PROJECT TITLE

Sanitary Lift Pump Replacement
Warkworth Institution
Campbellford, Ontario

PROJECT NUMBER

460-2513-0

PROJECT DATE

2016-04-12

END OF SECTION

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises the constrtuction of a wet well as indicated on the contract drawings. Contract is further identified as CSC Project Number 460-2513-0.

1.2 CONTRACT METHOD

.1 Construct Work under Lump Sum Contract.

1.3 CONTRACTOR USE OF PREMISE

.1 Co-ordinate use of premises under direction of owner.

.2 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

.3 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.4 OWNER OCCUPANCY

.1 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.5 DOCUMENTS REQUIRED

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

1.6 ALTERATIONS TO EXISTING SITE

.1 Remove and recycle, compost, anarobically digest, sell material for reuse or dispose of:
.1 Mechanical items as indicated.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security.

.4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.

.5 Closures: protect work temporarily until permanent enclosures are completed.

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.4 EXISTING SERVICES

.1 Notify, Departmental Representative utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for personnel pedestrian and vehicular traffic.

1.4 EXISTING SERVICES (Cont'd)

.4 Construct barriers in accordance with Section 01 56 00.

1.5 SPECIAL REQUIREMENTS

.1 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.2 Keep within limits of work and avenues of ingress and egress.

1.6 SECURITY

.1 Security clearances:
.1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.
.2 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.
.3 Contractor's personnel will require satisfactory RCMP initiated security screening in order to complete Work in premises and on site.

1.7 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions. Smoking is not permitted.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are co-ordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.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.

1.1 ADMINISTRATIVE (Cont'd)

.11 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, MS Project and Autocad dwg files on USB compatible with the Institutions encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.3 Allow 10 working days for Departmental Representative's review of each submission.

.4 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.5 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.6 Accompany submissions with transmittal letter, in duplicate, containing:
.1 Date.
.2 Project title and number.
.3 Contractor's name and address.
.4 Identification and quantity of each shop drawing, product data and sample.
.5 Other pertinent data.

.7 Submissions shall include:
.1 Date and revision dates.
.2 Project title and number.
.3 Name and address of:

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.7 (Cont'd)
.3 (Cont'd)
.1 Subcontractor.
.2 Supplier.
.3 Manufacturer.
.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
.5 Details of appropriate portions of Work as applicable:
.1 Fabrication.
.2 Layout, showing dimensions, including identified field dimensions, and clearances.
.3 Setting or erection details.
.4 Capacities.
.5 Performance characteristics.
.6 Standards.
.7 Operating weight.
.8 Wiring diagrams.
.9 Single line and schematic diagrams.
.10 Relationship to adjacent work.

.8 After Departmental Representative's review, distribute copies.

.9 Submit three hard copies and one electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.10 Submit three hard copies and one electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
.2 Certificates must be dated after award of project contract complete with project name.

.11 Submit three hard copies and one electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.12 Submit three hard copies and one electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.13 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.14 Submit three hard copies and one electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.15 Delete information not applicable to project.

.16 Supplement standard information to provide details applicable to project.

.17 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.18 The review of shop drawings by the Institution is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that Institution approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative's business address site office.

1.3 SAMPLES (Cont'd)

.3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Departmental Representative are not intended to change Contract Amount. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 PHOTOGRAPHIC DOCUMENTATION

.1 Submit electronic colour digital photography in jpg format, standard resolution as directed by Departmental Representative.

.2 Project identification: name and number of project and date of exposure indicated.

.3 Number of viewpoints: 2 locations.
.1 Viewpoints and their location as determined by Departmental Representative.

.4 Frequency of photographic documentation: as directed by Departmental Representative.
.1 Upon completion of Work, and as directed by Departmental Representative.

1.5 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Safety and Insurance Board Experience Report.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 PURPOSE

.1 To ensure that both the construction project and the institutional operations may proceed without undue disruption or hindrance and that the security of the Institution is maintained at all times.

1.2 DEFINITIONS

.1 "Contraband" means:

.1 An intoxicant, including alcoholic beverages, drugs and narcotics.

.2 Tobacco or associated tobacco products.

.3 An igniting device, lighter or matches.

.4 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.

.5 An explosive or a bomb or a component thereof.

.6 Currency over any applicable prescribed limit, $25 when possessed by an inmate without prior authorization.

.7 Any item not described in paragraphs 1.2.1.1 to 1.2.1.6 that could jeopardize the security of a Penitentiary or the safety of persons, when that item is possessed without prior authorization.

.2 "Unauthorized Smoking and related Items" means all smoking items including, but not limited to, cigarettes, cigars, tobacco, chewing tobacco, cigarette making machines, matches and lighters.

.3 "Commercial Vehicle" means any motor vehicle used for the shipment of material, equipment and tools required for the construction project.

.4 "CSC" means Correctional Service Canada.

.5 "Director" means Director, Warden or Superintendent of the Institution as applicable.

.6 "Construction Employees" means persons working for the General Contractor, the sub-contractors, equipment operators, material suppliers, testing and inspection companies and regulatory agencies.

.7 "Departmental Representative" means the project manager from Correctional Service Canada.

1.2 DEFINITIONS (Cont'd)

.8 "Perimeter" means the fenced or walled area of the Institution that restrains the movement of the inmates.

.9 "Construction Limits" means the area as shown on the contract drawings that the Contractor will be allowed to work. This area may or may not be isolated from the security area of the Institution.

1.3 PRELIMINARY PROCEEDINGS

.1 Prior to the commencement of work, the Contractor shall meet with the Director or his/her representative to:
.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 Contractor shall:
.1 Ensure that all Construction Employees are aware of the security requirements.
.2 Ensure that a copy of the security requirements is always prominently on display at the job site.
.3 Co-operate with institutional personnel in ensuring that security requirements are observed by all Construction Employees.

1.4 CONSTRUCTION EMPLOYEES

.1 Submit to the Director a list of the names with date of birth of all Construction Employees to be employed on the construction site and a security clearance form for each employee.

.2 Allow two (2) weeks for processing of security clearances. Employees will not be admitted to the Institution without a valid security clearance in place and a recent picture identification such as a provincial driver's license. Security clearances obtained from other CSC Institutions are not valid at this Institution.

1.4 CONSTRUCTION EMPLOYEES (Cont'd)

.3 The Director may require that facial photographs may be taken of Construction Employees and these photographs may be displayed at appropriate locations in the Institution or in an electronic database for identification purposes. The Director may require that Photo ID cards be provided for all Construction Employees. ID cards will then be left at the designated entrance to be picked upon arrival at the institution and shall be displayed prominently on the Construction Employees' clothing at all time while Construction Employees are in the institution.

.4 Entry to Institutional 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 Institutional 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.

.6 Smoking is prohibited anywhere on CSC property.

1.5 VEHICLES

.1 All unattended vehicles on CSC property shall have windows closed; doors and trunks shall be locked and keys removed. The keys shall be securely in the possession of the owner or an employee of the company that owns the vehicle.

.2 The Director may limit at any time the number and type of vehicles allowed within the Institution.

.3 Drivers of delivery vehicles for material required by the project will not require security clearances but must remain with their vehicle the entire time that the vehicle is in the Institution. The Director may require that these vehicles be escorted by Institutional Staff or Commissionaires while in the Institution.

.4 If the Director permits trailers to be left inside the secure perimeter of the Institution, these trailer doors will be locked at all times. All windows will be securely locked when left unoccupied. All trailer windows shall be covered with expanded metal mesh. All storage trailers inside and outside the perimeter shall be locked when not in use.

1.6 PARKING

.1 Parking area(s) to be used by Construction Employees will be designated by the Director. Parking in other locations will be prohibited and vehicles may be subject to removal.

1.7 SHIPMENTS

.1 All shipments of project material, equipment and tools shall be addressed in the Contractor's name to avoid confusion with the Institution's own shipments. The Contractor must have his/her own employees on site to receive any deliveries or shipments. CSC staff will NOT accept receipt of deliveries or shipments of any material, equipment or tools.

1.8 TELEPHONES

.1 There will be no installation of telephones, Facsimile machines and computers with Internet connections permitted within the perimeter of the Institution unless prior approval of the Director is received.

.2 The Director will ensure that approved telephones, facsimile machine and computers with internet connections are located where they are not accessible to inmates. All computers will have an approved password protection that will stop an internet connection to unauthorized personnel.

.3 Wireless cellular and digital telephones, including but not limited to devices for telephone messaging, pagers, BlackBerries, telephone used as 2-way radios, are not permitted within the Institution unless approved by the Director. If wireless cellular telephones are permitted, the user will not permit their use by any inmate.

.4 The Director may approve but limit the use of two way radios.

1.9 WORK HOURS

.1 Work hours within the Institution are: Monday to Friday 08:00 a.m. to 3:30 p.m.

.2 Work will not be permitted during weekends and statutory holidays without the permission of the Director. 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 Director.

1.10 OVERTIME WORK

.1 No overtime work will be allowed without permission of the Director. Give a minimum forty-eight (48) hours advance notice when overtime work on the construction project is necessary and approved. If overtime work is required because of an emergency such as the completion of a concrete pour or work to make the construction safe and secure, the Contractor shall advise the Director as soon as this condition is known and follow the directions given by the Director. Costs to the Crown for such events may be attributed to the Contractor.

.2 When overtime work, weekend, or statutory holiday work is required and approved by the Director, extra staff members may be posted by the Director or his/her designate, to maintain the security surveillance. The Departmental Representative may post extra staff for inspection of construction activities. The actual cost of this extra staff may be subject to reclamation by the Crown.

1.11 TOOLS AND EQUIPMENT

.1 Maintain a complete list of all tools and equipment to be used during the construction project. Make this inventory available for inspection when required.

.2 Throughout the construction project maintain up-to-date the list of tools and equipment specified above.

.3 Keep all tools and equipment under constant supervision, particularly power-driven and cartridge-driven tools, cartridges, files, saw blades, rod saws, wire, rope, ladders and any sort of jacking device.

.4 Store all tools and equipment in approved secure locations.

.5 Lock all tool boxes when not in use. Keys to remain in the possession of the employees of the Contractor. Scaffolding shall be secured and locked when not erected and when erected, will be secured in a manner agreed upon with the Institutional designate.

.6 All missing or lost tools or equipment shall be reported immediately to the Director.

1.11 TOOLS AND EQUIPMENT (Cont'd)

.7 The Director will ensure that the security staff members carry out checks of the Contractor's tools and equipment against the list provided by the Contractor. These checks may be carried out at the following intervals:
.1 At the beginning and conclusion of every construction project.
.2 Weekly, when the construction project extends longer than a one week period.
.3 The Contractor may be subject to random checks by security staff to ensure proper storage and security of tools throughout the project.

.8 Certain tools/equipment such as cartridges and hacksaw blades are highly controlled items. The Contractor will be given at the beginning of the day, a quantity that will permit one day's work. Used blades/cartridges will be returned to the Director's representative at the end of each day.

.9 If propane or natural gas is used for heating the construction, the Institution will require that an employee of the Contractor supervise the construction site during non-working hours.

.10 If torches or grinders are required tools to perform Work, Contractor must complete a Hot Work Permit as supplied by CSC. Completed original form(s) are copied and posted on the work site in a conspicuous location. Original documents are to remain with the Institutional Fire Chief.

1.12 KEYS

.1 Security Hardware Keys:
.1 The Contractor shall arrange with the security hardware supplier/installer to have the keys for the security hardware to be delivered directly to Institution, specifically the Security Maintenance Officer (SMO).
.2 The Security Maintenance Officer (SMO) will provide a receipt to the Contractor for security hardware keys.
.3 The Contractor will provide a copy of the above-mentioned receipt to the Departmental Representative.

.2 Other Keys:
.1 The Contractor will use standard construction cylinders for locks for his/her use during the construction period.

1.12 KEYS (Cont'd)

.2 (Cont'd)

.2 The Contractor will issue instructions to his/her employees and sub-trades, as necessary, to ensure safe custody of the construction set of keys.

.3 Upon completion of each phase of the construction, the CSC representative will, in conjunction with the lock manufacturer:

.1 Prepare an operational keying schedule.

.2 Accept the operational keys and cylinders directly from the lock manufacturer

.3 Arrange for removal and return of the construction cores and install the operational core in all locks.

.3 Upon putting operational security keys into use, the CSC construction escort shall obtain these keys as they are required from the Security Maintenance Officer (SMO) and open doors as required by the Contractor. The Contractor shall issue instructions to his/her employees advising them that all security keys shall always remain with the CSC construction escort.

1.13 SECURITY HARDWARE

.1 Turn over all removed security hardware to the Director of the Institution for disposal or for safekeeping until required for re-installation.

1.14 PRESCRIPTION DRUGS

.1 Employees of the Contractor who are required to take prescription drugs during the workday shall obtain approval of the Director to bring a one day supply only into the Institution.

1.15 SMOKING RESTRICTIONS

.1 Contractors and construction employees are not permitted to smoke inside correctional facilities or outdoors within the perimeter of a correctional facility and must not possess unauthorized smoking items within the perimeter of a correctional facility.

.2 Contractors and construction employees who are in violation of this policy will be requested to immediately cease smoking or dispose of any unauthorized smoking items and, if they persist, will be directed to leave the institution.

.3 Smoking is only permitted outside the perimeter of a correctional facility in an area to be designated by the Director.

1.16 CONTRABAND

.1 Weapons, ammunition, explosives, alcoholic beverages, drugs and narcotics are prohibited on Institutional Property.

.2 Discovery of Contraband on the construction site and the identification of the person(s) responsible for the Contraband shall be reported immediately to the Director.

.3 Contractors shall be vigilant with both their staff and the staff of their sub-contractors and suppliers that the discovery of Contraband may result in cancellation of the security clearance of the affected employee. Serious infractions may result in the removal of the company from the Institution for the duration of the construction.

.4 Presence of arms and ammunition in vehicles of Contractors, sub-contractors and suppliers or employees of these will result in the immediate cancellation of security clearances for the driver of the vehicle.

1.17 SEARCHES

.1 All vehicles and persons entering Institutional property may be subject to search.

.2 When the Director suspects, on reasonable grounds, that an employee of the Contractor is in possession of Contraband or unauthorized items, he/she may order that person to be searched.

.3 All employees entering the Institution may be subject to screening of personal effects for traces of Contraband drug residue.

1.18 ACCESS TO AND REMOVAL FROM INSTITUTION PROPERTY

.1 Construction personnel and commercial vehicles will not be admitted to the Institution after normal working hours, unless approved by the Director.

