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Number R.100921.001		2018-11-06

PROJECT TITLE Canadian Coast Guard Base Sewer System Repair
401 King St. W. Prescott, Ont.

PROJECT NUMBER R.100921.001

PROJECT DATE 2018-11-06

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PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Precedence.
- .2 Work covered by contract documents.
- .3 Contract method.
- .4 Cost breakdown.
- .5 Work sequence.
- .6 Contractor use of premises.
- .7 Owner occupancy.

1.2 PRECEDENCE

- .1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises of Reconstruction of portions of the exiting sanitary sewer system, located at the Canadian Coast Guard Base in Prescott, Ontario.
 - .1 Construct 20.0m of 150mm DR-35 sanitary sewer from existing MH2 to Prop MH1.
 - .2 Divert existing 38mm water pipe around existing MH1 and Proposed MH1.
 - .3 Remove existing MH1.
 - .4 Place proposed MH1.
 - .5 Construct 23.7m of 150mm DR-18 sanitary sewer from proposed MH1 to existing ship intake No. 1.
 - .6 Construct 31.1m of 150mm DR-35 sanitary sewer from proposed MH1 to proposed MH2.
 - .7 Place proposed MH2.
 - .8 Construct 36m of 150mm DR-18 sanitary sewer from proposed MH2 to existing ship intake No. 2
 - .9 Adjust invert grade on ship intake No. 2 and connect to new sewer.
 - .10 Restore site to original conditions, remove all equipment and clean site work area.

1.4 CONTRACT METHOD

- .1 Construct work under combined price contract.

1.5 COST BREAKDOWN

- .1 Within one week of notification of acceptance of tender furnish a cost breakdown by Fixed Price (Lump Sum) Line Item aggregating contract item.
- .2 Submit breakdown in metric (SI) units.

1.6 WORK SEQUENCE

- .1 Construct sewers from downstream towards the upstream maintenance holes and intakes.
- .2 Maintain fire access/control.

1.7 CONTRACTOR USE OF PREMISES

- .1 Contractor shall limit use of premises for Work, storage and for access to allow;
 - .1 Owner occupancy
- .2 Coordinate use of premises under direction of Departmental Representative.

1.8 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.
- .3 The Coast Guard carry out emergency operations. During an emergency operation the Contractor shall, as directed by the Departmental Representative, either:
 - .1 Vacate the site.
 - .2 Remove equipment and vacate site.
 - .3 Immediately backfill all open trenches, remove equipment and vacate site.
 - .4 Reschedule further work with the Departmental Representative.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

PART 1 - GENERAL

1.1 MINIMUM STANDARDS

- .1 Execute work to meet or exceed:
 - .1 National Building Code of Canada 2015, National Fire Code of Canada 2015, Ontario Building Code 2012 and any other code of provincial or local application, including all amendments up to project date, provided that in any case of conflict or discrepancy, the more stringent requirements shall apply as directed by the Departmental Representative.
 - .2 Rules and regulations of authorities having jurisdiction.
 - .3 Treasury Board of Canada Secretariat, Fire Protection Standard, April 1, 2010.
 - .4 Observe and enforce construction safety measures required by National Building Code 2010, Part 8 Safety Measures at Construction and Demolition Sites, Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, O. Reg. 213/91 as amended by O. Reg. 631/94, O. Reg. 143/99, O. Reg. 571/99, O. Reg. 145/00, O. Reg. 527/00, R.R.O. 1990, Reg. 834, O. Reg. 278/05 (Asbestos), Workplace Safety and Insurance Board and municipal statutes and authorities.
 - .5 Environmental Protection Act, O. Reg. 102/94 and O. Reg. 103/94.

1.2 SAFETY PLANS

- .1 Provide a Fire Safety Plan in accordance with National Building Code 2015, Division B, Part 8, subsection 8.1.1.1.3 and NFC 2015, Division B, Part 2, subsection 2.8.2 prior to commencement of work. Deliver two copies of the Fire Safety Plan to the Departmental Representative not later than 14 days before commencing work.
- .2 On award of Contract, submit to Departmental Representative, two copies of Contractor's and sub-contractors':
 - .1 Safety Policy and Program.
 - .2 Safety Communication Plan.
 - .3 Emergency Preparedness Plan.
 - .4 Workplace Safety and Insurance Board LTI rating.

1.3 TAXES

- .1 Pay applicable Federal, Provincial and Municipal taxes.

1.4 FEES, PERMITS AND CERTIFICATES

- .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates and permits required.
- .3 Furnish certificates and permits when requested.

1.5 EXAMINATION

- .1 Before submitting tender, examine existing conditions and determine conditions affecting work.
- .2 Obtain all information which may be necessary for proper execution of Contract.

1.6 SITE

- .1 Confine work, including temporary structures, plant, equipment and materials to established limits of site.
- .2 Locate temporary buildings, roads, walks, drainage facilities, services as directed and maintain in clean and orderly manner.

1.7 CONSTRUCTION & STORAGE AREA

- .1 The limits of the Construction and Storage Area are delineated on the Drawings.

1.8 DOCUMENTS

- .1 Keep on site one copy of contract documents.

1.9 MEASUREMENT PROCEDURES

- .1 Items measured for payment are in metric (SI) units.
- .2 Submit requests for payment in metric units corresponding with items on the Unit Price Table.
- .3 Submit supporting documents in metric units. Perform all necessary conversions required.

