieve Designation	Percent Passing
19.0mm	100
12.5mm	75-100
9.5mm	60-90
4.75mm	40-70
2.36mm	27-55
1.18mm	16-42
0.600mm	8-30
0.300mm	5-20
0.075mm	2-8

2.10 RECYCLED AGGREGATE MATERIAL

- .1 Aggregates containing recycled material may be utilized if approved by the Department Representative. In addition to meeting all other conditions of this specification, recycled material should not reduce the quality of construction achievable with quarried materials. Recycled material should consist only of crushed Portland cement concrete; other construction and demolition materials such as asphaltic pavements, bricks, plaster, etc. are not acceptable.

PART 3 - EXECUTION

3.1 HANDLING

- .1 Handle and transport aggregates to avoid segregation, contamination and degradation.
- .2 Do not use intermixed or contaminated materials. Remove and dispose rejected materials within 48 h of rejection.

2.1 MATERIALS

- .1 Gravel to be composed of inert, durable material, reasonably uniform in quality and free from soft or disintegrated particles. In absence of satisfactory performance records over a five year

period for particular source of material, soundness to be tested according to ASTM test procedure C-88 or latest revised issue. Maximum weight average losses for course and fine aggregates to be 30% when magnesium sulphate is used after five cycles.

- .2 All crushed gravel when tested according to ASTM C-136 and ASTM C-117, or latest revised issue, to have a generally uniform gradation and conform to following gradation limits and 60% of the material passing each sieve must have one or more fractured faces.

2.2 SOURCE QUALITY CONTROL

- .1 Provide Departmental Representative with copy of material gradation curves prior to commencing work.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Topsoil stripping
 - .1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.
 - .2 Begin topsoil stripping of areas after area has been cleared of brush and grasses and removed from site.
 - .3 Strip topsoil to depths as indicated. Avoid mixing topsoil with subsoil.
 - .4 Dispose of topsoil to location as indicated off site.
- .2 Aggregate source preparation
 - .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as approved by authority having jurisdiction.
 - .2 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.
 - .3 Trim off and dress slopes of waste material piles and leave site in neat condition.
- .3 Processing
 - .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
 - .2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Departmental Representative.

.3 Wash aggregates, if required to meet specifications. Use only equipment approved by Departmental Representative.

.4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.

.4 Handling

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

.5 Stockpiling

.1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.

3.2 CLEANING

.1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.

.2 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.

-----END OF SECTION-----

PART 1 - GENERAL

1.1 REFERENCES

- .1 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.

PART 2 - EXECUTION

2.1 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 the final completion of the project.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

2.2 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 Strip topsoil as directed by Departmental Representative.
 - .1 Avoid mixing topsoil with subsoil.
- .5 Dispose of unused topsoil off-site.
- .6 Protect stockpiles from contamination and compaction.

2.3 PREPARATION OF
GRADE

- .1 Verify that grades are correct and notify Departmental Representative if discrepancies occur do not begin work until instructed by Departmental Representative.

- .1 Grade area only when soil is dry to lessen soil compaction.
- .2 Grade soil establishing natural contours and eliminating uneven areas and low spots, ensuring positive drainage.

2.4 CLEANING

- .1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

-----END OF SECTION-----

PART 1 - GENERAL

1.1 RELATED
SECTIONS

- .1 Section 31 05 16-Aggregate Materials.
- .2 Section 31 23 17-Rock Removal.
- .3 Section 33 05 13-Manholes and Catch Basin Structures.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C 117, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D 422-63, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³).
 - .5 ASTM D 1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³).
 - .6 ASTM D 4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001, Cementitious Materials for Use in Concrete.
 - .2 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.3 DEFINITIONS

- .1 Excavation classes: one class of excavation will be recognized; common excavation.
 - .1 Rock: solid material in excess of 1.0m³ and which cannot be removed by means of heavy duty mechanical excavating equipment with 1.0m³ 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 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material.

.3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.4 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.5 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 D 4318, and gradation within limits specified when tested to ASTM D 422 and ASTM C 136: Sieve sizes to CAN/CGSB-8.1.

.2 Coarse grained soils containing more than 10 % by mass passing 0.075 mm sieve.

.7 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.4 QUALITY
ASSURANCE

.1 Qualification Statement: submit proof of insurance coverage for professional liability.

.2 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed the Yukon Territory of Canada.

.3 Keep design and supporting data on site.