1.19 MOVEMENT OF VEHICLES

.1 Escorted commercial vehicles will be allowed to enter or leave the Institution through the vehicle access gate during the following hours:
.1 08:00 a.m. to 11:00 a.m.
.2 1:00 p.m. to 3:30 p.m.

.2 Construction vehicles shall not leave the Institution until an inmate count is completed.

1.19 MOVEMENT OF VEHICLES (Cont'd)

.3 The Contractor shall advise the Director twenty four (24) hours in advance to the arrival on the site of heavy equipment such as concrete trucks, cranes, etc.

.4 Vehicles being loaded with soil or other debris, or any vehicle considered impossible to search, must be under continuous supervision by CSC Staff or Commissionaires working under the authority of the Director.

.5 Commercial Vehicles will only be allowed access to Institutional Property when their contents are certified by the Contractor or his/her representative as being strictly necessary to the execution of the construction project.

.6 Vehicles shall be refused access to Institutional Property if, in the opinion of the Director, they contain any article which may jeopardize the security of the Institution.

.7 Private vehicles of Construction Employees will not be allowed within the security wall or fence of medium or maximum security Institutions without the permission of the Director.

.8 With prior approval of the Director, a vehicle may be used in the morning and evening to transport a group of employees to the work site. This vehicle will not remain within the Institution the remainder of the day.

.9 With the approval of the Director, certain equipment may be permitted to remain on the construction site overnight or over the weekend. This equipment must be securely locked, with the battery removed. The Director may require that the equipment be secured with a chain and padlock to another solid object.

1.20 MOVEMENT OF CONSTRUCTION EMPLOYEES ON INSTITUTIONAL PROPERTY

.1 Subject to the requirements of good security, the Director will permit the Contractor and his/her employees as much freedom of action and movement as is possible.

.2 However, notwithstanding paragraph above, the Director may:
.1 Prohibit or restrict access to any part of the Institution.

1.20 MOVEMENT OF CONSTRUCTION EMPLOYEES ON INSTITUTIONAL PROPERTY (Cont'd)

.2 (Cont'd)
.2 Require that in certain areas of the Institution, either during the entire construction project or at certain intervals, Construction Employees only be allowed access when accompanied by a member of the CSC security staff.

.3 During the lunch and coffee/health breaks, all employees will remain within the construction site. Employees are not permitted to eat in the officer's lounge and dining room.

1.21 SURVEILLANCE AND INSPECTION

.1 Construction activities and all related movement of personnel and vehicles will be subject to surveillance and inspection by CSC security staff members to ensure that established security requirements are met.

.2 CSC staff members will ensure that an understanding of the need to carry out surveillance and inspections, as specified above, is established among Construction Employees and maintained throughout the construction project.

1.22 STOPPAGE OF WORK

.1 The Director may request at any time that the Contractor, his/her employees, sub-contractors and their employees not enter or leave the work site immediately due to a security situation occurring within the Institution. The Contractor's site supervisor shall note the name of the staff member making the request and the time of the request and obey the order as quickly as possible.

.2 The Contractor shall advise the Departmental Representative within 24 hours of this delay to the progress of the work.

1.23 CONTACT WITH INMATES

.1 Unless specifically authorized, it is forbidden to come into contact with inmates, to talk with them, to receive objects from them or to give them objects. Any employee doing any of the above will be removed from the site and his/her security clearance revoked.

.2 It is forbidden to take pictures of inmates, of CSC staff members or of any part of the Institution other than those required as part of this Contract.

1.24 COMPLETION OF CONSTRUCTION PROJECT

.1 Upon completion of the construction project or, when applicable, the takeover of a facility, the Contractor shall remove all remaining construction material, tools and equipment that are not specified to remain in the Institution as part of the construction contract.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA): Canada
.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

.2 National Building Code 2010 (NBC):
.1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.

.3 National Fire Code 2010 (NFC):
.1 NFC 2010, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.

.4 Province of Ontario:
.1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
.2 O. Reg. 490/09, Designated Substances.
.3 Workplace Safety and Insurance Act, 1997.
.4 Municipal statutes and authorities.

.5 Treasury Board of Canada Secretariat (TBS):
.1 Treasury Board, Fire Protection Standard April 1, 2010 www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=17316&section=text.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
.1 Results of site specific safety hazard assessment.
.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
.3 Measures and controls to be implemented to address identified safety hazards and risks.

.3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 10 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 5 days after receipt of comments from Departmental Representative.

1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.4 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.5 Submit one copie of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and authority having jurisdiction, .

.6 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.

.7 Submit copies of incident and accident reports.

.8 Submit Material Safety Data Sheets (MSDS).

.9 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.

1.3 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to commencement of Work.

1.4 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.5 MEETINGS

.1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.6 REGULATORY REQUIREMENTS

.1 Comply with the Acts and regulations of the Province of Ontario.

.2 Comply with specified standards and regulations to ensure safe operations at site.

1.7 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or requesting improvements.

.3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing.

1.8 COMPLIANCE REQUIREMENTS

.1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter 0.1, as amended.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.9 RESPONSIBILITY

.1 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.

.2 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.

.3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act and Regulations for Construction Projects for the Province of Ontario.

1.10 UNFORSEEN HAZARDS

.1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Departmental Representative verbally and in writing.

1.10 UNFORSEEN HAZARDS (Cont'd)

.2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.

1.11 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province of Ontario, and in consultation with Departmental Representative.

.1 Contractor's Safety Policy.
.2 Constructor's Name.
.3 Notice of Project.
.4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
.5 Ministry of Labour Orders and reports.
.6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
.7 Address and phone number of nearest Ministry of Labour office.
.8 Material Safety Data Sheets.
.9 Written Emeregency Response Plan.
.10 Site Specific Safety Plan.
.11 Valid certificate of first aider on duty.
.12 WSIB "In Case of Injury At Work" poster.
.13 Location of toilet and cleanup facilities.

1.12 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

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

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.13 BLASTING

.1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Departmental Representative .

1.14 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.15 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 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.

1.2 REFERENCES

.1 OPSS 1860 (apr 2012) Material Specifications for Geotextiles

.2 OPSS 506 (nov 2013) Construction Specifications for Dust Suppressants

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.

.3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

.4 Address topics at level of detail commensurate with environmental issue and required construction task.

.5 Include in Environmental Protection Plan:
.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
.2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
.3 Names and qualifications of persons responsible for training site personnel.
.4 Descriptions of environmental protection personnel training program.

1.3 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.5 (Cont'd)

.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 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

.7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.

.1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.

.8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.

.1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.

.9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.13 Waste Water Management Plan identifying methods and procedures for management and or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

1.3 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.5 (Cont'd)
.14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

1.4 FIRES

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

1.5 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.

1.6 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties as indicated.

.2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
.1 Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict tree removal to areas indicated or designated by Departmental Representative.

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.
.1 Provide temporary enclosures where indicated directed by Departmental Representative.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.10 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 SILT FENCE FABRIC

.1 Fabric to be woven and comply with OPSS 1860.07.05.03.

PART 3 - EXECUTION

3.1 CLEANING

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

3.1 CLEANING (Cont'd)

.2 Bury rubbish and waste materials on site where directed after receipt of written approval from Departmental Representative.

.3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

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

.5 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.

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

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) 2010, National Fire Code of Canada (NFC) 2010 and Ontario Building Code (OBC) 2012, including all amendments up to bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply as directed by the Departmental Representative.

.2 Meet or exceed requirements of:
.1 Contract documents.
.2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Stop work immediately and notify Departmental Representative if materials which may contain designated substances or PCB's are discovered in course of work.

1.3 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions and municipal bylaws.

1.9 TAXES

.1 Pay applicable Federal, Provincial and Municipal taxes.

1.10 EXAMINATION

.1 Examine existing conditions and determine conditions affecting work.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 INSPECTION

.1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative 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.

1.2 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work, above and beyond those required of the Contractor. Cost of such services will be borne by 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 cost to Departmental Representative. Pay costs for retesting and reinspection.

1.3 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.4 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.

1.5 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative may deduct from Contract Amount difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Departmental Representative.

1.6 REPORTS

.1 Submit copies of inspection and test reports to Departmental Representative.

.2 Provide copies to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

1.7 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as may be requested.

.2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Departmental Representative and may be authorized as recoverable.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CSA 0121-08(R2013), Douglas Fir Plywood.

.3 CSA Z797-09(R2014), Code of practice for Access Scaffold.

.4 CAN/CSA-Z321-96(R2006), Signs and Symbols for the Occupational Environment, withdrawn but still available from CSA, CCOHS and Techstreet.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

1.3 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

.4 Provide construction facilities in order to execute work expeditiously.

.5 Remove from site all such work after use.

1.4 SITE STORAGE/LOADING

.1 Confine work and operations of employees to areas defined 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.

1.5 CONSTRUCTION PARKING

.1 Parking will be permitted on site within a designated area for designated number of vehicles by Departmental Representative.

1.5 CONSTRUCTION PARKING (Cont'd)

.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.

1.6 OFFICES

.1 Provide office heated to 22°C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

.2 Provide a clearly marked and fully stocked first-aid case in a readily available location.

.3 Subcontractors may provide their own offices as necessary. Direct location of these offices.

1.7 EQUIPMENT, TOOL AND MATERIALS 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.

1.8 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.9 CONSTRUCTION SIGNAGE

.1 Locate project identification sign as directed by Departmental Representative and construct as follows:

.1 Build concrete foundation, erect framework, and attach signboard to framing.

.2 Paint all surfaces of signboard and framing with one coat primer and two coats enamel. Colour white on signboard face, black on other surfaces.

.3 Apply vinyl sign face overlay to painted signboard face in accordance with installation instruction supplied.

1.9 CONSTRUCTION SIGNAGE (Cont'd)

.2 Direct requests for approval to erect a Consultant/Contractor signboard to Departmental Representative. For consideration general appearance of Consultant/Contractor signboard must conform to project identification site sign. Wording shall be in both official languages.

.3 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN/CSA-Z321.

.4 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

.5 No other signs or advertisments, other than warning signs are permitted on site.

1.10 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.

.2 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs

.3 Protect travelling public from damage to person and property.

.4 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.5 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.6 Construct access and haul roads necessary.

.7 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

.8 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

1.10 PROTECTION AND MAINTENANCE OF TRAFFIC (Cont'd)

.9 Dust control: adequate to ensure safe operation at all times.

.10 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative .

.11 Provide snow removal during period of Work.

.12 Remove, upon completion of work, haul roads designated by Departmental Representative .

1.11 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 52 00 - Construction Facilities.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB):
.1 CAN/CGSB-1.189-2000, Exterior Alkyd Primer for Wood.
.2 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA):
.1 CSA O121-08(R2013), Douglas Fir Plywood.

1.3 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.4 HOARDING

.6 Erect temporary site enclosure using new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m o.c. Provide one lockable truck gate. Maintain fence in good repair.

.7 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.5 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations.

.2 Provide as required by governing authorities .

1.8 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.9 PUBLIC TRAFFIC FLOW

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.10 FIRE ROUTES

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

1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.12 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Progressive cleaning.

.2 Final cleaning.

1.2 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.

.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.

.3 Clear snow and ice from access to building, bank/pile snow in designated areas only remove from site.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Provide on-site containers for collection of waste materials and debris.

.6 Provide and use clearly marked separate bins for recycling. Refer to Section 01 74 20.

.7 Remove waste material and debris from site and deposit in waste container at end of each working day.

.8 Clean interior areas prior to start of finish work, and maintain areas free of dust and other contaminants during finishing operations.

.9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.2 PROJECT CLEANLINESS (Cont'd)

.12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.3 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 and debris other than that caused by Owner or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.

.9 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.10 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.11 Remove dirt and other disfiguration from exterior surfaces.

.12 Clean and sweep roofs, gutters, areaways, and sunken wells.

.13 Sweep and wash clean paved areas.

1.3 FINAL CLEANING (Cont'd)

.14 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.

.15 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.16 Remove snow and ice from access to building.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 CONSTRUCTION & DEMOLITION WASTE

.1 Carefully deconstruct and source separate materials/equipment and divert, from D&C waste destined for landfill to maximum extent possible. On site sales are not permitted.

.2 Source separate waste and maintain waste audits in accordance with the Environmental Protection Act, Ontario Regulation 102/94 and Ontario Regulation 103/94.

.1 Provide facilities for collection, handling and storage of source separated wastes.

.2 Source separate the following waste:

.1 Brick and portland cement concrete.

.2 Corrugated cardboard.

.3 Wood, not including painted or treated wood or laminated wood.

.4 Gypsum board, unpainted.

.5 Steel.

.6 Items indicated in Section 02 42 93, Deconstruction and Waste Products Workplan Summary.

.4 Submit proof that all waste is being disposed of at a licensed land fill site or waste transfer site. A copy of the disposal/waste transfer site's license and a letter verifying that said landfill site will accept the waste must be supplied to Departmental Representative prior to removal of waste from the demolition site.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Methods for removal of existing asphalt pavement.

1.2 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 20.

.2 Divert unused asphalt materials from landfill to local facility.

1.3 MEASURMENT PROCEDURES

.1 Included in balance of project.

PART 2 - PRODUCTS

2.1 EQUIPMENT

.1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Prior to beginning removal operation, inspect and verify with Departmental Representative areas, depths and lines of asphalt pavement to be removed.

3.2 PROTECTION

.1 Protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.3 REMOVAL

.1 Remove existing asphalt pavement to lines and grades as indicated.

.2 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.

3.3 REMOVAL (Cont'd)

.3 Sawcut along lines designated on contract drawings to provide a clean true edge on existing asphalt.

.4 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.

.5 Provide for suppression of dust generated by removal process.

3.4 FINISH TOLERANCES

.1 Finished surfaces in areas where asphalt pavement has been removed to be within +/-5 mm of grade specified but not uniformly high or low.

3.5 SWEEPING

.1 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 CSA International
.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 .

.2 Submit demolition drawings:.1 Submit for review and approv
Departmental Representative shoring and underpinning drawings stamped and signed by professional engineer registered or licensed in the Province of Ontario Canada, showing proposed method.
.2 Erosion and Sedimentation Control: submit erosion and sedimentation control plan in accordance with authorities having jurisdiction .

1.3 SITE CONDITIONS

.1 Review "Designated Substance Report" and take precautions to protect environment.

.2 If material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.
.1 Proceed only after receipt of written instructions have been received from Departmental Representative.

.3 Notify Departmental Representative before disrupting building access or services.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

.4 Disconnect, cap, plug or divert, as required, existing utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.

.1 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.