1.10 AS-BUILT RECORD DRAWINGS

- .1 As work progresses, neatly record significant deviations from the Contract drawings using fine, red marker on full size white prints.
- .2 Neatly print lettering and numbers in size to match original. Lines may be drawn free-hand but shall be neat and accurate. Add at each title block note: "AS BUILT RECORD".
- .3 Record following significant deviations:
 - .1 Depths of various elements and foundations.
 - .2 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement.
 - .3 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
 - .4 Field changes of dimension.
 - .5 Other significant deviations which are concealed in construction and

- cannot be identified by visual inspection.
- .6 Turn one set of As-Built Record Drawings and specifications over to Departmental Representative on completion of work.
 - .7 If project is completed without significant deviations from contract drawings and specifications declare this in writing and submit to Departmental Representative in lieu of As-Built Record Drawings and Specifications.

1.11 ADDITIONAL DRAWINGS

- .1 Departmental Representative may furnish additional drawings to clarify work.
- .2 Such drawings become part of Contract Documents.

1.12 LAYOUT OF WORK

- .1 Immediately upon entering site for purpose of beginning work on this project, locate all general reference points and take proper action necessary to prevent their disturbance.
- .2 Supply stakes and other survey markers required for this work. Employ competent personnel to lay out work in accordance with lines and grades provided.
- .3 Maintain all reference points and markers for duration of contract.

1.13 CO-OPERATION & PROTECTION

- .1 Execute work with minimum disturbance to the public and to normal base operations. Make arrangements with Departmental Representative to facilitate execution of work. Note that the CCG Base provides emergency services that will take precedence over construction activities. Construction may be delayed due to the base operation schedule. In an emergency situation the contractor may be required to stop and reschedule work.
- .2 Maintain access and exits. Maintain the site as per the staging plans and as per day to day instructions from the Departmental Representative.
- .3 Provide necessary barriers, warning lights and signs. Protect work from damage. Replace damaged existing work with material and finish to match original.
- .4 Execute work within hours of 7:30AM to 4:00PM Monday to Friday. No work is permitted on Saturdays, Sundays and statutory holidays.

1.14 EXISTING UTILITIES

- .1 Establish location, protect and maintain existing utility lines.
- .2 Connect to existing utilities with minimum disturbance to base operations.

1.15 MATERIAL AND EQUIPMENT

- .1 Use new products unless otherwise specified.
- .2 Deliver and store material and equipment to manufacturer's instructions with manufacturer's labels and seals intact.
- .3 When material or equipment is specified by standard or performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.16 INSPECTION AND TESTING

- .1 The Departmental Representative may employ an Inspection and Testing company to ensure work conforms with Contract Documents.
- .2 When initial tests and inspections reveal work not to contract requirements, pay for tests and inspections required by Departmental Representative on corrected work.
- .3 The Contractor shall retain an Environmental Engineer as per the requirements of Section 01 35 43 and 31 23 10.

1.17 SCHEDULING OF WORK

- .1 On award of contract submit with tender a bar chart construction schedule for work, indicating anticipated progress stages within time of completion.
- .2 When schedule has been reviewed by the Departmental Representative take necessary measures to complete work within scheduled time. Do not change schedule without notifying Departmental Representative.

1.18 PROGRESS PHOTOGRAPHS

- .1 As soon as work commences, take regular progress photographs from locations that reveal work that is to be buried or permanently hidden.
- .2 View points, which will best illustrate progress of work, will be selected by Departmental Representative.
- .3 Forward high resolution date stamped progress photographs to Departmental Representative upon completion of project.

1.19 DATUM

- .1 Elevations shown on Drawings are expressed in metres relative to plan datum.
- .2 A site Benchmark is shown on the drawings.

1.20 CONSTRUCTION PARKING

- .1 Parking will be permitted on site in designated parking areas only.
- .2 Provide and maintain adequate access to project site.
- .3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.
- .4 Maintain clean construction access ways and laydown areas.

PART 1 - GENERAL

1.1 ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Preside at meetings.
- .4 Representative of Contractor attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

- .1 Within 10 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor and Field Inspectors and will be in attendance.
- .3 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .4 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work.
 - .3 Name of Contractors Environmental Engineer and the name of the Environmental Engineering Firm.
 - .4 Schedule of submission of samples. Submit submittals in accordance with Section 01 11 02.
 - .5 Delivery schedule of specified equipment in accordance with Section 01 11 02 and 31 05 18.
 - .6 Health and safety in accordance with Section 01 11 02.
 - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .8 Record drawings and specifications in accordance with Section 01 11 02.
 - .9 Monthly progress claims, administrative procedures, photographs, hold backs.
 - .10 Appointment of inspection and testing agencies or firms.
 - .11 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

- .1 During course of Work and 1 weeks prior to project completion, attend progress meetings biweekly.
- .2 Contractor involved in Work and the Inspector and the Departmental

- Representative are to be in attendance.
- .3 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.
 - .4 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Corrective measures and procedures to regain projected schedule.
 - .6 Revision to construction schedule.
 - .7 Progress schedule, during succeeding work period.
 - .8 Review submittal schedules: expedite as required.
 - .9 Maintenance of quality standards.
 - .10 Review proposed changes for affect on construction schedule and on completion date.
 - .11 Other business.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 11 02 and 31 23 10.

1.2 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.3 REFERENCES

- .1 Ontario Environmental Protection Act, O. Reg. 102/94 and O. Reg 103/94.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 11 02.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and
 - .2 Submit 2 copies of WHMIS SDS.
- .3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review by Departmental Representative.
- .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .6 Include in Environmental Protection Plan:
 - .1 Name of person responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Name and qualifications of person and company responsible for manifesting hazardous waste to be removed from site.
 - .3 Name and qualifications of person responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

- .6 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
- .7 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .8 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .9 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .10 Waste Water Management Plan identifying methods and procedures for management and discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, hydrostatic test water, and water used in flushing of lines.