.4 Engage services of qualified professional Engineer

who is registered or licensed in the Yukon Territory, Canada in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.

- .5 Health and Safety Requirements:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.

1.5 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Divert excess materials from landfill to local facility for reuse as directed by Departmental Representative.

1.6 EXISTING
CONDITIONS

- .1 Buried services:
 - .1 Before commencing work establish location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
 - .3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.
 - .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .5 Prior to beginning excavation Work, notify applicable Departmental Representative, establish location and state of use of buried utilities and structures.
 - .6 Confirm locations of buried utilities by careful soil hydrovac methods.
 - .7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
 - .8 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing/re-routing.
 - .9 Record location of maintained, re-routed and abandoned underground lines.
 - .10 Confirm locations of recent excavations adjacent to area of excavation.
- .2 Existing buildings and surface features:
 - .1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires,

rail tracks, pavement, survey bench marks and monuments which may be affected by Work.
.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.
.3 Where required for excavation, cut roots or branches as directed by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

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

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 final completion of the project.
- .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 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

- 3.3 PREPARATION/
PROTECTION
- .1 Protect existing features.
 - .2 Keep excavations clean, free of standing water, and loose soil.
 - .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.
 - .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
 - .5 Protect buried services that are required to remain undisturbed.
- 3.4 STRIPPING OF
TOPSOIL
- .1 Begin topsoil stripping of areas after area has been cleared of brush, weeds and grasses and removed from site.
 - .2 Strip topsoil to depths as directed by Departmental Representative.
 - .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 Stockpile fill materials in areas designated by Departmental Representative.
 - .1 Stockpile granular materials in manner to prevent segregation.
 - .2 Protect fill materials from contamination.
 - .3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.
- 3.6 COFFERDAMS,
SHORING, BRACING
AND UNDERPINNING
- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 33 - Health and Safety Requirements.
 - .2 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 500mm above toe of sheeting.

3.7 DEWATERING AND HEAVE PREVENTION

- .1 Riprap and headwall installation are to be done at low tides and in dry conditions.
- .2 Keep excavations free of water while Work is in progress.
- .3 Provide for Departmental Representative's review details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.
- .4 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
 - .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .5 Protect open excavations against flooding and damage due to surface run-off.
- .6 Dispose of water in a manner not detrimental to public and private property, or portion of Work completed or under construction.
 - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.
- .7 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

3.8 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as indicated.
- .2 Remove concrete, masonry, paving, walks demolished foundations and rubble and other obstructions encountered during excavation.
- .3 Excavation must not interfere with bearing capacity of adjacent foundations.
- .4 Do not disturb soil within branch spread of trees or shrubs that are to remain.
 - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

- .5 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.
 - .6 Keep excavated and stockpiled materials safe distance away from edge of trench
 - .7 Restrict vehicle operations directly adjacent to open trenches.
 - .8 Dispose of surplus and unsuitable excavated material off site.
 - .9 Do not obstruct flow of surface drainage or natural watercourses.
 - .10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
 - .11 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
 - .12 Correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with Type 2 fill compacted to not less than 100% of corrected Standard Proctor maximum dry density.
 - .2 Fill under other areas with Type 2 fill compacted to not less than 95% of corrected Standard Proctor maximum dry density.
 - .13 Hand trim, make firm and remove loose material and debris from excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
 - .2 Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.
- 3.9 BEDDING AND SURROUND OF UNDERGROUND SERVICES
- .1 Place and compact granular material for bedding and surround of underground services as indicated.
 - .2 Place bedding and surround material in unfrozen condition.
- 3.10 BACKFILLING
- .1 Do not proceed with backfilling operations until completion of following:
 - .1 Inspection, testing, approval has been completed

- .2 Recorded location of underground utilities.
- .3 Removal of concrete formwork.
- .4 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
- .2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.
- .4 Place backfill material in uniform layers not exceeding 300mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .5 Backfilling around installations:
 - .1 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
 - .2 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 0.30 m.