.2 Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

3.2 PROTECTION

.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

3.3 PREPARATION

.1 Protection of In-Place Conditions:

3.3 PREPARATION (Cont'd)

.1 (Cont'd)

.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

.2 Demolition/Removal:

.1 Remove items as indicated.

.2 Removal of Pavements, Curbs and Gutters:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular materials.

.4 Trim edges of partially demolished building elements to tolerances as defined by Departmental Representative to suit future use.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11.

.1 Leave Work area clean at end of each day.

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

.3 Refer to demolition drawings and specifications for items to be salvaged for reuse.

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20 .

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
- .1 CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CSA-O86-14, Engineering Design in Wood.
- .3 CSA O121-08(R2013), Douglas Fir Plywood.
- .4 CSA O151-09(R2014), Canadian Softwood Plywood.
- .5 CSA O153-13, Poplar Plywood.
- .6 CAN/CSA-O325.0-92(R2003), Construction Sheathing.
- .7 CSA O437 Series-93(R2011), Standards for OSB and Waferboard.
- .8 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
- .9 CAN/CSA-S269.3-M92(R2013), Concrete Formwork, National Standard of Canada

.2 Underwriters' Laboratories of Canada (ULC)
- .1 CAN/ULC S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit shop drawings for formwork and falsework.
- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

.3 Submit WHMIS MSDS - Material Safety Data Sheets.

.4 Coordinate submittal requirements and provide submittals.

.5 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings Comply with CAN/CSA-S269.3 for formwork drawings.

.6 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.

1.3 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.7 Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative.

.8 When slip forming and flying forms are used, submit details of equipment and procedures for review by Departmental Representative.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:
.1 Place materials defined as hazardous or toxic in designated containers.
.2 Divert wood materials from landfill to a recycling reuse composting facility as approved by Departemental Representative.
.3 Divert plastic materials from landfill to a recycling reuse composting facility as approved by Departmental Representative.
.4 Divert unused form release material from landfill to an official hazardous material collections site as approved by the Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Formwork materials:
.1 Use wood and wood product formwork materials to CSA-O121 CAN/CSA-O86 CSA O437 Series CSA-O153.
.2 Rigid insulation board: to CAN/ULC-S701.

.2 Form ties:
.1 Use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.

.3 Form liner:
.1 Plywood: medium density overlay Douglas Fir to CSA O121 Canadian square edge, 19mm thick.

.4 Form release agent: non-toxic, biodegradable, low VOC,.

.5 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC,free of kerosene, with viscosity between 70 and 110s Saybolt Universal 15 to 24 mm^2 /s at 40 degrees C, flashpoint minimum 150 degrees C, open cup.

.6 Falsework materials: to CSA-S269.1.

PART 3 - EXECUTION

3.1 FABRICATION AND ERECTION

.1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.

.2 Fabricate and erect falsework in accordance with CSA S269.1.

.3 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.

.4 Align form joints and make watertight.
.1 Keep form joints to minimum.

.5 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.

.6 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections
.1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes including painting.

.7 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

.8 When slip forming and flying forms are used, submit details as indicated in Section 01 33 00.

3.2 REMOVAL AND RESHORING

.1 Leave formwork in place for following minimum periods of time after placing concrete.
.1 3 days for sides of top slab and walls

.2 Remove formwork when concrete has reached 100% of its design strength and replace immediately with adequate reshoring (where required).

.3 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.

.4 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 03 10 00 - Concrete Forming and Accessories.

1.2 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment:

.1 Measurement Procedures: in accordance with Section 01 29 83 - Payment Procedures Testing Laboratory Services.

.2 Measure cast-in-place concrete in sub-structure in cubic metres calculated from neat dimensions as indicated authorized in writing by DCC Representative.

.1 Concrete placed beyond dimensions indicated will not be measured.

.3 No deductions will be made for volume of concrete displaced by reinforcing steel, structural steel, or piles.

.4 No deductions will be made for volume of concrete less than 0.1 m^2 in cross sectional area in volume displaced by individual drainage openings.

.5 Cast-in-place concrete in superstructure will not be measured but will paid for as fixed price item.

.6 Supply and installation of anchor bolts, nuts and washers and bolt grouting will not be measured but considered incidental to work.

.7 Measure supply and installation of waterstops in lineal metres installed.

1.3 REFERENCES

.1 Abbreviations and Acronyms:

.1 Cement: hydraulic cement or blended hydraulic cement (XXb - where b denotes blended).

.1 Type GU or GUb - General use cement.

.2 Type MS or MSb - Moderate sulphate-resistant cement.

.3 Type MH or MHb - Moderate heat of hydration cement.

.4 Type HE or Heb - High early-strength cement.

.5 Type LH or LHb - Low heat of hydration cement.

.6 Type HS or HSb - High sulphate-resistant cement.

.2 Fly ash:

.1 Type F - with CaO content less than 8%.

.2 Type CI - with CaO content ranging from 8 to 20%.

.3 Type CH - with CaO greater than 20%.

.3 GGBFS - Ground, granulated blast-furnace slag.

.2 Reference Standards:

.1 ASTM International

.1 ASTM C 260-06, Standard Specification for Air-Entraining Admixtures for Concrete.

1.3 REFERENCES (Cont'd)

.2 (Cont'd)
.1 (Cont'd)
.2 ASTM C 309-07, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
.3 ASTM C 494/C 494M-08a, Standard Specification for Chemical Admixtures for Concrete.
.4 ASTM C 1017/C 1017M-07, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
.5 ASTM D 412-06ae1, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
.6 ASTM D 624-00(2007), Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
.7 ASTM D 1751-04, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
.8 ASTM D 1752-04a, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
.2 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
.3 CSA International
.1 CSA A23.1/A23.2-2004, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
.2 CSA A283-06, Qualification Code for Concrete Testing Laboratories.
.3 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meetings: in accordance with Section 01 11 00, convene pre-installtion meeting one week prior to beginning of concrete works
.1 Ensure key personnel, site supervisor, Departmental Representative specialty contractor- finishing, forming concrete producer testing laboratories attend.
.1 Verify project requirements.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 Submittal Procedures.

1.5 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.2 At least 4 weeks prior to beginning Work, provide Departmental Representative with samples of materials proposed for use as follows:
.1 5 L of curing compound.
.2 1 m length of each type of joint filler.
.3 1 m length of each type of waterstops.

.3 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.

.4 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.

.5 Provide two copies of WHMIS MSDS in accordance with Section 01 70 12 - Safety Requirements and 01 35 43 - Environmental Procedures.

1.6 QUALITY ASSURANCE

.1 Provide Departmental Representative, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
.1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.

.2 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items:
.1 Falsework erection.
.2 Hot weather concrete.
.3 Cold weather concrete.
.4 Curing.
.5 Finishes.
.6 Formwork removal.
.7 Joints.
.8 Sealants.

.3 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

.4 Sustainability Standards Certification:
.1 Construction Waste Management: Provide copy of plan.
.2 Recycled Content

1.6 QUALITY ASSURANCE (Cont'd)

.4 (Cont'd)
.2 (Cont'd)
.1 Provide listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post consumer and pre-consumer content, and total cost materials for project.
.2 When supplementary cementing materials (SCMs) are used provide evidence to certify reduction in cemefrom Base Mix to Actual SCMs Mix as percentage.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:
.1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
.1 Do not modify maximum time limit without receipt of prior written agreement from DCC Representative laboratory representative and concrete producer as described in CSA A23.1/A23.2.
.2 Deviations to be submitted for review by DCC Representative.
.2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

.2 Packaging Waste Management: remove for reuse areturn by manufacturer of pallets, crates, padding, and packaging materials in accordance with Section 01 74 11- Cleaning and Waste Management.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

.1 Alternative 1 - Performance: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

2.2 PERFORMANCE CRITERIA

.1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by DCC Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

2.3 MATERIALS

.1 Cement: to CSA A3001, Type GU HS.
.1 Reduction in cement from Base Mix to Actual Supplementary Cementing Materials (SCMs) Mix, as percentage.

.2 Blended hydraulic cement: Type GUb HSb to CSA A3001.

2.3 MATERIALS (Cont'd)

.3 Supplementary cementing materials: with minimum 20% Type fly ash replacement N GGBFS, by mass of total cementitious materials to CSA A3001.

.4 Water: to CSA A23.1.

.5 Aggregates: to CSA A23.1/A23.2.

.6 Admixtures:
.1 Air entraining admixture: to ASTM C 260.
.2 Chemical admixture: to ASTM C 494 ASTM C 1017. DCC Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

.7 Shrinkage compensating grout: premixed compound consisting of non-metallc aggregate, Portland Cement, water reducing and plasticizing agents to CSA A23.1/A23.2.
.1 Compressive strength: MPa at 28 days.
.2 Net shrinkage at 28 days: max %.

.8 Non premixed dry pack grout: composition of non metallic aggregate Portland cement with sufficiewater for mixture to retain its shape when made into ball hand and capable of developing strength of MPa at days.

.9 Curing compound: to CSA A23.1/A23.2 white and ASTM C 309, Type 1- chlorinated rubber Type1-D with fugitive dye.

.10 Mechanical waterstops: ribbed extruded PVC of sizes indicated.
.1 Tensile strength: to ASTM D 412, method A, Die "C", minimum MPa.
.2 Elongation: to ASTM D 412, method A, Die "C", minimum 275%.
.3 Tear resistance: to ASTM D 624, method A, Die "B", minimum 30 kN/m. Waterstop to be chemical resistant and approved by DCC Representative.

.11 Damproof membrane:
.1 Kraft/polyethylene membrane:
.1 Plain: .05 .10 .75mm thick polyethylene film bonded to asphalt treated creped kraft.
.2 Reinforced: two .05 .10 .75 mm thick polyethylene films bonded to each side of asphalt treated creped kraft paper, reinforced with 13 x 13mm fibreglass scrim.
.3 Membrane adhesive: as recommended by membrane manufacturer.

.12 Dampproofing:
.1 Emulsified asphalt, mineral colloid type, unfilled to CAN/CGSB-37.2, and to Section 07 11 13- Bitumous Dampproofing

2.4 MIXES

.1 Alternative 1 - Performance Method for specifying concrete: to meet DCC Representative performance criteria to CSA A23.1/A23.2.
.1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
.2 Provide concrete mix to meet the following plastic state requirements.
.1 Uniformity:
.2 Workability: free of surface blemishes loss of mortar colour variations segregation.
.3 Finishibility: amount of bleeding.
.4 Set time: hours max.
.3 Provide concrete mix to meet the following hard state requirements.
.1 Durability and class of exposure:
.2 Compressive strength at 28 days: 35 MPa minimum.
.3 Aggregate size: 20 mm maximum.
.4 Volume stability: Acceptable volume change range due to shrinkage, creep, and freeze thaw cycle.
.4 Provide quality management plan to ensure verification of concrete quality to specified performance.
.5 Concrete supplier's certification: both batch plant and materials meet CSA A23.1 requirements.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Obtain Departmental Representative's written approval before placing concrete.
.1 Provide 24 hours minimum notice prior to placing of concrete.

.2 During concreting operations:
.1 Development of cold joints not allowed.
.2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.

.3 Pumping of concrete will not be permitted is permitted only after approval of equipment and mix.

.4 Ensure reinforcement and inserts are not disturbed during concrete placement.

.5 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.

.6 Protect previous Work from staining.

3.1 PREPARATION (Cont'd)

.7 Clean and remove stains prior to application for concrete finishes.

.8 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.9 Do not place load upon new concrete until authorized by Departmental Representative.

3.2 INSTALLATION/ APPLICATION

.1 Do cast-in-place concrete work to CSA A23.1/A23.2.

.2 Sleeves and inserts:
.1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by Departmental Representative.
.2 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
.3 Sleeves and openings greater than 100 x 100 mm not indicated, must be reviewed by Departmental Representative.
.4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Departmental Representative before placing of concrete.
.5 Confirm locations and sizes of sleeves and openings shown on drawings.
.6 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.

.3 Anchor bolts:
.1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.
.2 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from Departmental Representative.
.1 Formed holes: 100 mm minimum diameter.
.2 Drilled holes: 25 mm minimum diameter larger than bolts used to manufacturers' recommendations.
.3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
.4 Set bolts and fill holes with epoxy grout.
.5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.

.4 Drainage holes and weep holes:
.1 Form weep holes and drainage holes in accordance with Section 03 10 00 - Concrete Forming and Accessories. If wood forms are used, remove them after concrete has set.
.2 Install weep hole tubes and drains as indicated.

3.2 INSTALLATION/ APPLICATION (Cont'd)

.5 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.

.6 Finishing and curing:
.1 Finish concrete to CSA A23.1/A23.2.
.2 Use procedures as reviewed by Departmental Representative or those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.
.3 Use curing compounds compatible with applied finish on concrete surfaces. Applied finish on concrete: Beams and pile caps to have smooth form finish. Provide written declaration that compounds used are compatible.
.4 Finish concrete floor to CSA A23.1/A23.2. Class A.
.5 Concrete floor to have finish hardness equal to or greater than Mohs hardness to CSA A23.1/A23.2.
.6 Provide screed float swirl-trowelled finish unless otherwise indicated.
.7 Rub exposed sharp edges of concrete with carborundum to produce 3 mm minimum radius edges unless otherwise indicated.

.7 Toppings:
.1 Topping mixture to meet min requirements as follows: monolithic bonded overlay mm thick:
.2 Make allowances for monolithic and bonded overlay topping thickness when pouring base course.
.3 Apply cement/sand grout latex bonding agent modified cement/sand grout epoxy bonding agent to base course to CSA A23.1/A23.2
.4 Place monolithic bonded topping to CSA A23.1/A23.2 and topping to manufacturer's recommendations.
.5 Ensure that joints in topping are of the same material as those in base course. Also ensure that their locations precisely match those in base course. Provide dividers edge strips reinforcing mesh as indicated.

.8 Waterstops:
.1 Install waterstops to provide continuous water seal.
.2 Do not distort or pierce waterstop in way as to hamper performance.
.3 Do not displace reinforcement when installing waterstops.
.4 Use equipment to manufacturer's requirements to field splice waterstops.
.5 Tie waterstops rigidly in place.
.6 Use only straight heat sealed butt joints in field.
.7 Use factory welded corners and intersections unless otherwise approved by DCC Representative.

.9 Joint fillers:
.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative.

3.2 INSTALLATION/ APPLICATION (Cont'd)

.9 (Cont'd)
.2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
.3 Locate and form expansion joints as indicated.
.4 Install joint filler.
.5 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

.10 Dampproof membrane:
.1 Install dampproof membrane under concrete slabs-on-grade inside building.
.2 Lap dampproof membrane minimum 150 mm at joints and seal.
.3 Seal punctures in dampproof membrane before placing concrete.
.4 Use patching material at least 150 mm larger than puncture and seal.

