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PARKS CANADA AGENCY

PETERBOROUGH LIFT LOCK 21

UPPER WEST BANK REHABILITATION

SPECIFICATIONS

Rev. 00 - Issued for Tender

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Prepared by KGS Group

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Above Sections prepared by
Doug Dubeau, E.I.T.
Geotechnical E.I.T.

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Above Sections reviewed by
Shan Gnanasunthar, P.Eng.
Geotechnical Engineer

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PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Title and Description of Work
- .2 Contract Method
- .3 Work planning
- .4 Parks Canada Agency occupancy and operation of navigation lock

1.2

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

1.3 RELATED REQUIREMENTS

- .1 Section 01 14 00 - Work Restrictions
- .2 Section 01 20 01 - Site Access
- .3 Section 01 35 43 - Archaeological, Cultural and Environmental Procedures
- .4 Section 01 41 00 - Regulatory Requirements
- .5 Section 01 71 00 - Examination and Preparation

1.4 WORK COVERED BY
CONTRACT DOCUMENTS

- .1 Work of this Contract is comprised of rehabilitation of the Upper West Embankments- Peterborough Lift Lock 21 (PLL21) of the Trent-Severn Waterway (TSW) located in the Town of Peterborough, ON (44° 18' 28.4" N and 78° 18' 02.1" W.
 - .2 The Construction Work includes but is not limited to the following:
 - .1 Obtaining regulatory permits, certificates of authorization and approvals;
 - .2 Temporary Site Access;
 - .3 Construction staging areas;
 - .4 Public and Navigation traffic safety;
 - .5 Drainage, sediment and erosion control and other environmental protection;
 - .6 Protection / Stabilization of the existing embankments, during construction;
 - .7 Preparation and implementation of a Health and Safety Plan, including an Emergency Response Plan (ERP);
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- .8 Removal and disposal offsite of wire and appurtenances from existing gabion baskets;
 - .9 Re-use of the gabion stone and existing riprap for the re-grading of the wet side of the embankment slope;
 - .10 Reconstruction/regrading of the wet side embankment to nominal 3H:1V slope, as per Contract drawings;
 - .11 Installation of new riprap on wet side embankments;
 - .12 Installation of new sheet piles along the wet side of the crest as indicated on the Contract drawings;
 - .13 Installation of stone drains (French Drains) and associated as indicated on the Contract Drawings;
 - .14 Restoration of the crest near lockmaster building (concrete slab, unshrinkable fill, etc.) as indicated in the contract drawings;
 - .15 Embankment erosion protection (TRM and Hydro seeding);
 - .16 Removal of temporary works;
 - .17 Site reinstatement and restoration.
 - .18 Preparation of Environmental Management Plan (EMP).
- .3 In addition, the work under this contract, the Contractor will also be responsible for:
- .1 The design, approvals and monitoring work associated with temporary construction works (stabilization of embankments and structures to remain, water and sediment control etc.)

1.5 LOCATION OF WORK

- .1 Peterborough Lift Lock (Lock 21) is located on the Trent Canal in the City of Peterborough, ON, at the corner of Ashburnham Drive and Hunter Street.

1.6 EXAMINATION OF SITE

- .1 Visit site before submitting tender. Examine site, adjacent premises, means of access and egress, and investigate and be fully informed of the nature and extent of the work required, difficulties in performing the work, site access, facilities available for delivery, placing, operating plant and for delivery of materials.
- .2 A site visit will be organized to allow Bidders to examine site, adjacent premises, and embankments before submitting a bid.
- .3 Be completely familiar with every detail and intent of these specifications and scope of work to be performed, and regulatory requirements governing

Work.

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| <u>1.7 CONTRACT METHOD</u> | .1 | Construct Work under combined unit price and lump sum price contract. |
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| <u>1.8 COST BREAKDOWN</u> | .1 | Within 5 days of notification of acceptance of bid, provide the Departmental Representative with a cost breakdown for both lump sum and unit price items as outlined in Section 01 22 01 - Measurement and Payment. |
| | .2 | Submit breakdown in metric (SI) units. |
| | .3 | Upon approval from the Departmental Representative cost breakdown will be used as basis for progress payment. |
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| <u>1.9 CONSTRUCTION SCHEDULE AND CASH FLOW</u> | .1 | Within 15 days of award of the Contract, provide the Departmental Representative with a copy of the Construction Schedule and estimated Cash Flow corresponding to the construction schedule. |
| | .2 | The construction schedule is to be prepared in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT). |
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| <u>1.10 CONTRACTORS'S TECHNICAL SUPPORT</u> | .1 | Within 5 days of acceptance of bid submit a list of design engineers and specialists that will support the Contractor to deliver the project. |
| | .2 | Contractor's Technical Support Team must include (but not limited to): |
| | .1 | Environmental Specialist |
| | .2 | Health and Safety Specialist |
| | .3 | Civil Engineer (Temporary works, slope grading, etc.) |
| | .4 | Geotechnical Engineer (Stability - excavation/excavation shoring etc.) |
| | .5 | Surveyor OLS (layout and monitoring) |
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| <u>1.11 WORK PLANNING</u> | .1 | Plan and schedule the Work such that the wet-side Work is undertaken only during the non-navigation period (Wednesday after Thanksgiving in October to Friday prior to Victoria Day in May). |
| | .2 | Road closures are to be minimized. Maintain access to the lock stations for PCA staff all times. Advise PCA when vehicular access is to be temporarily restricted. |
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- .3 Maintain/protect all structures, services and utilities that are to remain throughout the work. Undertake any relocations to the requirement of the local authorities.
- .4 Carry out work in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) and approved schedule.

1.12 WATER MANAGEMENT AND CONTROL

- .1 PCA will continue their responsibility of water management and control on the Trent Severn Waterway throughout the duration of the construction period. Department Representative will advise the Contractor on water management issues.

1.13 COORDINATION WITH PARKS CANADA AGENCY

- .1 Any usage of the lock by the Contractor during the navigation season, for moving material or equipment will require a 24 hour notification. The locks will not be available to the Contractor outside the navigation season.
- .2 Parks Canada Agency shall continue to have control and full access to the embankments.

1.14 CONTRACTOR USE OF PREMISES

- .1 Contractor has unrestricted use of embankments for the purpose of construction, as defined by the construction limit, until final acceptance of the Work.
- .2 Coordinate use of premises with Departmental Representative.
- .3 Confine work, including temporary structures, plant, equipment and materials to established Construction Limit, unless otherwise agreed to in writing by the Departmental Representative.
- .4 The Contractor will not have access or use of any lock master building, including the use of the public washrooms.
- .5 Obtain and pay for use of additional off-site storage or staging areas as needed to carry out the work under this Contract. Provide copy of formal agreement with the landowner to the Departmental Representative. Furthermore, at completion of the work, provide copy of landowner owner release letter stating the all land use agreement conditions that have been met.
- .6 Locate temporary buildings, access roads, drainage

facilities, services and utilities as approved by the Departmental Representative and maintain in clean and orderly manner.

1.15 PARKS CANADA AGENCY
OCCUPANCY AND NAVIGATION
LOCK OPERATION

- .1 Parks Canada Agency shall have access to the lock master building, navigation lock and adjacent land at all times during entire construction period for execution of normal maintenance and operations.
- .2 Cooperate with Departmental Representative in scheduling operations to minimize conflict.
- .3 The navigation lock shall remain open to recreational boaters throughout the navigation season.

1.16 COMMUNICATION PROTOCOL

- .1 Due to nature of the work of on-going water management and control issues, and continued operation of the navigation lock, a communication protocol will need to be established between the Departmental Representative and the Contractor prior to commencement of work
- .2 In general terms the Communication Protocol will address:
 - .1 Daily communication related to water management and control;
 - .2 Communication related to urgent safety concerns;
 - .3 Communication related to urgent environmental concerns;
 - .4 Communication related to scheduled and unscheduled Contractor or Parks Canada Agency operation activities;
 - .5 Communication related to construction and contract issues;
 - .6 Communication with the general public.

1.17 SITE DOCUMENTATION

- .1 Maintain on site, one copy of each document as follows:
 - .1 Work Permit,
 - .2 Contract Drawings (Full Size),
 - .3 Specifications,
 - .4 Addenda,
 - .5 Reviewed Shop Drawings,
 - .6 List of Outstanding Shop Drawings,
 - .7 Field Test Reports,
 - .8 Copy of Approved Work Schedule,
 - .9 Site Specific Health and Safety Plan,
 - .10 Environmental Management Plan (EMP),

- .11 Red Line drawings of As-Built Changes marked on Full Size Contract Drawings.
- .12 PCA - Basic Impact Assessment (BIA).

1.18 CANAL REGULATIONS AND PERMITS

- .1 "Historic Canals Regulations" apply to and govern work under this Contract.
- .2 Regulations may be obtained from Justice Canada's website at:
<http://lawsois.justice.gc.ca/eng/regulationssor-93-220/>
- .3 Contractor shall not mobilize or begin any work prior to Parks Canada issuing the permit under Historic Canals Regulation (SOR93-220 Sections, 11, 14 and 15) and unless the Departmental Representative advises the Contractor to mobilize at site.
 - .1 Permit will not be issued before following are submitted and accepted:
 - .1 Site Specific Environmental Management Plan (EMP).
 - .2 Dewatering/Water Management Plan.
 - .3 Site Specific Health and Safety Plan.
 - .4 Site Layout Plan.
 - .2 Changes to project scope of work not assessed under site specific EMP or BIA will require review and acceptance by the Departmental Representative and may require issuing revised permit.

1.19 ARCHAEOLOGICAL, CULTURAL AND ENVIRONMENTAL PROTECTION

- .1 The Trent-Severn Waterway, Peterborough Earth Dams and Lift Locks are National Heritage Sites.
- .2 The Owner, Parks Canada Agency, is the main Environmental Authority for Trent-Severn Waterway Projects.
- .3 The Contractor shall seek and obtain acceptance of Departmental Representative and PCA's Environmental Authority on submittals or changes in scope of work or methodologies that may affect archaeological resources, cultural resources or environment prior to providing direction to the Contractor.
- .4 Comply with mitigation measures outlined in the Basic Impact Assessment (BIA) and other federal, provincial, territorial or municipal act or regulation applying to the National Parks and Historic Sites of Canada.
- .5 Site may contain possible cultural and archaeological resources.
- .6 Employ minimal intervention approach for all work.

- .7 Damage to heritage elements will not be tolerated.
- .8 All works to be executed in accordance with the requirements of Section 01 35 43 - Archaeological, Cultural and Environmental Procedures.

1.20 REQUIREMENTS OF
REGULATORY AGENCIES

- .1 Adhere to National, Provincial and Municipal requirements relating to the safety, health and protection of workers and the environment.
- .2 Be entirely responsible for the design and adequacy of all scaffold, supports, set forms, bracing, blocking, ties, shoring, handrails, guardrails, fencing, conveyance systems, etc. used in the construction and comply with applicable Federal, Provincial and Municipal ordinances and regulations.
- .3 Adhere to noise bylaws of the authority having jurisdiction.
- .4 Dispose of all unwanted materials at a location off Canal lands approved by the Ontario Ministry of the Environment and/or Parks Canada Agency.

1.21 ENVIRONMENTAL
MANAGEMENT PLAN

- .1 The Contractor shall submit Environmental Management Plan (EMP) prior to commencement of work. The EMP must be written by a qualified consultant.
- .2 Update EMP specifications in accordance with PCA Environmental Standards and Guidelines (ESG) and the Basic Impact Analysis (BIA).
- .3 Permit under Historic Canal Regulation (HCR) shall not be issued until the EMP is accepted and approved by Owner/PCA. The Contractor is not permitted to commence work on site prior to issuance of HCR Permit.

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 This section provides a list of work items covered under the Contract Lump Sum Price and the procedures for payment that will be applied to these work items within the Contract Lump Sum Price.
- .2 This section covers the measurement of work for payment purposes, and the scope of work included in the pay items in the Unit Price Table.

1.2 LUMP SUM AND UNIT PRICE ITEMS

- .1 Lump Sum Price - All Work other than that which is specifically designated in the Unit Price Table, shall be included Contract Lump Sum Price. This item includes all costs to undertake the Work.
 - .2 Unit Price - Specifically designated work items that may be measured directly on site to identify quantities for payment.
 - .3 The items of work listed below are not intended to be complete, but are provided to give an indication to the Contractor how the Contract Lump Sum Price will be broken down for payment purposes. As such, it is the Contractor's responsibility to ensure that all items of work not covered under the Unit Price Table are covered in the Contract Lump Sum Price.
 - .4 Items of work to be considered in the Contract Lump Sum or Unit Price are, but not limited to:
 - .1 **Bonding and Insurance, including (Item 1 - Lump Sum):**
 - .1 Bonding as per contract;
 - .2 Insurance as per contract.
 - .3 Maintaining bonds and insurance in full force until Total Completion is achieved.
 - .2 **Mobilization/Demobilization and Site Preparation (on-site and/or off-site) - Construction Activities / Site Works, including (Item 2 - Lump Sum):**
 - .1 All equipment, supplies, materials;
 - .2 Site Offices;
 - .3 Submittals, approvals, permits and fees (other than specified below);
 - .4 Agreements/permits/authorization and releases with private landowners, municipalities and other authorities
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- having jurisdiction;
 - .5 Dust and noise management;
 - .6 Protection, maintenance, relocation and reconnection of existing services and utilities.
 - .7 Site Access - Construction and deconstruction of temporary works for access to embankments
 - .8 General site preparation, clearing and grubbing, soils stripping, rough grading, drainage of area etc. as required.
 - .9 General maintenance and cleaning of work site, site access, and haul routes;
 - .10 Site security;
 - .11 Snow removal;
 - .12 Temporary utilities;
 - .13 Dust and noise management;
 - .14 Land restoration (as per lease agreement)
 - .15 Lease agreement payment (as required).
- .3 **Environmental Protection (on-site and/or off-site) including (Item 3 - Lump Sum):**
- .1 Supply and installation of sediment and erosion control measures;
 - .2 Maintenance and cleanout of sediment and erosion control measures;
 - .3 Inspection of sediment and erosion control measures prior to forecast storm events and within 24 hours of a storm event;
 - .1 Inspection of effectiveness and functionality of erosion and sediment control measures should occur on daily basis.
 - .4 Inspection of sediment and erosion control measures prior to forecast significant melting event which could result in runoff and within 24 hours of a the event
 - .5 Repair or replacement of damaged sediment or erosion control measures within 48 hours of identifying damage;
 - .6 Removal of sediment and erosion control measures at completion of the work.
- .4 **Gabion Baskets Removal and Vegetation Stripping including (Item 4 - Lump Sum):**
- .1 Removal and disposal of wire and appurtenances from gabion baskets;
 - .2 Grading of wet side slope to a uniform condition suitable for placement of new riprap.
 - .3 Stripping existing vegetation and topsoil on embankment slopes and other
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areas.

- .5 **Replacement of Concrete Slab and Asphalt Pavement including (Item 5 - Lump Sum):**
 - .1 Removal and disposal of existing concrete slab, asphalt, soil, etc.;
 - .2 Installation of unshrinkable fill and new slab-on-grade as per the contract drawings.
- .6 **Earth Excavation (Item 6 - Unit Price):**
 - .1 Removal and disposal of soils as needed to accommodate the stone drain (French Drain) along the toe of the embankments as indicated in the contract drawings;
 - .2 Payment will be based on calculated quantity of the volume, excavated based on the contract drawings and verified by measurements by Department Representative.
- .7 **Sheet Piles (7 m and 9 m) (Item 7 - Unit Price):**
 - .1 Supply and installation of new steel sheet piles, nominal 7 m and 9 m long, along the wet side of the embankments as indicated in the contract drawings in compliance with OPSS 903;
 - .2 In general, installation by vibratory driver or gravity hammer is acceptable; however, vibratory driver may not be acceptable near lockmaster building, timber crib retaining wall areas and near structures. Jetting not permitted;
 - .3 Piles to be cut straight to required elevation as indicated in the drawings;
 - .4 Remove and dispose of cutoff sections;
 - .5 Payment will be based on 7 and 9 m length of embedded sheet pile installed over the linear length measured parallel to the embankment.
- .8 **Rip-Rap (Item 8 - Unit Price):**
 - .1 Supply and installation of new riprap on wet side slope;
 - .2 Installation to be on uniform surface on wet side.;
 - .3 Payment will be based on tonnage delivered, installed and verified by weigh scale tickets.
- .9 **Stone Drain (Item 9 - Unit Price):**
 - .1 Supply and installation of stone drain and associated items (perforated pipe, geotextile, cleanouts, manhole, etc.) along the dry side toe of the

- embankments as indicated in the contract drawings;
- .2 Payment will be based on calculated quantity of the volume based on the contract drawings, installed and verified by measurements by Department Representative.

.10 **Turf Reinforcements Mat (TRM) (Item 10 - Unit Price):**

- .1 Supply and installation of TRM along at the dryside slope and other areas as shown in the contract drawings;
- .2 Installation as per the manufacture's recommendations;
- .3 Payment will be based on square metres of coverage installed and verified by Department Representative.

.11 **Hydroseed (Item 11 - Unit Price):**

- .1 Supply and installation of MTO Standard Roadside Seed Mix inclusive of fertilizer and mulch;
- .2 Application rate to be in accordance with suppliers recommendations as supported by supplier product information;
- .3 Payment will be based on square metres of coverage installed and verified by Department Representative.

1.3 CONTRACT WORK ITEMS
MEASUREMENT AND PAYMENT
PROCEDURES

- .1 Items of Work will be paid, as set out below:
 - .1 **Bonding and Insurance** - 50% on commencement of contract, 25% pro-rated over duration of the contract and 25% upon Total Completion of the contract.
 - .2 **Mobilization/Demobilization and Site Preparation** - 40% initial mobilization and completion of site access, staging areas, offices, security and temporary utilities, 40% pro-rated over duration of contract and 20% on completion of demobilization and deconstruction activities and close-out submittals.
 - .3 **Environmental Protection** - 40% on installation of required measures, 40% maintenance activities pro-rated over duration of contract, 20% deconstruction activities and close-out submittals.
 - .4 **Gabion Basket Removal and Vegetation**

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- Stripping** - 60% on removal and disposal of gabion baskets and vegetation, 40% upon completion of new works.
- .5 **Replacement of Concrete Slab and Asphalt Pavement** - 60% on removal and disposal of existing concrete and asphalt, 40% on completion of installation of new concrete and asphalt.
- .6 **Earth Excavation** - Earth excavation shall be paid at the contract unit price by the unit cubic metres. This item shall include the removal of soil of the embankment, inclusive of organic debris and deleterious materials as required for new construction. It will be measured in cubic metres in place within the lines and limits shown on the drawings.
1. The supply and installation of non-woven geotextile shall be incidental to the supply and placement of riprap or granular material.
 2. Quantities will be taken from cross sections showing original earth surface and actual grade line set by Departmental Representative.
 3. No payment will be made for earth excavation beyond the limits shown on the contract drawings which has not been authorized by the Departmental Representative before the Work is undertaken; any over-excavation beyond these limits shall be replaced by approved material at the Contractor's expense.
- .7 **Sheet Piles** - Sheet piles (nominal 7m and 9 m long) shall be paid at the contract unit price by the linear metre as measured horizontally parallel to the crest of the embankment. This item shall include installation of the sheet piles plumb and with interlock to adjacent structure.
- .8 **Rip-Rap** - Rip-Rap shall be paid at the contract unit price by the tonnage placed as measured by truck scale weigh tickets collected by the Department Representative during the work.
- .9 **Stone Drain** - Stone drain and associated items shall be paid at the contract unit price by the unit cubic metres.
- .10 **TRM**: TRM shall be paid at the contract unit price by square metres covered on the dry
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side slopes and other areas disturbed by the activities of the contractor, within the limits of work. The limits of coverage shall be solely determined by the Department Representative.

- .11 **Hydroseed** - Hydroseed shall be paid at the contract unit price by square metres covered on the dry side slopes and other areas disturbed by the activities of the contractor, within the limits of work. The limits of coverage shall be solely determined by the Department Representative. No payment shall be made for overspray.

1.4 PREPARING SCHEDULE OF
UNIT PRICE TABLE ITEMS

- .1 Submit separate schedule of unit price items of Work requested in Bid form.
- .2 Make form of submittal parallel to Schedule of Values, with each line item identified same as line item in Schedule of Values. Include in unit prices only:
- .1 Cost of material.
 - .2 Delivery and unloading at site.
 - .3 Sales taxes.
 - .4 Installation, overhead and profit.
- .3 Ensure unit prices multiplied by quantities given equal material cost of that item in Schedule of Values.

1.5 PROGRESS PAYMENT

- .1 Consultant will issue to Owner, no later than 10 days after receipt of an application for payment, certificate for payment in amount applied for or in such other amount as Consultant determines to be due. If Consultant amends application, Consultant will give notification in writing giving reasons for amendment.

1.6 SUBSTANTIAL PERFORMANCE
OF WORK

- .1 Prepare and submit to Consultant comprehensive list of items to be completed or corrected and apply for a review by Consultant to establish Substantial Performance of Work. Failure to include items on list does not alter responsibility to complete Contract.
- .2 No later than 10 days after receipt of list and application, Consultant will review Work to verify validity of application, and no later than 7 days after completing review, will notify Contractor if Work or designated portion of Work is substantially

performed.

.3 Consultant: state date of Substantial Performance of Work or designated portion of Work in certificate.