3.11 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Replace topsoil as directed by Departmental Representative.
- .3 Reinstate lawns to elevation which existed before excavation.
- .4 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .5 Clean and reinstate areas affected by Work as directed by Departmental Representative.
- .6 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.
- .7 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

-----END OF SECTION-----

PART 1 - GENERAL

- 1.1 RELATED SECTIONS
- .1 Section 31 23 17-Rock Removal.
 - .2 Section 31 23 10-Excavating, Trenching and Backfilling.
- 1.2 REFERENCES
- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D 698, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m³).
- 1.3 EXISTING CONDITIONS
- .1 Known underground and surface utility lines and buried objects are as indicated on site plan.
 - .2 Existing utilities found within the building foot print have been removed by others.
- 1.4 PROTECTION
- .1 Protect existing fencing, trees, landscaping, natural features, benchmarks, buildings, pavement, surface or underground utility lines, which are to remain as directed by Departmental Representative. If damaged, restore to original or better condition unless directed otherwise.
 - .2 Maintain access roads to prevent accumulation of construction related debris on roads.

PART 2 - PRODUCTS

- 2.1 MATERIALS
- .1 Granular fill material: clean sand and gravel with less than 5% passing the 0.075mm sieve and a maximum particle size not to exceed 75mm.

PART 3 - EXECUTION

- 3.1 STRIPPING OF TOPSOIL
- .1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected as determined by Departmental Representative.
 - .2 Commence topsoil stripping of areas as directed by Departmental Representative.
 - .3 Strip topsoil to depths as directed by Departmental Representative. Avoid mixing topsoil with subsoil.
 - .4 Stockpile in locations as directed by Departmental Representative. Stockpile height not to exceed 2 m.

- .5 Dispose of unused topsoil as directed by Departmental Representative off site.

3.2 GRADING

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
- .2 Rough grade to following depths below finish grades:
 - .1 25mm for grassed areas.
 - .2 25mm for asphalt paving.
 - .3 10mm for concrete walks.
- .3 Slope rough grade away from building as indicated.
- .4 Grade ditches to depth as indicated.
- .5 Prior to placing fill over existing ground, scarify surface to depth of 300 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .6 Compact filled and disturbed areas to ASTM D698 Standard Proctor densities, as follows:
 - .1 98% under paved and walk areas
 - .2 100% under the structure.

3.3 TESTING

- .1 Submit testing procedure, frequency of tests, testing laboratory as designated by certified testing personnel to Departmental Representative for review.

3.4 SURPLUS MATERIAL

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

-----END OF SECTION-----

PART 1 - GENERAL

- 1.1 RELATED SECTIONS
- .1 Section 01 01 50-General Instructions.
 - .2 Section 01 35 33-Health and Safety Requirements.
 - .3 Section 31 23 10-Excavating, Trenching and Backfilling.
- 1.2 DEFINITION
- .1 Rock: any solid material in excess of 1.0 m³ and which cannot be removed by means of heavy duty mechanical excavating equipment with 1.0 m³ bucket. Frozen material not classified as rock.
- 1.3 SUBMITTALS
- .1 Blasting Operation
 - .1 Submit to Departmental Representative for approval, written proposal of operations for removal of rock by blasting, in accordance with Section 01 01 50-General Instructions, Submittal Procedures.
 - .2 Indicate proposed method of carrying out work. Include details on protective measures, time of blasting and other pertinent details.
- 1.4 QUALIFICATIONS
- .1 Retain licensed explosives expert to program and supervise blasting work, and to determine precautions, preparation and operations techniques.
- 1.5 BLASTING SURVEY AND MONITORING
- .1 Visit property holders of adjacent buildings and structures to determine existing conditions and describe blasting and seismic recording operations.
 - .2 Seismographic monitoring will be conducted during entire progress of blasting operations.
- 1.6 BLASTING AND VIBRATION CONTROL
- .1 Reduce ground vibrations to avoid damage to structures or remaining rock mass

PART 3 - EXECUTION

- 3.1 PROTECTION
- .1 Prevent damage to surroundings and injury to persons. Erect fencing, post guards, sound warnings and display signs when blasting to take place.

3.2 ROCK REMOVAL

- .1 Co-ordinate this Section with Section 01 35 33 - Health and Safety Requirements.
- .2 Remove rock to alignments, profiles, and cross sections as indicated.
- .3 Explosive blasting is not permitted at locations indicated.
 - .1 Do blasting operations in accordance with requirements of authority having jurisdiction.
- .4 Use rock removal procedures to produce uniform and stable excavation surfaces. Minimize overbreak, and to avoid damage to adjacent structures.
- .5 Excavate rock to horizontal surfaces with slope as indicated.
- .6 Prepare rock surfaces which are to bond to concrete, by scaling, pressure washing and broom cleaning surfaces.
- .7 Excavate trenches to lines and grades to minimum of 150mm below pipe invert indicated. Provide recesses for bell and spigot pipe to ensure bearing will occur uniformly along barrel of pipe.
- .8 Cut trenches to widths as indicated.
- .9 Use pre-shearing, cushion blasting or other smooth wall drilling and blasting techniques or directed by Departmental Representative.
- .10 Remove boulders and fragments which may slide or roll into excavated areas.
- .11 Correct unauthorized rock removal at no extra cost, in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.