3.3 SURFACE TOLERANCE

.1 Concrete tolerance to CSA A23.1 Straightedge MethodFF FL = 15.

3.4 FIELD QUALITY CONTROL

.1 Site tests: conduct tests and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
.1 Concrete pours.
.2 Slump.
.3 Air content.
.4 Compressive strength at 7 and 28 days.
.5 Air and concrete temperature.

.2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by DCC Representative for review to CSA A23.1/A23.2.
.1 Ensure testing laboratory is certified to CSA A283.

.3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and Departmental Representative.

.4 Departmental Representative will pay for costs of tests as specified in Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

.5 Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

.6 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.

3.4 FIELD QUALITY CONTROL (Cont'd)

.7 Inspection or testing by DCC Representative will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.

3.5 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning and Waste Management.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)
- .1 CSA-C22.1-15, Canadian Electrical Code, Part 1 (26th Edition), Safety Standard for Electrical Installations.
- .2 CAN3-C235-83(R2006), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

.2 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).

.3 The Ontario Electrical Safety Code 2015, and all bulletins (Ontario).

.4 Hydro requirements and local applicable codes and regulations.

1.2 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235.

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
- .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

.3 Language operating requirements: provide identification nameplates for control items in English.

1.3 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00.

.2 Product Data: submit WHMIS MSDS in accordance with Section 01 47 15 and Section 02 61 33.

.3 Quality Control: in accordance with Section 01 45 00.
- .1 Provide CSA certified equipment and material.
- .2 Where CSA certified equipment and material is not available, submit such equipment and material to inspection authorities for special approval before delivery to site.
- .3 Submit test results of installed electrical systems and instrumentation.

1.3 SUBMITTALS (Cont'd)

.3 (Cont'd)
.4 Permits and fees: in accordance with General Conditions of contract. Pay associated fees. Departmental Representative will provide drawings and specifications required by Electrical Inspection Department and Supply Authority at no cost.
.5 Submit certificate of acceptance from Electrical Inspection Department upon completion of Work to Departmental Representative.

1.4 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00.

.2 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices as per the conditions of Provincial Act respecting manpower vocational training and qualification.
.1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
.2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.

.3 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Material Delivery Schedule: provide Departmental Representative with schedule within 2 weeks after award of Contract.

.2 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 20.

1.6 SYSTEM STARTUP

.1 Instruct Departmental Representative and operating personnel in operation, care and maintenance of systems, system equipment and components.

.2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.

1.6 SYSTEM STARTUP (Cont'd)

.3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

PART 2 - PRODUCTS

2.1 SUSTAINABLE REQUIREMENTS

.1 Materials and products in accordance with Section 01 47 15.

2.2 MATERIALS AND EQUIPMENT

.1 Provide material and equipment in accordance with Section 01 61 00.

.2 Material and equipment to be CSA certified. Where CSA certified material and equipment is not available, obtain special approval from inspection authorities before delivery to site and submit such approval as described in PART 1 - Submittals.

.3 Factory assemble control panels and component assemblies.

2.3 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

.1 Control wiring and conduit: in accordance with Section 26 29 03.

2.4 WARNING SIGNS

.1 Warning Signs: in accordance with requirements of inspection authorities and Departmental Representative.

.2 Decal signs, minimum size 175 x 250 mm.

2.5 WIRING TERMINATIONS

.1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.6 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates as follows:

2.6 EQUIPMENT IDENTIFICATION (Cont'd)

.1 (Cont'd)

.1 Nameplates: Lamicoid 3mm thick plastic engraving sheet red face, white core, lettering accurately aligned and engraved into core, mechanically attached with self tapping screws for essential (Emergency) power.

.2 Wording on nameplates to be approved by Departmental Representative prior to manufacture.

.3 Allow for minimum of twenty-five (25) letters per nameplate.

.4 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

.5 Terminal cabinets and pull boxes: indicate system and voltage.

2.7 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, numbered, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour coding: to CSA-C22.1.

.4 Use colour coded wires in communication cables, matched throughout system.

2.8 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code conduits, boxes and metallic sheathed cables.

.2 Code by prepainting couplings, connectors and boxes.

.3 Colours:

Service	Colour
up to 250 V	yellow
Fire Alarm	red

2.9 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

2.9 FINISHES (Cont'd)

.1 (Cont'd)
.1 Paint outdoor electrical equipment "equipment green".
.2 Paint indoor switchgear and distribution enclosures light gray to EEMAC 2Y-1.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

.1 Conduct following tests in accordance with Section 01 45 00.
.1 Systems: fire alarm system, communications.

.2 Carry out tests in presence of Departmental Representative.

.3 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.4 Verification requirements in accordance with Section 01 47 17 include:
.1 Materials and resources.
.2 Storage and collection of recyclables.
.3 Construction waste management.
.4 Resource reuse.
.5 Recycled content.
.6 Local/regional materials.
.7 Certified wood.
.8 Low-emitting materials.

3.2 CLEANING

.1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

3.3 FIREPROOFING

.1 Where cables or conduits pass through floors and fire rated walls proper firestopping for the specific construction shall be used. Refer to Section 07 84 00.

3.4 OPERATION AND MAINTENANCE DATA

.1 Provide operation and maintenance data for incorporation into operation and maintenance manuals specified in Section 01 78 00.

.2 Include in operation and maintenance data:

3.4 OPERATION AND MAINTENANCE DATA (Cont'd)

.2 (Cont'd)

.1 Details of design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.

.2 Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items, and parts lists. Advertising or sales literature not acceptable.

.3 Wiring and schematic diagrams and performance curves.

.4 Names and addresses of local suppliers for items included in maintenance manuals.

.5 Copy of reviewed shop drawings.

.3 Provide two distinct manuals, one for operational personnel and one for maintenance personnel. Provide a simplified operation instruction sheet for fire alarm.

3.5 AS-BUILT RECORDS

.1 As work progresses, maintain accurate records to show deviations from contract drawings. The Departmental Representative will provide a set of clean white prints for this purpose.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for wire and box connectors.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CAN/CSA-C22.2 No.18.4-04(R2009), Hardware for the Support of Conduit, Tubing and Cable.
.2 CAN/CSA-C22.2 No.18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.
.3 CSA C22.2 No.65-03, Wire Connectors.

.2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
.1 EEMAC 1Y-2, 1961 Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

.3 National Electrical Manufacturers Association (NEMA).

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 20.

.2 Divert unused wiring materials from landfill to metal recycling facility as approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 All fixtures and Branch Circuit wiring joints, in junction and outlet boxes shall be made with CSA Certified Pressure Type connectors rated at 600 volts maximum (1,000 volts when enclosed in fixture or sign). Connector body shall consist of a cone-shaped coil spring insert, insulated with a colour-coded, flame-retardant shell which shall be knurled for easy grip and capable for use with an Electrician's Pliers.

PART 3 - EXECUTION

3.1 INSTALLATION .1 Remove insulation carefully from ends of conductors and:

.1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.

.2 Install fixture type connectors and tighten. Replace insulating cap.

.3 Install bushing stud connectors in accordance with EEMAC 1Y-2 NEMA.

END OF SECTION

PART 1 - GENERAL

1.1 PRODUCT DATA

.1 Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.

1.2 REFERENCES

.1 CSA C22.2 No .0.3-09, Test Methods for Electrical Wires and Cables.

.2 CAN/CSA-C22.2 No. 131-07, Type TECK 90 Cable.

1.3 PRODUCT DATA

.1 Provide product data in accordance with Section 01 33 00.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Packaging Waste Management: remove for reuse and return of pallets, crates, paddling and packaging materials in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 BUILDING WIRES

.1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, with 600 Volt insulation of cross-linked thermosetting polyethylene material rated RWU90 XLPE, Non Jacketted. for below 250 volts.

.3 Copper Conductors: size as indicated, with 1000 volt insulation of cross linked thermosetting polysthylene material rated RWU 90 KLPE, non-jacketed for below 750 volts.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00.

.2 Perform tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.

3.1 FIELD QUALITY CONTROL (Cont'd)

.3 Perform tests before energizing electrical system.

3.2 GENERAL CABLE INSTALLATION

.1 Terminate cables in accordance with Section 26 05 20.

.2 Cable Colour Coding: to Section 26 05 00.

3.3 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:
.1 In conduit systems in accordance with Section 26 05 34.

3.4 INSTALLATION OF TECK90 CABLE (0 -1000 V)

.1 Group cables wherever possible on channels.

.2 Install cable exposed, securely supported by straps.

END OF SECTION

PART 1 - GENERAL

1.1 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 20.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Divert unused metal materials from landfill to metal recycling facility as approved by Department Representative.

.5 Fold up metal banding, flatten and place in designated area for recycling.

1.2 RESTRICTIONS

.1 Explosive driven fasteners shall not be used except by specific approval.

PART 2 - PRODUCTS

2.1 SUPPORT CHANNELS

.1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted or suspended.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Secure equipment to solid masonry, tile and plaster surfaces with epoxy anchors.

.2 Secure equipment to poured concrete with expandable inserts.

.3 Secure equipment to hollow masonry walls or suspended ceilings with expandable inserts.

.4 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.

3.1 INSTALLATION (Cont'd)

.5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.6 Fasten exposed conduit or cables to building construction or support system using straps.
.1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
.2 Two-hole steel straps for conduits and cables larger than 50 mm.
.3 Beam clamps to secure conduit to exposed steel work.

.7 Suspended support systems.
.1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.
.2 Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.

.8 For surface mounting of two or more conduits use channels at 1200mm on centre spacing.

.9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

.11 Do not use wire lashing or perforated strap to support or secure raceways or cables.

.12 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Departmental Representative.

.13 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

.14 Provide channels for mounting of conduit, wiring and devices on walls of tunnels, mechanical rooms, basements and attics.

.15 Provide spacers to prevent direct contact between 'U' channels and concrete.

.16 File rough edges of cut 'U' channels and paint with galvanized paint.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA C22.1-15, Canadian Electrical Code, Part 1, 26th Edition.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Submit samples for floor box in accordance with Section 01 33 00.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00.

.2 Waste Management and Disposal:
.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 0.

PART 2 - PRODUCTS

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.1.

.2 102 mm square or larger outlet boxes as required.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

2.2 GALVANIZED STEEL OUTLET BOXES

.1 One-piece electro-galvanized construction.

.2 Utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.

2.3 CONDUIT BOXES

.1 Cast FS or FD feraloy boxes with factory-threaded hubs and mounting feet for surface wiring of devices in mechanical rooms, attics and basement.

2.4 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 35 mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Do not install reducing washers.

.4 Identify systems for outlet boxes as required.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CAN/CSA-C22.2 No. 18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
.2 CAN/CSA-C22.2 NO. 18.1-04, Metallic Outlet Boxes.
.3 CAN/CSA-C22.2 NO. 18.2-06, Nonmetallic Outlet Boxes.
.4 CSA C22.2 No. 45-M1981(R2008), Rigid Metal Conduit.
.5 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
.6 CSA C22.2 No. 83-M1985(R2008), Electrical Metallic Tubing.
.7 CSA C22.2 No. 211.2-06, Rigid PVC (Unplasticized) Conduit.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Product data: submit manufacturer's printed product literature, specifications and datasheets.
.1 Submit cable manufacturing data.

.3 Quality assurance submittals:
.1 Test reports: submit certified test reports.
.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
.3 Instructions: submit manufacturer's installation instructions.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

PART 2 - PRODUCTS

2.1 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, hot dipped galvanized steel threaded.

.2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with expanded ends.

.3 Rigid PVC conduit: to CSA C22.2 No. 211.2.

.4 Flexible metal conduit: to CSA C22.2 No. 56, aluminum liquid-tight flexible metal.

2.2 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits NPS 2 50 mm and smaller.
.1 Two hole steel straps for conduits larger than NPS 2 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 1.2 m on centre.

.4 Threaded rods, 6 mm diameter, to support suspended channels.

2.3 CONDUIT FITTINGS

.1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.

.2 Ensure factory "ells" where 90 degrees bends for NPS 1 27 mm and larger conduits.

.3 Watertight connectors and couplings for EMT.
.1 Set-screws are not acceptable.

2.4 FISH CORD

.1 Polypropylene.

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 data sheets.

3.2 INSTALLATION

.1 Use rigid hot dipped galvanized steel threaded conduit for conduits to be sealed in hazardous locations.

.2 Minimum conduit size circuits: NPS 3/4 21 mm.

.3 Bend conduit cold:
.1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.4 Mechanically bend steel conduit over 21 mm diameter.

.5 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.6 Remove and replace blocked conduit sections.
.1 Do not use liquids to clean out conduits.

.7 Dry conduits out before installing wire.

3.3 CLEANING

.1 Proceed in accordance with Section 01 74 11.

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

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)
.1 ASTM D4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.2 SAMPLES

.1 Submit samples in accordance with Section 01 33 00.

.2 Allow continual sampling by Departmental Representative during production.

.3 Provide Departmental Representative with access to source and processed material for sampling.

.4 Install sampling facilities at discharge end of production conveyor, to allow Departmental Representative to obtain representative samples of items being produced. Stop conveyor belt when requested by Departmental Representative to permit full cross section sampling.

.5 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

.6 Provide water, electric power and propane to Departmental Representative laboratory trailer at production site.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Divert unused granular materials from landfill to local facility as approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Granular A to OPSS 1010.

.2 Granular B to OPSS 1010.

.3 Selective subgrade to OPSS 1010.

2.2 SOURCE QUALITY CONTROL

.1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.

.2 If, in opinion of Departmental Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.

.3 Advise Departmental Representative 4 weeks in advance of proposed change of material source.

.4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

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 as indicated after area has been cleared of brush, weeds and grasses and removed from site.

.3 Strip topsoil to depths as indicated. Avoid mixing topsoil with subsoil.

.4 Stockpile in locations as directed by Departmental Representative. Stockpile height not to exceed 2 m.

.5 Dispose of topsoil as directed by Departmental Representative.

.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 directed by Departmental Representative.

.2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.

.3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.

3.1 PREPARATION (Cont'd)

.2 (Cont'd)

.4 When excavation is completed dress sides of excavation to nominal 1:1 slope, and provide drains or ditches as required to prevent surface standing water.

.5 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.

.2 Stockpile aggregates in sufficient quantities to meet Project schedules.

.3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

.4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.

.5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.

.6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 h of rejection.