1.5 FIRES

- .1 Fires and burning of rubbish on site is not permitted.

1.6 DRAINAGE

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

1.7 WORK ADJACENT TO WATERWAYS

- .1 Construction equipment to be operated on land only.
- .2 Waterways to be kept free of excavated fill, waste material and debris.

1.8 POLLUTION CONTROL

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

1.9 NOTIFICATION

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

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 32 12 16.01
 - .1 Leave Work area clean at end of each day.
- .2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .4 Waste Management: separate waste materials for reuse and recycling.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

PART 1 - GENERAL

1.1 APPROVAL

- .1 Incorporate only approved materials into the work or stockpile.
- .2 Advise the Departmental Representative of proposed material sources sufficiently in advance of aggregate use, so that samples may be taken and tests may be made.
- .3 Materials shall be subject to sampling and testing by the Departmental Representative at all times. Provide the Departmental Representative with ample opportunity to sample any material at any time.
- .4 Should a change of source of material be proposed during the work, advise the Departmental Representative sufficiently in advance of such change to allow samples to be taken and tests made.
- .5 The acceptance of any material shall not preclude its future rejection if it is subsequently found to lack uniformity, or of it fails to conform to the requirements specified, or if its field performance is found to be unsatisfactory.

1.2 SAMPLING AND TESTING

- .1 Samples for quality testing will be required for all aggregates.
- .2 Samples shall be taken by the Departmental Representative or his representative.
- .3 The time required for quality testing, after receipt of the samples in the laboratory will be 2 weeks.
- .4 Testing of aggregates will be carried out in accordance with OPSD.PROV 1010, AASHTO or ASTM methods.
- .5 Thin and elongated pieces shall be those particles whose greatest dimension exceeds four times their least dimension.
- .6 Pieces having at least one freshly fractured face will be considered as crushed material.

1.3 MEASUREMENT PROCEDURES

- .1 No separate measurement will be made under this Section. Include costs in items of work for which aggregate is required.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 The specific aggregate requirements shall be as detailed in the material specification for the type of material provided.
- .2 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic or other deleterious substances.
- .3 Fine aggregate satisfying all requirements of the specification unless otherwise provided therein, shall be one, or a blend of the following:
 - .1 Natural sand.
 - .2 Manufactured sand.
 - .3 Screenings produced in the crushing of quarried rock, boulders or gravel.
- .4 Coarse aggregates satisfying all requirements of the specification unless otherwise provided therein, shall be one of the following:
 - .1 Crushed rock.
 - .2 Gravel composed of naturally formed particles of stone.

PART 3 - EXECUTION

3.1 HANDLING

- .1 Handle and transport aggregates in a manner and with equipment that will avoid segregation and contamination.

3.2 STOCKPILING

- .1 Stockpiling sites shall be level, well drained, free of all foreign materials and of adequate bearing capacity to support the weight of the materials to be placed thereon. Stockpiles shall be either far enough apart or separated by substantial dividers to prevent intermingling.
- .2 Build stockpiles in layers not exceeding 1.5 m in depth; complete each layer over the entire area of the stockpile before beginning the next layer. Uniformly spot-dump aggregates delivered to the stockpile in trucks and build the stockpile as specified. Coning of the piles or spilling of material over the edges of the pile not permitted. During winter operations keep stockpiles free from buried ice or snow.

3.3 DEFECTIVE MATERIALS

- .1 Unless otherwise permitted by the Departmental Representative, remove rejected materials from the site of the work within 48 hours of such rejection.

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 35 43: Environmental Procedures.
- .2 Section 31 05 18: Aggregates: General.
- .3 Section 33 05 14: Maintenance Holes and Catch Basins.
- .4 Section 33 34 02: Sanitary Sewers and Force Mains.
- .5 Section 33 11 16: Site Water Utility Distribution Piping.

1.2 MEASUREMENT PROCEDURES

- .1 Work performed under this Section will be incidental to work in Sections: 33 05 14, 33 11 16, 33 34 02.
- .2 Contaminated soil removal will be paid by the metric tonne.
- .3 The cost to retain a Qualified Environmental Engineer shall be included in the items to construct the sewers, water pipe and maintenance holes. There will be no additional payment for the retention of the Environmental Engineer.

1.3 REFERENCES

- .1 OPSS.PROV 1010, April 2013, Ontario Provincial Standard Specification: Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.
- .2 OPSS.PROV 501, November 2014, Ontario Provincial Standard Specification: Construction Specification for Compacting.
- .3 OPSS.PROV 401, November 2015, Ontario Provincial Standard Specification, Construction Specification for Trenching, Backfilling, and Compacting.
- .4 CSA A23.1-09/A23.2-09, January 1 2014, Canadian Standards Association: Concrete materials and methods of concrete construction/Test methods and standard practices for concrete.
- .5 ASTM D698, May 2 2012, American Society for Testing and Materials: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort 600Kn-m/m³.
- .6 MOECP document: Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15 2011 and O. Reg. 347, as amended by O. Reg. 558/00.
- .7 MOECP document: Registration Guidance Manual for Generators of Liquid Industrial and Hazardous Waste, October 2000.