.4 Immediately following issuance of certificate of Substantial Performance of Work, in consultation with Consultant, establish reasonable date for finishing Work.

1.7 PAYMENT OF HOLDBACK
UPON SUBSTANTIAL
PERFORMANCE OF WORK

.1 After issuance of certificate of Substantial Performance of Work:

- .1 Submit application for payment of holdback amount.
- .2 Submit statutory declaration that accounts for labour, subcontracts, products, construction machinery and equipment, and other indebtedness which may have been incurred in Substantial Performance of Work and for which Owner might in be held responsible have been paid in full, except for amounts properly retained as holdback or as identified amount in dispute.

.2 After receipt of application for payment and statutory declaration, Consultant will issue certificate for payment of holdback amount less the amount of deficiencies. A deficiency list needs to be established at the time of substantial completion.

1.8 FINAL PAYMENT

.1 Submit application for final payment when Work is completed. A statutory declaration is also required for Final Completion.

.2 Consultant will, no later than 10 days after receipt of application for final payment, review Work to verify validity of application. Consultant will give notification that application is valid or give reasons why it is not valid, no later than 7 days after reviewing Work.

.3 Consultant will issue final certificate for payment when application for final payment is found valid.

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 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting 4 days in advance of meeting date to Departmental Representative.
- .4 The Contractor is to provide physical space and make arrangements for meetings.
- .5 The Departmental Representative will preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within 3 days after meetings and transmit to meeting participants.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
 - .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
 - .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
 - .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
 - .6 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.07- Construction Progress Schedules - Bar (GANTT) Chart.
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- .3 Schedule of submission of shop drawings, samples, quality control requirements. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Schedule of submission of the Site Specific Health and Safety Plan in accordance with Section 01 35 29.06 - Health and Safety Requirements. Environmental Management Plan (EMP) in accordance with Section 01 35 43 - Archaeological, Cultural and Environmental Procedures.
- .5 Schedule of submission of sediment and erosion control measures plan.
- .6 Location and usage plan of Laydown Areas in accordance with Section 01 20 01 - Site Access.
- .7 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .8 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .11 Monthly progress claims, administrative procedures, photographs, hold backs.
- .12 Appointment of inspection and testing agencies or firms.
- .13 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

- .1 During course of Work and two weeks prior to project completion, schedule progress meetings on bi-weekly basis.
- .2 Contractor, major Subcontractors involved in Work, Departmental Representative and Parks Canada Agency are to be in attendance.
- .3 Notify parties minimum 4 days in advance.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Problems which impede construction schedule.
 - .4 Health and safety issues and concerns.
 - .5 Environmental Protection Issues and concerns.

- .6 Field observations including monitoring reports, problems and conflicts.
- .7 Review of off-site fabrication delivery schedules.
- .8 Corrective measures and procedures to regain projected schedule.
- .9 Revision to construction schedule.
- .10 Progress schedule, during succeeding work period.
- .11 Review submittal schedules: expedite as required.
- .12 Maintenance of quality standards.
- .13 Review proposed changes for effect on construction schedule and on completion date.
- .14 Other business.

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 RELATED SECTIONS

- .1 Section 01 77 00 - Closeout Procedures

1.2 PROGRESS PHOTOGRAPHS

- .1 Sizes: Prints 200 mm x 300 mm
- .2 Type: semi-matt with binding margin at one edge.
- .3 Paper: double weight, unmounted.
- .4 Number of prints required: 4 sets.
- .5 Identification: typewritten name and number of project and date of exposure on 25 x 50 mm white patch in upper right hand corner reverse side.

1.3 ELECTRONIC COPY

- .1 Submit electronic and hard copy of colour digital photography in jpg or tiff format, fine resolution.
- .2 Identification: name and number of project, date of exposure and viewpoint/descriptor indicated.
- .3 Number of photographs: Minimum of four (4) photographs of active areas and at key elements of the work progress as determined by Departmental Representative. Provide viewpoint location plan where requested by the Departmental Representative.
- .4 Frequency: take weekly photographs and submit monthly with progress statement as directed by Departmental Representative. During periods of inactivity at work site, take photographs bi-weekly at the same viewpoints. At project closeout, provide electronic file of all compiled referenced photographs.
- .5 Camera to have a rating of 12 Megapixels and set at high resolution.

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 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
-

-
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
 - .3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.
 - .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Substantial Completion and Final Completion as defined times of completion are of essence of this contract.
 - .5 Make allowance for obtaining of regulatory permits, other agency approvals, obtaining of additional lands for staging areas, receiving permission to temporarily relocate utilities, and establishing a waste management and disposal plan.
 - .6 Project milestones form interim targets for Project Schedule.
 - .1 Due to the fish spawning season in water work is not allowed between March 15th and July 15th. As such, the Contractor cannot do any in-water work such as wetside gabion basket removal or riprap placement within this period. This restriction also applies to any work involving movement of equipment in the water during this period.
 - .7 Due to the migratory bird nesting season, no tree cutting will be allowed between April 1st and August 31st.
 - .8 Start of drawdown to winter water levels normally occurs the week following the navigation closure. The Trent-Severn Waterway does not have an exact date when the water levels are raised back to the navigation levels, as the spring run-off depends on the snowfall and spring weather for that particular year. As a practice the navigation water levels are typical restored by the end of April.
 - .9 Trent-Severn Waterway navigation season and hours of operation:
 - .1 Navigation season and hours of operation are described in Section 01 41 00 Regulatory Requirements.
 - .10 Contractor must take these constraints into considerations while developing the detailed project schedule and must show them and as activities in the GANTT chart.
 - .11 Construction in areas of potential turtle
-

habitat(s) during the turtle nesting season from May 15th to August 15th of any year should be avoided to best extent possible in order to protect potential local turtle residents.

1.3 MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return revised schedules within 5 working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.4 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Design submission of the temporary works.
 - .4 EMP acceptance by PCA - required for HCR permitting.
 - .5 Required Permits.
 - .6 Mobilization and staging area preparation.
 - .7 Environmental controls.
 - .8 Traffic control.
 - .9 Construction of erosion protection measures.
 - .10 Site access.
 - .11 Salvage of identified items/materials.
 - .12 Excavation and demolitions work.
 - .13 Backfill and erosion control work.
 - .14 Removals of temporary works.
 - .15 Site restoration.
 - .16 Restoration of external staging areas as required.
 - .17 Inspection for completion of all work and issuing of Substantial Certificate of Completion.
 - .18 Other activities as specified by the Departmental Representative.
- .3 Update Project Schedule on bi-weekly basis reflecting activity changes and completions, as well as activities in progress.
- .4 Include as part of Project Schedule, narrative report identifying Work status to date, comparing

current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.5 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

1.6 PROGRESS PAYMENT REQUEST RELEASE

- .1 Project schedule reporting as described above is condition for Progress Payment release by the Departmental Representative.

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 This section specifies general requirements and procedures for contractors' submissions of shop drawings, product data and samples to Departmental Representative for review.
- .2 Additional specific requirements for submissions are specified in individual sections of Divisions 01 to 35.

1.2 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review in other Sections of this Specification. 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 Works 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.

1.3 MEASUREMENT FOR PAYMENT .1

The work covered by this section will not be considered separately for payment but will be considered as incidental to Work of the specification.

1.4 SHOP DRAWINGS AND
PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario.
- .3 Indicate materials, methods of construction and other information necessary for completion of Work. Indicate cross references to design drawings and specifications.
- .4 Allow 5 working days for Departmental Representative's review of each submission.
- .5 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.
- .6 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.
- .7 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.
- .8 Submissions include:
- .1 Date and revision dates.
 - .2 Project title and number.

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- .3 Name and address of:
 - .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.
 - .9 After Departmental Representative's review, distribute copies.
 - .10 Submit electronic copies of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
 - .11 Submit electronic copies 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.
 - .12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
 - .13 Submit electronic copies 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.
 - .14 Submit electronic copies of manufacturer's 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 (MSDS) concerning impedances, hazards and safety precautions as required in Section 01 35 29.06 Health and Safety Requirements.

- .15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 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.
- .20 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.5 SAMPLES

- .1 Not required.

1.6 CERTIFICATES AND
TRANSCRIPTS

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

Report.

- .2 Submit transcription of insurance immediately after
award of 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 REFERENCE STANDARDS

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS)
- .3 National Building Code 2010 (NBC):
 - .1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites
- .4 Province of Ontario:
 - .1 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990, c.0.1, as amended and O. Reg. 213/91 as amended- Updated 2005.
 - .1 Regulations for Construction Projects, O. Reg. 213/91 as amended.
 - .2 Workplace Safety and Insurance Act, 1997
 - .3 Municipal statutes and authorities
- .5 National Fire Code (NFC) 2015.
 - .1 NFC 2015, Division B, Part 2, Emergency Planning, subsection 2.8.2 Fire Safety Plan.
- .6 Fire Commissioner of Canada (FCC):
 - .1 FC-301 Standard for Construction Operations, June 1982.
 - .2 FC-302 Standard for Welding and Cutting, June 1982.

Human Resources and Social Development Canada
Labour Program
Fire Protection Engineering Services
4900 Yonge Street 8th Floor
North York, Ontario M2N 6A8

and copies may be obtained from:

Human Resources and Social Development Canada
Labour Program
Fire Protection Engineering Services
Ottawa, Ontario K1A 0J2

1.2 ACTION AND
INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
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- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed (Contract Award) and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Site-specific safety hazard assessment and measures to be taken to address the anticipated hazards.
 - .2 Contractor's and Sub-contractors' Safety Communication Plan. Must include contact information for all key contacts. Departmental Representative will provide contact information for other key government agencies.
 - .3 Contingency and Emergency Response Plan (ERP) addressing standard operating procedures specific to the project site to be implemented during emergency situations.
 - .4 Contractor's Health and Safety Policy
 - .5 Name of Health and Safety Coordinator
 - .3 Departmental Representative will review Contractor's site-specific Health and Safety Plan(s) 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.
 - .4 Departmental Representative's review of Contractor's final Health and Safety plan(s) should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
 - .5 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative monthly.
 - .6 Submit Construction Safety Checklists after completion.
 - .7 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
 - .8 Submit copies of incident and accident reports.
 - .9 Submit WHMIS MSDS - Material Safety Data Sheets to Departmental Representative, if requested.
 - .10 Submit Workplace Safety and Insurance Board (WSIB) - Experience Rating Report.
-

1.3 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.
- .2 Submit copies of Notice(s) of Project to the Departmental Representative.
- .3 File all other required notices in accordance with Acts and Regulations of Province of Ontario.

1.4 SAFETY ASSESSMENT

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

1.5 REGULATORY REQUIREMENTS

- .1 Do Work in accordance with Section 01 41 00-Regulatory Requirements.
- .2 Comply with the Acts and regulations of the Province of Ontario.
- .3 Comply with specified standards and regulations to ensure safe operations at site.

1.6 PROJECT/SITE CONDITIONS

- .1 Hazards on-site include but are not limited to:
 - .1 Working near or under electrical wires.
 - .2 Working around moving equipment.
 - .3 Exposure to boat traffic during navigation season (navigation closed from the Monday following the Thanksgiving long weekend in October to the Friday of the Victoria long weekend in May).
 - .4 Working near or on the roadway.
 - .5 Working near water.
 - .6 Snow covered and icy surfaces.
 - .7 Slippery slopes both wet side and dry side of embankments.
 - .8 Working near utilities.
 - .9 Falling hazards.
 - .10 Noxious plants (Poison Ivy, Wild Parsnip, Hogweed, etc)
 - .11 Animals and insects.
 - .12 Low temperatures.

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 Site-specific Health and Safety Plan needs to cover all workers, including subcontractors.
- .3 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.
- .4 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 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 Contractor will be responsible and assume the role Constructor as described in the Ontario Occupational Health and Safety Act and Regulations for Construction Projects.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.9 COMPLIANCE REQUIREMENTS

- .1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990, c. 0.1 and Ontario Regulations for Construction Projects, O. Reg. 213/91.
- .2 Comply with Occupational Health and Safety Regulations, 1996.
- .3 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .4 If diving is required, comply with Ontario Occupational Health and Safety Act, Regulation 629/94.

1.10 UNFORSEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province of Ontario and advise

Departmental Representative verbally and in writing.

- .2 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, immediately stop Work, advise Health and Safety co-ordinator and follow procedures in accordance with Acts and Regulations of Province of Ontario and advise Departmental Representative verbally and in writing.

1.11 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have site-related working experience specific to activities associated with similar embankment reconstruction projects.
 - .2 Have working knowledge of occupational safety and health regulations.
 - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .5 Be on site during execution of Work and report directly to site supervisor.

1.12 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.
- .2 Provide documents as follows and post on site:
 - .1 Contractor's Health and Safety Policy.
 - .2 Contractor's (Constructor's) Name
 - .3 Notice of Project.
 - .4 Name, trade, and employer of Health and Safety Coordinator
 - .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 Emergency Response Plan
 - .10 Site Specific Health and Safety Plan,

including Emergency Response Plan.

- .11 Copy of valid certificate for first-aid personnel on duty.
- .12 WSIB "In Case of Injury At Work" poster.
- .13 Location of toilet and cleanup facilities.
- .14 Any special handling and procedures specific to the site.

- .3 Comply with Provincial general posting requirements.

1.13 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.

1.14 BLASTING

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

1.15 POWDER ACTUATED DEVICES

- .1 Use powder actuated devices only after submittal of full justification for the requirement of their use and receipt of written permission from Departmental Representative.

1.16 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.
- .2 Assign responsibility and obligation to Health and Safety Coordinator to stop or start Work when, at Health and Safety Coordinator's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative or their designates may also stop Work for health and safety considerations.
- .1

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 REFERENCE STANDARDS

- .1 This Section describes requirements for the protection of the environment that apply to the Work. These requirements apply to all Sections of this Specification, without limiting the conditions and approvals imposed by statute.
- .2 Control Work to provide effective environmental, waterbody and fish habitat protection. It is the main responsibility of the Contractor to monitor and maintain erosion and sediment controls on a daily basis for the duration of the Work. The Departmental Representative will monitor environmental protection measures and will identify whenever such protection is found to be ineffective. Change protective measures or work procedures as directed by Departmental Representative.

1.2 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
 - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants
 - .3 "Deleterious Materials" - any substance that, if added to a water body, could degrade water quality or impact fish, fish habitat and aquatic wildlife. This includes, but is not limited to:
 - .1 Soils (clay, silt, sand).
 - .2 Oil, diesel or gasoline.
 - .3 Chipped or fresh concrete and admixtures.
 - .4 Alkali water resulting from fresh concrete or cementitious grout.
 - .5 Salt.
 - .6 Solvents.
 - .7 Concrete dust.
-

- .4 "Drip line" - means the location on the ground surface directly beneath a theoretical line described by the tips of the outermost branches of the trees.

1.3 CANAL REGULATIONS AND PERMITS

- .1 "Historic Canals Regulations" apply to and govern under this Contract.
- .2 Regulations may be obtained from Justice Canada's website at:

<http://laws-lois.justice.gc.ca/eng/regulations/sor-93-220/>
- .3 Contractor may not mobilize or begin any work until Parks Canada issues permit under Historic Canals Regulation (SOR93-220 Sections, 11, 14 and 15).
 - .1 Permit will not be issued before following submittals are submitted and accepted:
 - .1 Environmental Management Plan (EMP).
 - .2 Dewatering Plan.
 - .3 Health and Safety Plan.
 - .4 Site Layout Plan.
 - .5 Changes to project scope of work not assessed under site specific BIA will require review and acceptance by Departmental Representative and may require issuing revised permit.

1.4 HERITAGE PROTECTION

- .1 Trent-Severn Waterway and Crowe Bay Dam 12, Lock 14 and Headrace Bridge are Resources of Other National Heritage Value.
- .2 Preserve heritage elements of site by executing Work without damage to site features or character defining elements.
- .3 Notify Departmental Representative and PCA Environmental Authority immediately if heritage items are damaged.
- .4 Employ minimal intervention approach for all Work.
- .5 Access roads, staging areas, and work pads require review and approval.
- .6 Damage to heritage elements will not be tolerated.
- .7 Ensure appropriate supervision work, adequate training for workers, and other necessary precautions to protect existing structures.
- .8 Notify Departmental Representative immediately where reasonable concern exists that damage may

result from work.

.9 Contractor may propose alternative work methodologies to be accepted by Departmental Representative and PCA Environmental Authority.

.10 Protect possible archaeological and cultural resources by excavating only to limits indicated.
.1 Excavation beyond indicated limits requires acceptance by PCA Environmental Authority.

1.5 RELICS AND ANTIQUITIES

.1 Corner stones and their contents, buried artifacts, remains and evidence of ancient persons and peoples, commemorative plaques, and other objects of historic value and worth, remain property of the Crown. Protect and notify Departmental Representative immediately of discovery of such objects.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

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

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

.3 Contractor is required to submit an Environmental Management Plan (EMP) to the Department Representative and Parks Canada which outlines all the measures to be implemented by the contractor on the project site to eliminate or reduce environmental effects and address mitigation measures outlined in the BIA.

.4 The EMP and its component plans, must be prepared in accordance with Parks Canada Agency's Environmental Standards and Guidelines Document (ESG) - Ontario Waterways, July 2017, and BIA and BMPs.

.5 In order to allow for the timely commencement of project activities, the EMP can be submitted as separate components as project details become available.

.6 The EMP, or its components, will be submitted in writing prior to implementation of project activities and must be accepted by Parks Canada and the Departmental Representative.

.7 The complexity and detailedness of the EMP should be proportionate to the scope of work and level of complexity and risk involved.

.8 Address topics at level of detail commensurate with

environmental issue and required construction tasks.

.9 Include in Environmental Management Plan (EMP):

- .1 Names of persons responsible for ensuring adherence to Environmental Management Plan.
- .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
- .3 Names and qualifications of person[s] responsible for training site personnel.
- .4 Descriptions of environmental protection personnel training program.
- .5 Erosion and sediment control plan identifying type and location of erosion. 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.
 - .1 Identify the key point and non-point sources of contaminants.
 - .2 Identify surface water drainage patterns.
 - .3 Sensitive erosion and sedimentation during each phase of the work.
 - .4 Describe mitigation requirements, maintenance and monitoring program.
 - .5 The plan must cover all activities within the limits of the construction, laydown and traffic diversion areas.
- .6 Provisions for protection stockpile material, such as vegetating of material, for stockpile material that are to be inactive for a period exceeding 30 days are to form part of the erosion.
- .7 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, material storage areas, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .8 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.
- .9 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.

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- .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
 - .10 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .1 Describe the on-site roles and responsibilities for spills and emergency response.
 - .2 Include contents and location of spill kits.
 - .3 Up-to-date emergency response contact list including contact information for reporting spills.
 - .11 Spill Prevention Plan: including location/procedures for storage and refuelling of all fuel and fuel operated equipment located near waterway. Fuel containers are to have secondary containment, overfill and spill protection. Fueling area is to be contained to address potential spillage. All heavy equipment used near waterway is to be in good condition. Any equipment that is leaking any fluid is to be removed from the site
 - .12 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including wire from gabion baskets. Where waste materials are not to be incorporated into the works and are to be disposed off-site at an approved landfill as part of the Solid Waste Management Plan, provide to the Departmental Representative a letter from the receiving station agreeing to accept the waste material and Waste Site Certificate of Approval. Carry out disposal to the requirements on Ontario Regulation 347.
 - .13 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash do not become air borne and travel off project site.
 - .14 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.
 - .15 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and
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- wetlands.
- .16 Noise Control Plan: including notifying local residents in advance of potential disruption from noise activities. Establish a communications protocol / plan acceptable to the Departmental Representative.
 - .17 Flood Contingency Plan: identifying measures to be undertaken in the event of significant flows in the waterway. Measures to include storage of equipment and material out of the waterway that have not been secured or form part of the construction works.
 - .18 Waste Water Management Plan identifying methods and procedures for management and discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
 - .1 Do not pump water directly into the waterway. Send all discharge to a settling pond or filtration area before being released into the waterway. Refer to ESG for waste water management. Water quality downstream of construction activities and/or released to watercourses not to exceed background turbidity readings of 8 nephelometric turbidity units (NTU), or a change of 25 mg/L for suspended solids. Refer to CCME guidelines for the protection of aquatic life.
 - .2 Prior to dewatering, submit a Dewatering Plan for approval by the Departmental Representative.
 - .19 The area to be controlled. In addition to the construction site, it is necessary to identify adjacent areas that could be negatively impacted by construction activities.
 - .20 Drainage areas and patterns based on pre-construction topography and construction design.
 - .21 Design specification to address the specific soil and sediment types that are expected to be present.
 - .22 How sediment-laden run-off will be directed to detention or retention facilities on site. Large drainage areas can produce a significant amount of run-off, resulting in a need for large detention or retention structures.
 - .23 How clean storm run-on will be diverted around the site and away from exposed areas.
 - .24 Channels that are designed and constructed to
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the necessary design discharge.

.25 Temporary and permanent erosion control needs for all drainage channels.

.26 Consideration of project schedule in selecting, designing and laying out environmental controls.

1.7 GENERAL CONSTRUCTION

.1 All mitigation measures shall be implemented to the satisfaction of PCA and PSPC.

.2 Ensure that all on-site personnel are aware of, and comply with, these mitigation measures.

.3 A copy of the EMP shall be kept on site for the duration of the project and all works, as applicable, shall be completed in compliance with the EMP.