.7 Stockpile materials in uniform layers of thickness as follows:

.1 Max 1.5 m for coarse aggregate and base course materials.

3.1 PREPARATION (Cont'd)

.5 (Cont'd)

.7 (Cont'd)

.2 Max 1.5 m for fine aggregate and sub-base materials.

.3 Max 1.5 m for other materials.

.8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.

.9 Do not cone piles or spill material over edges of piles.

.10 Do not use conveying stackers.

.11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

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.

.3 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 29 83 - Payment Procedures: Testing Laboratory Services.

.2 Section 31 23 10 - Excavation, Trenching and Backfilling.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)
.1 ASTM D698-07e1, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m^3).

1.3 EXISTING CONDITIONS

.1 Examine subsurface investigation report which is bound into specification.

.2 Known underground and surface utility lines and buried objects are as indicated on site plan. Lines shown for information purposes only. Contractor is responsible for obtaining locates prior to commencing work.

.3 Refer to dewatering in Section 31 23 10.

1.4 PROTECTION

.1 Protect and/or transplant existing fencing trees, landscaping, natural features, bench marks, 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 Fill material: Type 3 in accordance with of Section 31 23 10.

.2 Excavated or graded material existing on site may be suitable to use as fill for grading work if approved by Departmental Representative.

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 after area has been cleared of brush weeds and grasses and removed from site.

.3 Strip topsoil to depths as indicated. Rototill weeds and grasses and retain as topsoil on site. 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 off site.

3.2 GRADING

.1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.

.2 Slope rough grade away from building as indicated.

.3 Grade ditches to depth as indicated.

.4 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

.5 Compact filled and disturbed areas to maximum dry density to ASTM D698, as follows:
.1 85% under landscaped areas.
.2 95% under paved and walk areas.

.6 Do not disturb soil within branch spread of trees or shrubs to remain.

3.3 TESTING

.1 Inspection and testing of soil compaction will be carried out by an independent testing agency, acceptable to the Departmental Representative.

.2 Submit testing procedure, frequency of tests, testing results to Departmental Representative for review.

3.4 SURPLUS MATERIAL

.1 Remove surplus material and material unsuitable for fill, grading or landscaping off site.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 31 22 13: Rough Grading.

.2 Section 31 05 17: Aggregates: General.

.3 Section 33 34 02: Sanitary Sewers and Force Mains.

1.2 REFERENCES

.1 ASTM C117-04, Standard Test Method for Materials Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136-06, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D422-63(2007), Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3) (600 kN-m/m^3).

.5 ASTM D1557-09, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3) (2,700 kN-m/m^3).

.6 ASTM D4318-10, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.7 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.8 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.9 CSA-A23.1-09/A23.2-09, Concrete materials and methods of concrete construction/Test methods and standard practices for concrete.

.10 Typ. for all references to OPSS 401, Ontario Provincial Standard Specification, Construction Specification for Trenching, Backfilling, and Compacting.

1.3 DEFINITIONS

.1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.

.1 Rock excavation: excavation of material from solid masses of igneous, sedimentary or metamorphic rock which, prior to its removal, was integral with its parent mass, and boulders or rock fragments having individual volume in excess of 1 m^3.

.2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

.2 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.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 Unsuitable materials:

.1 Weak and compressible materials under excavated areas.

.2 Frost susceptible materials under excavated areas.

.3 Frost susceptible materials:

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

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45-100
0.02 mm	10-80
0.005 mm	0-45

.2 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.

.6 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.

1.4 SAMPLES

.1 Inform Departmental Representative at least 4 weeks prior to commencing work, of proposed source of fill materials and provide access for sampling.

1.5 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, steam, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.

.5 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before re-routing. Costs for such work to be paid by Departmental Representative.

.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, 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 to approval of Departmental Representative.

.3 Where required for excavation, cut roots or branches as approved by Departmental Representative.

1.6 SHORING, BRACING AND UNDERPINNING

.1 Protect existing features in a manner acceptable to the departmental representative and applicable local regulations.

.2 Engage services of qualified professional engineer who is registered or licensed in province of Ontario, Canada in which work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for work.

.3 Submit design and supporting data at least 2 weeks prior to commencing work.

1.6 SHORING, BRACING AND UNDERPINNING (Cont'd)

.4 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in province of Ontario, Canada.

1.7 EXCAVATION AND BACKFILLING REQUIRED BY OTHER SECTIONS

.1 Excavation and backfilling for site services, mechanical and electrical 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 trade concerned.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Type 1 fill: to Ontario Provincial Standard Specification OPSS 1010, April 2004 for Granular A aggregate. Maximum size 19.0mm

.2 Type 2 fill: to Ontario Provincial Standard Specification OPSS 1010, April 2004 for Granular B Type 2 aggregate. Maximum size 26.5mm.

.3 Type 3 fill: selected material from excavation or other sources, approved by Departmental Representative for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.

.4 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/m^3.
.3 Minimum strength of 0.07 MPa at 24 h.
.4 Concrete aggregates: to CAN/CSA-A23.1/A23.2.
.5 Portland cement: Type GU.
.6 Slump: 160 to 200 mm.

.5 Shearmat: honeycomb type bio-degradable cardboard 100 mm thick, treated to provide sufficient structural support for poured concrete until concrete cured.

PART 3 - EXECUTION

3.1 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.

3.2 STRIPPING OF TOPSOIL

.1 Commence topsoil stripping of areas as indicated after area has been cleared of brush, weeds, and grasses and removed from site.

.2 Strip topsoil to depths as indicated. Do not mix topsoil with subsoil.

.3 Stockpile in locations as directed by Departmental Representative. Stockpile height not to exceed 2 m.

.4 Dispose of unused topsoil off site.

3.3 STOCKPILING

.1 Stockpile fill materials in areas designated by Departmental Representative. Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

3.4 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

.1 Construct temporary works to depths, heights and locations as indicated or directed by Departmental Representative.

.2 During backfill operation:

.1 Unless otherwise as indicated or as 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 an elevation at least 500 mm above toe of sheeting.

.3 When sheeting is required to remain in place, cut off tops at elevations as indicated.

3.5 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while work is in progress.

.2 Submit for Departmental Representative's approval details of proposed dewatering or heave prevention methods, such as dikes, well points, and sheet pile cut-offs.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

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

.5 Dispose of water in accordance with local regulations and in a manner not detrimental to public and private property, or any portion of work completed or under construction.

.6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, water courses or drainage areas.

3.6 EXCAVATION

.1 Excavate to lines, grades, elevations and dimensions as indicated as directed by Departmental Representative.

.2 Remove concrete masonry paving walks demolished foundations and rubble and other obstructions encountered during excavation in accordance with Section 01 74 20.

.3 Excavation must not interfere with normal 45° splay of bearing from bottom of any footing.

.4 Do not disturb soil within branch spread of trees or shrubs that are to remain. 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 Dispose of surplus and unsuitable excavated material off site.

3.6 EXCAVATION (Cont'd)

.7 Do not obstruct flow of surface drainage or natural watercourses.

.8 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.9 Notify Departmental Representative when bottom of excavation is reached.

.10 Obtain Departmental Representative's approval of completed excavation.

.11 Remove unsuitable material from trench bottom to extent and depth as directed by Departmental Representative.

.12 Correct unauthorized over-excavation as follows:
.1 Fill under bearing surfaces and footings with concrete specified for footings.
.2 Fill under other areas with Type 2 fill compacted to not less than 95% of Standard Proctor Density to ASTM D698.

.13 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.

3.7 BEDDING AND UNDERGROUND SERVICES

.1 Place and compact granular material for bedding and surround of underground services as indicated in Section 32 11 20.

.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 backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

3.8 BACKFILLING (Cont'd)

.5 Backfill around installations.

.6 Place unshrinkable fill in areas as indicated. Consolidate and level unshrinkable fill with internal vibrators.

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within 24 h after placing of concrete.

.3 Place layers simultaneously on both sides of installed work to equalize loading. Difference not to exceed 0.6m.

.4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:

.1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative or:

.2 If approved by Departmental Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental Representative.

.7 Install drainage system in backfill as indicated.

3.9 COMPACTION

.1 Compaction equipment to be capable of obtaining required material densities.

.2 Compact to density of not less than 100% maximum dry density in accordance with ASTM D1557.

.3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.

.4 Apply water as necessary during compaction to obtain specified density.

.5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.

.6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

.7 Compaction equipment shall be used in such a way that the utility pipes are not damaged during construciton.

3.10 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 indicated.

.3 Reinstate pavement, sidewalks and lawns to elevation which existed before excavation.

.4 Clean and reinstate areas affected by work as directed by Departmental Representative.

.5 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 h.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 31 23 10 - Excavating, Trenching and Backfilling.

1.2 DEFINITIONS

.1 Rock: any solid material in excess of 0.25 m^3 and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m^3 bucket. Frozen material not classified as rock.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measure rock removal in plan cubic meters (m^3) removed. Measurement to be verfied with Departmental Representative. All additional work is to be included in balance of the project.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Not used.

PART 3 - EXECUTION

3.1 PROTECTION

.1 Prevent damage to surroundings and injury to persons by erecting appropriate protective barriers to the approval of a Department Representative.

3.2 ROCK REMOVAL

.1 Remove rock as indicated.

.2 Rock shall be removed by mechanical means.

.3 Explosive blasting is not permitted.

.4 Use rock removal procedures to produce uniform and stable excavation surfaces. Minimize overbreak, and to avoid damage to adjacent structures.

.5 Prepare rock surfaces which are to bond to concrete, by scaling, pressure washing and broom cleaning surfaces.

3.2 ROCK REMOVAL (Cont'd)

.6 Remove boulders and fragments which may slide or roll into excavated areas.

3.3 ROCK DISPOSAL

.1 Dispose of surplus removed rock off site in accordance with section 01 74 20.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 32 11 20 - Granular Base

.2 Section 32 12 16.01 - Asphalt Paving

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.

.2 ASTM C131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.3 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.4 ASTM D422-63(1998), Standard Test Method for Particle-Size Analysis of Soils.

.5 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN-m/m^3).

.6 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft^3) (2,700kN-m/m^3).

.7 ASTM D1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.

.8 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 OPSS 1010 (nov 2013) Material Specification for Aggregates - Base, Subbase, Select Subgrade and Backfill Material

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 20.

.2 Divert unused granular material from landfill to local quarry as approved by Departmental Representative.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

.1 Included in balance of project.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Granular sub-base material: in accordance with following requirements:
.1 Crushed, pit run or screened stone, gravel or sand.
.2 Granulars to OPSS 1010

PART 3 - EXECUTION

3.1 PLACING

.1 Place granular sub-base after subgrade is inspected and approved by Departmental Representative.

.2 Construct granular sub-base to depth and grade in areas indicated.

.3 Ensure no frozen material is placed.

.4 Place material only on clean unfrozen surface, free from snow or ice.

.5 Place granular sub-base materials using methods which do not lead to segregation or degradation.

.6 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.

.7 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.

.8 Remove and replace portion of layer in which material has become segregated during spreading.

3.2 COMPACTION

.1 Compaction equipment to be capable of obtaining required material densities.

.2 Compact to density of not less than 100% maximum dry density in accordance with ASTM D1557.

.3 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.

3.2 COMPACTION (Cont'd)

.4 Apply water as necessary during compaction to obtain specified density.

.5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.

.6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

.7 Compaction equipment shall be used in such a way that the utility pipes are not damaged during construciton.

3.3 SITE TOLERANCES

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

3.4 PROTECTION

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section: 32 11 16.01 - Granular Sub-Base.

.2 Section: 32 12 16.01 - Asphalt Paving.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Granular A: to Ontario Provincial Standard Specification 1010, April 2004.

PART 3 - EXECUTION

3.1 PLACING

.1 Place on a clean surface, properly shaped and compacted and free from snow or ice.

.2 Place material in layers not exceeding 150 mm when compacted.

.3 Spread each layer uniformly using approved grading equipment and methods.

3.2 COMPACTING

.1 Compact each layer to minimum 100% Standard Proctor Density.

.2 Add water as required to maintain material at or near optimum moisture content while compacting.

3.3 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.

3.4 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.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 32 11 16.01 - Granular Sub-base.

.2 Section 32 11 20 - Granular Base

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)
.1 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-1.74-2001, Alkyd Traffic Paint.

.3 Ontario Provincial Standard Specifications (OPSS)
.1 OPSS 302-November 2007, Construction Specification for Primary Granular Base.
.2 OPSS 310-November 2012, Construction Specification for Hot Mixed Asphalt.
.3 OPSS 314-November 2013, Construction Specification for Untreated Granular, Subbase, Base, Surface Shoulder and Stockpiling.
.4 OPSS 1010-November 2013, Material Specification for Aggregates, Subbase, Select Subgrade, and backfill material.
.5 OPSS 1103-November 2012, Material Specification for Emulsified Asphalt.
.6 OPSS 1150-November 2010, Material Specification for Hot Mixed, Hot Laid Asphalt Concrete.

1.3 SAMPLES

.1 Submit to Departmental Representative, the asphalt mix design at least 2 weeks before paving work.

1.4 MEASUREMENT AND PAYMENT PROCEDURES

.1 Included in balance of project.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Aggregates to: OPSS 1010.
- .1 Granular A.
- .2 Granular B Type II.
- .3 Select subgrade.

.2 Prime coat: SS-1 to OPSS 1103.

.3 Asphalt concrete:
- .1 HL-3 to OPSS 1150.
- .2 HL-8 to OPSS 1150.

.4 Asphaltic joint sealent between existing and new asphalt: to ASTM D6690.

.5 The performace grade of asphalt: PG 58-34

.6 Traffic paint: Alkyd yellow (505-308) and white(513-301) to CAN/CGSB-1.74 and OPSS 1712.

.7 Paint thinner: to CAN/CGSB-1.5.

PART 3 - EXECUTION

3.1 PAVEMENT THICKNESS

.1 As per cross section on contract drawings.

3.2 PAVEMENT CONSTRUCTION

.1 Construction of asphalt concrete: OPSS 310.

3.3 ASPHALT MARKINGS

.1 Paint stop lines, centre lines and other pavement markings in accordance with manufacturers recommendations and as indicated.

.2 Review layout with Departmental Representative prior to application.

.3 Use paint thinner in accordance with manufacturer's requirements.

.4 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.

.5 Air temperature to be above 10°C, wind speed less than 60 km/h and no rain in forecast within next 4 hours.

3.3 ASPHALT MARKINGS (Cont'd)

.6 Paint lines to be of uniform colour and density with sharp edges.

.7 Remove incorrect markings as directed by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Agriculture and Agri-Food Canada
.1 The Canadian System of Soil Classification, Third Edition, 1998.