1.4 DEFINITIONS

- .1 Excavation classes: two class of excavation will be recognized; common excavation and contaminated fill excavation.
 - .1 Common excavation: excavation of materials of whatever nature including asphalt, concrete pipes and structures such as maintenance holes but excluding contaminated fill.
 - .2 Contaminated fill excavation: excavation of fill classified as contaminated by an environmental engineer under the criteria of section.
- .2 Waste material: excavated material unsuitable for use in work or surplus to requirements.
- .3 Borrow material: material obtained from locations outside area to but required for construction of fill areas or for other portions of work.
- .4 Unsuitable materials: Surplus material. (Only new granular bedding and backfill material shall be used).
- .5 Unshrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.5 SAMPLES

- .1 Submit samples in accordance with Section 01 11 02.
- .2 Inform Departmental Representative at least 2 weeks prior to commencing work of proposed source of granular materials and provide access for sampling.
- .3 Submit selected soil samples for chemical analyses to a laboratory that is accredited in accordance with the International Standard ISO/IEC 17025, the Canadian Association for Laboratory Accreditation (CALA) or by the Standards Council of Canada (SCC);

1.6 PROTECTION OF EXISTING FEATURES

- .1 Existing buried utilities and structures:
 - .1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .2 Prior to commencing excavation work, notify applicable owner or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Owners or authorities having jurisdiction to clearly mark such locations to prevent disturbance during work.
 - .3 Confirm locations of buried utilities by careful test excavations.
 - .4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
 - .5 Where utility lines or structures exist in area of excavation, obtain

direction of Departmental Representative before re-routing.
.6 Record location of maintained, re-routed and abandoned underground lines.

- .2 Existing buildings and surface features:
- .1 Conduct, with Departmental Representative, condition survey of existing buildings, service poles, wires, pavement, survey bench marks and monuments which may be affected by work.
 - .2 Protect existing buildings and surface features from damage while work is in progress. In event of damage, immediately make repair to approval of Departmental Representative.

1.7 SHORING, BRACING AND UNDERPINNING

- .1 Protect existing features in accordance with Section 01 11 02 and applicable local regulations.
- .2 A pre-engineered trench box shall be used to carry out trenching work unless soil stability in relation to depth of trench do not necessitate the requirement of a trench box.
 - .1 Restoration cost due to over excavation, due to failure to use a trench box where practical, will be at the Contractors' expense.

1.8 EXCAVATION AND BACKFILLING REQUIRED BY OTHER SECTIONS

- .1 Excavation and backfilling for site services work is included in this Section and shall be carried out in accordance with provisions specified herein and as indicated on drawings. This work to be laid out and supervised by the Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Type 1 fill: to OPSS.PROV 1010 for Granular A aggregate. Maximum aggregate size 19.0 mm.
- .2 Type 2 fill: to OPSS.PROV 1010, for Granular B Type II aggregate. Maximum aggregate size 26.5 mm.
- .3 Unshrinkable fill: proportioned and mixed to provide:
 - .1 Maximum compressive strength of 0.4 MPa at 28 days.
 - .2 Maximum Portland cement content of 25 kg/m³.
 - .3 Minimum strength of 0.07 MPa at 24 h.
 - .4 Concrete aggregates: to CSA A23.1/A23.2.
 - .5 Portland cement: Type GU.
 - .6 Slump: 160 to 200 mm.

PART 3 - EXECUTION

3.1 SOIL TESTING

- .1 Prior to any bulk excavation work the Contractor shall retain a Qualified Environmental Engineer approved by the Departmental Representative. The Contractor shall assist the engineer to carry out soil sampling. Selected samples shall be submitted for chemical analyses by the Environmental Engineer. Environmental Sampling will consist of the following:
 - .1 Field vapour screening to assess the presence of potential contaminants will be completed using portable vapour analyzer.
 - .2 Appropriate samples will be collected and analyzed for a minimum of; metals and inorganics, petroleum hydrocarbons (PHC) fractions F1 to F4, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and volatile organic compounds (VOCs).
 - .3 One (1) soil samples from the project area will be collected for analysis under Ontario Regulation 558 toxicity characteristic leaching procedure (TCLP) for metals & inorganics, VOCs and benzo(a)pyrene (B(a)P), ignitability and PCBs.
- .2 Comparison of the laboratory analytical results to soil standards presented in Table 1 of the MOECP document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act," dated April 15, 2011 and O. Reg. 347, as amended by O. Reg. 558/00, Schedule 4 Leachate Quality Criteria provided in the MOECP document entitled "Registration Guidance Manual For Generators of Liquid Industrial and Hazardous Waste," October 2000 (the "Schedule 4 Criteria").

3.2 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Cut pavement along limits of proposed excavation in order that surface may break evenly and cleanly.

3.3 STOCKPILING

- .1 Stockpile fill materials in areas designated on the drawings. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

3.4 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while work is in progress.
- .2 Submit for Departmental Representative's review details of proposed dewatering.
- .3 Protect open excavations against flooding and damage due to surface run-off.
- .4 Dispose of water in manner not detrimental to public and private property, or any portion of work completed or under construction.

- .5 Provide silt bags to remove suspended solids or other materials before discharging to storm sewers, water courses or drainage areas.

3.5 EXCAVATION

- .1 Excavations to be carried out as per OPSS.PROV 401.
- .2 Excavate to lines, grades, elevations and dimensions as indicated on drawings.
- .3 Remove concrete and asphalt pavement.
- .4 Excavation must not interfere with normal 45° splay of bearing from bottom of any footing.
- .5 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 10 m of trench in advance of installation operations. All excavations to be backfilled by end each day of work.
- .6 Dispose of surplus and unsuitable excavated material in approved location off site.
- .7 Dispose of any contaminated fill to a receiving site approved by the Departmental Representative.
 - .1 Proof of disposal to the approved receiving site to the satisfaction of the Departmental Representative shall be provided.
- .8 Do not obstruct flow of surface drainage or natural watercourses.
- .9 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .10 Remove unsuitable material from trench bottom to extent and depth as directed by Departmental Representative.
- .11 Correct unauthorized over-depth excavation as follows:
 - .1 Fill under bearing surfaces and footings with Type 2 fill compacted to not less than 98% of Standard Proctor Density to ASTM D698.
- .12 Hand trim, make firm and remove loose material and debris from excavations.