.4 The Contractor shall adhere to all federal, provincial, and municipal legislation, by-laws, regulations, guidelines, safety standards, and codes governing construction activities. In cases of overlap, the most stringent will apply.

.5 The Contractor shall obtain all permits, licenses, and approvals required to construct/rehabilitate the canal walls and complete all other work as shown on the Contract Drawings.

.6 Only those cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, shall be used adjacent to water courses or ground water with PCA acceptance.

.7 Any new, or potentially questionable, cleaning products shall be approved by PCA.

1.8 FIRES

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

1.9 TURBIDITY CONTROL AND DRAINAGE

.1 Control turbidity of all water released.

.2 Develop and submit erosion and Sediment Control Plan 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.

.3 Provide temporary drainage and pumping required to keep excavations and site free from water as

needed.

.1 A water management/dewatering plan is to be outlined within the EMP.

.4 Ensure pumped water into waterways or drainage systems is free of suspended materials. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

.1 Follow CCME Canadian Water Quality Guidelines (see Section 1.12 WORK ADJACENT TO WATERWAYS AND IN RIVER BED below).

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.10 WILDLIFE MITIGATION

.1 In the event that an unexpected wildlife situation arises or a species at risk is found on site or encountered during construction activities, all work in the immediate vicinity of the animal will cease, and a Parks Canada representative will be contacted immediately to assist with mitigation measures.

.2 Detail procedures for preventing turtle entry and nesting within disturbed project area in EMP.

.3 Place temporary reptile exclusion fencing around stockpiled material and construction areas that may attract turtle nesting activities.

.1 Reptile exclusion fencing must follow the guidance in the document titled Species at Risk Branch, Best Practices Technical Note, Reptile and Amphibian Fencing, ver.1.1, developed by the Ontario Ministry of Natural Resources and Forestry:

http://files.ontario.ca/environment-andenergy/species-atrisk/mnr_sar_tx_rptl_amp_fnc_en.pdf

.4 Environmental Management Plan to detail procedures for avoiding disturbance to wildlife and nesting birds, and Species at Risk.

.5 Do not use synthetic plastic erosion control mats or blankets to reduce potential for entrapment hazard for wildlife.

.6 Standard sediment fencing on site should not have mesh/netted backing.

.7 Removal of woody vegetation will not occur during

the breeding bird season from May 1st to August 31st inclusive, unless a qualified biologist has searched the site for nests and concluded that no nests are present, no more than 7 days prior to clearing. If nests are found, a protective buffer around the nest location will be required until such time that the nest is abandoned.

- .8 When possible, complete work during daylight. If nighttime lights are used, they are to be installed so as to illuminate the work area only to minimize impacts to nighttime activities of wildlife.

1.11 PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties as indicated in tree/vegetation protection plan.
- .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 1 meter beyond the dripline during excavation and site grading to prevent disturbance or damage.
 - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Restrict grubbing and clearing to locations identified in the Contract Drawings.
- .5 Minimize stripping of topsoil and vegetation.
- .6 Restrict tree removal to areas designated by Departmental Representative.

1.12 WORK ADJACENT TO WATERWAYS AND IN RIVER BED

- .1 Construction equipment to be operated on land only.
- .2 Do not use waterway beds for borrow material.
- .3 Waterways to be kept free of excavated fill, waste material and debris. Do not dump excavated fill, waste material or debris in waterways beyond the work area.
- .4 Design and construct temporary crossings to minimize erosion to waterways. Ensure all equipment placed in waterbodies are in good working condition and free of debris, fuel, lubricants, coolant and other deleterious material that could enter the water body.
- .5 Do not skid logs or construction materials across

waterways.

- .6 Stockpile, excavated or fill materials must be stored and stabilized away from the water. Runoff from the excavated or fill material must be contained from entering the waterway.
 - .7 Blasting is not allowed.
 - .8 Do not use salt as a de-icer near the waterway. In areas where ice is a safety concern, the use of sand will be permitted, but it must not be allowed to enter the watercourse.
 - .9 Install sediment fences and erosion control structures prior to any work adjacent to waterways.
 - .10 The Contractor shall employ appropriate sediment retention methods to ensure no sediment is discharged into the watercourse. Turbidity barriers shall be located as shown on the Erosion Sediment Control Plan provided by the Contractor. The Contractor is responsible for the design of the turbidity barriers.
 - .1 CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life will form the baseline for water and streambed quality monitoring and assessment.
 - .2 Maintain water alkalinity and pH between 6.5 and 9.0. Water with pH > 9 or <6.5 cannot be released directly back into the watercourse. Aqueous substances with a pH \geq 12.5 are corrosive and considered a hazardous waste under Ontario Regulation 347 of the Environmental Protection Act and wastewater in this condition must be either removed from site or treated before it is released.
 - .3 Maximum increase of 8 NTU from background levels for a short-term exposure (e.g., 24-h period). Maximum average increase of 2 NTU from background levels for a longer term exposure (>24 h). If elevated turbidity beyond 8 NTU from background levels for a short-term exposure is observed at the source of in-water work, the Departmental Representative will assess potential impact to the aquatic environment. Additional mitigation measures may be required.
 - .4 Maximum increase of suspended sediment concentrations by more than 25 mg/L over background levels during any short-term exposure period (e.g., 24-h). For longer term exposure (> 24 h), average suspended sediment concentrations shall not be increased by more than 5 mg/L over background levels. If elevated turbidity beyond 25 mg/L from
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background levels for a short-term exposure is observed at the source of in-water work, the Departmental Representative will assess potential impact to the aquatic environment. Additional mitigation measures may be required.

- .11 Waterways to be kept free of excavated fill, waste material and debris.
- .12 Clean storm run-on shall be diverted around the site and away from exposed areas as detailed in the EMP.
- .13 All in-canal work to be approved by Departmental Representative. All in-canal work shall take place only under dewatered or low flow conditions.
- .14 Do not clean or drain equipment in waterways.

1.13 IN-WATER WORK

- .1 No in-water work is permitted. Work shall be conducted in the dewatered waterbody.

1.14 WATER QUALITY AND AQUATIC LIFE PROTECTION

- .1 Activities shall be scheduled to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed. In-water works, including but not limited to installation and removal of turbidity curtains, shall be restricted to the approved fish timing window. In-water works shall be conducted between July 16 and March 14, no in-water work permitted from March 15 to July 15.
- .2 Where necessary, fish salvages will be conducted by a qualified professional in areas isolated from flows prior to construction, under applicable permit(s).
 - .1 Amphibians, reptiles, fish, or crustaceans that could become or have become trapped within dewatered cofferdam area, or in other construction zones, to be captured and transferred "live" immediately by authorized personnel in accordance with permit conditions, to nearest waterbody as directed by Departmental Representative.
 - .2 Work program to be overseen by Departmental Representative and PCA Environmental Authority to ensure proper capture and handling of aquatic life.
 - .3 Advise Departmental Representative and PCA Environmental Authority 24 hours prior to fish rescue.

- .4 Minimize length of time fish are out of water.
 - .5 Use appropriate equipment when removing stranded fish.
 - .6 Monitor Work areas with deeper pool areas where fish is congregating, if safe to do so seine or dip nets can be operated to remove the fish.
 - .7 Document by species, counted and removed any fish found within dewatered areas, fish to be placed in nearest waterbody.
 - .8 Encountered Species at Risk (SAR) PCA Environmental authority should be notified.
 - .9 Report to Departmental Representative and PCA Environmental Authority, invasive species found within project area.
 - .10 Invasive species to be euthanized rather than returned to water system.
 - .11 Retain the services of a qualified fish biologist who will be on-site during the dewatering process in order to rescue stranded fish (or other aquatic fauna).
- .3 Where possible, schedule work to avoid wet, windy, and rainy periods that may increase erosion and sedimentation.
- .4 Refer to mitigation measures for Surface Water Quality for NTU and TSS requirements.

1.15 HAZARDOUS MATERIALS

- .1 Place materials defined as hazardous or toxic waste in designated containers
- .2 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials, and regarding labelling and the provision of Material Safety Data Sheets (MSDS) acceptable to Human Resources Development Canada, Labour Program.
- .3 Store Hazardous Materials in secure areas, a minimum of 30 m from the water, on impermeable pads, provide berms if necessary.
- .4 Hazardous materials shall be appropriately disposed of at a licensed facility that accepts this class of waste; all applicable federal, provincial, and municipal laws, regulations, and guidelines shall be strictly adhered to.
- .5 An adequate containment system shall be provided and inspected daily to effectively confine and capture any debris that could potentially become detached during the removal and replacement of the canal walls, or any of their component parts.

- .6 Do not dispose of waste or volatile materials, such as mineral spirits or oil into waterways, storm or sanitary sewers, onto the ground, or in any other location where they will pose a health or environmental hazard.
- .7 The management of fuels, lubricants and chemicals must meet with the requirements of the Ontario Dangerous Goods Transportation Act (RSO 1990, c. D.1) and all other appropriate provincial and federal regulations.
- .8 The Departmental Representative must be immediately contacted after a spill of any volume of fuel or lubricant, and after any amount of other chemical products has escaped.
- .9 Departmental Representative may suspend work following the improper handling of hazardous materials.
- .10 Storage of hazardous material, including explosives, shall not be permitted (except for quantities which shall normally be expected to be utilized in a day of work, and which are not permitted to stockpile).
- .11 Contractor to maintain on-site adequate supply of absorbent material and berming devices to contain spills.
 - .1 Provide training to site personnel in the use of the kit.
 - .2 Spill response materials to be compatible with the type and quantity of materials being handled.
- .12 Dispose of hazardous materials and designated substances in accordance with Ontario Regulation 347/90.

1.16 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 extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures where required to carry out the work or as directed by Departmental Representative.
 - .4 Cover or wet down dry materials to prevent blowing dust and debris. Provide dust control for temporary
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roads. Due to the proximity of the work site to water, calcium chloride shall not be used to suppress concrete dust.

- .5 Work shall be carried out in compliance with the Environmental Protection Act, 1990 and applicable air emission regulations and by-laws.
 - .6 Use well-maintained heavy equipment and machinery, fitted with fully functional emission control systems/muffler/exhaust baffles, engine covers, etc.
 - .7 All on-site vehicles are expected to have a Drive Clean Emissions Report, in compliance with O.Reg. 361/98: Motor Vehicles Under the Environmental Protection Act, R.S.O. 1990, C.E.19.EA. Officers may stop a vehicle if they believe the vehicle is emitting excessive exhaust smoke or suspect that emission control equipment has been tampered with or removed.
 - .8 Machinery shall be left running only while in use, with the exception of during extreme temperatures which prohibit shutting machinery down.
 - .9 Waste and debris shall be transported from site in a fashion that limits the loss of soils and dust.
 - .10 Cleaning of heavy equipment, including concrete trucks, shall not be cleaned within the park boundaries.
 - .11 Prevent sandblasting, concrete dust and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures where directed by the Departmental Representative.
 - .12 Be responsible for all costs of cleaning up any spills to the satisfaction of the Construction Manager.
 - .13 Compressed fuel tanks shall be placed off to side of work area when not in use and shall be equipped with an impact-protection barrier.
 - .14 Use biodegradable hydraulic fluids for machinery that will be working in or around the river.
 - .15 Store all oils, lubricants, fuels and chemicals in secure areas on impermeable pads; provide berms and secondary containment systems as necessary.
 - .16 A secondary containment system is required of all on site ASTs as per provincial and federal storage
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tank requirements:

<https://www.canada.ca/en/environmentclimatechange/services/canadian-environmental-protection-act/registry/publications/codepractice-storage-tank-systems/par>

1.17

HISTORICAL/ARCHAEOLOGICAL
CONTROL

- .1 Provide historical, archaeological, cultural resources, biological resources, and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site: and identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in area are discovered during construction.
- .2 Plan: include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.
- .3 Provide protection for historical, archaeological, cultural, and biological/vegetation resources in accordance with approved SSEMP.
- .4 Accommodate PCA Cultural Resource Management (CRM) representatives' needs for documentation of existing structures after discovery.
- .5 Include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative to address situations where such resources not known to be on site are discovered during construction.
- .6 Should any archaeological or cultural resource be discovered while excavation, stop work. Contact Departmental Representative for direction prior to continuing work.
- .7 The use of heavy machinery on site creates potential for damage or destruction of existing and potential archaeological resources. To ensure the protection of cultural and archaeological resources, work shall not commence until the necessary clearance has been provided.
- .8 Vehicular access routes and staging areas will be restricted to present-day roadways, parking lots, and significantly disturbed areas. If this is not possible, the use of protective covering such as geotextile protective mats with granular "A" gravel is required. All protective measures employed must

be removed following construction and the area restored to a pre-construction state. Excavation is not permitted during installation or removal of protective covering.

- .9 Should vegetation clearing be required for staging, excavation or grubbing of the ground surface is not permitted.
- .10 Should cultural heritage values (archaeological or historical features) be uncovered during project activities, work shall be stopped immediately and the Departmental Representative shall be notified. Work shall not resume until direction to resume work has been provided by the Departmental Representative.
- .11 If unrecorded archaeological resources (e.g., structural features or artifact concentrations) are encountered during construction activities, work will cease in the immediate area and the PCA Project Manager informed. The Project Manager should then contact PCA's Terrestrial Archaeology section for advice and assessment of significance, which will in turn determine what will be required to mitigate the find. Ensure that all exposed underwater cultural materials are kept submerged and/or wet while waiting for direction.

1.18 ARCHAEOLOGICAL AND CULTURAL REQUIREMENTS AND RESTRAINTS

- .1 Site may contain possible cultural and archaeological resources.
- .2 PCA Environmental Authority may monitor and record some or all aspects of excavations, site access routes, and disturbances to soil overburden due to equipment and general work operations.
- .3 Cease Work immediately in affected Work area and notify Departmental Representative if cultural resources, suspected archaeological resources, or character-defining elements are uncovered or damaged during Work.
- .4 Do not resume Work until directed by Departmental Representative.
- .5 Proceed with other work and wait further direction for work in affected area from Departmental Representative on how to proceed.
- .6 Allow Departmental Representative and PCA Environmental Authority Representative full access to affected Work area and cooperate to provide reasonable facilities for such access.

1.19 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 Management Plan (EMP).

- .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.
- .5 In the event of a spill, the Departmental Representative and the Ontario Spill Action Centre (1-800-268-6060) shall be notified immediately; remediation will be conducted immediately contain and clean up in accordance with provincial regulatory requirements AND to the satisfaction of the Departmental Representative; documentation of remediation, testing and results will be provided to the Departmental Representative.
- .6 Should any suspected species at risk - snakes or turtles and/or eggs be encountered during construction, project staging, implementation, or demobilization, Departmental Representative and Parks Environmental Assessment (EA) Staff shall be notified. Contractor shall stop work within the direct vicinity of the specimen immediately and contact the Departmental Representative for guidelines on how to proceed. Additional measures to avoid impacts may be required before work can restart. Stand back and allow the animal to leave the site.
- .7 PCA shall be contacted in the event of an environmental incident or emergency such as:
 - .1 Chemical spill or petroleum spill;
 - .2 Poisonous or caustic gas emission;
 - .3 Biological or chemical explosion;
 - .4 Hazardous material spill;
 - .5 Sewage spill;
 - .6 Contaminated water into waterways; or
 - .7 Turbidity release into waterways.

Notify the Contractor's job superintendent. Call the local emergency services and give type of emergency. Notify the MOE Spills Action Center (1-

800-565-1633) and Trent Severn Waterway Parks
Canada Warden Office (1-705-750-4949).

- .8 Following an environmental incident or emergency, the Contractor is to submit to Departmental Representative an incident report, outlining details of the incident, actions taken to mitigate the incident, monitoring and results completed during, and after incident, remediation actions taken, lessons learned and actions taken/adjusted to prevent future incidents.
- .9 Should conditions at the work site indicate that there are unforeseen negative impacts to fish or their habitat, cease all work until the problem has been corrected and/or appropriate guidance has been obtained from Parks Canada Agency.

1.20 WASTE MANAGEMENT

- .1 All waste subject to Regulation 558 of the Ontario Environmental Protection Act must be transported with a valid "Certificate of Approval for a Waste Management System" to a site approved by the Ontario Ministry of the Environment to accept that waste.
 - .2 Be responsible for obtaining all Waste Generator Numbers, permits, manifests, and all other paperwork necessary to comply.
 - .3 All debris collected within the containment system shall be carefully emptied into an enclosed container daily, or more frequently if required, to ensure that no debris escape into the surrounding environment, or remain at the site. All debris shall be recovered, collected, and taken to a landfill site licensed to receive it for disposal in accordance with all applicable federal, provincial, and municipal laws, regulations, and guidelines.
 - .4 The Non-Hazardous Solid Waste Disposal Plan, included as a component of the EMP, shall be implemented for all construction phases such that discarded materials shall be separated, recycled, re-used, or disposed of, as appropriate, in a landfill licensed to accept the class of waste; all applicable federal, provincial, and municipal laws, regulations, and guidelines shall be strictly adhered to.
 - .5 Waste subject to Ontario Environmental Protection Act to be transported with valid "Certificate of Approval for a Waste management System" to site approved by Ontario Ministry of the Environment to accept that waste.
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- .6 Obtain and submit Waste Generator Numbers, permits, manifests, and other paperwork necessary to comply.
- .7 Do not bury rubbish and waste materials on site. Remove all garbage from site daily.
- .8 Dispose of uncontaminated construction/demolition materials which cannot be recycled or reused, at an approved construction and debris disposal site.

1.21 EROSION AND
SEDIMENTATION CONTROL

- .1 Prepare, implement, monitor and maintain an Erosion and Sediment Control Plan (ESCP) to provide water quality protection. The ESCP is to mitigate the potential for soil erosion and discharge of soil-bearing runoff or airborne dust resulting from the Contractor's construction operations from entering all watercourses including drainage ditches, environmental sensitive areas, adjacent properties to the Working Area, and from the Contractor's trailer site(s).
- .2 Carry out construction operations that may impact upon water quality in a manner that strictly meets the requirements of all applicable legislation and regulations.
- .3 Before commencing work, provide four (4) copies of a detailed Erosion and Sediment Control Plan for the Contractor's proposed water quality protection schemes bearing the seal and signature of a qualified Professional Engineer licensed to practice in the Province of Ontario. The ESCP will contain but is not limited to the following:
 - .1 Description of site condition, potential erosion and sediment issues at the site and associated risk;
 - .2 Description and details of environmental controls to be put in place;
 - .3 Phasing steps and coordination of environmental control measures installation with sequence of construction;
 - .4 Inspection, monitoring and maintenance program of all control measures during construction, work stoppage and post-construction, including additional inspections following large storm events and other periods of runoff;
 - .5 Monitoring plan of water quality at outlet of any construction site discharge at a receiving watercourse, to the requirements of Section 01 48 00.
 - .6 Emergency contingency plan (provision of

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- additional labour, equipment and materials to install additional control measures, and detail an emergency response plan in case of an accidental event);
- .7 Procedures and phasing of the removal and disposal of the control measures;
 - .8 Removal of all sediment and other materials contained by the temporary works
- .4 The designer of the ESCP is to visit the site prior, during and after construction to plan and evaluate the requirements for control measures, their installation and their effectiveness. The designer is to conduct a thorough inspection, as part of their site assessment, and provide a risk assessment and mitigation plan to the Contractor and the Departmental Representative. The ESCP shall be revised as required as a result of their site assessment and monitoring.
- .5 In the event of a work stoppage due to weather, seasonal work stoppage, contractual disputes or direction by a Regulatory agency, the Contractor is to continue monitoring and maintaining the erosion and sediment control measures.
- .6 Guidelines for the development of an ESCP can be found in the 2007 Ministry of Transportation (Ontario), Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects.
- .7 It is the Contractor responsibility to develop and detail the ESCP to ensure that all Regulatory requirements and environmental criteria for discharge to a water course are satisfactorily met.
- .8 Measures may include but shall not be limited to the following: sediment ponds, sediment fences/barriers, straw bales, geotextiles, check dams and/or berms, biodegradable filter socks, erosion mats, vegetation, interceptor ditch/swales, mechanical equipment, or other recognized technologies and methods available at the time of construction.
- .9 Contractor shall supply and install additional or alternative measures as directed by the Departmental Representative if the installed control measures fail to perform adequately.
- .10 Monitor weather forecasts and schedule the Work in order to minimize the risk of sediment-laden runoff entering any watercourse and other environmentally sensitive areas.
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- .11 The ESCP shall provide a contingency plan to include the provision of additional labour, equipment or materials to install additional control measures, and detail an emergency response plan in case of an accidental event.
 - .12 Ensure all workers, including sub-contractors, in the working areas are aware of the importance of the erosion and sediment control measures and informed of the consequences of the failure to comply with the requirements of the Regulatory Agencies and these specifications.
 - .13 Clean out accumulated sediment deposits periodically as required at the sediment control devices, including those deposits that may originate from outside the construction area. Accumulated sediment shall be removed in such a manner that prevents the deposition of this material into any sewer or watercourse and avoids damage to the control measure. The sediment shall be removed from the site at the Contractor's expense and managed in compliance with the requirements for excess earth material, as specified elsewhere in the Contract.
 - .14 Immediately report to the Departmental Representative any accidental discharges of sediments material into either the watercourse or adjacent ditches. Appropriate response measures, including any repairs to existing control measures or the implementation of additional control measures, shall be carried out by the Contractor without delay.
 - .15 Remove the sediment control measures when, in the opinion of the Departmental Representative, the measure(s) is no longer required. All sediment and erosion control measures shall be removed in a manner that avoids the entry of any equipment, other than hand-held equipment, into any watercourse, and prevents the release of any sediment or debris into any sewer or watercourse within or downstream of the Working Areas.
 - .16 Erosion and sediment control measures shall be implemented prior to work and maintained during the work phase, to prevent entry of sediment into the water where site access or other activities cause exposed soil.
 - .17 Any stockpiled materials shall be stored and stabilized a safe distance away from any watercourse, drainage course or swales to prevent erosion and subsequent entry into the water body OR
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removed from the site, in accordance with all federal, municipal, and provincial regulations. Any material which is stockpiled on site shall have A sediment fence installed around it and should be covered.