3.3 ROCK DISPOSAL

- .1 Dispose of surplus removed rock off site.
- .2 Do not dispose removed rock into landfill. Material must be sent to appropriate location.

-----END OF SECTION-----

PART 1 - GENERAL

1.1 RELATED
SECTIONS

- .1 Section 01 01 50-General Instructions.
- .2 Section 31 23 10-Excavating, Trenching and Backfilling.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A 48/A 48M, Standard Specification for Gray Iron Castings.
 - .2 ASTM C 117, Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing.
 - .3 ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM C 139, Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
 - .5 ASTM C 478M, Standard Specification for Precast Reinforced Concrete Manhole Sections [Metric].
 - .6 ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A23.1/A23.2-[04], Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001, Cementitious Materials for Use in Concrete.
 - .2 CSA-A3002, Masonry and Mortar Cement.
 - .3 CAN/CSA-A165 Series, CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2 and A165.3).
 - .4 CAN/CSA-G30.18, Billet Steel Bars for Concrete Reinforcement.
 - .5 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

- 1.3 SUBMITTALS .1 Provide submittals in accordance with Section 01 01 50-General Instructions, Submittal Procedures.
- 1.4 DELIVERY, STORAGE AND HANDLING .1 Packing, shipping, handling and unloading:
.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- PART 2 - PRODUCTS
- 2.1 MATERIALS .1 Cast-in-place concrete:
.1 Cement: to CAN/CSA-A3001, Type GU 50.
.2 Concrete mix design to produce 30 MPa minimum compressive strength at 28 days and containing 25mm maximum size coarse aggregate, with water/cement ratio to CAN/CSA-A23.1.
.1 Air entrainment to CAN/CSA-A23.1.
- .2 Precast manhole units: to ASTM C 478M, circular or oval.
.1 Top sections eccentric cone or flat slab top type with opening offset for vertical ladder installation.
- .3 Precast catch basin sections: to ASTM C478M.
- .4 Joints: made watertight using rubber rings to ASTM C443 or cement mortar.
- .5 Mortar:
.1 Aggregate: to CSA A82.56.
.2 Masonry Cement: to CAN/CSA-A8.
- .6 Ladder rungs: to CAN/CSA-G30.18, No.25M billet steel deformed bars, hot dipped galvanized to CAN/CSA-G164.
.1 Rungs to be safety pattern (drop step type).
- .7 Adjusting rings: to ASTM C 478.
- .8 Concrete Brick: to CAN3-A165 Series.
- .9 Drop manhole pipe: same as sewer pipe.
- .10 Galvanized iron sheet: approximately 2 mm thick.
- .11 Steel gratings, I-beams and fasteners: as indicated.
- .12 Frames, gratings, covers to dimensions as indicated and following requirements:
.1 Metal gratings and covers to bear evenly on

frames.

- .1 Frame with grating or cover to constitute one unit.
- .2 Assemble and mark unit components before shipment.
- .2 Cast iron manhole & catchbasin frames and covers must conform to ASTM A48 and be designed to withstand H2O loading.
 - .1 Must bear manufacturer identification on castings.
- .13 Granular bedding and backfill: in accordance with Section 31 05 16 - Aggregate Materials.
- .14 Unshrinkable fill: in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 EXCAVATION AND BACKFILL

- .1 Excavate and backfill in accordance with Section 31 23 10 - Excavating Trenching and Backfilling and as indicated.