3.6 FILL TYPES AND COMPACTION

- .1 Use fill of types as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698 Standard Proctor Density.

3.7 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place and compact Type 1 Fill (Granular 'A') for bedding and surround of

underground services as per OPSD 802.010 and 33 34 02.

- .2 Place bedding and surround material in unfrozen condition.

3.8 BACKFILLING

- .1 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.
- .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 and compact Type 2 (Granular 'B') material in uniform layers not exceeding 200 mm compacted thickness up to underside of pavement base grades. Compact each layer before placing succeeding layer.
- .5 Compact to 98% SPMD per OPSS.PROV 501.
- .6 Do not backfill around or over cast-in-place concrete within 24 h after placing of concrete.
- .7 Place layers simultaneously on both sides of installed work to equalize loading.

3.9 RESTORATION

- .1 Upon completion of work, remove waste materials and debris and correct defects as directed by Departmental Representative.
- .2 Reinstate pavement to elevation which existed before.
- .3 Clean and reinstate areas affected by work as directed by Departmental Representative.

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 05 18: AGGREGATES GENERAL

1.2 MEASUREMENT PROCEDURES

- .1 Granular base course will be measured in tonnes of aggregate incorporated into the work.
- .2 Water for compaction is considered included in the producing and placing and will not be measured separately for payment.

1.3 REFERENCES

- .1 OPSS.PROV 314, November 2015, Ontario Provincial Standard Specification: Construction Specification for Untreated Subbase, Base, Surface, Shoulder, Selected Subgrade, and Stockpiling.
- .2 OPSS.PROV 1010, April 2013, Ontario Provincial Standard Specification: Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.
- .3 OPSS.PROV 501, November 2014, Ontario Provincial Standard Specification: Construction Specification for Compacting.

1.4 MATERIALS

- .1 Granular A to OPSS.PROV 1010, Maximum size Granular A 19.0 mm.

PART 2 - EXECUTION

2.1 PLACING

- .1 Construction of granular foundations: OPSS.PROV 314.
- .2 Place on a clean surface, properly shaped and compacted and free from snow or ice.
- .3 Place material 200 mm thick when compacted.
- .4 Spread each granular uniformly using approved grading equipment and methods.

2.2 COMPACTING

- .1 Compact to 100% Standard Proctor Density per OPSS.PROV 501.
- .2 Add water as required to maintain material at or near optimum moisture content while compacting.

2.3 FINISHING

- .1 Finish compacted surface to within 12 mm of established grade as indicated by a 3 m straightedge placed in any direction.
- .2 Correct irregularities greater than 12 mm by loosening the surface and adding or removing material until surface is within specified tolerance.

2.4 FIELD QUALITY CONTROL

- .1 The Departmental Representative may perform field and laboratory tests for control of moisture, density and aggregate gradation. Results will control Contractor's operations.

PART 1 - GENERAL

1.1 PRODUCTS SUPPLIED BUT NOT INSTALLED UNDER THIS SECTION

- .1 Notify Departmental Representative and supplier authorized to release material of proposed date for use of materials; order and schedule shipments to coincide with construction schedule.

1.2 MEASUREMENT AND PAYMENT

- .1 Measure asphalt concrete paving in tonnes of asphalt concrete actually incorporated into Work.

1.3 REFERENCES

- .1 Ontario Provincial Standard Specifications (OPSS):
 - .1 OPSS.MUNI 310 November 2010, Construction Specification for Hot Mixed Asphalt.
 - .2 OPSS.PROV 314, November 2015, Construction Specification for Untreated Granular, Subbase, Base, Surface Shoulder and Stockpiling.
 - .3 OPSS.MUNI 1150, November 2008, Material Specification for Hot Mixed Asphalt.
 - .4 OPSS.PROV 1010, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.
 - .1 SP 110S13-2010, May 2010, Amendment to OPSS.PROV 1010, Material Specification for Aggregates, Granular A, B, M and Select Subgrade Material.
- .2 ASTM D698, May 2 2012, American Society for Testing and Materials: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort 600Kn-m/m³.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit asphalt mixes and aggregate and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit viscosity-temperature chart for asphalt cement to be supplied showing either Saybolt Furol viscosity in seconds or Kinematic Viscosity in centistokes, temperature range 105 to 175 degrees C 2 weeks prior to beginning Work.
- .2 Samples:
 - .1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling 2 weeks prior to beginning Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Type 1 fill per OPSS.PROV 1010 for Granular A aggregate. Maximum aggregate size 19.0mm.
- .2 Asphalt concrete: to OPSS.MUNI 1150.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Proceed with installation only after unacceptable conditions have been remedied and approval to proceed has been received from Departmental Representative.

3.2 FOUNDATIONS (GRANULAR BASE)

- .1 Foundations (granular base) for site comprise:
 - .1 200 mm thickness of Type 1 fill.
- .2 Construction of granular foundations: OPSS.PROV 314.
- .3 Compaction: compact each lift of granular material to 100% maximum density to ASTM D698. Maximum lift thickness: 200 mm.

3.3 PAVEMENT TYPE AND THICKNESS

- .1 Pavements for site:
 - .1 Base course: 50 mm HL8.
 - .2 Wear course: 50 mm HL3.

3.4 PAVEMENT CONSTRUCTION

- .1 Construction of asphalt concrete: OPSS.MUNI 310.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 11 02.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

PART 1 - GENERAL

1.1 REFERENCE STANDARD

- .1 CAN/CGSB-1.74-2001, March 1, 2001, Standards Council of Canada: Alkyd Traffic Paint.