- .18 All erosion and sediment control measures shall be inspected daily to ensure they are functioning properly and are maintained and/or upgraded as required to prevent entry of sediment into the water.
 - .19 If erosion and sediment control measures are not functioning properly, no further work shall occur until the sediment and/or erosion problem is addressed to the satisfaction of PCA.
 - .20 To the extent feasible, construction shall be undertaken during normal weather conditions, and the ESC Plan shall be designed to appropriate specifications to withstand variable weather conditions.
 - .21 Environmental protection measures shall be checked after each extreme weather event.
 - .22 All surplus excavated material must be disposed of at an approved location and in an approved manner.
 - .23 When vegetation must be removed, then the extent and duration of exposure should be kept to a minimum. Plan the phases of development so that only areas that are activity being developed are exposed.
 - .24 Where there is potential for severe erosion and/or downstream "sedimentation", cover exposed and excavated areas prior to major precipitation events.
 - .25 Prior to carrying out work, check long range weather forecast to ensure that there is adequate time before forecast of heavy rain storms to stabilize the work. Provide details of stabilization plan to Departmental Representative for review.
 - .26 Maintain a stockpile of appropriate erosion and environmental protection materials (e.g. sediment fences, wood chips, clean rock fill and aggregate base course) on site at all times.
 - .27 Provide a one (1) meter high sediment fence barrier in all areas where, due to construction activities, sediment or debris may enter the waterway. Install sediment curtain a minimum of three (3) m from
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shoreline.

- .28 Minimize the noise levels from construction activities by using proper muffling devices, in addition to appropriate timing and location of these activities to reduce or minimize the effects of noise on nearby residents, recreationists, and wildlife.
- .29 Local residents shall be informed in advance of potential disruption from noisy activities.
- .30 Contractors should avoid excess and unnecessary noise.
- .31 Monitor and mitigate public complaints by keeping a record of complaints and addressing any issues raised by the public.

1.22 NOISE CONTROL

- .1 Minimize the noise levels from construction activities by using proper muffling devices, in addition to appropriate timing and location of these activities to reduce or minimize the effects of noise on nearby residents, recreationists, and wildlife.
- .2 Local residents shall be informed in advance of potential disruption from noisy activities.
- .3 Contractors should avoid excess and unnecessary noise.
- .4 Monitor and mitigate public complaints by keeping a record of complaints and addressing any issues raised by the public.

1.23 SPILL MANAGEMENT

- .1 The Contractor shall have a spill containment kit on site and available at all times. Spill kit must have a capacity to handle the volume of chemical liquids of the largest sized tank at the site.
 - .1 Spill control kits to be available to Contractor employees at all areas where Work of the Contract is being performed and at all times during the course of the contract.
 - .2 During all operations, such as refueling, the operations shall be completed within a secondary containment system capable of preventing release of spills or leaks into the environment. Containment system must be of appropriate capacity to handle volumes expected from accidental release.
 - .3 An adequate supply of clean-up materials shall be maintained on site, and employed immediately should a spill occur. In the case of a spill, including
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but not limited to concrete, grout, or water with pH > 9, PCA and the Ontario Spill Action Center (1-800-268-6060) shall be notified immediately; all provincial and federal regulations shall be strictly adhered to the satisfaction of PCA. Documentation of remediation, testing and results will be provided to PCA.

- .4 Construction crews shall be fully trained in the use of spill kits and spill response procedure to ensure timely and effective responses to spill incidents.
- .5 Procedures, instructions, and reports to be used in the event of an unforeseen spill of a regulated substance are detailed in the Spill Control Plan, included as a component of the EMP, and shall be adhered to.
- .6 Disposal of spilled materials and impacted/contaminated material to be off Parks Canada property and at approved locations for materials to be disposed of.
- .7 Contractor to protect all wells, catch basins, drywells, drains and watercourses from contamination in event of a spill.
- .8 Contractor to immediately remove as much or all of the contaminated soils as possible, from any spills created from Work of the Contractor.
- .9 Contaminated soils/materials to be placed in sealed, isolating containers compatible to the contaminants.
- .10 Any remaining clean-up of spills to be performed at no extra cost to Parks Canada. Clean-up to be to the Departmental Representative's satisfaction
 - .1 Documentation of remediation, testing, and results are to be submitted to Departmental Representative and PCA Environmental Authority.

1.24 CONCRETE AND CONCRETE
WASTE MANAGEMENT

- .1 Ensure concrete forms are tight and no flow is occurring.
- .2 In event of a release of concrete, notify Departmental Representative, PCA Environmental Authority and Ontario Ministry of Environment and MOE Spills Action Centre (Tel: 1-800-268-6060).
 - .1 Clean up and execute remediation immediately in accordance with provincial and federal regulatory requirements and accepted by PCA

- Environmental Authority.
- .2 Install additional sediment barriers as necessary.
 - .3 Document remediation, testing, results to be submitted to Departmental Representative and PCA Environmental Authority.
 - .3 Departmental Representative will designate cleaning area for equipment and tools to limit water use and control runoff.
 - .4 Cleaning area to be no closer than 30 m from waterway to prevent contamination.
 - .5 Where no safe cleaning area is available, Contractor to provide sealed containment basin for the area where equipment is to be cleaned.
 - .6 Alkali water, such as concrete wash water, is to be collected and disposed off-site in accordance with federal, provincial, and local authority requirements.
 - .7 Waste water which has come into direct contact with concrete shall not to be treated and released on site.
 - .8 Use only trigger-operated spray nozzles for water hoses.
 - .9 As concrete leachate is alkaline and highly toxic to fish and other aquatic life, ensure that all works involving the use of concrete, cement, mortars and other Portland cement or lime-containing materials (concrete) will not deposit, directly or indirectly, sediments, debris, concrete, concrete fines, wash or contact water into or about any watercourse. Concrete materials cast in place must remain inside formed structures. Concrete waste water must be removed from site. Refer to ESG-5-C - Concrete Pour Operations and Grouting and strictly follow the defined guidelines.
 - .10 Provide containment facilities for the wash-down water from concrete delivery trucks, concrete pumping equipment and other tools and equipment.
 - .11 Dispose of all concrete wash water in a location where it will not enter subsurface drains, water bodies or storm drains.
 - .12 Prevent any water that contacts uncured or partly cured concrete during activities like exposed aggregate wash-off, wet curing, or equipment washing from directly or indirectly entering any
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watercourse.

1.25 SITE ACCESS, OPERATION .1
AND STORAGE

- To the extent possible, existing access routes shall be used to minimize impacts to vegetation. Removal of habitat within the adjacent forest community shall not be undertaken to facilitate staging or storage.
- .2 Areas for staging or storage shall be identified in the Contractor's EMP.
- .3 Land disturbance shall be minimized by clearly demarcating the construction envelope.
- .4 Staging areas shall be set aside within a secondary containment system capable of preventing release of spills or leaks into the environment. These areas shall be used for refueling and for the storage of all deleterious substances, materials, and equipment, and shall be set-back at the maximum available on-site distance from the water's edge (recommended 30 m minimum) on impermeable pads/pans designed to allow full containment of spills. For additional requirements on the containment system, fueling, and storage protocols, refer to the Contractor's EMP.
- .5 All hazardous materials (e.g., oils, lubricants, fuels, paints, solvents, paint thinners, etc.) shall be securely locked-up to avoid vandalism and accidental spills.
- .6 Materials should be stored in a dry location that is clean, dry, and well-ventilated.
- .7 Replace defective or damaged materials with new.
- .8 Stockpiles shall be stabilized and cover by tarpaulins when not in use and have a sediment fence barrier around their perimeter.
- .9 All machinery and equipment are to arrive on site in a clean condition and be maintained free of fluid leaks, invasive species, and noxious weeds.
- .10 Follow the Ontario Clean Equipment Protocol for Industry - Inspecting and cleaning equipment for the purposes of invasive species prevention.
- .11 Operation and idling of gas-powered equipment, machinery, and vehicles shall be minimized to the extent possible.
- .12 Movement of heavy equipment and machinery shall be
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avoided in areas with sensitive slopes, and vehicle traffic shall be minimized on exposed soils.

- .13 All heavy equipment, machinery, and tools required for the work shall be regularly inspected and maintained to avoid leakage of fuels and liquids, and, where feasible, shall be operated, maintained, and stored a minimum of 30 m from the water in a manner that prevents any deleterious substance from entering the watercourse or soils.

1.26 REFUELING AND FUEL MANAGEMENT

- .1 Deleterious substances (including fuel) shall be handled, and utilized in a manner to avoid contamination of soils, groundwater, and surface waters.
- .2 Refueling shall be conducted within the defined staging area as defined within the EMP and accepted by PCA.
- .3 All deleterious substances (including fuel, cleaners, solvents, paint, etc.) shall be mixed and transferred within the defined staging area.
- .4 Drip trays shall be placed under fuel-powered equipment when re-fueling.
- .5 Refer to ESG-13-C - Refueling and Spill Management for PCA requirements.
- .6 Refuelling activities shall not take within 30 m of the waterbody, unless additionally mitigations are employed and accepted by PCA.
- .7 All spills of hydrocarbon based products such as (but not limited to) gasoline, kerosene, naphtha, lubricating oils, engine oils, greases and de-icing fluids or antifreeze, no matter how large or small, to be reported to Departmental Representative and the Park's Environmental Protection Officer (EPO).
- .8 All refueling to be performed on level surfaces.
- .9 Drip pans are to be utilized for all fuel-run machinery and equipment present on site, regardless of whether in use or not.
- .10 Equipment with leaks or poor mechanical repair shall be removed from site.

1.27 SPECIES AT RISK (SAR)

- .1 The EMP must detail procedures (e.g. exclusion fencing) for preventing turtle entry/nesting within disturbed project gravels/soils during all stages of project activity.
- .2 Daily ongoing observation for SAR and wildlife in

general shall be undertaken for the duration of the project by all personnel on site.

- .3 Should work-related activities have the potential to impact SAR, or those thought to be SAR, all work shall cease in the immediate vicinity of the specimen. PCA, shall be contacted immediately for guidelines on how to proceed.
- .4 Park on roads or disturbed areas only.
- .5 Provide training to all employees before beginning work on site on identifying species at risk and procedures to follow if species at risk are encountered.
- .6 Stop work within the immediate vicinity of the specimen and contact the Departmental Representative and PCA Environmental Authority on how to proceed if species at risk does not or cannot leave site on its own accord.
- .7 Minimize disturbed areas and clearly mark Work space.
- .8 If species at risk are observed or encountered, the individual must not be harmed, harassed, or killed. Stand back and allow animal to leave site.
- .9 Surround stockpiled materials by sediment control fencing to prevent turtle nesting.

- .1 Fencing shall not have mesh backing, as this poses as a hazard to wildlife

1.28 ENVIRONMENTAL MONITORING

- .1 Environmental mitigation measures shall be inspected daily and a daily checklist/log shall be maintained over the duration of the project.
 - .1 Daily logs are to include water quality monitoring, taken up and downstream of work area, twice daily (minimum), at locations designated within the EMP.
 - .2 Checklists/Logs are to be provided to Departmental representative on a weekly basis, at minimum.
 - .2 Any deficiencies should be addressed immediately.
 - .3 SAR and wildlife sightings, or lack thereof, should be reported on the daily inspection checklist.
 - .4 Environmental summary reports shall be completed monthly and provide details of monitoring work completed, the findings of all monitoring, and details of how and when issues were resolved.
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- .5 Following completion of the project, weekly ESC monitoring or ESC monitoring following precipitation/snowmelt events, shall be completed until vegetation has become establish on all disturbed areas and ESC measures are removed.
- .6 Any damages should be repaired immediately and any build-up of sediment should be removed and disposed of as required by all applicable federal, provincial, and municipal laws, regulations, and guidelines.
- .7 The Contractor shall provide a written checklist of for inspection for vehicle/machinery leaks and overall condition, and, for the purpose of invasive species prevention, a written record of measures taken to clean vehicles/machinery/equipment.

1.29 INVASIVE SPECIES

- .1 Clean mud, dirt, and vegetation off machinery and equipment before entering work site and before leaving work site. Inspect and clean in accordance with the EMP and Clean Equipment Protocol for Industry:

https://www.ontarioinvasiveplants.ca/wpcontent/uploads/2016/07/Clean-Equipment-Protocol_June2016_D3_WEB-1.pdf
- .2 Equipment and vehicles to be used in waterbody, to be cleaned before and after use. This includes any visible mud, vegetation, mussels.
 - .1 Drain of standing water.
 - .2 Clean with hot water (>50°C) at high pressure (>250 psi).
 - .3 Allow to dry for 2-7 days in sunlight before transporting between waterbodies.
 - .4 Conduct cleaning minimum 30 m from edge of waterbody.
- .3 Submit photo and report to Invading Species Hotline (1-800-563-7711) or online at EDDMaps Ontario, <https://www.eddmaps.org/ontario/> and to Departmental Representative and PCA Environmental Authority if an invasive species is suspected.
- .4 Conduct site assessment for invasive plant infestations prior carrying out field activities.
- .5 Round gobies and other invasive species found during dewatering activities shall be euthanized and not returned to the water system. This shall be reported to PCA.
- .6 Use weed-free material for erosion control and

stabilization ensuring that seed does not potentially contain invasive plants.

- .7 Commercially purchased seeds should have a label that states following:
 - .1 Species.
 - .2 Purity: no less than 90%.
 - .3 Weed seed content: tag should state no invasive plants are present, only use certified weed-free seed.
 - .4 Germination of desired seed: germination should not be less 50% for most species with exceptions for some shrubs and forbs.
- .8 Move only contaminate-free materials to non-infested areas to prevent spread of invasive plants.
- .9 Familiarize workers with invasive species potentially present within work site areas.
- .10 Properly dispose of any found invasive species to ensure no further propagation.
- .11 Preventative and Control Measures, as identified in the Ontario Waterways (2017) document to be incorporated into the EMP and implemented by the Contractor.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - Execution

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Permit no undue amounts of debris, trash or garbage to accumulate.
- .3 Do not bury or burn rubbish on site.
- .4 Dispose of waste or volatile materials by taking them to a special designated waste facility. Do not dump these into waterways.
- .5 Ensure all emptied containers are sealed and stored safely for disposal away from children

- .6 Ensure public waterways remain free of waste and volatile materials disposal.
 - .7 Spills:
 - .1 Report all spills immediately to the Departmental Representative and to the Ontario Spills Action Centre (Telephone No. 1-800-268-6060).
 - .2 Using appropriate safety precautions, collect liquid or solidify liquid with an inert, non-combustible material and remove for disposal.
 - .3 Be responsible for all costs of cleaning up any spills to the satisfaction of the Departmental Representative.
 - .4 Provide and maintain an environmental emergency response plan in place and a spill kit readily available.
 - .5 Further information on dangerous goods emergency cleanup and precautions including a list of companies performing this work can be obtained from the Transport Canada 24-hour number (613) 996-6666 collect.
 - .8 Remove all temporary protection and surplus materials, tools, plant, rubbish and debris and dispose of them in an approved manner off Crown property at the following times:
 - .1 At the completion date of the work for all areas.
 - .9 Clean areas under contract to a condition at least equal to that previously existing and to approval of Departmental Representative.
 - .10 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.
 - .11 Clean up work area continuously as Work progresses.
 - .12 At end of each work period, and more often if ordered by Departmental Representative, remove debris from site, neatly stack material for use, and clean up generally.
 - .13 Permit no amount of debris, trash or garbage to accumulate on site.
 - .14 Do not bury rubbish on site.
 - .15 Separate and recycle materials that can be recycled.
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- .16 Dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner by taking them to special designated waste facility.
- .17 Excess concrete must be disposed of at an appropriate facility outside of the Parks Canada protected heritage place. If excess concrete must be dumped prior to transport outside of the protected heritage place, it must be deposited in a location approved by Parks Canada and removed following hardening for disposal at an approved facility. Stockpiled concrete waste must be stabilized and isolated with appropriate erosion and sediment controls.
- .18 Ensure emptied containers are sealed and stored safely for disposal away from children and wildlife.
- .19 Unless prior permission from the Departmental Representative is obtained, all contractor equipment, facilities and materials must be removed from the site at the finish of each work phase, or if work is suspended due to weather or other circumstances, upon the suspension of work activities.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- .1 This Section references to laws, by laws, ordinances, rules, regulations, codes, orders of Authority Having Jurisdiction, and other legally enforceable requirements applicable to Work and that are; or become, in force during performance of Work.

1.2 RELATED SECTIONS

- .1 Section 01 35 43 Archaeological, Cultural and Environmental Procedures

1.3 REFERENCES TO
REGULATORY REQUIREMENTS

- .1 Perform Work in accordance with National Building Code of Canada (NBC) 2015, National Fire Code of Canada (NFC) 2015 and Ontario Building Code (OBC) 2012 including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Specific design and performance requirements listed in the specifications or indicated on the Drawings may exceed the minimum requirements established by the referenced Building Code; these requirements will govern over the minimum requirements listed in the Building Code:
- .1 Meet or exceed requirements of:
- .1 Contract documents.
- .2 Specified standards, codes and referenced documents.
- .3 Should adhere to all applicable federal and provincial environmental legislation as well as all permitting conditions.
- .1 Includes (but is not limited to):
- .1 Historic Canal Regulations
- .2 CEAA, 2012,
- .3 Fisheries Act,
- .4 Federal and provincial Species at Risk Acts,
- .5 Federal and provincial Environmental Protection Acts,
- .6 Migratory Bird Convention Act.

1.4 MEASUREMENT AND PAYMENT
PROCEDURES

- .1 There shall be no separate measurement for payment for the work under this Section. Include cost in the Contract Lump sum Price.
- .2 Payment shall be made as set out in Section 01 22 01 - Measurement and Payment and shall be included in the applicable item of work
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<u>1.5 HAZARDOUS MATERIAL DISCOVERY</u>	.1	Stop work immediately when any hazardous material is encountered during work. Notify Departmental Representative.
<u>1.6 FLOATING PLANT</u>	.1	Not applicable.
<u>1.7 NAVIGATION BUOYS AND MARKERS</u>	.1	Not applicable.
	.2	Not applicable.
<u>1.8 NATIONAL PARKS ACT</u>	.1	For projects located within boundaries of National Park, perform Work in accordance with National Parks Act as stipulated in the Historic Canals Regulations Permit.
<u>1.9 RELICS AND ANTIQUITIES</u>	.1	Relics and antiquities, and items of historical or scientific interest such as brass caps, benchmarks, survey monuments and similar objects found on site shall remain the property of Parks Canada. Protect such articles and request direction from Departmental Representative.
	.2	Should historic objects be uncovered during excavating, stop work immediately and notify the Departmental Representative. Do not resume work until directed to by the Departmental Representatives.
	.3	Archaeology staff from Parks Canada will monitor the project work and may require temporary stop of work to carry out site investigations.
<u>1.10 WATER QUALITY</u>	.1	The contractor shall not impact the quality of surface water or groundwater.
	.2	The contractor shall obtain all respective permits and approvals to be able to undertake the work.
	.3	CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life will form the baseline for water and streambed quality monitoring and assessment.
<u>1.11 QUALITY ASSURANCE</u>	.1	Regulatory Requirements: Except as otherwise specified, Contractor shall apply for, obtain, and pay all fees associated with, permits, licenses, certificates, and approvals and applicable taxes required by regulatory requirements and Contract

Documents, based on General Conditions of Contract and the following:

- .1 Regulatory requirements and fees in force on date of Bid submission, and
- .2 Any change in regulatory requirements or fees scheduled to become effective after date of tender submission and of which public notice has been given before date of tender submission
- .3 Store Hazardous Materials in secure areas on impermeable pads, provide berms if necessary.

PART 2 - PRODUCTS

2.1 EASEMENTS AND NOTICES

- .1 Owner will obtain permanent easements and rights of servitude that may be required for performance of Work.
- .2 Contractor shall give notices required by regulatory requirements.

2.2 PERMITS

- .1 Tree Cutting:
 - .1 Make application and obtain approval and related permit from the City of Peterborough and Region of Durham regarding any tree cutting outside PCA property and the indicated work limits.
 - .2 Contractor to abide by all requirements of the permit.
- .2 Water Taking:
 - .1 Not applicable.

PART 3 - Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Inspection and testing, administrative and enforcement requirements.

1.2 REFERENCE STANDARDS

1.3 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, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.4 INDEPENDENT INSPECTION
AGENCIES

- .1 Independent Inspection/Testing Agencies may be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. 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
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to Departmental Representative. Pay costs for retesting and re-inspection.

1.5 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.

1.6 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 orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.7 REJECTED WORK

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

1.8 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.