.2 Canadian Council of Ministers of the Environment
.1 PN1340-2005, Guidelines for Compost Quality.

.3 U.S. Environmental Protection Agency (EPA) / Office of Water
.1 EPA 833-R-06-004, May 2007, Developing Your Stormwater Pollution Prevention Plan - A Guide for Construction Sites.

.4 Canadian Nursery Landscape Association (CNLA)
.1 Canadian Standards for Nursery Stock, 8th Edition, 2006.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Quality control submittals :
.1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.
.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.3 QUALITY ASSURANCE

.1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 32 16.07.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

.2 Divert unused soil amendments from landfill to official hazardous material collections site approved by Departmental Representative.

.3 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

PART 2 - PRODUCTS

2.1 TOPSOIL

.1 Topsoil for seeded areas: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
.1 Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 70% sand, minimum 7% clay, and contain 2 to 10% organic matter by weight.
.2 Contain no toxic elements or growth inhibiting materials.
.3 Finished surface free from:
.1 Debris and stones over 50 mm diameter.
.2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
.4 Consistence: friable when moist.

2.2 SOIL AMENDMENTS

.1 Fertilizer:
.1 Fertility: major soil nutrients present in following amounts:
.2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
.3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.
.4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.
.5 Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
.6 Ph value: 6.5 to 8.0.

.2 Sand: washed coarse silica sand, medium to course textured.

.3 Limestone:
.1 Ground agricultural limestone.
.2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.

.4 Fertilizer: industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

2.3 SOURCE QUALITY CONTROL

.1 Advise Departmental Representative of sources of topsoil and manufactured topsoil to be utilized with sufficient lead time for testing.

.2 Contractor is responsible for amendments to supply topsoil as specified.

.3 Soil testing by recognized testing facility for PH, P and K, and organic matter.

.4 Testing of topsoil will be carried out by testing laboratory designated by Departmental Representative.
.1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction sediment and erosion control drawings sediment and erosion control plan, specific to site, that complies with EPA 833-R-06-004 or requirements of authorities having jurisdiction, whichever is more stringent.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

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

3.2 STRIPPING OF TOPSOIL

.1 Begin topsoil stripping of areas as indicated after area has been cleared of brush weeds and grasses and removed from site.

.2 Strip topsoil to depths as indicated.
.1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.

.3 Stockpile in locations as directed by Departmental Representative.
.1 Stockpile height not to exceed 2 m.

3.2 STRIPPING OF TOPSOIL (Cont'd)

.4 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill.

.5 Protect stockpiles from contamination and compaction.

3.3 PREPARATION OF EXISTING GRADE

.1 Verify that grades are correct.
.1 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.

.2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.

.3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
.1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
.2 Remove debris which protrudes more than 75 mm above surface.
.3 Dispose of removed material off site.

.4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
.1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.4 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

.1 Place topsoil after Departmental Representative has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 150 mm.

.3 For sodded areas keep topsoil 15 mm below finished grade.

.4 Spread topsoil as indicated.

.5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.5 FINISH GRADING

.1 Grade to eliminate rough spots and low areas and ensure positive drainage.
.1 Prepare loose friable bed by means of cultivation and subsequent raking.

.2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.

3.5 FINISH GRADING (Cont'd)

.2 (Cont'd)
.1 Leave surfaces smooth, uniform and firm against deep footprinting.

3.6 ACCEPTANCE

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

3.7 SURPLUS MATERIAL

.1 Dispose of materials except topsoil not required.

3.8 CLEANING

.1 Proceed in accordance with Section 01 74 11.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 74 20 - Construction/Demolition Waste Management and Disposal.

.2 Section 32 91 19.13 - Topsoil Placement and Grading.

1.2 SCHEDULING

.1 Schedule sod laying to coincide with preparation of soil surface. Sod to be applied immediately after topsoil surface is ready and accepted.

.2 Schedule sod installation when frost is not present in ground.

1.3 MEASUREMENT PROCEDURES

.1 Included in balance of project.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 20

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.

.1 Turf Grass Nursery Sod types:

.1 Number One Kentucky Bluegrass Sod - Fescue Sod: Nursery Sod grown solely from seed mixture of cultivars of Kentucky Bluegrass and Chewing Fescue or Creeping Red Fescue, containing not less than 40% Kentucky Bluegrass cultivars and 30% Chewing Fescue or Creeping Red Fescue cultivars.

.2 Turf Grass Nursery Sod quality:

.1 Not more than 2 broadleaf weeds or 10 other weeds per 40 square metres.

.2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.

.3 Mowing height limit: 35 to 65 mm.

.4 Soil portion of sod: 6 to 15 mm in thickness.

2.1 MATERIALS (Cont'd)

.1 (Cont'd)
.2 (Cont'd)

.2 Water:
.1 Supplied by contractor via off-site source.

.3 Fertilizer:
.1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
.2 Complete, synthetic, slow release with 65 % of nitrogen content in water-insoluble form.

2.2 SOURCE QUALITY CONTROL

.1 Obtain approval from Departmental Representative of sod at source.

.2 When proposed source of sod is approved, use no other source without written authorization from Departmental Representative.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Verify that grades are correct and prepared in accordance with Section 32 91 19.13. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Department Representative.

.2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.

.3 Fine grade surface free of humps and hollows to smooth, even grade, to tolerance of plus or minus 8 mm, for Turf Grass Nursery Sod, surface to drain naturally.

.4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site.

3.2 SOD PLACEMENT

.1 Lay sod within 24 hours of being lifted if air temperature exceeds 20 degrees C.

.2 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.

3.2 SOD PLACEMENT (Cont'd)

.3 Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.3 SOD PLACEMENT ON SLOPES AND PEGGING

.1 Install and secure geotextile fabric in areas indicated, in accordance with manufacturer's instructions.

.2 Start laying sod at bottom of slopes.

.3 Peg sod on slopes steeper than 3 horizontal to 1 vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to following pattern:
.1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.
.2 Not less than 3-6 pegs per square metre.
.3 Not less than 6-9 pegs per square metre in drainage structures. Adjust pattern as directed by. Departmental Representative.

.4 Drive pegs to 20mm above soil surface of sod sections

3.4 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following operations from time of installation until acceptance.

.2 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.

.3 Cut grass to 50 mm when or prior to it reaching height of 75 mm. Remove clippings which will smother grassed areas as directed byDepartmental Depresentative.

.4 Maintain sodded areas weed free 95%.

.5 Fertilize areas. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

3.5 ACCEPTANCE

.1 Turf Grass Nursery Sod areas will be accepted by Departmental Representative provided that:
.1 Sodded areas are properly established.
.2 Sod is free of bare and dead spots.
.3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.

3.5 ACCEPTANCE (Cont'd)

.2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.6 MAINTENANCE DURING WARRANTY PERIOD

.1 Perform following operations from time of acceptance until end of warranty period:

.2 Repair and resod dead or bare spots to satisfaction ofDepartmental Representative.

.3 Eliminate weeds by mechanical or chemical means to extent acceptable to Departmental Representative.

3.7 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers. Refer to Section 01 74 20 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 31 23 10: Excavating, Trenching and backfilling.

.4 Section 33 34 02: Sanitary sewers and forcemains.

1.2 SOURCE QUALITY CONTROL

.1 Departmental Representative will inspect material at construction site.

1.3 MEASUREMENT PROCEDURES

.1 Maintenance holes and catch basins will be measured in units including frames, gratings and covers for the classes indicated on the Unit Price Table.

.2 Adjusting tops of existing maintenance holes or catch basins will be measured in units.

.3 Gratings will be measured in units supplied and installed.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Cement: to CAN/CSA-A3001-13.

.2 Water, aggregates, admixtures: to CSA A23.1-14/A23.2-14, Concrete materials and methods of concrete construction/Test methods and standard practices for concrete.

.3 Frames, gratings, covers: to plan dimensions and to following requirements for designated materials:
.1 Metal gratings and covers to bear evenly on frames. A frame with grating or cover to constitute one unit. Assemble and mark unit components before shipment.

.4 Precast maintenance holes: to ASTM C478M-15.

.5 Ladder rungs: to OPSD 405.010 Nov. 2013 Rev. 3.

.6 Mortar:
.1 Aggregate: to CSA A179-14.
.2 Cement: to CAN/CSA-A3002-13.

.7 Brick: to CAN/CSA-A82-14, Grade SW, Type FBS.

2.1 MATERIALS (Cont'd)

.8 Adjustment rings: precast concrete to ASTM C478M-15.

PART 3 - EXECUTION

3.1 EXCAVATION AND BACKFILL

.1 Excavation and backfill to Section 31 14 11.

.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.

.2 Position metal inserts to dimensions and details shown or required.

3.3 INSTALLATION

.1 Construct units to details indicated, plumb and true to alignment and grade.

.3 Pump maintenance hole excavation dry and remove soft and foreign material before placing concrete base.

.5 Set bottom section of precast unit in place. Make each successive joint watertight.

.6 Clean surplus mortar and joint compounds from interior surface of unit as work progresses.

.7 Plug lifting holes with precast concrete plugs set in cement mortar or compound.

.8 For sanitary sewers:
.1 Place stub outlets and bulkheads at elevations and in positions indicated.
.2 Bench to provide a smooth U-shaped channel. Side height of channel to be full diameter of sewer. Adjacent floor to be sloped at 75 mm/m. Channels to be curved smoothly. Slope invert to establish sewer grade.

.9 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.

3.3 INSTALLATION (Cont'd)

.9 (Cont'd)

.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.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 31 23 10 - Excavating, Trenching and Backfilling.

.2 Section 01 33 00 -Submittal Procedures.

.3 Section 33 32 15 - Temporary Bypass Pumping.

1.2 SYSTEM DESCRIPTION

.1 Principal items of equipment to include but are not limited to 2 identical submersible sewage pumping units, all internal piping and valves, liquid level controls, lifting chains, guide bars, cover, electrical wiring, control panel and enclosure.

.2 Wet well sewage lift station:
.1 Fully automatic, consisting of duplex submersible pumps mounted on rail system. Control of pump on-off functions to be by level transducer (primary) or float system (back-up).
.2 Pumps to alternate as lead pump on each cycle.
.3 Control panel be mounted to a new concrete pad in a control cabinet as shown on the contract drawings.

1.3 SYSTEM OPERATION

.1 System shall be fully automatic.

.2 Pumps shall operate based on liquid level in wetwell with level transducer as primary source.

.3 Pumps to operated in a duty-standby configuration and automatically alternate.

.4 Operator adjustable set points are to be adjustable through a graphical terminal loacted in the control cabinet.

1.4 SHOP DRAWINGS

.1 Submit shop drawings for civil, structural, hydraulic, mechanical and electrical elements.

.2 Indicate individual components by manufacturer's model number and accompany with technical and performance characteristics.

1.5 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for sewage pumping stations for incorporation into manual specified in Information For Tenderers.

.2 Include in this information:
.1 Record drawings, wiring diagrams, electrical schematics of equipment as installed.
.2 Interconnections with numbers and wire sizes.
.3 Certified pump characteristic curves.
.4 Detailed operation and maintenance instructions.
.5 Spare parts list comprising a complete schedule clearly identified to facilitate re-ordering.

1.6 SCHEDULING

.1 Schedule work to minimize interruptions to existing services.

.2 Maintain existing sewage flows during construction as per related sections.

PART 2 - PRODUCTS

2.1 NEW WET WELL AND COMMINUTOR STRUCTURES

.1 New FRP or Precast Concrete wet well. Shop drawings for chamber of either material shall be stamped by a Professional Engineer licensed in Ontario.
.1 Precast Concrete Structures:
.1 Constructed to OPSD 701.012
.2 Chamber cover to be desiged to withstand loading by equipment used in hoisting the equipment in and out of the station.
.3 Joints to be sealed with butyl mastic sealant and have 0.5m of water proofing membrane centered on the joint.
.4 Waterproofing membrane shall be a composite membrane of high density cross laminated polyethylene and rubberized asphalt with associated primer and mastic protection board as recommended by manufacturer.
.2 FRP Chambers:
.1 Cylinder shall be wound to the station bottom such that the assembly is of a monolithic design and is capable of withstanding the full hydrostatic head and soil pressure from the exterior of the station while the station is completely empty.

2.1 NEW WET WELL AND COMMINUTOR STRUCTURES (Cont'd)

.1 (Cont'd)

.2 (Cont'd)

.2 A safety factor of two (2) on the minimum ultimate tensile strenght of the laminate bottom shall be used in designing the basin and cylinder wall thicknesses for the station, taking into account all normally imposed loads arising from flotation, soil pressures, normal backfill, handling loads, operating loads and static loads imposed by equipment used in hoisting the pumps in and out of the station.

.3 The entire length of the cylinder shall be designed to provide adequate thickness for the mechanical loads of each application.

.4 All inside surfaces shall be smooth and free of cracks and crazing.

.5 The station shall be provided with one (1) anti-flotation flange located near the bottom of the station. This anti-flotation flange is an integral part of the station and is sufficient in design to withstand the forces acting upto the station due to the subsoil water pressure. Supply cast-in-place concrete ring if required.

2.2 PUMPS

.1 Two totally submersible non-clog centrifugal wastewater pumps with submersible electric motor connected with SOW or SUBCAB cable sized according to CSA standards and carry a CSA approval. The pump shall be supplied with cast iron discharge connection, steel lifting chain and guide bars extending from the top of the station to the discharge connection. The safe working load of the lifting chain shall incorporate a 4:1 safety factor.

.2 Approvals

.1 The pump/motor assembly shall have CSA approval as one unit, per CSA standard C22.2-108. Proof of this approval shall be submitted by the pump manufacturer with the shop drawing drawings. An approval of the motor unit only will not be acceptable.

.2 The pump/motor unit is also approved by CSA for service in Class 1, Division II, Groups A, B, C or D hazardous locations.

.3 The pump shall be tested for proper operation at rated power supply values and for electrical and mechanical integrity prior to shipment according to ISO 9906. Upon request of the departmental representative the pump supplier will supply the following test results:

2.2 PUMPS (Cont'd)

.2 (Cont'd)

.3 (Cont'd)

.1 Hydraulic test curve, proving that the pump meets the operating conditions in accordance with ISO 9906:1999 Annex A;

.2 Current and power consumed during the test;

.3 Megger Test - verification of the electrical resistance to ground;

.4 Wet Test - Submerged functional test and electrical verification of the rated current;

.5 Dry Test - Test for 15 secs. Minimum in a dry condition with verification that current or power consumption draw does not exceed the normal dry rating;

.6 Water Infiltration & Oil Check;

.7 Monitoring Device Check - includes, but is not limited to, motor temperature sensors and leakage detectors.