1.2 ACCEPTANCE

- .1 Upon request, Departmental Representative will supply a qualified product list of paints applicable to work. Only paints listed may be used.

1.3 MEASUREMENT PROCEDURES

- .1 Traffic stripes will be measured in metres of single line acceptably painted.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Paint: to CAN/CGSB-1.74, Alkyd Traffic Paint. Colour white.

2.2 WEATHER CONDITIONS

- .1 Do not apply paint if the air temperature is below 8°C.

2.3 MARKING

- .1 Width of stripe: match existing at helicopter pad.

PART 3 - EXECUTION

3.1 APPLICATION OF PAINT

- .1 Evenly apply paint at the rate of 4.5 L/m².
- .2 Protect freshly applied paint from traffic until it is dry.

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 05 18: Aggregates General.
- .2 Section 31 23 10: Excavating, Trenching and backfilling.
- .3 Section 33 34 02: Sanitary sewers and Force Mains.

1.2 SOURCE QUALITY CONTROL

- .1 Departmental Representative will inspect material at construction site.

1.3 MEASUREMENT PROCEDURES

- .1 Maintenance holes will be measured in units for the classes indicated on the Combined Price Contract.
- .2 Frames and covers will be measured in units supplied and installed.

1.4 REFERENCES

- .1 OPSS 407, November 2014, Ontario Provincial Standard Specification: Construction Specification for Maintenance Hole, Catch Basin, Ditch Inlet, and Valve Chamber Installation.
- .2 OPSS.PROV 1010, April 2013, Ontario Provincial Standard Specification: Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.
- .3 OPSS.PROV 501, November 2014, Ontario Provincial Standard Specification: Construction Specification for Compacting.
- .4 CAN/CGSB-8-GP-2M, March 3, 1988, Standards Council of Canada: Sieves, Testing, Woven Wire, Inch Series.
- .5 CSA A23.1-14/A23.2-14(R2018), Canadian Standards Association: Precast Concrete Paving Slabs/Precast Concrete Pavers.
- .6 CSA A179-14,2004, Canadian Standards Association: Mortar and grout for Unit Masonary.
- .7 CSA A3002-18, 2013, Canadian Standards Association: Cementitious Materials Compendium.
- .8 ASTM D698, May 2 2012, American Society for Testing and Materials: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort 600Kn-m/m³.
- .9 OPSD 401.010, November, 2018, Ontario Provincial Standard Drawing: Cast Iron, Square Frame with Circular Closed or Open cover for Maintenance Holes.

- .10 OPSD 701.010, November 2014, Ontario Provincial Standard Drawing: Precast Concrete Maintenance Hole 1200mm Diameter.
- .11 OPSD 701.021, November, 2014 Ontario Provincial Standard Drawing: Maintenance Hole Benching and Pipe Opening Alternatives.
- .12 OPSD 704.010, November 2014, Precast Concrete Adjustment Units for Maintenance Holes, Catch Basins and Valve Chambers.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Maintenance Hole concrete and reinforcing steel as per OPSS 407.
- .2 Water, aggregates, admixtures: to CSA A23.1-14/A23.2-14(R2018), Concrete materials and methods of concrete construction/Test methods and standard practices for concrete.
- .3 Frames and covers as per OPSD 401.010, type A (closed cover)
- .4 Precast maintenance holes: to OPSD 701.010 November 2014.
- .5 Mortar:
 - .1 Aggregate: to CAN/CSA-A179-14.
 - .2 Cement: to CAN/CSA-A3002-18.
- .6 Adjustment rings per OPSD 704.010.
- .7 Type 1 fill: to OPSS.PROV 1010 for Granular A aggregate. Maximum aggregate size 19.0 mm.
- .8 Type 2 fill: to OPSS.PROV 1010, for Granular B Type II aggregate. Maximum aggregate size 26.5 mm.
- .9 OPSS.PROV 501, Construction Specification for Compacting.
- .10 CAN/CGSB-8-GP-2M, Sieves, Testing, Woven Wire, Inch Series.
- .11 CAN/CSA-179-14, Canadian Standards Association: Mortar and grout for Unit Masonary.
- .12 CA/CSA-A3000-18, Canadian Standards Association: Cementitious Material Compendium.
- .13 Maintenance Hole benching as per OPSD 701.021.

PART 3 - EXECUTION

3.1 EXCAVATION AND BACKFILL

- .1 Excavation and backfill to Section 31 23 10.
- .2 Excavation requires approval prior to installing maintenance holes or catch basins.

3.2 CONCRETE WORK

- .1 Do concrete work to CSA A23.1-14/A23.2-14(R2018).

3.3 INSTALLATION

- .1 Place units to details indicated, plumb and true to alignment and grade.
- .2 Complete maintenance holes as pipe laying progresses. Maximum of 1 maintenance holes behind point of pipe laying will be allowed.
- .3 Pump maintenance hole excavation dry and remove soft and foreign material before placing concrete base.
- .4 Set precast concrete MH on 150mm minimum of well compacted granular A material.
- .5 Set bottom section of precast unit in place. Make each successive joint watertight with approved rubber ring gaskets.
- .6 Clean surplus mortar and joint compounds from interior surface of unit as work progresses.
- .7 Remove existing benching from San MH 2.
- .8 Plug lifting holes with precast concrete plugs set in cement mortar or compound.
- .9 For sanitary sewers:
 - .1 Place stub outlets and bulkheads at elevations and in positions indicated.
 - .2 Provide Pre-benched MH units or Bench on site (Recommended) to provide a smooth U-shaped channel. Side height of channel to be full diameter of sewer. Adjacent floor to be sloped to 2 cm fall across MH. Channels to be curved smoothly. Slope invert to establish sewer grade.
- .10 Installing units in existing systems:
 - .1 Where new unit is within existing run of pipe, carefully remove 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 to be put into operation, complete the installation with appropriate break-outs, removals, redirection of flows, blocking unused pipes or any other necessary work.