1.9 MILL TESTS .1 Submit mill test certificates as required of
specification Sections.

1.10 EQUIPMENT AND SYSTEMS .1 Refer to Section 11 90 10 for definitive
requirements.

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 DESCRIPTION

- .1 Work under this section relates to condition surveys and monitoring of structures and buildings which are adjacent to the construction site and which may be affected by excavation and slope rehabilitation works and vibration producing activities (such as sheet pile driving/vibrating, concrete demolition work, excavation of frozen ground, and operation of heavy construction equipment)
- .2 The Contractor is advised that structures, buildings and buried utility services are located close to the proposed work and that construction activities are to be conducted in such a manner to preclude damage to these structures, buildings and wells. The Contractor shall be responsible for any damage caused by their activities.
- .3 The contractor shall undertake environmental monitoring of the sediment and erosion control system including water quality of discharge from dewatering operations.
- .4 The scope of work described in this section is a minimum requirement for conducting a condition survey and monitoring of the work. The Contractor Design Engineer together with the Monitoring Engineer are to review and advise the Departmental Representative on movement and vibration criteria and any additional monitoring requirements.
- .5 The monitoring work under the present scope only covers the construction area and immediate surrounds. The Contractor shall take full responsibility for other areas as part of their construction operation including haul routes.

1.2 RELATED REQUIREMENTS

- .1 Section 01 11 00 - Summary of Work
 - .2 Section 01 33 00 - Submittal Procedures
 - .3 Section 01 35 43 - Environmental Procedures
 - .4 Section 01 71 00 - Examination and Preparation
 - .5 Section 01 77 00 - Closeout Procedures
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1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 There shall be no separate measurement for payment for the work under this Section. Include cost in the Contract Lump sum Price.
- .2 Payment shall be made as set out in Section 01 22 01 - Measurement and Payment and shall be included in the applicable item of work.

1.4 INDEPENDENT INSPECTION FIRMS

- .1 An Independent Inspection/Monitoring Firm(s) shall be retained by the Contractor for the purpose of inspecting and/or monitoring portions of Work as described in this section. Cost of such services will be borne by the Contractor.
- .2 The Independent Inspection/Monitoring Firm(s) team shall be qualified and competent in:
 - .1 Performing condition surveys;
 - .2 The determination of allowable movement including displacement and vibration at structures and embankments;
 - .3 The protection of groundwater wells;
 - .4 The establishment of measurement procedures and their implementation;
 - .5 Monitoring and reporting.
- .3 The Condition Survey shall be undertaken by a qualified and competent inspector.
- .4 If requested by the Departmental Representative, submit the inspector and monitoring specialist qualification and experience.

1.5 DEFINITIONS

- .1 Monitoring Engineer: refers to the independent inspection / monitoring firm which is responsible for the work under this section.
- .2 Design Engineer: refers to the engineer retained by the Contractor to design and oversee the construction of any temporary works required to complete the work under the Contract.

1.6 CONSTRUCTION CONTROL AND MONITORING

- .1 At least 7 days prior to start of work, the Contractor shall submit their Construction Control and Monitoring (CCM) plan. The plan shall be prepared in conjunction with the work area and environmental management plan for sediment and erosion control.
- .2 As a minimum the CCM plan is to cover:

- .1 The format and extent of the Condition Survey;
- .2 The methodology to be used to monitor existing cracks in existing buildings and other structures including bridges and embankments;
- .3 The extent and methodology for soil movement monitoring program at existing structures and embankments, including establishment of critical movement criteria, type of monitoring equipment and frequency of measurement.
- .4 The vibration monitoring program, including influence vibration zone, safe and critical vibration levels and anticipated vibration levels at the closest structure, including type of monitoring equipment and frequency of measurement.
- .5 The turbidity control and drainage water as part of the sediment and erosion control plan.
- .6 Measures to protect existing groundwater wells and their services.

.3

1.7 GROUNDWATER WELL
MONITORING

- .1 The Departmental Representative will be undertaking a monitoring program of the wells of the Parks Canada Agency property. The program will include sampling and testing of water and water levels prior to commencement of work and during the construction and post-construction phases.
- .2 Result of the initial sampling and sampling during the construction and post-construction phases will be shared with the Contactor.
- .3 If water quality changes during the construction phase of the project, the contractor will be advised. The Contractor will be required to immediately stop all work and take appropriate measures to reduce or eliminate water quality problems.

1.8 TURBIDITY CONTROL AND
DRAINAGE WATER

- .1 The Contractor shall undertake quality (turbidity) monitoring of any discharge water to a receiving stream as part of their sediment and erosion control plan as set out in Section 01 35 43 - Environmental Procedures.

1.9 CONDITION SURVEY

- .1 Prior to commencement of the work, a Pre-Construction Condition Survey Report of the lock structure, the lock master building and the

electrical building, which may be affected by the work under this contract, shall be submitted by the Contractor.

- .2 The Condition Survey shall be undertaken by the Contractor's qualified inspector together with the Departmental Representative, private landowners and Township/municipality representatives, as appropriate
- .3 The survey shall include the location and condition at adjacent properties.
- .4 Condition Surveys are to be performed for all building and structures located within 50 metres from the toe of embankments vibration producing activities.
- .5 Furthermore, Condition Survey is to be performed for:
 - .1 Township and municipalities roads.
 - .2 Staging areas.
- .6 The Contractor shall perform a monthly inspection of the haul routes and report their findings to the township/municipality and Departmental Representative. Repair and make good any damage to the satisfaction of the Local Authorities and the Departmental Representative.
- .7 Upon completion of the work under the contract a Post-Construction Condition Survey shall be performed on all properties, buildings or structures that were surveyed as part of the Pre-Construction Condition Survey. The survey needs to focus on the same issues that were identified under the original survey, plus any new issues that may have developed during the construction period.

1.10 CONDITION SURVEY REPORT

- .1 Prepare and submit a DRAFT Condition Survey Report for review and approval by the Departmental Representative within 10 days of construction commencement.
- .2 Revise as required by the Departmental Representative and submit Final version of report.
- .3 For each property surveyed, provide copies of the Condition Survey Report (electronic copy or approved alternative) with annotation of location of interest and comments on the existing conditions.

- .4 One copy of the approved report is to be provided to the respective individual landowner and/or township/municipality. One copy is to be maintained on site.

1.11 MONITORING

- .1 The Contractor will be responsible to carry out monitoring of TSW land and assets. Monitoring work is to include:
 - .1 Monitoring of cracks in buildings and other structures which were identified as part of the Pre-Construction Condition Surveys;
 - .2 Vibration (seismographic) monitoring.
- .2 Cracks in buildings and structures monitoring:
 - .1 Displacement monitoring gauges shall be installed across any significant existing crack to monitor for any additional building/structure distress due to work under this contract.
 - .2 Location and number of gauges will be established by the Contractor and the Departmental Representative.
 - .3 Gauges shall be read prior to commencement of construction activities and shall continue on a weekly basis until the completion of vibration producing construction activities.
 - .4 The Departmental Representative is to be advised of any significant crack displacement detected by the monitoring gages.
- .3 Movement monitoring:
 - .1 Earthen embankments
 - .1 Install minimum of 10 monitoring points along the top of the Northwest and Southeast Embankments at locations to be determined by the Department Representative.
 - .2 The monitoring points are to be durable and not interfere with construction activities and provided accurate and repeatable readings.
 - .3 In general these may be installed as follows:
 - .1 A +/-50mm diameter hole is drilled to 1.5m (to be below the frost line). An ABS tube is placed in the hole (to fit snugly).
 - .2 A rod (+/-20mm) is inserted into the tube and driven 300mm into undisturbed ground, below the end of the ABS tube.
 - .3 The rod is to extend at least one

- meter above the ground surface and have a survey target attached to it. The rod and target are to be protected by a sleeve similar to the one used on ground water monitoring wells.
- .2 The work also includes the construction of four (minimum) reference monuments, from which the monitoring points can be easily surveyed. If acceptable, these reference monuments may also serve as temporary bench mark for the construction.
- .3 Survey work for the movement monitoring is to have an accuracy of +/- 2 mm.
- .4 Movement monitoring schedule:
- .1 Pre-construction: Initial measurements are to be taken before any work is started. Initial reading are to be taken on two different days, and result should be identical.
- .2 Construction: Measurements are to be taken on a daily basis during sheet pile installation, excavation, backfill and compaction work within 20 m of the lock approach walls and concrete culvert.
- .3 Post-construction activities: Measurements can be reduced to a bi-weekly basis for the first two weeks following the completion of the activities listed above. If no movement has been observed during this period, the monitoring can be discontinued until the next activity.
- .4 Construction and post-construction activities: The Contractor will undertake daily visual inspection of the areas being monitored. The visual inspection shall continue until substantial completion of the work.
- .5 Monitoring criteria:
- .1 The movement criteria given below are nominal criteria and need to be reviewed and confirmed by the Monitoring Firm and Design Engineer:
- .1 .
- .2 Earth embankment:
- .1 Total movement of 25 mm at any monitoring point - stoppage of work and review of construction procedure.
- .2 Total movement of 50 mm at any monitoring point - stoppage of the work, add, adjust, replace or repair damaged and weakened elements or modify work

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- procedure.
- .2 If at any time the lock structure, or the lock entrance wall exhibit signs of distress, all work is to stop, the situation assessed and modification made to the stabilization (shoring) system or to the work procedure
- .3 Reporting:
- .1 The Monitoring Firm shall provide a written record of findings including new data and its interpretation including other figures and graphs. The record shall be provided within 48 hours of the measurements being taken.
- .2 The Contractor Design and Monitoring Engineer shall provide recommendations based on the findings to the Departmental Representative.
- .3 The report shall be clear and concise and be acceptable to the Departmental Representative.
- .4 Action requirements by the Contractor shall be clearly defined with schedule of implementation.
- .5 An addendum to the report shall be made by the Monitoring Engineer based on the result of the action taken by the Contractor to address the construction issue.
- .4 Vibration (Seismograph) monitoring:
- .1 The monitoring engineer shall:
- .1 Establish vibration influence zones and safe vibration levels and develop the Contractors vibration monitoring program.
- .2 Supervise the Contractor vibration monitoring program.
- .2 During vibration producing activities within the identified zone of influence for structures or buildings, the Contractor shall monitor vibration levels, and shall not exceed the established safe level to preclude damage to the adjacent structure.
- .3 The vibration monitoring equipment shall be capable of:
- .1 Continuously record peak particle velocity.
-

- .2 Providing permanent record of the entire vibration event.
- .3 Providing an alarm when vibration limit exceed the established safe vibration level.
- .4 Being remotely monitored by the Monitoring Engineer.
- .4 Copies of all vibration records and associated construction activities (, sheet pile driving/vibrating, concrete demolition work, excavation of frozen ground, and operation of heavy construction equipment) data shall be provided to the Design Engineer and Departmental Representative on a daily basis.
- .5 Reporting:
 - .1 The Monitoring Firm shall provide a written record of findings including new data and its interpretation including other figures and graphs. The record shall be continuous and shall be provided within 48 hours of the measurements being taken.
 - .2 The Contractor Design and Monitoring Engineer shall provide recommendations based on the findings to the Departmental Representative.
 - .3 The report shall be clear and concise and be acceptable to the Departmental Representative.
 - .4 Action requirements by the Contractor shall be clearly defined with schedule of implementation.
 - .5 An addendum to the report shall be made by the Monitoring Engineer based on the result of the action taken by the Contractor to address the construction issue.
- .6 Take appropriate measures to reduce movement and vibration to adjacent properties and structures. If ground movement or if vibration measurements exceeds

- set criteria, immediately stop all construction activity and inform Design engineer and Departmental Representative of the situation. Provide and implement remedial action to rectify the situation. Obtain written permission from Departmental Representative prior to resuming construction activities.
- .7 Immediately repair any damage to any adjacent structure to the satisfaction of the Departmental Representative.
- .5 Turbidity control and drainage water:
- .1 The monitoring firm shall provide a protocol and methodology for monitoring the total suspended solids (TSS) from any discharge point to a watercourse including drainage ditches as set out in Section 01 35 43.
- .1 The Ministry of Environment has established criteria wherein the allowable increase in TSS from background levels is 25 mg/l.
- .2 Reporting shall be undertaken as set out in this Section

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

- 3.1 ADJUSTMENT .1 Monitor stabilization / shoring system performance and maintain its effectiveness by making adjustments, replacing or repairing damaged and weakened elements of system until substantial completion of project

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Construction aids.
- .2 Office and sheds.
- .3 Parking.
- .4 Project identification.

1.2 MEASUREMENT AND PAYMENT .1
PROCEDURES

- .1 There shall be no separate measurement for payment for the work under this Section. Include cost in the Contract Lump Sum Price.
- .2 Payment shall be made as set out in Section 01 22 01 - Measurement and Payment and shall be included in the applicable item of work.

1.3 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International)
- .1 CAN/CSA-Z321-96 (R2006), Signs and Symbols for the Occupational Environment.
 - .2 CAN/CSA G40.20/G40.21-04 (R2009) General Requirements for Rolled or Welded Structural Quality Steel

1.4 ACTION AND
INFORMATIONAL SUBMITTALS

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

1.5 INSTALLATION AND
REMOVAL

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

<u>1.6 SCAFFOLDING</u>	.1	Not applicable
<u>1.7 HOISTING</u>	.1	Not applicable
<u>1.8 SITE STORAGE/LOADING</u>	.1	Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
	.2	Do not load or permit to load any part of Work with weight or force that will endanger Work.
<u>1.9 CONSTRUCTION PARKING</u>	.1	Parking will be permitted on site within the Construction Limits.
	.2	Provide and maintain access to project site.
	.3	Provide snow removal during period of Work.
	.4	If authorized to use existing roads for access to project site, maintain such roads for duration of Contract. Contractor responsible for repair of damage to roads caused by construction operations.
<u>1.10 SECURITY AND MONITORING</u>	.1	Site security during the construction period is the sole responsibility of the Contractor.
	.2	Contractor shall pay for monitoring of the site during periods of no construction activity and to maintain and service dewatering and heating equipment.
<u>1.11 OFFICES</u>	.1	Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
	.2	Provide marked and fully stocked first-aid case in a readily available location.
	.3	Subcontractors to provide their own offices as necessary. Direct location of these offices.
	.4	Departmental Representative's Site office.
	.1	Provide temporary office for Departmental Representative.
	.2	Inside dimensions minimum 3.6 m long x 3 m

wide x 2.4 m high, with floor 0.3 m above grade, complete with 4 50% opening windows and one lockable door.

- .3 Insulate building and provide heating system to maintain 22 degrees C inside temperature at -20 degrees C outside temperature.
- .4 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.
- .5 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10% upward light component.
- .6 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.
- .7 Equip office with 1 x 2 m table, 6 chairs, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, one plan rack and one coat rack and shelf.
- .8 Maintain in clean condition.

1.12 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in 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 manner to cause least interference with work activities.

1.13 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.14 CONSTRUCTION SIGNAGE

- .1 Provide and erect project sign, within three weeks of signing Contract, in a location designated by Departmental Representative.
 - .1 Project signage
- .2 Construction sign 1.2 x 2.4 m, of wood frame and plywood construction painted with exhibit lettering produced by a professional sign painter.

- .3 No other signs or advertisements, other than traffic, pedestrians and warning signs, are permitted on site.
- .4 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 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.
- .5 Indicate on sign, name of Owner, Consultant, Contractor and Subcontractor with logo, Name of Project, Project Identification Reference of design style established by Departmental Representative
- .6 Direct requests for approval to erect Consultant/Contractor signboard to Departmental Representative. For consideration general appearance of Consultant/Contractor signboard must conform to project identification site sign. Wording in both official languages.
- .7 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
- .8 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.

1.15 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide measures for protection and diversion of traffic as set out in Section 01 20 01.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of 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

-
- .4 Protect travelling public from damage to person and property.
 - .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
 - .6 Verify adequacy of existing roads and allowable load limit on these roads.
 - .7 Construct access and haul roads as necessary.
 - .8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
 - .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
 - .10 Dust control: adequate to ensure safe operation at all times.
 - .11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.
 - .12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
 - .13 Provide snow removal during period of Work of construction and access roads.
 - .14 Remove, upon completion of work, construction and access roads designated Departmental Representative.

1.16 CLEAN-UP

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

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 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 35 29.06 - Health and Safety Requirements
- .3 Section 01 35 43 - Archaeological Cultural and Environmental Procedures
- .4 Section 01 48 00 - Construction Control and Monitoring
- .5 Section 01 71 00 - Examination and Preparation
- .6 Section 01 77 00 - Closeout Procedures

1.2 REFERENCE STANDARDS

- .1 Ontario Provincial Standard Specifications (OPSS) and Ontario Provincial Standard Drawings (OPSD).
- .2 Ontario Ministry of Transportation, Book 7 of the Ontario Traffic Manual - Temporary Conditions.

1.3 MEASUREMENTS AND
PAYMENT PROCEDURES

- .1 There shall be no separate measurement for payment for the work under this Section. Include cost in the Contract Lump Sum Price
- .2 Payment of this Section shall be as set out in Section 01 22 01 - Measurement and Payment.

1.4 INSTALLATION AND
REMOVAL

- .1 Contractor is to provide PCA a minimum of three (3) weeks' advanced notice prior to a temporary road closure.
- .2 Contractor is responsible for coordinating any required temporary road closures with the City of Peterborough.
- .3 Provide temporary controls in order to execute Work expeditiously.
- .4 Remove from site all such work after use.

1.5 WORK AREA DELINEATION

- .1 Erect and maintain temporary site enclosures and barriers to delineate the work area as identified on the drawings and other measures as necessary to
-

define the Work area and restrict access of the public to the Work area.

- .2 Place construction warning signage at the work area and construction camp.
- .3 Provide lockable truck entrance gate(s) as approved and conforming to applicable traffic restrictions on adjacent roads. Equip gates with locks and keys.

1.6 CONSTRUCTION AND DETOUR .1
SIGNAGE

Provide a construction Traffic Control Plan as set out in Section 01 35 00.06 - Special Procedures for Traffic Control.

- .2 Provide a pre-construction record of the approved haul route annotated as to location, and any road deficiencies as set out in Section 01 20 01 - Site Access.
- .3 Identify measures to upgrade haul road for construction traffic to governing authorities, Agency, and Departmental Representative.
 - .1 Upon confirmation, implement haul road upgrades to the requirements of the Municipalities and the Departmental Representative.
- .4 Provide Notice and Signage in both official languages and by graphic symbols as identified in the construction Traffic Control Plan.

1.7 GUARD RAILS AND
BARRICADES

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

1.8 NAVIGATION WARNING
SIGNAGE

- .1 Not Used.

1.9 ACCESS TO SITE

- .1 Provide and maintain access roads and construction runways as may be required for access to work areas, and for public and Parks Canada staff access to the waterway and related structures and buildings.
- .2 Undertake approved measures to upgrade haul road for construction traffic.

- | | | |
|---|----|--|
| <u>1.10 PUBLIC TRAFFIC FLOW</u> | .1 | Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public, as required. |
| <u>1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY</u> | .1 | Protect surrounding private and public property from damage during performance of Work. |
| | .2 | Be responsible for damage incurred. |
| <u>1.12 WASTE MANAGEMENT AND DISPOSAL</u> | .1 | Separate waste materials for reuse in accordance with Section 01 74 21 - Construction / Demolition Waste Management and Disposal. |

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 Product quality, availability, storage, handling, protection, and transportation.
- .2 Manufacturer's instructions.
- .3 Quality of Work, coordination and fastenings.
- .4 Existing facilities.

1.2 RELATED REQUIREMENTS

- .1 Section 01 45 00 - Quality Control
- .2 Section 01 33 00 - Submittal Procedures

1.3 REFERENCE STANDARDS

- .1 Within text of each specifications section, reference may be made to reference standards. Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .2 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .3 Cost for such testing will be borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .4 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.

1.4 OPSS ONTARIO PROVINCIAL STANDARD

- .1 Whenever OPSS Ontario Provincial Standard Specifications and OPSD Ontario Provincial Standard Drawings are been quoted in these specifications, any standards, specifications or publications which are referred to within the specified OPSS or OPSD form an integral part of those documents and thus form an integral part of these specifications, unless specifically otherwise mentioned.
 - .2 OPSS Ontario Provincial Standard Specifications and OPSD Ontario Provincial Standard Drawings quoted in these specifications are available online at:
-

<http://www.raqsa.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage>.

1.5 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided. Salvage materials as identified for reuse shall be safely and securely stored.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .4 Quality control shall be provided by the Departmental Representative as set out in Section 01 45 00 - Quality Control.

1.6 AVAILABILITY

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

1.7 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and

undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.8 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Pay costs of transporting of specified material and equipment to be salvaged and re-used to and from the facility designated by Departmental Representative. Work includes loading and unloading, handling and storing such products.

1.9 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.10 QUALITY OF WORK

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

1.11 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of all work.