.3 Characteristics:

.1 Capacity: 5.0L/s.

.2 Total dynamic head: 31.98m.

.3 600v 3 phase

.4 Fully overload protected.

.5 Maximum motor speed: 1760 r/m.

.6 Motor: 2.2KW

.7 Discharge: 50mm diameter

2.3 PUMP CONSTRUCTION

.1 Pump Construction:

.1 Major pump components shall be of cast iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. All exposed nuts or bolts shall be of AISI type 316 stainless steel. An approved, sewage resistant coating shall protect all metal surfaces coming into contact with the pumped liquid, other than stainless steel or brass.

.2 Sealing design shall incorporate metal-to-metal contact between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.

2.3 PUMP CONSTRUCTION (Cont'd)

.1 (Cont'd)

.3 The pump volute shall be a single piece cast iron, ASTM A-48, Class 35B, non-concentric design with smooth passages of sufficient size to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as specified. The volute shall have a replaceable suction cover inert ring in which are cast spiral-shaped, sharp-edged groove(s). The spiral groove(s) shall provide trash release pathways and sharp edge(s) across which each impeller vane leading edge shall cross during rotation so to remain unobstructed. The insert ring shall be cast of (ASTM A-48, Class 35B cast iron or ASTM A-532 (Alloy III A) 25% chrome cast iron) and shall provide effective sealing between the multi-vane semi-open impeller and the volute.

.4 The impeller shall be of (ASTM A-48, Class 35B cast iron or ASTM A-532 (Alloy III A) 25% chrome cast iron), dynamically balanced, semi-open, multi-vane, back swept, screw-shaped, non-clog design. The impeller leading edges shall be mechanically self-cleaned automatically upon each rotation as they pass across a spiral groove located on the volute suction. The screw-shaped leading edges of the impeller shall be hardened to Rc 45 and shall be capable of handling solids, fibrous materials, heavy sludge and other matter normally found in wastewater. The screw shape of the impeller inlet shall provide an inducing effect for the handling of up to 5% sludge and rag-laden wastewater. The impeller to volute clearance shall be readily adjustable by the means of a single trim screw. The impellers shall be locked to the shaft, held by an impeller bolt and shall be coated with alkyd resin primer.

.5 The exterior of the pump, including all metal surfaces coming into contact with the pumped liquid shall be protected by a factory-applied spray coating of acrylic dispersion zinc phosphate primer and finished with a polyester, epoxidized resin paint. Prior to the final paint finish being applied, the pump components shall be primed and washed. The components shall then be assembled and washed a second time before the final topcoat is applied. The finish paint or top-coat shall be applied externally to a minimum dry film thickness of not less than 100 microns. The film thickness shall be consistent with ISO 2808, method no.6.

.6 The pump and motor shaft shall be a single piece unit. The pump shaft is an extension of the motor shaft. Shafts using mechanical couplings shall not be acceptable. The shaft shall be AISI type 431 stainless steel. Shaft sleeves will not be acceptable.

2.3 PUMP CONSTRUCTION (Cont'd)

.1 (Cont'd)

.7 Each pump shall be provided with a positively driven dual, tandem mechanical shaft seal system consisting of two seal sets, each having an independent spring. The lower primary seal, located between the pump and seal chamber, shall contain one stationary and one positively driven rotating corrosion resistant tungsten-carbide ring. The upper secondary seal located between the seal chamber and the seal inspection chamber, shall contain one stationary and one positively driven rotating corrosion resistant tungsten-carbide seal ring. The rotating seal ring shall have small back-swept grooves laser inscribed upon its face to act as a pump as it rotates, returning any fluid that should enter the dry motor chamber back into the lubricant chamber. All seal rings shall be individual solid sintered rings. Each seal interface shall be held in place by its own spring system. The seals shall not depend upon direction of rotation for sealing. Mounting of the lower seal on the impeller hub is not acceptable. Shaft seals without positively driven rotating members or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces are not acceptable. The seal springs shall be isolated from the pumped media to prevent materials from packing around them, limiting their performance. Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and shall provide capacity for lubricant expansion. The seal lubricant chamber shall have one drain and one inspection plug that are accessible from the exterior of the motor unit. The seal system shall not rely upon the pumped media for lubrication. A separate seal leakage chamber shall be provided so that any leakage that may occur past the upper, secondary mechanical seal will be captured prior to entry into the motor stator housing. Such seal leakage shall not contaminate the motor lower bearing. The leakage chamber shall be equipped with a float type switch that will signal if the chamber should reach 50% capacity.

.8 The area about the exterior of the lower mechanical seal in the cast iron housing shall have cast in an integral concentric spiral groove. This groove shall protect the seals by causing abrasive particulate entering the seal cavity to be forced out away from the seal due to centrifugal action.

.2 Motor:

2.3 PUMP CONSTRUCTION (Cont'd)

.2 (Cont'd)

.1 The pump motor shall be a NEMA-B design induction type with a squirrel cage rotor, shell type design and be housed in an air filled, watertight chamber. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be trickle impregnated with Class H resin and shall be heat-shrink fitted into the stator housing providing for superior heat transfer. The use of pins, bolts, screws or other fastening devices used to locate or hold the stator and that penetrate the stator housing are not acceptable. The motor shall be designed for continuous duty while handling pumped media of up to 40°C (104°F). The motor shall be capable of withstanding at least 15 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of aluminum. Three thermal switches shall be embedded in the stator end coils, one per phase winding, to monitor the stator temperature. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the motor control panel.

.2 The motor service factor (combined effect of voltage, frequency and specific gravity) shall be 1.15. The motor shall have a voltage tolerance of +/- 10%. The motor shall be designed for continuous operation in up to a 40°C (104°F) ambient and shall have a NEMA Class B maximum operating temperature rise of 80°C (176°F). A motor performance chart shall be provided upon request exhibiting curves for motor torque, current, power factor, input/output kW and efficiency. The chart shall also include data on motor starting and no-load characteristics.

.3 The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of a single, cylindrical elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the body containing a strain relief function, separate from the function of sealing the cable. The assembly shall provide ease of changing the cable when necessary using the same entry seal. The cable entry junction chamber and motor shall be separated by a stator lead sealing gland or terminal board, which shall isolate the interior from foreign material gaining access through the pump top. Epoxies, silicones, or other secondary sealing systems shall not be considered acceptable.

2.3 PUMP CONSTRUCTION (Cont'd)

.2 (Cont'd)

.4 Each unit shall be provided with an integral motor cooling system. A motor cooling jacket shall encircle the stator housing, providing for dissipation of motor heat regardless of the type of pump installation. An impeller, integral to the cooling system and driven by the pump shaft, shall provide the necessary circulation of the cooling liquid through the jacket. The coolant shall be a mixture of water and mono-propylene glycol. The cooling liquid shall pass about the stator housing in the closed loop system in turbulent flow providing for superior heat transfer. The cooling system shall have one fill port and one drain port integral to the cooling jacket. The cooling system shall provide for continuous pump operation in liquid or ambient temperatures of up to 40°C (104°F). Operational restrictions at temperatures below 40°C (104°F) are not acceptable. Fans, blowers or auxiliary cooling systems that are mounted external to the pump motor are not acceptable.

.5 Each pump motor stator shall incorporate three thermal switches, one per stator phase winding and be connected in series, to monitor the temperature of the motor. Should the thermal switches open, the motor shall stop and activate an alarm. A float switch shall be installed in the seal leakage chamber and will activate if leakage into the chamber reaches 50% chamber capacity, signalling the need to schedule an inspection. The thermal switches and float switch shall be connected to a control and status monitoring unit. The control unit shall be designed to be mounted in the pump control panel.

.6 The integral pump/motor shaft shall rotate on two bearings. The motor bearings shall be sealed and permanently grease lubricated with high temperature grease. The upper motor bearing shall be a double row angular contact bearing to handle radial loads. The lower bearing shall be a two row angular contact ball bearing to handle the thrust and radial forces. The minimum L10 bearing life shall be 50,000 hours at any usable portion of the pump curve.

2.4 LIFTING SYSTEM

.1 The pumps shall be automatically and firmly connected to the discharge connection, guided by no less than two guide bars extending from the top of the station to the discharge connection. There shall be no need for personnel to enter the wet-well. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal-to-metal, watertight contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable. No portion of the pump shall bear directly on the sump floor.

2.5 LEVEL TRANSMITTER

.1 Radar level transmitter shall be supplied to provide primary level measurement to control panel. Indicating transmitter to be mounted in control panel and shall be configured for panel mounting.

.1 Level transmitter characteristics:

.1 OPERATING CONDITIONS:

.1 Medium Sludge

.2 Ambient Temperature 0-50°C

.2 MEASURING DEVICE:

.1 Antenna:

.1 Type 100mm Horn

.2 Range 0-5.0 metres

.3 Wetted material 316L SS

.4 Area Classification Class I Div.1

.2 Transmitter:

.1 Mounting 38mm NPT Threaded connection with integral transmitter

.2 Enclosure NEMA 4 X

.3 Signal Output: Analog 4-20ma isolated

.4 Display LCD or LED

.5 Accuracy 0.03% of range

.6 Resolution 0.03% of range

.7 Power Supply 24 VDC- with intrinsically safe barrier

.8 Area Classification Class I Div.1

.9 Approval CSA

.3 ACCESSORIES:

.1 Mounting As required

.2 Support Material As required

.2 Mechanical floast switches in a plastic casing suitable for sewage applications.

.3 Provide control levels indicated on Contract Drawings.

2.5 LEVEL TRANSMITTER (Cont'd)

.4 When in automatic mode, pump start/stop to be controlled by PLC supplied by control panel manufacturer. Pump setpoints to be adjustable. Starting of pumps shall be based on the level measured in the wet-well.

.5 A relay shall be included to enable the pumps to draw down the liquid level to an absolute minimum to a point where air is beginning to be drawn into the impeller. The relay will monitor current drop and then shut the pump off to ensure no damage is caused to the pumps. The frequency of this occurrence is to be variable up to 40 times per day. A lockout relay ,in parallel, shall also be included to ensure that the low level alarms are bypassed during this event. Bypass of these event will be maintained until the liquid level rises above the low level alarm activation.

.6 Lead pump and lag pump controls to provide automatic pump alternating for each pump cycle when pump sequence selector switch is on alternate.

.7 Pump control panel to include UPS sized for 30 minute duty and rated for 50% of load. PLC and ethernet communication hardware to be fed by UPS.

2.6 PIPING, VALVES AND FITTINGS

.1 Process piping:

.1 Dimensions and construction of various classes of piping components, ie: fittings, flanges and valves shall be in accordance with the appropriate ANSI, API or MSS standards.

.1 All piping components including pipe, couplings, flanges, mechanical grooved couplings, nuts, bolts, supports, valves, valve actuators, etc., submerged in liquids and/or within 2 meters above the highest liquid level shall be stainless steel.

.2 Stainless Steel Piping:

.3 Piping and piping components shall be installed, fabricated, assembled and tested in accordance with drawings, specification, the ASME/ANSI code B31.1.

.2 Check valves: class 125, flanged, ball check type with metal core ball with nitrile rubber vulcanized coating. Valves shall have bolted covers and shall be epoxy coated with 316 stainless steel cover bolts.

2.6 PIPING, VALVES AND FITTINGS (Cont'd)

.3 Plug valves: eccentric plug valves to ANSI/AWWA C-517, cast iron construction, resilient faced plug, flanged to ANSI Class 125, Cast Iron ASTM A126 Class B body, 316 stainless steel plug and body bearing. Packing to be BUNA (Nitrile Butadiene) filled TFE u-ring seal neoprene plug facing. Lever actuator or square nut (as shown on drawings) with stainless bolting.

2.7 ACCESS LADDERS AND HATCHES

.1 Access ladder shall be of aluminum construction with a minimum standard as per OPSD 406.010.

.2 Egress from wet well, shall have a retractable ladder.

.3 Access hatch shall be of aluminum construction and have stainless steel hinges. Access hatch shall have a 90 degree hold open arm, a recess drop handle and a lockable tab. Access hatches to provide fall through protection grating (min 125mm x 125mm opening) with retained post and chain fall protection when grating is open.

.4 Shop drawing to be stamped by a professional engineer licensed in Ontario.

2.8 ELECTRICAL CONTROL PANEL AND WIRING

.1 Control Cabinet Enclosure:
.1 12 gauge stainless steel control cabinet to be 1200mm wide x 1800mm tall x 450mm deep with 300mm high mounting feet and be NEMA 4x.
.2 Cabinet to have 2 doors with dual latches. Provide lockable hasp for locking cabinet with keys.

.2 Electrical Control Panel:
.1 All components to be C.S.A. approved.
.2 Electrical equipment in wet-well to requirement for Hazardous Locations, Class 1, Group D, Division 2.
.3 Panel enclosure to be Nema 12 of fabricated steel suitably braced for mounting in stainless steel control cabinet.

2.8 ELECTRICAL CONTROL PANEL AND WIRING (Cont'd)

.2 (Cont'd)

.4 Panel to be complete with required components including but not limited to: Nema 12 enclosure c/w inner door. 1 x Main 30A-3P disconnect switch c/w fuses 2 x disconnect switches, one for each pump, lockable in the off position. 2 reversing starters with forward reverse selector switch, 1 x Pump #1 duty - Pump #2 duty - Selector switch 1 x Alternation "off" - "on" selector switch 2 x Hand-Off-Automatic selector switch 1 x reset button for MAS 711 2 x MAS 711 pump supervision OP panel and base unit 1 x 24 Vdc Power Supply 1 x GFCI duplex receptacle 2 x ammeters 1 x voltmeter 1 x 60W strip heater c/w thermostat.

.5 Panel to include controller complete with:

.1 1784-CF64 compact flash for back-up memory.

.2 1769-BA battery back-up.

.3 Ethernet connection to switch for communication with SCADA P/C.

.4 All I/O wired to terminal blocks.

.5 Common fused disconnect for relay output module.

.6 Individually fused disconnects for each Analog IO.

.7 5 port high speed switch (HSS) PLC power supply to be protected by CSA approved surge suppression and automatic voltage regulation. The switch shall be din rail mounted and powered by 24 VOC p/s switch to.