- .11 Place frame and cover on top section to elevation indicated. If adjustment required use concrete ring.
- .12 Clean units of debris and foreign materials; remove fins or sharp protuberances.
- .13 Backfill with compacted Granular B type II to underside of pavement base elevation.

3.4 Remove Existing MH 1

- .1 Sawcut and remove pavement around existing MH 1.
- .2 Remove and Salvage Frame and Cover for reuse for proposed MH 1.
- .3 Protect existing watermain in MH.
- .4 Fill and compact remaining MH void with Granular B Type II to underside of Pavement base elevation.
- .5 Pave over existing MH during paving operation.

3.5 SALVAGE AND REUSE SEWAGE INTAKE NO. 2

- .1 Sawcut and remove pavement around structure.
- .2 Remove fill around intake structure until structure is fully exposed.
- .3 Remove structure and adjust pipe length of structure to achieve invert shown on drawings.
- .4 Place structure to correct grade and invert and connect to proposed sewer pipe.
- .5 Backfill structure with Unshrinkable Fill to underside of pavement base elevation.
- .6 Pave around structure during paving operation.

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

- .1 Measure water main including trenching and backfilling as Lump Sum.

1.2 REFERENCES

- .1 OPSS.MUNI 441, November 2016, Ontario Provincial Standard Specification: Construction Specification for Watermain Installation in Open Cut.
- .2 OPSS.PROV 1010, April 2013, Ontario Provincial Standard Specification: Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.
- .3 OPSS.PROV 501, November 2014, Ontario Provincial Standard Specification: Construction Specification for Compacting.
- .4 CAN/CGSB-8-GP-2M, March 3, 1988, Standards Council of Canada: Sieves, Testing, Woven Wire, Inch Series.
- .5 OPSS 441, November 2010, Ontario Provincial Standard Drawing: Construction Specification for Watermain Installation in Open Cut.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 38 mm Type W Copper Tubing and associated fittings.
- .2 Use pipe fittings of same standard as pipe casing.
- .3 Provide appropriate couplings to connect to existing piping.
- .4 Type 1 fill: to OPSS.PROV 1010 for Granular A aggregate. Maximum aggregate size 19.0 mm.
- .5 Type 2 fill: to OPSS.PROV 1010, for Granular B Type II aggregate. Maximum aggregate size 26.5 mm.
- .6 OPSS.PROV 501, November 2014, Ontario Provincial Standard Specification: Construction Specification for Compacting.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for distribution piping installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of Departmental Representative.

3.2 PREPARATION

- .1 Clean pipes, fittings, valves, hydrants, and appurtenances of accumulated debris and water before installation.
 - .1 Inspect materials for defects to approval of Departmental Representative.
 - .2 Remove defective materials from site as directed by Departmental Representative.

3.3 TRENCHING

- .1 Do trenching work in accordance with Section 31 23 10.

3.4 GRANULAR BEDDING

- .1 Place Type 1 fill (Granular A) in uniform layers not exceeding 200 mm compacted thickness.
- .2 Do not place material in frozen condition.
- .3 Shape bed true to grade to provide continuous uniform bearing surface for pipe.
- .4 Shape transverse depressions in bedding as required to suit joints.
- .5 Compact each layer full width of bed to 98% minimum of corrected maximum dry density as per OPSS.PROV 501.

3.5 PIPE INSTALLATION

- .1 Construct new watermain as per OPSD 441.
- .2 Do not exceed permissible pipe bending radius as recommended by pipe manufacturer.
- .3 Keep jointing materials and installed pipe free of dirt and water and other foreign materials.
 - .1 Whenever work is stopped, install a removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .4 Position and join pipes with equipment and methods approved by Departmental Representative.
- .5 Cut pipes in approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
- .6 Align pipes before jointing.
- .7 Complete each joint before laying next length of pipe.

- .8 Minimize deflection after joint has been made.
- .9 Apply sufficient pressure in making joints to ensure that joint is completed to manufacturer's recommendations.
- .10 Ensure completed joints are restrained by compacting bedding material alongside and over installed pipes or as otherwise approved by Departmental Representative.
- .11 When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.
- .12 Do not lay pipe on frozen bedding.
- .13 Backfill remainder of trench with Type 2 fill (Granular B, type II)

3.6 BACKFILL

- .1 Place Type 2 backfill material, above pipe surround, in uniform layers not exceeding 200 mm compacted thickness up to grades as indicated.
- .2 Do not place backfill in frozen condition.
- .3 Compact backfill to 98% corrected maximum dry density as per OPSS.PROV 501.

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 05 18: Aggregates General.
- .2 Section 31 23 10: Excavating, Trenching and Backfilling
- .3 Section 33 05 14: Maintenance Holes.

1.2 MATERIAL CERTIFICATION

- .1 At least 1 week prior to commencing work submit manufacturer's test data and certification that pipe materials meet requirements of this section.

1.3 AS BUILT DRAWINGS, OPERATING AND MAINTENANCE DATA

- .1 Provide as built drawings of sewers in accordance with Section 01 11 02 on project completion. Give details of pipe material and pipe inverts.

1.4 SCHEDULING OF WORK

- .1 Schedule work to minimize interruptions to existing services.
- .2 Maintain existing sewage flows during construction.
- .3 Submit schedule of expected interruptions for approval and adhere to approved schedule.