1.12 REMEDIAL WORK

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

1.13 EXISTING UTILITIES

- .1 Protect, relocate or maintain existing active services. When services are encountered, relocate or cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

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

- | | | |
|---|----|---|
| <u>1.1 SECTION INCLUDES</u> | .1 | Field engineering survey services to measure and stake site. |
| | .2 | Recording of subsurface conditions found. |
| | .3 | List of geotechnical reports, and environmental studies undertaken for the project and available to the contractor. |
| | | |
| <u>1.2 REFERENCES</u> | .1 | Owner's identification of existing survey control points and property limits. |
| | | |
| <u>1.3 MEASUREMENT AND PAYMENT PROCEDURES</u> | .1 | The work covered by this Section will not be considered separately for payment but will be considered as incidental to work of this specification. Include cost in Contract Lump Sum Price. |
| | | |
| <u>1.4 QUALIFICATIONS OF SURVEYOR</u> | .1 | Qualified registered land surveyor, licensed to practice in the province of Ontario, acceptable to Departmental Representative. |
| | .2 | Surveyor with minimum five years relevant construction layout experience, acceptable to Departmental Representative is to carry out the layout work. |
| | | |
| <u>1.5 SURVEY REFERENCE POINTS</u> | .1 | Existing base horizontal and vertical control points are designated on drawings. |
| | .2 | Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction. |
| | .3 | Make no changes or relocations without prior written notice to Departmental Representative. |
| | .4 | Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations. |
| | .5 | Require surveyor to replace control points in accordance with original survey control. |
-

1.6 SURVEY REQUIREMENTS

- .1 Qualified land surveyor is to establish minimum 3 permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.
- .2 Establish lines and levels, locate and lay out, by instrumentation.
- .3 Stake for grading, fill and topsoil placement and landscaping features.
- .4 Stake slopes and berms.
- .5 Establish lines and levels for crest, and toe of slopes and elevations.

1.7 EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.
- .2 Protect any line encountered during excavation work. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

1.8 RECORDS

- .1 Qualified land surveyor is to prepare as built record of the embankments and ancillary works.
- .2 Maintain a complete, accurate log of control and survey work as it progresses.
- .3 Record locations of maintained, re-routed and abandoned service lines.
- .4 Submit paper and electronic copies of record drawings per Section 01 78 00.

1.9 ACTION AND
INFORMATIONAL SUBMITTALS

- .1 Submit name and address of Surveyor to Departmental Representative.
 - .2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.
-

1.10 SUBSURFACE CONDITIONS .1 Test hole logs are available within the tender package.

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

- | | | |
|---------------------------------|----|--|
| <u>1.1 RELATED REQUIREMENTS</u> | .1 | Section 01 74 21 - Construction/Demolition Waste Management and Disposal |
| | .2 | Section 01 35 43 - Archaeological, Cultural and Environmental Procedures |
| <u>1.2 REFERENCES</u> | .1 | Construction to be in accordance with the latest edition of the applicable Ontario and National codes. The above to govern except where other applicable codes or provided notes are more restrictive. |
| <u>1.3 PROJECT CLEANLINESS</u> | .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 daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site. |
| | .3 | Clear snow and ice from project site and staging areas. Temporary bank/pile snow within work limits and/or remove from site as required.
.1 Accumulated snow and ice should not be deposited in the waterbody or stockpiled in a location where it is feasible for melt and surface runoff from the stockpile to migrate into the waterbody. Stockpiles of ice and snow should be appropriately isolated. |
| | .4 | Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris. |
| | .5 | Clean and maintenance of haul routes on a weekly basis, or in accordance with the authorities having jurisdictions, whichever is more stringent. |
| <u>1.4 FINAL CLEANING</u> | .1 | When Work is Substantially Performed remove surplus products, tools, surplus stockpiled material, construction machinery and equipment not required for performance of remaining Work from project site and staging area. |
| | .2 | Remove waste products and debris and leave Work clean and suitable for occupancy. |
| | .3 | Prior to final review remove surplus products, |
-

tools, construction machinery and equipment.

- .4 Remove waste materials and debris from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of surplus stockpiles material, waste and debris.

1.5 WASTE MANAGEMENT AND
DISPOSAL

- .1 Not applicable

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 WASTE MANAGEMENT GOALS

- .1 Prior to start of Work, conduct meeting with Departmental Representative to review and discuss PCA's waste management goal and Contractor's proposed Waste Reduction Workplan for Construction, Renovation and /or Demolition (CRD) waste to be generated.
- .3 Minimize amount of non-hazardous solid waste generated by project and accomplish maximum source reduction, reuse and recycling of solid waste produced by CRD activities.
- .4 Protect environment and prevent environmental pollution damage.

1.2 RELATED SECTIONS

- .1 Section 01-35-43 - Archaeological, Cultural and Environmental Procedures

1.3 REFERENCE STANDARDS

- .1 Ontario Ministry of Environment
 - .1 Ontario 3 R's Regulations (Regulation 102/94) for waste management programs applicable to construction and demolition projects greater than 2,000 m2.
 - .2 Ontario Environmental Protection Act (EPA)
 - .1 Regulation 102/94, Waste Audits and Waste Reduction Workplans.
 - .2 Regulation 103/94, Source Separation Programs.
 - .3 Canadian Construction Association (CCA)
 - .1 CCA 81-2001: A Best Practices Guide to Solid Waste Reduction.
 - .4 Public Works and Government Services Canada (PWGSC)
 - .1 2002 National Construction, Renovation and Demolition Non-Hazardous Solid Waste Management Protocol.
 - .2 CRD Waste Management Market Research Report (available from PWGSC's Environmental Services).

1.4 DEFINITIONS

- .1 Approved/Authorized recycling facility: waste recycler approved by applicable provincial authority or other users of material for recycling approved by the Departmental Representative.
-

- .2 Inert Fill: inert waste - exclusively soils, rock and concrete.
- .3 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .4 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .5 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .6 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
 - .2 Returning reusable items including pallets or unused products to vendors.
- .7 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .8 Separate Condition: refers to waste sorted into individual types.
- .9 Source Separation: act of keeping different types of waste materials separate beginning from the point they became waste.
- .10 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as co-ordinating required submittal and reporting requirements.
- .11 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials generated by project. Specifies diversion goals, implementation and reporting procedures, anticipated results and responsibilities. Waste Reduction Workplan (Schedule B) information acquired from Waste Audit.

1.5 DOCUMENTS

- .1 Post and maintain in visible and accessible area at

job site, one copy of following documents:

.1 Waste Reduction Workplan.

1.6 ACTION AND
INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00-Submittal Procedures.
- .2 Prepare and submit following prior to project start-up:
 - .1 1 hard copy and 1 electronic copy of completed Waste Reduction Workplan (WRW).
- .3 Prepare and submit on monthly basis, throughout project or at intervals agreed to by Departmental Representative the following:
 - .1 Receipts, scale tickets, waybills, and/or waste disposal receipts that show quantities and types of materials reused, recycled, or disposed of.

1.7 WASTE REDUCTION
WORKPLAN (WRW)

- .1 Prepare and submit WRW prior to project start-up.
 - .2 WRW identifies strategies to optimize diversion through reduction, reuse, and recycling of materials and comply with applicable regulations.
 - .3 WRW should include but not limited to:
 - .1 Applicable regulations.
 - .2 Specific goals for waste reduction, identify existing barriers and develop strategies to overcome them.
 - .3 Destination of materials identified.
 - .4 Deconstruction/disassembly techniques and schedules for gabion baskets.
 - .5 Methods to collect, separate, and reduce generated wastes like steel, gabion stone, etc.
 - .6 Security of on-site stock piles.
 - .7 Protection of personnel, sub-contractors.
 - .8 Clear labelling of storage areas.
 - .9 Training plan for contractor and sub-contractors.
 - .10 Methods to track and report results reliably.
 - .11 Details on materials handling and removal procedures.
 - .12 Recycler and reclaimer requirements.
 - .13 Quantities of materials to be salvaged for reuse or recycled and materials sent to landfill.
 - .14 Requirements for monitoring on-site wastes management activities.
-

- .4 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .5 Post WRW or summary where workers at site are able to review content.

1.8 USE OF SITE AND FACILITIES

- .1 Execute Work with minimal interference and disturbance to normal use of premises.
- .2 Maintain security measures established by facility provide temporary security measures approved by Departmental Representative.

1.9 WASTE PROCESSING SITES

- .1 Contractor is responsible to research and locate waste diversion resources and service providers. Salvaged materials are to be transported off site to approved and/or authorized recycling facilities or to users of material for recycling. 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.

- .1 Province of Ontario

- .1 Name: Ministry of Environment and Energy, 135 St. Clair Avenue West, Toronto, ON, M4V 1P5

- Telephone: 800-565-4923 or 416-323-4321

- Fax: 416-323-4682

- .2 Recycling Council of Ontario:

- .1 Name: 215 Spadina Avenue, #225, Toronto, ON, M5T

- Telephone: 416-657-2797

- Fax: 416-960-8053

- E-mail: rco@rco.on.ca

1.10

1.11 STORAGE, HANDLING AND PROTECTION

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
-

- .2 Unless specified otherwise, materials for removal becomes Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items not removed from the site within 24 hours of generation.
- .4 Protect surface drainage from damage and blockage.
- .5 Separate and store materials produced during project in designated areas.
- .6 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off-site processing facility for separation.
 - .3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.
- .7 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.

1.12 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of oil, mineral spirits, volatile materials, into waterways.
- .3 Remove materials on-site as Work progresses.
- .4 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in the waste audit.

1.13 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.
-

PART 3 - EXECUTION

3.1 APPLICATION

- .1 Do Work in compliance with WRW.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

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

3.3 DIVERSION OF MATERIALS

- .1 Not required.

3.4 CANADIAN GOVERNMENTAL
DEPARTMENTS CHIEF
RESPONSIBILITY FOR THE
ENVIRONMENT

- .1 Government Chief Responsibility for the Environment:

Province	Address	General Inquires	Fax
Ontario	Ministry of Environment and Energy, 135 St. Clair Avenue West Toronto ON M4V 1P5	416-323-4321 800-565-4923	416-323- 4682

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 22 01 - Measurement for Payment
- .2 Section 01 33 00 - Submittal Procedures
- .3 Section 01 32 16.07 - Construction Progress Schedule
- .4 Section 01 35 43 - Archaeological, Cultural and Environmental Procedures
- .5 Section 01 45 00 - Quality Control
- .6 Section 01 48 00 - Construction Control and Monitoring
- .7 Section 01 74 20 - Construction / Demolition Waste Management and Disposal
- .8 Section 35 42 19 - Preservation of Watercourses

1.2 ADMINISTRATIVE
REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative's inspection.
 - .2 Departmental Representative Inspection:
 - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Environmental testing to be undertaken by the Contractor at staging areas on PCA lands and at external staging areas to confirm that there has been no impact to the soils. Any issues arising from the testing shall be addressed by the contractor at their expense.
 - .4 The contractor shall provide a release from owners of adjacent lands indicating that there are no impacts to
-

-
- their services and utilities (water, sanitary, storm drainage; electricity, communications) as a result of the construction activities. The Departmental Representative will provide all testing information related to groundwater monitoring to the contractor for their usage.
- .5 The contractor shall provide a release from the municipality and/or County regarding restoration of haul roads in the immediate vicinity of the Work.
- .6 The contractor shall provide a release from any waste transfer / receiving station and/or registered landfill as part of the Waste Management Workplan.
- .7 The contractor shall provide a release from landowners whose lands have been used as a construction staging area indicating their acceptance of the site clean-up / grading /restoration.
- .3 Completion Tasks: the Contractor is to sign and submit written certificates in English that tasks have been performed as follows:
- .1 Work: completed and inspected for compliance with Contract Documents.
- .2 Defects: corrected and deficiencies completed.
- .3 Work is complete and ready for final inspection.
- .4 Final Inspection:
- .1 When completion tasks are done, submit new certificates and request final inspection of Work by Departmental Representative and Contractor.
- .2 When Work is deemed incomplete according to Departmental Representative, complete outstanding items and request re-inspection.
- .3 Upon final acceptance by the Departmental Representative, the contractor shall formally request that the embankments be taken over by the Agency on a particular date acceptable to the Departmental Representative.
- .5 Declaration of Substantial Performance: Refer to GC 1.1.4.
- .6 Final Payment:
- .1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
-

- .2 When Work deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.
Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.3 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
 - .2 Waste Management: separate waste materials for recycling and/or reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

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 RELATED REQUIREMENTS

- .1 Section 01 22 01 - Measurement and Payment
- .2 Section 01 33 00 - Submittal Procedures
- .3 Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart
- .4 Section 01 35 43 - Archaeological, Cultural and Environmental Procedures
- .5 Section 01 45 00 - Quality Control
- .6 Section 01 48 00 - Construction Control and Monitoring
- .7 Section 01 74 21 - Construction/Demolition Waste Management and Disposal
- .8 Section 35 01 40.92 - Preservation of Water Courses
- .9 Section 01 71 00 - Examination and Preparation

1.2 ADMINISTRATIVE REQUIREMENTS

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

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Not applicable
-

1.4 FORMAT

.1 Not applicable

1.5 CONTENTS - PROJECT
RECORD DOCUMENTS

.1 Not applicable

1.6 AS -BUILT DOCUMENTS AND
SAMPLES

.1 Maintain at site for Departmental Representative
one record copy of:

- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Change Orders and other modifications to Contract.
- .5 Reviewed shop drawings, product data, and samples.
- .6 One set, full-size paper copy of red-lined AS-BUILT drawings and specifications, to be updated as the work progresses
- .7 Field test records.
- .8 Inspection certificates.
- .9 Manufacturer's certificates.

.2 Store record documents and samples in field office
apart from documents used for construction.

.1 Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with
Section number listings in List of Contents of this
Project Manual.

.1 Label each document "PROJECT RECORD" in neat,
large, printed letters.

.4 Maintain record documents in clean, dry and legible
condition.

.1 Do not use record documents for construction
purposes.

.5 Keep record documents and samples available for
inspection by Departmental Representative.

.6 Turn one set, paper copy of red-lined AS-BUILT
drawings and specifications over to Departmental
Representative on completion of work.

.7 Turn one set, paper copy and electronic copy of
record survey drawing and survey data as set out in
Section 01 71 00 - Examination and Preparation over
to Departmental Representative on completion of
work.

.8 If project is completed without significant
deviations from Contract drawings and

specifications submit to Departmental Representative one set of drawings and specifications marked as "AS-BUILT".

1.7 RECORDING INFORMATION
ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, Record information to create red-lined AS-BUILT drawings.
- .2 Use felt tip marking pens, maintaining separate colours for each major component of work, for recording information.
- .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements in relation to established bench mark.
 - .2 Field changes of dimension and detail.
 - .3 Changes made by change orders.
 - .4 Details not on original Contract Drawings.
 - .5 Referenced Standards to related shop drawings and modifications.
- .5 Provide digital photos, if requested, for site records.

1.8 FINAL SURVEY

- .1 Submit final site survey certificate in accordance with Section 01 71 00- Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.9 EQUIPMENT AND SYSTEMS

- .1 Not applicable

1.10 MATERIALS AND FINISHES

- .1 Not applicable.

1.11 MAINTENANCE MATERIALS

- .1 Not applicable.

1.12 DELIVERY, STORAGE AND
HANDLING

- .1 Store all materials and special tools in manner to prevent damage or deterioration.

- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Remove and replace damaged products at own expense and for review by Departmental Representative.
- .1 Not applicable.

1.13 WARRANTIES AND BONDS

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 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 35 43 - Archaeological, Cultural and Environmental Procedures
- .3 Section 01 45 00 - Quality Control
- .4 Section 01 61 00 - Common Product Requirements
- .5 Section 31 23 33.01 - Excavation, Trenching and Backfilling

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM D4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
- .2 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 1001 - Material Specification for Aggregate - General (November 2005).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for aggregate materials and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit 3 samples.
 - .2 Allow continual sampling by Departmental Representative during production.
 - .3 Provide Departmental Representative with access to source and processed material for sampling.
 - .4 Supply new or clean sample bags or containers according appropriate to aggregate materials. Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .2 Transportation and Handling: handle and transport aggregates to avoid segregation, contamination and
-

degradation.

- .3 Storage: store washed materials or materials excavated from underwater 24 hours minimum to allow free water to drain and for materials to attain uniform water content.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
 - .1 Greatest dimension to exceed 5 times least dimension.
- .3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
 - .1 Screenings produced in crushing of quarried rock, boulders, or gravel.
- .4 Coarse aggregates satisfying requirements of applicable section to be crushed limestone quarried rock.

2.2 SOURCE QUALITY CONTROL

- .1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling 1 week minimum before starting production.
- .2 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source.
- .3 Advise Departmental Representative one (1) week minimum 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 Aggregate source preparation:
 - .1 Aggregate material is to be supplied from Ontario Ministry of Transportation approved source or alternative approved by Department Representative.
 - .2 If requested by the Departmental Representative, submit Ontario Ministry of Transportation approval certificates/documentation of the proposed source of aggregates.
 - .2 Processing:
 - .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
 - .2 Blend aggregates, as required, to satisfy gradation requirements for material and, percentage of crushed particles, or particle shapes specified.
 - .1 Use methods and equipment approved in writing by Departmental Representative.
 - .3 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.
 - .4 Where necessary, screen, crush, wash, classify and process aggregates with suitable equipment to meet requirements.
 - .1 Use only equipment approved in writing by Departmental Representative.
 - .5 Stockpiling:
 - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative.
 - .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 Stockpile different aggregates by 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 hours of rejection.
- .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Maximum 1.5 m for coarse aggregate and base course materials.
 - .2 Maximum 1.5 m for fine aggregate and sub-base materials.
 - .3 Maximum 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 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .4 Remove any unused aggregates from the site as directed by Departmental Representative.
- .5 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.
- .6 Restrict public access to temporary or permanently abandoned stockpiles by means acceptable to Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION

- .1 This section specifies requirements for the clearing and grubbing of the work area as designated by the Departmental Representative.

1.2 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 35 29.06 - Health and Safety Requirements
- .3 Section 01 74 11 - Archaeological, Cultural and Environmental Procedures
- .4 Section 01 71 00 - Examination and Preparation
- .5 Section 01 74 11 - Cleaning
- .6 Section 01 74 21 - Construction / Demolition Waste Management and Disposal
- .7 Section 31 23 33.01 - Excavation, Trenching and Backfilling
- .8 Section 31 14 13 - Soil Stripping and Stockpiling

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 There shall be no separate measurement for payment for clearing and grubbing or close cut clearing and underbrush clearing. Include cost in Contract Lump Sum Price.
- .2 Payment shall be made as set out in Section 01 22 01 and shall be incidental to all work related to all applicable items of work.

1.4 REFERENCE STANDARDS

- .1 Ontario Provincial Standard Specifications (OPSS)
- .1 OPSS 201 - Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders, November 2007.
- .2 OPSS 805 - Temporary Erosion and Sediment Control Measures (November 2010).
- .2 Stormwater Management Planning and Design Manual, Ontario Ministry of Environment (March 2003).
- .3 Erosion & Sediment Control Guideline for Urban Construction (December 2006).
-

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- 1.5 ACTION AND INFORMATION SUBMITTALS
- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Samples:
 - .1 Submit 1 sample of each material listed below for approval prior to delivery of materials to project site.
 - .3 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .4 Submit manufacturer's installation instructions.
- 1.6 QUALITY ASSURANCE
- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06.
 - .2 Safety Requirements: worker protection.
 - .1 Workers must wear gloves, respirators dust masks, long sleeved clothing, eye protection protective clothing.
 - .2 Clean up spills of preservative materials immediately with absorbent material and safely discard to landfill.
- 1.7 WASTE MANAGEMENT AND DISPOSAL
- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.
 - .2 Replace any trees if damaged, as directed by Departmental Representative.
- PART 2 - PRODUCTS
- 2.1 MATERIALS
- .1 Herbicide: herbicide is not permitted on this project
 - .2 Soil Material for Fill:
 - .1 Excavated soil material: free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, deleterious, or objectionable materials.
 - .2 Remove and store soil material for reuse within grubbed areas.
-

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 watercourse, properties and walkways, according to requirements of Lake Simcoe Region Conservation Authority or applicable requirements of other authorities having jurisdiction, whichever is more stringent.
- .2 If necessary (stockpiles in spring) temporary reptile fencing, such as polythene/ woven geotextile secured with timber stakes, or material of a similar nature/function, shall be installed completely around gravel/soil stockpiles and exposed soils to prevent turtle nesting in the project area. Fencing should follow the Species at Risk Branch, Best Practices Technical Note, Reptile and Amphibian Fencing, Ver. 1.1, developed by the Ontario Ministry of Natural Resources and Forestry.
- .3 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .4 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION

- .1 Inspect site and verify with Departmental Representative, trees to be relocated and items designated to remain.
- .2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.
- .3 Notify utility authorities before starting clearing and grubbing.
- .4 Keep roads and paths free of dirt and debris.

3.3 CLEARING

- .1 Clearing includes felling, trimming, and cutting of trees into sections and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within cleared areas.
 - .2 Clear as designated by Departmental Representative, by cutting at a height of not more than 300 mm above ground. In areas to be subsequently grubbed,
-

height of stumps left from clearing operations to be not more than 1000 mm above ground surface.

- .3 Cut off branches, by qualified arborist and cut down trees overhanging area cleared as directed by Departmental Representative.
- .4 Cut off unsound branches by a qualified arborist, on trees designated to remain as directed by Departmental Representative.
- .5 Remove vegetation from targeted areas by non-chemical means and dispose of stripped vegetation at location approved by Departmental Representative.
- .6 Remove brush from targeted area by non-chemical means and dispose at a location approved by Departmental Representative

3.4 CLOSE CUT CLEARING

- .1 Close cut clearing to ground level.
- .2 Cut off branches by a qualified arborist overhanging area cleared as directed by Departmental Representative.
- .3 Cut off unsound branches by qualified arborist on trees designated to remain as directed by Departmental Representative.