.8 PLC I/O

.1 Hand/Auto Status (DI)

.2 Low level float switch (DI)

.3 High level float switch (DI)

.4 Thermal O/T for each pump (DI)

.5 Leak sensor for each pump (DI)

.6 Thermal O/L for each pump (DI)

.7 Aux contact for each pump disconnect (DI)

.8 Run status for each pump (DI)

.9 Run command for each pump (DI)

.10 Wet-well level (AI)

.11 Duty overide selector switch inputs (DI)

.12 LSH float (DI)

.13 LSL float (DI)

.14 Spare unused I/O points. -10% for Analogue I/O. -20% for Discrette I/O.

.15 Provide customer contacts for: Run status contact for each pump. Fault contact for each pump. Hi level alarm contact.

.6 Panel to include pane, with ethernet communications, to:

2.8 ELECTRICAL CONTROL PANEL AND WIRING (Cont'd)

.2 (Cont'd)

.6 (Cont'd)

.1 Display tank level, level switch status, hand/auto switch position, leak and thermal overload status.

.2 Operator input and display of lead/lag pump selector and display of hour counter.

.3 Operator input of tank level setpoint.

.4 Display of all process alarms and faults.

.7 Dedicated terminal strip for Customer Terminations:

.1 run status for each pump

.2 wet-well high level alarm

.8 Thermal overload relay and H.I.M. (Human Interface Module) options.

.9 Mount following switches and instrumentation on door of panel:

.1 Pump mode selector switches for hand-off-automatic operation of each pump.

.2 Duty mode selector switch alternate or off.

.3 "Pump 1 duty - pump 2 duty" selector switch for selection of which pump to run as lead pump.

.4 Green run status light for each pump.

.5 1 high level alarm complete with alarm relay and red light. Light to be exterior mounted to control panel

.10 Ground connection lug.

.11 Labels: all components on and inside panel to indicate operating routine. Labels to be anodized aluminum with 5mm minimum letters.

.12 Schematic wiring diagram: mounted inside panel door, varnish protected c/w timer program instructions.

.13 Conductors: copper.

.14 Control wiring: minimum number 14 AWG, stranded type TEW.

.15 Power wire: minimum number 12 AWG< type RWU 90.

.16 Wire:

.1 Numbered with printed permanent indelible identifying plastic tapes to correspond to schematic diagram.

.2 Terminated for external control connections by tubular screw type terminal blocks with barrier and labels.

.3 Equipped with grommet and shields for mechanical protection.

.4 Adequately supported and installed to approval of departmental representative.

2.9 FACTORY TESTING

.1 Perform operational tests on pumps at factory to check for excessive vibration, for leaks in piping or seals and for correct operation of automatic control system and auxiliary equipment. Pump suction and discharge lines to be coupled to reservoir and pumps to recirculate water for minimum of 1 our under simulated service conditions.

.2 Provide certification that pumps and controls have been factory tested and all deficiencies rectified prior to delivery to site.

PART 3 - EXECUTION

3.1 EXCAVATION BACKFILLING AND COMPACTION

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

3.2 EQUIPMENT INSTALLATION

.1 Install equipment, piping and controls in accordance with manufacturers' recommendations.

3.3 PROCESS PIPING

.1 Piping and components shall be installed free of all foreign materials.

.1 Bolt threads except Teflon-coated bolts and studs, shall be coated prior to assembly with an approved lead free thread compound.

.2 Connect equipment in accordance with manufacturer's instructions unless otherwise indicated.

.3 Cap open ends of piping during installation.

.4 Revisions to location of piping require approval of Departmental Representative.

.5 Become informed of installation requirements and dimensions of equipment required to be connected to piping. Where piping is to be connected to equipment, preliminary dimensions have been shown which are not warranteed and should be confirmed by Contractor prior to bidding. Contractor shall install and fabricate piping to suit equipment as selected.

.6 All austenitic stainless steels, and nickel-based and other non-ferrous alloy piping shall be welded using the GTAW (TIG) weld process on the root pass with argon gas back purge.

3.3 PROCESS PIPING (Cont'd)

.1 (Cont'd)

.7 Piping shall be cleaned externally and internally to remove slag and other surface defects.

.8 After fabrication, immerse all pipe assemblies in pickling solution in manufacturer's plant. Scrub and wash until discolourization and possible iron picked up form manufacturing process is removed.

.9 Field welds - treated with pickling pasts,scrubbed and washed with stainless wire brushed until clean. Use stainless steel brushes.

.10 During fabrication and installation, avoid contact of stainless steel pipe with structural steel, chain, wire-ropes, steel tools, cement, other building materials, etc. as the contamination of the stainless steel may lead to marks due to rusting or imbedded material.

.11 All flange bolt holes shall straddle the vertical centerline or the established north-south centerline noted on the drawings, unless noted otherwise.

.12 The Contractor will internally clean and, if necessary, flush all piping to remove all large debris prior to turning over the systems to the Departmental Representative. Following the hydrostatic test and flushing.

3.4 FIELD QUALITY CONTROL

.1 After completion of installation, demonstrate functional operation of systems, including sequence of operation, to approval of Departmental Representative.

.2 Test in presence of Departmental Representative and representative from equipment supplier.

.3 Provide labour and ancillary equipment necessary to fulfill tests.

.4 Test to demonstrate that:

.1 Pumps and equipment run free from heating, or vibration.

.2 Operation meets requirements of these specifications.

.3 Pumps and pumping are free and clear of debris and obstructions.

.5 Replace equipment found defective. Repeat test until equipment is accepted by Departmental Representative.

3.4 FIELD QUALITY CONTROL (Cont'd)

.6 Contractor to demonstrate all function of the pump & functional.

3.5 DEMONSTRATION

.1 Operating Personnel Training

.1 Provide on site training by qualified personnel for designated operating personnel prior to final commissioning. Training to be in accordance with training plan approved by Deprtmental Representative

.2 Provide training for 3 designated personnel on all routine maintenance procedures, minor repairs, replacement of parts, including disassembly of major components.

.3 Provide safety precaution procedures for all systems.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE

.1 Under this item the Contractor is required to furnish all materials, labour, equipment, power, maintenance, etc. to implement a temporary pumping system for the purpose of diverting the existing flow around the work area for the duration of the project.

.2 The design, supply, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The Contractor shall employ the service of a vendor who can demonstrate to the Departmental Representative that he specialized in the supply and operation of temporary bypass pumping systems. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

1.2 CLOSEOUT SUBMITTALS

.1 Prior to performing any shut-downs or flow diversions, provide the institution and the Departmental Representative with a minimum of 3 weeks notice.

.2 The Contractor shall submit to the Engineer detailed plans and descriptions outlining all provisions and precautions to be taken by the Contractor regarding the handling of existing wastewater flows. This plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials and all other incidental items necessary and/or required to insure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows and compliance with the requirements in the Contract Documents. No construction shall begin until all provisions and requirements have been reviewed by the Engineer.

.3 The plan shall include but not be limited to details of the following:

.1 Sewer plugging method and types of plugs;

.2 Number, size, material, location and method of installation of submersible sewage pumps.

.3 Number, size, material, method of installation and location of installation of discharge piping;

.4 Bypass pump sizes, capacity, number of each size to be on site and power requirements;

1.2 CLOSEOUT SUBMITTALS (Cont'd)

.3 (Cont'd)
.5 Calculation of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted).
.6 Standby power generator size, location;
.7 Downstream discharge plan;
.8 Method of noise control for standby generator;
.9 Any temporary pipe supports and anchoring required;
.10 Design plans and computation for access to bypass pumping locations indicated on the drawings;
.11 Calculations for selection of bypass pumping pipe size;
.12 Schedule for installation of and maintenance of bypass pumping lines;
.13 Plan indicating selection location of bypass pumping line locations.

.4 Perform all work in such a manner as to ensure that the sewage flow is not interrupted. The contractor shall provide all work and or material required to achieve this including but not limited to temporary pumping, flow diversion structures and temporary power.

.5 Provide 24hr monitoring of all temporary equipment that is not connected and monitored by the institution or an alarm monitoring device as required by the institution or Departmental Representative.

PART 2 - PRODUCTS

2.1 EQUIPMENT

.1 All pumps used shall be fully submersible, electric powered, constructed to accommodate the cyclical nature of the sewage flows.

.2 The contractor shall provide the necessary stop/start controls for each pump. The control panel shall be equipped with the control logic to generate alarms for generator fault, pump 1 fault, pump 2 fault and high level alarm.

.3 The contractor shall include one stand-by pump to be installed in the manhole to service as backup to the duty pump. If the standby pump is not able to be installed in the manhole, the pump shall be maintained on site.

2.1 EQUIPMENT (Cont'd)

.4 Discharge Piping - in order to prevent the accidental spillage of flows, all discharge systems shall be temporarily constructed of rigid pipe with positive, restrained joints. Under no circumstances will aluminum "irrigation" type piping or glued PVC pipe be allowed. Discharge hose will only be allowed in short sections and by specific permission of the Departmental Representative. All discharge pipe shall be secured to ensure that no one can tamper or easily disconnect the piping.

2.2 SYSTEM DESCRIPTION

.1 DESIGN REQUIREMENTS:

.1 The bypass pumping system shall have sufficient capacity to pump a peak flow of 7.5 l/s. The Contractor shall provide all pipeline plugs, pumps of adequate size to handle peak flow, and temporary discharge piping to ensure that the total flow of the main can be safely diverted around the wet-well. Bypass pumping system will be required to be operated 24 hours per day.

.2 The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure.

.3 Bypass pumping system shall be capable of bypassing the flow around the work area.

.4 The Contractor shall make all arrangements for bypass pumping during the time when the forcemain is shut down for any reason.

.2 PERFORMANCE REQUIREMENTS:

.1 It is essential to the operation of the existing sewage system that there be no interruption in the flow of sewage throughout the duration of the project. To this end, the Contractor shall provide, maintain, and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), conduits, all necessary power, and all other labour and equipment necessary to intercept the sewage flow before it reaches the point where it would interfere with his work, carry it past his work and return it to the existing sewer downstream of his work.

.2 The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

2.2 SYSTEM DESCRIPTION (Cont'd)

.2 (Cont'd)

.3 The contractor shall provide all necessary means to safely convey the sewage past the work area. The Contractor will not be permitted to stop or impede the main flows under any circumstances.

.4 The Contractor shall maintain sewer flow around the work area in a manner that will not cause surcharging of sewers, damage to sewers and that will protect public and private property from damage and flooding.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL & MAINTENANCE

.1 Test: The contractor shall perform leakage and pressure tests of the bypass pumping discharge piping using clean water prior to actual operation. The Engineer will be given minimum 24 hours notice prior to testing.

.2 Inspection: Contractor shall inspect bypass pumping system every two hours to ensure that they system is working correctly.

.3 Maintenance Service: The contractor shall insure that the temporary pumping system is properly maintained and a responsible operator shall be on hand at all times when pumps are operating.

END OF SECTION

PART 1 - GENERAL

1.1 MATERIAL CERTIFICATION

.1 At least 2 weeks prior to commencing work submit manufacturer's test data and certification that pipe materials meet requirements of this section.

1.2 AS BUILT DRAWINGS, OPERATING AND MAINTENANCE DATA

.1 Provide as built drawings of sewers upon project completion. Give details of pipe material, location of cleanouts, directions and list of equipment to operate valves, other maintenance and operating instructions.

1.3 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.

PART 2 - PRODUCTS

2.1 PLASTIC PIPE

.1 Gravity sewer pipe and fittings: Type PSM Poly (Vinyl Chloride): to ASTM D3034-08.
- .1 Standard Dimension Ratio (SDR): 28.
- .2 Locked-in gasket and integral bell system.
- .3 Nominal lengths: 4 m.

2.2 SERVICE CONNECTIONS

.1 Cast iron pipe: to CAN/CSA-B70-06 with rubber gasket push-on joints to ANSI/AWWA C111/A21.11. Fittings: to CAN/CSA-B70-06.

.2 Cast iron service saddles: with oil resistant gaskets, stainless steel clamp and oil resistant "0" rings in branch end.

2.3 PIPE BEDDING MATERIALS

.1 Granular material to following requirements:
- .1 Crushed or screened stone, gravel or sand free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
- .2 Granular 'A': to OPSS 1010, April 2004, maximum size 19 mm.

2.3 PIPE BEDDING MATERIALS (Cont'd)

.2 Concrete required for thrust blocks to be 20 MPa.

2.4 INSULATION

.1 HI-40 DOW rigid insulation, or approved equivalent, 50mm thick insulation boards installed as per manufacturer's specifications.

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 Do not backfill trenches between joints until pipe grade and alignment have been checked and accepted by Departmental Representative. Do not backfill at joints until pressure and leakage test results are within limits specified unless otherwise approved by Departmental Representative. Protect pipe from freezing if tested at temperatures lower than 5°C.

.5 Remove excess excavated material from the site.

.6 If cover of 1.5m is not maintained, insulation must be used.

3.3 INSTALLATION

.1 Place 150 mm granular 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.

3.3 INSTALLATION (Cont'd)

.4 Compact full width of bed to at least 95% 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 Install PVC pipe and fittings in accordance with CAN/CSA-B1800 Series-06.

.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.

3.3 INSTALLATION (Cont'd)

.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 Place concrete thrust blocks between bends, tees and fittings and undisturbed ground for forcemain lines. Keep pipe couplings free of concrete.

.18 Upon completion of pipe laying and after Departmental Representative has inspected pipe joints, place minimum 150 mm granular bedding material around and over top of pipes and compact as for bedding material. Backfill remainder of trench with excavated material.

.19 Plug service laterals with water tight caps or plugs as approved by Departmental Representative.

.20 Place location marker at ends of plugged or capped unconnected sewer lines.

3.4 FIELD TESTING

.1 Test force main in presence of Departmental Representative.

.2 Brace caps, bends and tees to prevent movement during tests.

.3 Expel air from main by slowly filling with water. High points to be drilled and tapped and suitable cocks installed to vent air and to be shut when pressure is applied. Remove cocks after satisfactory testing and seal holes with tight fitting plugs.

.4 Apply hydrostatic test pressure of 690 kPa based on lowest point in line and corrected to elevation of test gauge for hydrostatic test and 345 kPa for leakage test.

.5 Apply pressures for 1 h for pressure test and 2 h for leakage test.

.6 Remove defective joints, pipe and fittings where found and replace with new sound material.

.7 Define leakage as amount of water from source tank in order to maintain test pressure for 2 h. Allowable leakage to be as defined in AMSI/AWWA C600-10.

3.4 FIELD TESTING (Cont'd)

.8 Repeat testing until test results fall within accepted allowances.

.9 Upon the approval of the Departmental Representative CCTV inspection shall be considered an approved alternative to the testing outlined above. Contractor to submit copies of video inspections and reports to Departmentanl Representative for review and approval.

END OF SECTION