3.3 INSTALLATION

- .1 Construct units in accordance with details indicated, plumb and true to alignment and grade.
- .2 Dewater excavation and remove soft and foreign material before placing concrete base.
- .3 Set precast concrete base on 100 mm minimum of granular bedding compacted to 95%. Modified proctor density in compliance with ASTM D1557.
- .4 Precast units:
 - .1 Set bottom section of precast unit in bed of cement mortar and bond to concrete slab or base.
 - .2 Make each successive joint watertight with Departmental Representative's approval rubber ring gaskets, bituminous compound, cement mortar, epoxy resin cement, or combination of these materials.
 - .3 Clean surplus mortar and joint compounds from interior surface of unit as work progresses.
 - .4 Plug lifting holes with concrete plugs set in cement mortar or mastic compound.
- .5 For sewers:
 - .1 Place stub outlets and bulkheads at elevations and in positions indicated.

- .2 Bench to provide smooth U-shaped channel.
 - .1 Side height of channel to be 0.75 times diameter of sewer.
 - .2 Slope adjacent floor at 1 in 20.
 - .3 Curve channels smoothly.
 - .4 Slope invert to establish sewer grade.
- .6 Compact granular backfill to 95% Modified Proctor Density.
- .7 Place unshrinkable backfill in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.
- .8 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.
 - .2 Make joints watertight between new unit and existing pipe.
 - .3 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.
- .9 Set frame and cover to required elevation on no more than three courses of brick.
 - .1 Make brick joints and join brick to frame with cement mortar.
 - .2 Parge and make smooth and watertight.
- .10 Clean units of debris and foreign materials.
 - .1 Remove fins and sharp projections.
 - .2 Prevent debris from entering system.
- .11 Install safety platforms in manholes having depth of 6 m or greater, as indicated.

3.4 ADJUSTING TOPS OF EXISTING UNITS

- .1 Remove existing gratings, frames and store for re-use at locations designated by Departmental Representative.
- .2 Sectional units:
 - .1 Raise or lower straight walled sectional units by adding or removing precast sections as required.
 - .2 Raise or lower tapered units by removing cone section, adding, removing, or substituting riser sections to obtain required elevation, then replace cone section.
 - .1 When amount of raise is less than 300mm

use standard manhole brick, modoloc or grade rings.

- .3 Monolithic units:
 - .1 Raise monolithic units by roughening existing top to ensure proper bond and extend to required elevation with mortared brick course for 150 mm or less alteration.
 - .2 Lower monolithic units with straight wall by removing concrete to elevation indicated for rebuilding.
 - .3 When monolithic units with tapered upper section are lowered more than 150 mm, remove concrete for entire depth of taper plus as much straight wall as necessary, then rebuild upper section to required elevation with cast-in-place concrete.
 - .4 Install additional manhole ladder rungs in adjusted portion of units as required.
 - .5 Re-use existing gratings, frames and I-beams.

3.5 SEALING OVER
EXISTING UNITS

- .1 Fill with material approved by Departmental Representative.

3.6 FIELD QUALITY
CONTROL

- .1 Leakage Test:
 - .2 Install watertight plugs or seals on inlets and outlets of each new sanitary sewer manhole and fill manhole with water.
 - .3 Leakage not to exceed 0.3% per hour of volume of manhole.
 - .4 If permissible leakage is exceeded, correct defects.
 - .5 Repeat until accepted passing test.

3.7 CLEANING

- .1 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 SECTION INCLUDES .1 Materials and installation for storm sewer.
- 1.2 RELATED SECTIONS .1 Section 31 05 16-Aggregate Materials.
.2 Section 31 23 10-Excavating, Trenching and Backfilling.
.3 Section 33 05 13-Manholes and Catch Basin Structures.
- 1.3 REFERENCES .1 American Society for Testing and Materials International, (ASTM)
.1 ASTM C 14M, Standard Specification for Concrete Sewer, Storm Drain and Culvert Pipe (Metric).
.2 ASTM C 76M, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe (Metric).
.3 ASTM C 117, Standard Test Method for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
.4 ASTM C 136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
.5 ASTM C 443M, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
.6 ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m³).
.7 ASTM D 1056, Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
.8 ASTM D 2680, Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping.
.6 ASTM D 3034, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
.10 ASTM F 405, Standard Specification for Corrugated Polyethylene (PE) Tubing and Fittings.
.11 ASTM F 667, Standard Specification for Large Diameter Corrugated Polyethylene Tubing and Fittings.
.12 ASTM F 794, Standard Specification for Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
- .2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
- .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .3 CAN/CGSB-34.9, Asbestos-Cement Sewer Pipe.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A5-98, A8-98, A23.5-98, A362-98, A363-98, A456.1-98, A456.2-98, A456.3-98).
 - .1 CAN/CSA-A5, Portland Cement.
 - .2 CAN/CSA-A257 Series-[M92(R1998)], Standards for Concrete Pipe.
 - .3 CSA B1800-02, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
 - .1 CSA B182.2, PVC Sewer Pipe and Fittings (PSM Type).
 - .2 CSA B182.4, Profile PVC Sewer Pipe and Fittings.
 - .3 CSA B182.11, Recommended Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings.
 - .4 CSA-G401, Corrugated Steel Pipe Products.