3.5 ISOLATED TREES

Not applicable.

3.6 UNDERBRUSH CLEARING

- .1 Clear underbrush from areas as indicated at ground level.

3.7 GRUBBING

- .1 Remove and dispose of roots larger than 7.5 cm in diameter, matted roots, and designated stumps as approved by the Departmental Representative.
- .2 Grub out stumps and roots to not less than 200 mm below ground surface.
- .3 Fill depressions made by grubbing with suitable material and to make new surface conform to existing adjacent surface of ground.

3.8 REMOVAL AND DISPOSAL

- .1 Chipped wood debris may be reused on site as non-structural fill on dryside slope. Alternatively, provide Department Representative with certificate of licensed waste receiving station for approval of receiving site. Alternate non-licensed locations may be considered subject to the contractor having a formal agreement with the related party.
- .2 Chip and dispose on-site, or remove cleared and grubbed materials off site to disposal area as approved by Departmental Representative.
- .3 Cut timber greater than 150 mm diameter to 2400 mm lengths, and stockpile outside the active work area as directed by the Departmental Representative. Stockpiled timber becomes property of Departmental Representative Contractor and/or property owner.
- .4 Burning and burial of cleared and grubbed materials are not allowed.
- .5 Chip or mulch and place in temporary stockpile. Spread cleared and grubbed vegetative material on site as directed by Departmental Representative.
- .6 Remove diseased trees identified by Departmental Representative and dispose of this material to approval of Departmental Representative

3.9 FINISHED SURFACE

- .1 Leave ground surface of working and staging areas, in condition suitable for topsoil stripping and/or for use by the contractor, to approval of Departmental Representative.

3.10 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 This section specifies the environmentally responsible procedures for the stripping and preservation of topsoil.

1.2 RELATED REQUIREMENTS

- .1 Section 01 74 11 - Cleaning
- .2 Section 31 11 00 - Clearing and Grubbing
- .3 Section 31 22 13 - Rough Grading
- .4 Section 32 91 20 - Topsoil Placement and Grading
- .5 Section 01 35 43 - Archaeological, Cultural and Environmental Procedures

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 There shall be no separate measurement for payment for soil stripping and stockpiling or for any rehandling. Include cost in Contract Lump Sum Price.
- .2 Payment shall be made as set out in Section 01 22 01 and shall be incidental to all work related to soil stripping and stockpiling.

1.4 REFERENCE STANDARDS

- .1 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 201 - Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders, November 2007.
 - .2 OPSS 182 - Environmental Protection for Construction in Waterbodies and on Waterbody Banks (November 2010).
 - .3 OPSS 805 - Temporary Erosion and Sediment Control Measures (November 2010).
 - .2 Stormwater Management Planning and Design manual, Ontario Ministry of Environment (March 2003).
 - .3 Erosion & Sediment Control Guideline for Urban Construction (December 2006)
-

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 according to requirements of Erosion & Sediment Control Guideline for Urban Construction (December 2006) and sediment and erosion control drawings, 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 Ensure that procedures are conducted in accordance with applicable Provincial Regulatory agencies and Municipal requirements.

.2 Remove topsoil before construction procedures commence to avoid compaction of topsoil.

.3 Remove vegetation from targeted areas by non-chemical means and dispose of stripped vegetation as approved by Departmental Representative.

.4 Remove brush from targeted area by non-chemical means and dispose as approved by Departmental Representative.

.5 Strip topsoil as indicated by Departmental Representative. Avoid mixing topsoil with subsoil.

.6 Pile topsoil in berms in locations as approved by Departmental Representative. Stockpile height not to exceed 2.5 - 3 m.

.7 Dispose of unused topsoil off-site in location as indicated by Departmental Representative.

.8 Protect stockpiles from contamination and compaction.

- .9 Cover topsoil that has been piled for long term storage, with trefoil or grass to maintain agricultural potential of soil.
- .10 Carry out clearing and grubbing work in accordance with Section 31 11 00.
- .11 Topsoil that has been piled for long term storage (greater than 4 months) is to be seeded with annual rye grass to maintain agricultural potential of soil and to reduce erosion and sediment

3.3 PREPARATION OF GRADE

- .1 Verify that grades are correct and notify Departmental Representative if discrepancies occur and do not begin work until instructed by Departmental Representative.
 - .1 Grade area only when soil is dry to lessen soil compaction.
 - .2 Grade soil establishing natural contours and eliminating uneven areas and low spots, ensuring positive drainage.

3.4 PLACING OF TOPSOIL

- .1 Place topsoil only after Departmental Representative has accepted subgrade.
- .2 When replacing topsoil by truck, load with a small mechanical hoe (1.15 m3 or less) to allow for aeration of soil.
- .3 Spread topsoil during dry conditions by mechanical hoe in uniform layers not exceeding 150 mm, over unfrozen subgrade free of standing water.
- .4 Establish traffic patterns for equipment to prevent driving on topsoil after it has been spread to avoid compaction.
- .5 Cultivate soil following spreading procedures.

3.5 DISPOSAL

- .1 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill as approved by Departmental Representative.

3.6 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 All related work for rough grading including subgrade preparation.

1.2 RELATED REQUIREMENTS

- .1 Section 01 35 43 - Archaeological, Cultural and Environmental Procedures
- .2 Section 01 35 29.06 - Health and Safety Requirements
- .3 Section 01 45 00 - Quality Control
- .4 Section 01 56 00 - Temporary Barrier and Enclosures
- .5 Section 31 05 17 - Aggregate Materials
- .6 Section 31 11 00 - Clearing and Grubbing.
- .7 Section 31 14 13 - Soil Stripping and Stockpiling
- .8 Section 31 37 10 - RipRap

1.3 MEASUREMENT AND PAYMENT PROCEDURES

- .1 There shall be no separate measurement for payment for rough grading including preparation of subgrade. Include cost in Contract Lump sum price.
- .2 Payment shall be made as set out in Section 01 22 01 and shall be incidental to all work related to rough grading.

1.4 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM D698-07e1, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m³).
 - .2 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 206 - Construction Specification for Grading
 - .2 OPSS 212 - Construction Specification for Borrow
 - .3 OPSS 1010 - Material Specification for Aggregates - Base, Subbase, Select Subgrade and Backfill Material
 - .4 OPSS 1860 - Material Specification for Geotextiles
 - .5 OPSS 182 - General Specification for
-

- Environmental Protection for Construction in Waterbodies and on Waterbody Banks
- .6 OPSS 501 - Construction specification for Compacting
- .7 OPSS 805 - Construction Specification for Temporary Erosion and Sediment Control Measures
- .8 OPSS 902 - Construction Specification for Excavation and Backfilling - Structures

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

1.6 EXISTING CONDITIONS

- .1 Contractor to establish location of all underground and surface utility lines before commencing work.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Fill material: Granular B Type 2 in accordance with Section 31 05 16 - Aggregate Materials.
- .2 Excavated or graded material existing on site suitable to use as fill for grading work if approved by Departmental Representative.

PART 3 - Execution

3.1 EXAMINATION

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

3.2 STRIPPING OF TOPSOIL

- .1 Commence topsoil stripping of areas as indicated Departmental Representative after area has been cleared of grasses, brush and weeds.
- .2 Strip topsoil to depths as indicated Departmental Representative. Avoid mixing topsoil with subsoil.
- .3 Stockpile in locations as indicated by Departmental Representative. Stockpile height not to exceed 3 m.
- .4 Dispose of unused topsoil off site to location as indicated by Departmental Representative.

3.3 GRADING

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
- .2 Rough grade to following depths below finish grades:
 - .1 200 mm for grassed areas.
 - .2 150 mm minimum for stockpiled areas.
 - .3 150 mm for storage area.
 - .4 450 mm for embankments unless otherwise specified or required for the work.
 - .5 To requirements as identified on contract drawings at other work areas.
- .3 Grade ditches to capture run-off to depth as indicated.
- .4 Prior to placing fill over existing ground, proof-roll by 3 passes of fully loaded tandem, or sheepsfoot compactor (minimum 10 tonne), scarify surface to depth of 150 mm minimum before placing fill over existing ground. 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 98% under all surfaces unless specified otherwise.
- .6 Do not disturb soil within branch spread of trees or shrubs to remain.

3.4 TESTING

- .1 Inspection and testing of soil compaction will be carried out by testing laboratory with Canadian Council Independent Laboratories (CCIL) designation. Costs of tests will be included in unit price for appropriate item. Refer to Section 01 45 00 - Quality Control.
 - .2 Submit testing procedure, frequency of tests to
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Departmental Representative for review and approval.

3.5 CLEANING

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

3.6 PROTECTION

- .1 Identify all above-ground and below-ground works including utilities and services prior to commencement of construction.
- .2 Protect existing trees, fencing, landscaping, natural features, bench marks, buildings, 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.
- .3 Maintain access roads to prevent accumulation of construction related debris on roads.

3.7 SURPLUS MATERIAL

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

END OF SECTION

PART 1 - GENERAL

<u>1.1 SECTION INCLUDES</u>	.1	Excavation to the line and elevation according to the contract drawings and specifications.
	.2	Excavation to maintain the stability of temporary and permanent works including identification and protection of underground and above-ground facilities.
	.3	Backfilling with approved materials to build up, patch or repair existing structures such as slope embankment and associated works to the appropriate grades as indicated on the contract drawings.
	.4	Excavation and disposal of surplus material.
<u>1.2 RELATED REQUIREMENTS</u>	.1	Section 31 11 00 - Clearing and Grubbing
	.2	Section 31 37 00 - Rip-Rap
	.3	Section 01 35 43 - Archaeological, Cultural and Environmental Procedures
	.4	Section 31 22 13 - Rough Grading
	.5	Section 31 32 19.01 - Geotextiles
	.6	Section 31 05 17- Aggregate Material
<u>1.3 REFERENCE STANDARDS</u>	.1	Latest revision of American Society for Testing and Materials International (ASTM) Standards:
	.1	ASTM C117, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
	.2	ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
	.3	ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.
	.4	ASTM D698, 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, 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, Standard Test Methods for Liquid

Limit, Plastic Limit, and Plasticity Index of Soils.

- .2 Ontario Provincial Standard Specifications / Drawings (OPSS/OPSD), Ontario Ministry of Transportation:
 - .1 OPSS 180, General Specification for Management of Excess Materials.
 - .2 OPSS 421, Construction Specification for Pipe Culvert Installation.
 - .3 OPSS 501, Construction Specification for Compacting.
 - .4 OPSS 902, Construction Specification for Excavating and Backfilling of Structures.
 - .5 OPSS 1004, Ontario Provincial Standard Specification, Material Specification for Aggregates - Miscellaneous.
 - .6 OPSS 1010, Ontario Provincial Standard Specification, Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.
 - .7 OPSS 1001, Ontario Provincial Standard Specification, Material Specification for Aggregates - General.
 - .8 Ministry of Transportation (Ontario):
 - .1 Environmental Guide for Erosion and Sediment Control during Construction of Highway Projects.
- .3 PCA Environmental and Guidelines Document Ontario Waterways, July 2017 (ESG)
- .4 Occupational Health and Safety Act (OHSA).
- .5 Canadian Environmental Quality Guidelines (CCME).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article of this Section.
 - .3 Submit to the Departmental Representative written notice at least seven (7) days prior to excavation work, to ensure cross sections are taken.
 - .4 Preconstruction Submittals:
 - .1 Submit construction equipment list for major equipment to be used prior to start of Work.
 - .2 Submit records of underground utility locates, indicating: clearance record from utility authority, location plan of relocated and abandoned services, and
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location plan of existing utilities as found in field.

1.5 WASTE MANAGEMENT AND DISPOSAL

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

1.6 EXISTING CONDITIONS

- .1 Examine all geotechnical reports available from the Departmental Representative.
 - .2 Buried Services:
 - .1 Before commencing work establish location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: The Departmental Representative will pay the costs of relocating services.
 - .3 Remove obsolete buried services as determined by relevant authority and approved by the Departmental Representative.
 - .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .5 Prior to beginning of excavation Work, notify the Departmental Representative to establish location and state of use of buried utilities and structures. Authorities having jurisdiction or the Departmental Representative shall clearly mark such locations to prevent disturbance during Work.
 - .6 Confirm locations of buried utilities by using soil hydrovac methods and/or using testing by careful test excavation or hand digging.
 - .7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
 - .8 Where utility lines or structures exist in area of excavation, obtain direction of the Departmental Representative before removing or re-routing. Costs for such Work will be paid by the Contractor.
 - .9 Record location of maintained, re-routed and
-

abandoned underground lines.

- .10 Confirm locations of recent excavations adjacent to area of excavation.

- .3 Existing buildings and surface features:

- .1 Conduct with the 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 the Work.
- .2 Protect existing buildings and surface features from damage while Work is in progress. In the event of damage, immediately repair as directed by the Departmental Representative who will pay for the cost of damage.
- .3 Where required for excavation, cut roots or branches or proceed to vegetation removal as directed by the Departmental Representative in accordance with Section 31 11 00 - Clearing and Grubbing.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Clear Stone:

- .1 Properties to follow OPSS 1004 specification and Section 31 05 16 - AGGREGATE MATERIALS and the following requirements:
 - .1 19.0mm Type I as per OPSS 1004.
 - .2 Crushed or screened stone from quarry or other approved sources by the Departmental Representative.
 - .3 Unfrozen and free from cinders, ashes, sods, refuse or other deleterious materials.
 - .4 Gradations to be within limits specified in the drawings.

- .2 Topsoil Fill:

- .1 Properties to follow OPSS 1010 specification and Section 32 91 19.13 - TOPSOIL PLACEMENT & GRADING.
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.3 Granular A:

.1 Properties to follow OPSS 1010 specification and Section 31 05 16 - AGGREGATE MATERIALS and the following requirements:

.1 Crushed, or screened stone, gravel and sand from quarry or other approved sources by the Departmental Representative including granular material from required excavation.

.2 Unfrozen and free from cinders, ashes, sods, refuse or other deleterious materials.

.3 Gradations to follow OPSS 1010 and within limits specified when tested to LS-602 and/or LS-702; or ASTM C136 and/or ASTM D422.

.4 Gradations to be within limits specified in the drawings.

.4 Geotextile:

.1 Refer to Section 31 32 19.01 - Geotextile.

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 in accordance with provincial, regional or municipal requirements, whichever dictates the regulatory requirements of the Works. The Contractor is required to establish provisions for monitoring of the Work and place temporary erosion protection mitigation measures if required.

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

.3 Remove erosion and sediment controls following approval of the Departmental Representative. Restore and stabilize areas disturbed during removal.

3.2 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated or as directed by the Departmental Representative.
- .2 Perform all works in compliance with Section 01 35 43 - Environmental Procedures.
 - .1 Remove vegetation such as trees, shrubs, and grasses or other obstructions from the work area, as indicated on the drawings in accordance with Section 31 11 00 - CLEARING AND GRUBBING to Section 31 32 19.01 - GEOTEXTILE.

3.3 PREPARATION /
PROTECTION

- .1 Protect existing features in accordance with Section 01 56 00 - TEMPORARY BARRIERS AND ENCLOSURES and applicable local regulations.
- .2 Keep excavations clean, free of standing water, and loose soil.
- .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect the soil to the satisfaction of the Departmental Representative.
- .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .5 Protect buried services that are required to remain undisturbed.
- .6 Protect adjacent properties and structures including lock, existing buildings and other amenities.

3.4 DEWATERING AND HEAVE
PROTECTION

- .1 Keep excavations free of water while Work is in progress.
 - .2 Provide details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs for the approval of the Departmental Representative.
 - .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
 - .1 Prevent piping or bottom heave of excavations by groundwater lowering or other means.
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- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures and in a manner not detrimental to the public and private property, or portion of Work completed or under construction.
 - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.
- .6 Waste water management. Water quality downstream of the construction activities not to exceed SSEMP action monitoring point limit.

3.5 EXCAVATION

- .1 Advise the Departmental Representative at least 7 days in advance of excavation operations for initial cross sections to be taken by Departmental Representative.
 - .2 Excavate to lines, grades, elevations and dimensions as indicated on the contract drawings or as directed by the Departmental Representative.
 - .3 Use water spray or other approved methods for dust control, to be approved by the Departmental Representative.
 - .4 Remove, where applicable, demolished foundations and rubble, paving, masonry, concrete, wood, rock slabs and other obstructions encountered during excavation.
 - .5 Excavation must not interfere with bearing capacity of adjacent foundations or the stability of adjacent nearby structures, including waterway embankments or interface with access and egress from lock station or adjacent residences.
 - .6 Do not disturb soil within branch spread of trees or shrubs that are to remain.
 - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
 - .7 For trench excavation, unless otherwise authorized by the Departmental Representative in writing, do not excavate more than 30 m in advance of installation operations and do not leave open more than 15 m at end of day's operation.
 - .8 Keep excavated and stockpiled materials safe distance away from edge of excavation/trench as
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required by the OHSA.

- .9 Restrict vehicle operations directly adjacent to open trenches.
 - .10 Dispose of surplus and unsuitable excavated material in designated location or off site as directed by the Departmental Representative.
 - .11 Do not obstruct flow of surface drainage or natural watercourses.
 - .12 Bottom of earth or embankment excavation to be of competent soil, level, free of loose, soft or organic matter.
 - .13 Dress or reshape possible large voids at the bottom of excavation due to bridging of existing rockfill or rock slab or other backfilled materials, and fill the voids or depression with the select Granular material or as directed by the Departmental Representative.
 - .14 Remove unsuitable material from the excavated bottom including those that extend below required elevations to extent and depth as directed by the Departmental Representative.
 - .15 Materials excavated, if suitable for the embankment construction, can be re-used directly or stockpiled temporarily at designated areas as directed by the Departmental Representative.
 - .16 Haul and dispose of unsuitable material to a designated disposal areas as directed by the Departmental Representative.
 - .17 Where required correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with concrete specified for footings.
 - .2 Patch and fill over-excavated area or depressions and cavities with either Granular B Type II or Granular A select backfill compacted with a minimum 6 passes of compaction using 10 to 15 ton smooth drum vibratory compactor, or as approved by the Departmental Representative.
 - .18 Hand trim, make firm and remove loose material and debris from excavation.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to the undisturbed soil as directed by the Departmental Representative.
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.2 Where required, clean out rock seams and fill with concrete mortar or grout to the approval of the Departmental Representative.

- .19 Notify the Departmental Representative when bottom of excavation is reached.
- .20 Obtain the Departmental Representative approval of the completed excavation.

3.6 FILL PLACEMENT

- .1 Do not use backfill material which is frozen or contains ice, snow or debris.
 - .2 Transport, dump and spread all materials in such a manner so as to avoid segregation before compaction.
 - .3 During dumping and spreading, remove any waste materials such as, but not limited to, all debris, organics, vegetation or any other unsuitable materials.
 - .4 At the time of placement, maintain moisture content of the fill about $\pm 2\%$ of the optimum.
 - .5 Place fill materials in horizontal lifts beginning from the lowest area of the foundations unless specified otherwise.
 - .6 Place the specified granular material and impervious material in 200 mm maximum loose lift unless specified otherwise.
 - .7 If the material moisture content is greater than the limits specified herein, scarify and aerate the layer until the water content is within the specified limits or else remove and replace it with suitable material at no additional cost to the Owner.
 - .8 If the material is too dry, spray each lift with water to obtain the specified moisture content.
 - .9 Use types of fill as shown on the drawings.
 - .10 Refer to Section 3.12 for Fill Compaction.
 - .11 Prior to placing geotextile on the compacted bedding material, ensure the surface is smooth and uniform, and without any sharp protrusion that may damage the geotextile.
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3.7 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris in accordance with Section 01 74 19 - WASTE MANAGEMENT AND DISPOSAL, trim slopes, and correct defects as directed by the Departmental Representative.
- .2 Replace topsoil as directed by the Departmental Representative.
- .3 Reinstate lawns to elevation which existed before excavation.
- .4 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .5 Clean and reinstate areas affected by Work as directed by the Departmental Representative.
- .6 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.
- .7 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION

- .1 Materials and installation geotextiles used in erosion protection system for permanent Works, the purpose of which is to:
 - .1 Separate and prevent mixing of granular materials of different gradation and type.
 - .2 Act as hydraulic filters permitting passage of water while retaining underlying soil structure.

1.2 RELATED REQUIREMENTS

- .1 Section 01 22 01 - Measurement and Payment
- .2 Section 01 33 00 - Submittal Procedures
- .3 Section 01 74 20 - Construction/Demolition Waste Management and disposal
- .4 Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .5 Section 01 61 00 - Common Product Requirements
- .6 Section 31 37 10 - Rip-rap
- .7 Section 32 91 19.13 - Topsoil Placement and Grading

1.3 MEASUREMENT AND PAYMENT

- .1 No separate measurement for payment shall be made for geotextiles. Include cost in the Contract Lump Sum Price.
- .2 Payment shall be made as set out in Section 01 22 01 - Measurement and Payment and shall be incidental to the applicable item of work.

1.4 REFERENCE STANDARDS

- .1 Construction to be in accordance with the latest edition of the applicable Ontario and National codes. The above to govern except where other applicable codes or provided notes are more restrictive.
 - .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D3786M-09, Standard Test Method for Bursting Strength of Textile Fabrics
 - .2 ASTM D4355-07, Standard Test Method for
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Deterioration of Geotextiles by Exposure to Light, Moisture and Heat.