1.5 REFERENCES

- .1 OPSS.PROV 1010, April 2013, Ontario Provincial Standard Specification: Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.
- .2 OPSS.PROV 501, November 2014, Ontario Provincial Standard Specification: Construction Specification for Compacting.
- .3 CAN/CGSB-8-GP-2M, March 3, 1988, Standards Council of Canada: Sieves, Testing, Woven Wire, Inch Series.
- .4 OPSS.PROV 409, November 2017, Ontario Provincial Standard Specification: Construction Specification for Closed-Circuit television Inspection (CCTV) of Pipelines.
- .5 OPSS.PROV 410, November 2015, Ontario Provincial Standard Specification: Construction Specification for Pipe Sewer Installation in Open Cut.
- .6 ASTM D3034-16, November 1, 2016, American Society for Testing and Materials: Standard Specification for Poly vinyl Chloride Pipe Sewer Pipe and Fittings.
- .7 CSA B137.3-17, Canadian Standards Association: Thermoplastic Pressure Piping Compendium.

PART 2 - PRODUCTS

2.1 PLASTIC PIPE

- .1 Gravity sewer pipe and fittings: 150mm dia., Type PSM Poly Vinyl Chloride: to ASTM D3034-16.
 - .1 Standard Dimension Ratio (SDR): 28.
 - .2 Locked-in gasket and integral bell system.
- .2 Pressure sewer pipe (pumped from ship) and fittings: 150mm dia., Type Poly Vinyl Chloride: to CSA B137.3-17.
 - .1 Standard Dimension Ratio (SDR): 18.
 - .2 Locked-in gasket and integral bell system.

2.2 PIPE BEDDING AND BACKFILL MATERIALS

- .1 Type 1 fill: to OPSS.PROV 1010 for Granular A aggregate. Maximum aggregate size 19.0 mm.
- .2 Type 2 fill: to OPSS.PROV 1010, for Granular B Type II aggregate. Maximum aggregate size 26.5 mm.

2.3 PIPE TESTING

- .1 Carry out pipe testing as per OPSS.PROV 409 and OPSS.PROV 410.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Clean pipes and fittings of debris and water before installation. Inspect materials for defects before installing. Remove defective materials from site.

3.2 TRENCHING AND BACKFILL

- .1 Carry out trenching work as required to install sewers to lines and grades indicated.
- .2 Do not allow contents of any sewer or sewer connection to flow into trench.
- .3 Trench line require approval prior to placing bedding material and pipe.
- .4 Use trench box to minimize trench width.
- .5 Remove excess excavated material from the site.

3.3 INSTALLATION

- .1 Place 150 mm Granular 'A' bedding materials under piping.

- .2 Shape bed true to grade and to provide continuous, uniform bearing surface for barrel of pipe. Do not use blocks when bedding pipe.
- .3 Shape transverse depressions as required to receive bell if bell and spigot pipe is used.
- .4 Compact full width of bed to at least 98% Standard Proctor density.
- .5 Lay and join pipes in accordance with manufacturer's recommendations.
- .6 Handle pipe carefully with equipment recommended by manufacturer.
- .7 Lay pipes on prepared bed, true to line and grade, with pipe invert smooth and free of sags or high points. Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
- .8 Commence laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
- .9 Do not exceed maximum joint deflection recommended by pipe manufacturer.
- .10 Do not allow water to flow through pipe during construction, except as may be permitted by Departmental Representative.
- .11 Whenever work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .12 Position and join pipes by approved methods. Do not use excavating equipment to force pipe sections together.
- .13 Supply and install PVC pipe and fittings in accordance with CSA B1800-15.
- .14 Pipe jointing:
 - .1 Install gaskets in accordance with manufacturer's recommendations.
 - .2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
 - .3 Align pipes carefully before joining.
 - .4 Maintain pipe joints free from mud, silt, gravel and other foreign material.
 - .5 Avoid displacing gasket or contaminating with dirt or other foreign material. Gaskets so disturbed shall be removed, cleaned and lubricated and replaced before joining is attempted.
 - .6 Complete each joint before laying next length of pipe.
 - .7 Minimize joint deflection after joint has been made to avoid joint damage.
 - .8 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
- .15 Cut pipes as required for special inserts, fittings or closure pieces in a neat manner, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.

- .16 Make watertight connections to maintenance holes. Use non-shrink grout when suitable gaskets are not available.
- .17 Remove existing sewer pipes when necessary to construct new pipes and abandon existing pipes with watertight caps.
- .18 Connect all existing and proposed laterals to the mains.
- .19 Upon completion of pipe laying and after Departmental Representative has inspected pipe joints, place minimum 300 mm granular 'A' bedding material around and over top of pipes and compact as for bedding material.
- .20 Backfill remainder of trench with Granular 'B' material to underside of pavement base elevation.
- .21 Plug service laterals with water tight caps or plugs as approved by Departmental Representative.
- .22 Place location marker at ends of plugged or capped unconnected sewer lines.

3.4 FIELD TESTING

- .1 When directed by Departmental Representative, draw tapered wooden plug with diameter of 50 mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction.
- .2 Remove foreign material from sewers and related appurtenances by flushing with water.
- .3 Perform Air Pressure Testing in accordance with OPSS.PROV 410.07.16.04.03.
- .4 Carry out tests on each section of sewer between successive manholes including service connections.
- .5 Install watertight bulkheads in suitable manner to isolate test section from rest of pipeline.
- .6 Repair and retest sewer line as required, until test results are within limits specified.
- .7 Repair visible leaks regardless of test results.
- .8 Television and photographic inspections:
 - .1 Carry out inspection of installed sewers by video camera (CCTV), digital camera.
 - .2 Provide means of access to permit Departmental Representative to do inspections.
 - .3 The Contractor shall pay for any additional CCTV inspection of the sewer should the initial inspection indicate unacceptable results.