1.4 DEFINITIONS

- .1 A pipe section is defined as length of pipe between successive catchbasins and/or manholes.

1.5 SUBMITTALS

- .1 Certification to be marked on pipe.

1.6 WASTE
MANAGEMENT AND
DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Divert unused concrete materials from landfill to local facility as approved by Departmental Representative.
- .3 Divert unused aggregate materials from landfill to facility for reuse as approved by Departmental Representative.
- .4 Handle and dispose of hazardous materials in accordance with the Regional and Municipal regulations.
- .5 Dispose of unused asbestos cement pipe in accordance with regulations governing the disposal of hazardous materials.
- .6 Fold up metal banding, flatten and place in

designated area for recycling.

- 1.7 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.

PART 2 - PRODUCTS

- 2.1 CORRUGATED STEEL PIPE
- .1 Corrugated steel pipe and couplers: to CSA-G401.
 - .1 Gaskets: to ASTM D 1056.

- 2.2 PLASTIC PIPE
- .1 Type PSM Poly Vinyl Chloride (PVC): to ASTM D 3034 CSA-B182.2.
 - .1 Standard Dimensional Ratio (SDR): 35.
 - .2 Separate gasket and integral bell system.
 - .3 Nominal lengths: 4 m.

- 2.3 PIPE BEDDING AND SURROUND MATERIAL
- .1 Granular material in accordance with Section 31 05 16 - Aggregate Materials

- 2.4 BACKFILL MATERIAL
- .1 As indicated.

PART 3 - EXECUTION

- 3.1 PREPARATION
- .1 Clean pipes and fittings of debris and water before installation, and remove defective materials from site to approval of Departmental Representative.

- 3.2 TRENCHING
- .1 Do trenching Work in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.
 - .2 Do not allow contents of sewer or sewer connection to flow into trench.

3.3 GRANULAR
BEDDING

- .1 Place bedding in unfrozen condition.
- .2 Place granular bedding material in uniform layers not exceeding 150mm compacted thickness to depth as indicated.
- .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe. Do not use blocks when bedding pipes.
- .4 Shape transverse depressions as required to suit joints.
- .5 Compact each layer full width of bed to at least 95% Modified Proctor Density in compliance with ASTM D1557.
- .6 Fill excavation below bottom of specified bedding adjacent to manholes or catch basins with compacted bedding material.

3.4 INSTALLATION

- .1 Lay and join pipe in accordance with manufacturer's recommendations and to approval of Departmental Representative.
- .2 Handle pipe using methods approved by Departmental Representative.
 - .1 Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
- .3 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.
- .4 Begin laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
- .5 Do not exceed maximum joint deflection recommended by pipe manufacturer.
- .6 Do not allow water to flow through pipes during construction except as may be permitted by Departmental Representative.
- .7 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .8 Install plastic pipe and fittings in accordance with CSA B182.11.
- .10 When any stoppage of Work occurs, restrain pipes as directed by 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.

3.5 PIPE SURROUND

- .1 Place surround material in unfrozen condition.
- .2 Upon completion of pipe laying, and after 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 150mm compacted thickness as indicated.
 - .1 Do not dump material within 1 m of pipe.
- .4 Place layers uniformly and simultaneously on each side of pipe.
- .5 Compact each layer from pipe invert to mid height of pipe to at least 95% Modified Proctor Density.
- .6 When field test results are acceptable to Departmental Representative, place surround material at pipe joints.

3.6 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Place backfill material, above pipe surround, in uniform layers not exceeding 150mm compacted

thickness up to grades as indicated.

- .3 Under paving and walks, compact backfill to at least 95% Modified Proctor Density.

3.7 FIELD TESTING

- .1 Repair or replace pipe, pipe joint or bedding found defective.
- .2 Draw tapered wooden plug with diameter of 50mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction.
- .3 Remove foreign material from sewers and related appurtenances by flushing with water.

-----END OF SECTION-----