- .3 ASTM D4533-11, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
- .4 ASTM D4491-99a (2009), Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
- .5 ASTM D4632-08, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
- .6 ASTM D4751-04, Standard Test Method for Determining Apparent Opening Size of Geotextile.
- .7 ASTM GD4833-07, Standard Test Method for Index Puncture Resistance of Geomembrane and Related Products.
- .8 ASTM D5261 - 10 Standard Test Method for Measuring Mass per Unit Area of Geotextiles

.3 Ontario Provincial Standard Specifications (OPSS)

- .1 OPSS 1860- Material Specification for Geotextiles (November 2010)

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Not required.
- .4 Test and Evaluation Reports:
 - .1 Submit copies of mill test data and certificate at least 2 weeks prior to start of Work.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials in dry location off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents, and to requirements of OPSS 1860.

- .3 Replace defective or damaged materials with new.
- .3 Packaging Waste Management: remove for recycling and reuse packaging materials as specified in Construction Waste Management Plan in accordance with 01 74 21- Construction / Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

2.1 MATERIAL

- .1 Geotextile (for permanent Works): non-woven synthetic fibre fabric, supplied in rolls.
 - .1 Width: approved by the Departmental Representative.
 - .2 Composed of: minimum 95% by mass of polypropylene, polyethylene, polyester or other polymers, excluding polyamides, with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure for 60 days.
 - .3 Physical properties:
 - .1 Mass per unit area: to ASTM D5261, minimum 200 g/m².
 - .2 Grab Tensile strength and elongation (in any principal direction): to ASTM D4632.
 - .1 Tensile strength: minimum 690 N.
 - .2 Elongation at break: minimum 50%.
 - .3 Trapezoid tear strength: to ASTM D4533, minimum 275 N.
 - .4 Puncture resistance: to ASTM D4833, minimum 400 N.
 - .5 Mullen burst: to ASTM D3786, 2.17 MPa
 - .6 Hydraulic properties:
 - .1 Permittivity: to ASTM D4991, 1.6 sec⁻¹.
 - .2 Water flow rate: to ASTM D4991, 4480 l/min/m².
 - .3 Apparent opening size (AOS): to ASTM D4751, 0.212 mm.
 - .7 UV Stability: to ASTM D4355, 70% at 500h.
 - .2 Securing pins and washers: to CAN/CSA-G40.21 Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/m² to CAN/CSA G164.
 - .3 Geotextile for temporary sediment and erosion control measures shall be non-woven and as approved by the Departmental Representative.
 - .4 RECPs and Fibre Rolls composed of plastics are

prohibited (e.g., plastic netting).

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated and retain in position with pins as per the geotextile manufacturer's recommendations or to the requirements of the Departmental Representative.
 - .1 Orientation of geotextile shall be in the direction of the slope. The orientation shall be approved by the Departmental Representative.
- .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile as approved by the Departmental Representative.
- .4 Overlap each successive strip of geotextile to the manufacturer's recommendation, but to a minimum of 600 mm over previously laid strip. Where overlap joints are perpendicular to the channel flow, the overlap joint shall be in the flow direction.
- .5 Pin successive strips of geotextile with securing pins to the manufacturer's recommendations.
- .6 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .7 After installation, cover with overlying layer within 4 hours of placement.
- .8 Replace damaged or deteriorated geotextile to approval of Departmental Representative.
- .9 Place and compact backfill material in accordance with Section 31 23 33.01.

3.2 CLEANING

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

materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.3 PROTECTION

- .1 Vehicular traffic or construction machinery are not permitted directly on geotextile.

END OF SECTION

PART 1 - GENERAL

<u>1.1 SECTION INCLUDES</u>	.1	Supply and installation of rip-rap for erosion protection.
	.2	Supply and installation of clear stone for the stone drain (French Drain).
<u>1.2 RELATED REQUIREMENTS</u>	.1	Section 01 22 01 - Measurement and Payment
	.2	Section 01 33 00 - Submittal Procedure
	.3	Section 01 35 43 - Archaeological, Cultural and Environmental Procedures
	.4	Section 31 22 13 - Rough Grading
	.5	Section 31 32 19.01 - Geotextiles
	.6	Section 31 23 33.01 - Excavating, Trenching and Backfilling
	.7	Section 31 05 17 - Aggregate Material
<u>1.3 MEASUREMENT AND PAYMENT</u>	.1	Measure rip-rap in cubic metres of material placed as set out in Section 01 22 01 - Measurement and Payment.
	.2	Measure clear stone in cubic metres of material placed as set out in Section 01 22 01 - Measurement and Payment.
<u>1.4 REFERENCE STANDARDS</u>	.1	Ontario Provincial Standard Specifications (OPSS) / Ontario Ministry of Transportation
	.1	OPSS 1004, Ontario Provincial Standard Specification, Material Specification for Aggregates - Miscellaneous (November 2006).
	.2	OPSS 1010, Material Specifications for Aggregate-Base, Subbase, Select Subgrade and Backfill Material (April 2004).
	.3	OPSS 511, Construction Specifications for Rip-Rap Rock Protection and Granular Sheeting (April 2011).
<u>1.5 ACTION AND INFORMATIONAL SUBMITTALS</u>	.1	Submit in accordance with Section 01 33 00-Submittal Procedures.

1.6 WASTE MANAGEMENT AND
DISPOSAL

- .1 Divert left over aggregate materials from landfill to local quarry for reuse as approved by Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Stone:
- .1 Hard, durable quarry (shot-rock) stone, free from seams, cracks or other structural defects, clean with no deleterious materials, durable and resistant to weathering by air and water, non-acid generating, acceptable to the Departmental Representative. The Departmental Representative may reject any material at the stockpile, based on visual inspection, which contains excessive fines, dust or other deleterious products. The rip-rap shall meet following size distribution for the use intended:
- .1 Rip-Rap:
- .1 Not more than 10% of total volume of stones with individual size less than 75 mm (D min). Minimum size shall have a mean diameter of 250 mm.
- .2 Not less than 70% of total volume of stones with individual size of 380 mm (D max).
- .3 Remaining percentage of total volume to have uniform distribution of stones between 300 mm and 210 mm size.
- .4 Stones are to have angular faces and be spherical. No one dimension shall be greater than 30% of the mean dimension.
- .5 Stones shall be free of sand, silt and clay fraction. The Contractor should consider washing of the stone to provide material free of rock fines and dust at the source.
- .2 Granular fill material: to Section 31 05 16 and OPSS 1010 Granular "A".
- .3 Clear Stone material: to Section 31 05 16 and OPSS 1004 Aggregates - Miscellaneous.
- .2 Geotextile Filter: in accordance with Section 31 32 19.01

PART 3 - Execution

3.1 PLACING

- .1 Where rip-rap is to be placed on slopes, excavate trench at toe of slope to 0.45 m x 0.45 m or to dimensions as indicated on Contract drawings.
- .2 Fine grade area to be rip-rapped to uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.
- .3 Place geotextile on prepared surface in accordance with Section 31 32 19.01 - Geotextiles and as indicated. Avoid puncturing geotextile. Vehicular traffic over geotextile is not permitted.
- .4 Place rip-rap to thickness and details as indicated.
- .5 Place stones in manner approved by Departmental Representative to secure surface and create a stable mass. Place larger stones at bottom of slopes.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 This section covers all members to be used in the construction of the steel sheet piles. This specification also covers the installation of steel sheet piling and trimming of the sheet pile to the lines and grades shown on the drawings or as required.

1.2 REFERENCE STANDARDS

- .1 Latest revision of American Society for Testing and Materials International (ASTM) Standards:
 - .1 A36, Standard Specification for Carbon Structural Steel.
 - .2 A53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - .3 A139, Standard Specification for Electric-Fusion (ARC)-Welded Steel Pipe (NPS 4 and Over).
 - .4 A252, Standard Specification for Welded and Seamless Steel Pipe Piles.
 - .5 A328, Standard Specification for Steel Sheet Piling.
 - .6 A572, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
 - .7 A690, Standard Specification for High-Strength Low-Alloy Nickel, Copper, Phosphorus Steel H-Piles and Sheet Piling with Atmospheric Corrosion Resistance for Use in Marine Environments.
 - .8 A1011/A1011M, Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

1.3 SUBMITTALS

- .1 Provide qualifications of the proposed sheet pile installer.
 - .2 The contractor shall provide information from the manufacturer that indicates the sheet piling meets or exceeds the specifications listed in this section.
 - .3 The contractor shall submit verification from the manufacturer that the hammer can deliver the required energy.
 - .4 Splice locations, if necessary, shall be reviewed and accepted by the Departmental Representative prior to installation.
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1.4 QUALITY ASSURANCE

.1 Installer Qualifications:

- .1 Sheet piling installer shall have, as a minimum, three (3) successful past installation of sheet piling of comparable overall heights and sections and comparable penetration into soils similar to those existing at the site location.

PART 2 - PRODUCTS

2.1 GENERAL

- .1 All steel sheet piling shall be new and unspliced material throughout, unless otherwise reviewed and accepted by the Departmental Representative.
- .2 Steel sheet pile and special fabricated shapes shall be of a design that ensures continuous interlock throughout the entire length when in place.

2.2 MATERIALS

- .1 Steel sheet piling shall meet the requirements of ASTM A328, (Grade 50).
- .2 Steel corners, tees, wyes and crosses shall meet requirements of ASTM A328 or ASTM A690.
- .3 Steel sheet piles required for the Work shall be the type and weight shown on the drawings. Sheet piling shall be constructed with a weathering finish.
- .1 Additional length beyond those indicated on the drawings may be required to provide for trimming of tops of sheet piling.
- .4 The interlocks between the steel sheet pile sections shall be configured such that the average width of the angular space between all contact points of the interlocks shall be maximum of 3 mm, as determined by Departmental Representative.
- .5 Steel sheet piles and interlocks shall not have excessive kinks, camber or twist that would prevent the pile from reasonably free sliding to grade.
- .6 All fabricated connections shall be made with the use of angles or bent plates, as necessary, and shall be adequately welded or connected with high strength bolts as accepted by the Departmental Representative.
- .7 Handling Holes:
- .1 If handling holes are provided, they shall be
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two (2) standard two and none-sixteenth (2-14) mm diameter handling holes located 150 (150) mm from one end.

- .2 The holes shall be plugged by welding a piece of steel over the hole prior to installing any Rip-Rap or backfill.
- .3 The plated hole shall be watertight.
- .8 The minimum flange and web thickness of the sheet piles is 9.5 mm.

2.3 STORAGE AND HANDLING

- .1 Do not subject piles to damage by impact bending stresses in transporting to and storing piles onsite.
- .2 Store and handle piles such that corrosion protection coating will not be damaged.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 General:
 - .1 All welding or gas cutting shall be in accordance with the current standards of the American Welding Society.
 - .2 Steel sheet piling shall be driven to the depths shown on the drawings.
 - .1 A pile hammer shall be used to drive the sheet pile.
 - .2 The hammer shall be operating at the manufacturer's recommended stroke and speed.
- .2 Sheet Pile Driving:
 - .1 Steel sheet piling shall be assembled before driving and then driven as a continuous wall, progressively in stages to keep the piles aligned correctly and minimize the danger of breaking the interlock between the sheets.
 - .2 Steel sheet piling shall be driven to form a tight bulkhead.
 - .3 A driving head shall be used and any piling which is damaged in driving or which has broken interlocks between sections shall be pulled and replaced at contractor's expense.
 - .4 The piling shall be driven within the following tolerances:
 - .1 Alignment:
 - 1. Sheet pile shall be driven to form a

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- relatively straight line between the termini points shown on the Drawings.
2. Horizontal deviation of any point from a straight line connecting the two ends of the wall section shall be a maximum of 100 mm.
- .2 Plumbness: Each individual sheet pile section shall be driven vertical, within a horizontal tolerance of two percent (2%) of any vertical length measured along the pile.
- .3 Elevation:
1. Tops of sheet pile sections shall be within a tolerance of 15 mm from plan elevations.
2. Contractor shall not be paid for excess sheet pile trimmed off the end of the pile to meet final grade.
- .3 Contractor shall brace and/or provide soil grading as necessary during construction operations in order to provide lateral stability for the sheet pile wall. The sheet pile wall has been designed for the soil grades of the final configuration denoted on the drawings only. Other temporary configurations during the construction period shall not be allowed.
- .4 Care shall be taken during driving to keep from causing deformations of the top of the piles, splitting of section, or breaking of the interlock between sections. Care shall also be taken during driving to prevent and correct any tendency of steel sheet piles to twist or get out of plumb.
- .5 Steel Z piling shall be driven with the ball-end leading. Proper care and planning shall be used to allow for this construction procedure in both immediate and possible future walls.
- .6 Alternate Z piles shall be reversed end for end for proper interlocking in the "normal" position. Piles shall also be aligned properly to maintain a "normal" driving width.
- .7 Vibratory driving is not permitted in the proximity of the existing lock master building and structures.
- .8 Steel sheet pile that is full length as shown on the drawings and is required to be driven below the specified cutoff elevation shall be spliced with additional steel sheet piling with a full penetration butt weld.
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END OF SECTION

PART 1 - GENERAL

- 1.1 SECTION INCLUDES .1 This section specified topsoil, topsoil amendments, the preparation of existing grades and the placing of topsoil and finish grading.
- 1.2 RELATED REQUIREMENTS .1 Section 01 45 00 - Quality Control
.2 Section 01 33 00 - Submittal Procedures
.3 Section 01 35 43 - Archaeological, Cultural and Environmental Procedures
.4 Section 31 11 00 - Clearing and Grubbing
.5 Section 31 14 13 - Soil Stripping and Stockpiling
.6 Section 31 22 13 - Rough Grading
- 1.3 MEASUREMENT AND PAYMENT PROCEDURES .1 There shall be no separate measurement for payment for: (Include cost in Contract Lump Sum Price):
.1 The Preparation of Sub-grade for placing of topsoil at landscape areas;
.2 The Placing of Topsoil removed from stockpiles at landscape areas;
.3 Finish Grading at landscape and other areas;
.2 Testing of topsoil: cost of tests paid for as specified in Section 01 45 00 - Quality Control.
- 1.4 REFERENCE STANDARDS .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 Canadian Nursery Landscape Association (CNLA)
.1 Canadian Standards for Nursery Stock, Eighth Edition, 2006
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1.5 DEFINITIONS

- .1 Compost:
 - .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.
 - .2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.
 - .3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below (25) (50)), and contain no toxic or growth inhibiting contaminants.
 - .4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A) (B).

1.6 ACTION AND
INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .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 - PRODUCTS.
 - .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 32 16.07.

1.7 WASTE MANAGEMENT AND
DISPOSAL

- .1 Separate waste materials for recycling and reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .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.
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PART 2 - PRODUCTS

2.1 TOPSOIL

- .1 Topsoil for seeded areas and planting beds: mixture of particulates, microorganisms 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 consist of 4% organic matter for clay loams and 2% for sandy loams to a maximum of 20% 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 A complete commercial synthetic slow release fertilizer with a maximum 40% insoluble nitrogen.
 - .2 Formulation ratio as recommended by plant supplier.
 - .3 Calcium, magnesium, sulphur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.
 - .4 Ph value: 6.5 to 8.0.
 - .2 Peatmoss:
 - .1 Derived from partially decomposed species of Sphagnum Mosses.
 - .2 Elastic and homogeneous, brown in colour.
 - .3 Free of wood and deleterious material which could prohibit growth.
 - .4 Shredded particle minimum size: 5mm.
 - .3 Sand: washed coarse silica sand, medium to course textured.
 - .4 Organic matter: compost Category A in accordance with CCME PN1340 or BNQ AA unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.
 - .5 Use composts meeting Category B requirements for land fill reclamation and large scale industrial
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applications.

.6 Limestone:

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

.7 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 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 sediment and erosion control drawings 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.

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- 3.2 STRIPPING OF TOPSOIL .1 Soil stripping is to be carried in accordance with Section 31 14 13 - Soil Stripping and Stockpiling.
- 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 to following minimum depths after settlement.
- .1 150 mm for seeded areas.
- .2 135 mm for sodded areas.
- .3 300 mm for flower beds.
- .4 500 mm for shrub beds.
- .5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.
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3.5 SOIL AMENDMENTS

- .1 For planting beds: apply and thoroughly mix soil amendments into full specified depth of topsoil at following rates:
 - .1 5 part topsoil;
 - .2 1 part peatmoss;
 - .3 1 part organic matter.

3.6 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.
 - .1 Leave surfaces smooth, uniform and firm against deep footprinting.

3.7 ACCEPTANCE

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

3.8 SURPLUS MATERIAL

- .1 Dispose of materials except topsoil not required off site where directed by Departmental Representative.

3.9 CLEANING

- .1 Proceed in accordance with Section 01 74 11-Cleaning.

END OF SECTION

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS .1 Section 32 91 19.13 Topsoil Placement and Grading.
- 1.2 MEASUREMENT AND PAYMENT .1 Measure seeding in square metres unless noted otherwise.
- .2 Measure maintenance during establishment period and warranty period of areas seeded in square metres.
- .3 Payment for seeding made at unit price bid of actual area surface measurements taken and computed by Departmental Representative.
- 1.3 ADMINISTRATIVE REQUIREMENTS .1 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 31 19 - Project Meetings.
- .2 Scheduling:
.1 Schedule seeding to coincide with preparation of soil surface.
.2 Schedule seeding using OSC custom seed mixture.
- 1.4 ACTION AND INFORMATIONAL ITEMS .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for seed, growing medium, mulch, tackifier, fertilizer, liquid soil amendments and micronutrients.
.2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Submit in writing 7 days prior to commencing work:
.1 Volume capacity of hydraulic seeder in litres.
.2 Amount of material to be used per tank based on volume.
.3 Number of tank loads required per hectare to apply specified slurry mixture per hectare.
- .4 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
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.1 For both single seed species and seed mixtures:

.1 Submit a Seed Analysis Certificate from a Seed Testing Laboratory approved by the Canadian Food Inspection Agency (CFIA) twenty-four (24) hours prior to seeding operations.

.1 Seed Analysis Certificate: valid, legible and include seed supplier's lot designation numbers.

.5 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.1 Test Results from Seed Analysis Certificate:

.1 Specify germination and purity for each seed species of mix as well as seed mix composition expressed as percentage of each seed species by mass for each seed mix specified.

.2 Test results to meet or exceed value for various seed mixes as specified.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Landscape Contractor: Member in Good Standing of Ontario Horticultural Trades Association.

.2 Hydro-seeding or Terra Seeding Installation contractor: three (3) years proven experience in application of Hydro-seeding using hydro truck or Terra Seeding using a Blower Truck.

.3 Installers: members in Good Standing of Ontario Horticultural Trades Association.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements:

.1 Inoculant containers to be tagged with expiry date.

.3 Storage and Handling Requirements:

.1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse or recycling of pallets, crates, padding, and packaging materials in accordance with Section 01 74 19 - Waste Management and Disposal.

1.7 WARRANTY

- .1 Warranty shall extend 24 months from the date of acceptance by the Departmental Representative.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Seed: Ontario Seed Co. Limited (OSC) Custom Seed Mixture composition coverage sow at 25 kg/ha:
- .1 3.0 % Common Milkweed (*Asclepias syriaca*).
 - .2 3.0 % Butterfly Milkweed (*Asclepias tuberosa*).
 - .3 5.0 % Black Eyed Susan (*Rudbeckia hirta*).
 - .4 1.0 % New England Aster (*Symphyotrichum novae-angliae* G L Nesom).
 - .5 5.0 % Wild Bergamot (*Monarda fistulosa*).
 - .6 5.0 % Foxglove/Beardtongue (*Penstemon digitalis*).
 - .7 5.0 % Lance Leaf Coreopsis (*Coreopsis lanceolata*).
 - .8 3.0 % Canada Goldenrod (*Solidago canadensis*).
 - .9 8.0 % Canada Wild Rye (*Elymus canadensis*).
 - .10 8.0 % Indiangrass (*Sorghastrum nutans*).
 - .11 8.0 % Switchgrass (*Panicum virgatum*).
 - .12 8.0 % Little Bluestem (*Schizachyrium scoparium*).
 - .13 8.0 % Side Oats Grama (*Bouteloua curtipendula*).
 - .14 15.0 % Oats (*Avena sativa*).
 - .15 15.0 % Annual Ryegrass (*Lolium multiflorum*).
- .2 Hydro-Seeding.
- .1 Seed: Ontario Seed Co. Limited (OSC) Custom Seed Mixture
 - .2 Seeding Mulch: Type I mulch to approval of Departmental Representative.
 - .1 100% biodegradable, non-toxic, water-activated, seeding mulch, supplemented with Verdyol. Alternate supplement product to approval of Departmental Representative.
 - .2 Mixture of organic fiber approximately 2.5 cm long and vegetable-based glue.
 - .1 Wood cellulose fibre.
 - .2 Organic matter content: 95% plus or minus 0.5%.
 - .3 pH value: 6.0.
 - .4 Potential water absorption: 90%
 - .3 Water: free of germination and growth inhibiting impurities.
 - .4 Tackifier: organic, powder form, psyllium-based. Packaged in bags clearly marked stating list of contents.
- .3 Terra Seeding.

- .1 Growing Medium:
 - .1 Composted materials or blend of materials including organics.
 - .2 Particle size and nutritional specifications to suit application.
 - .3 Organic soil component: minimum standards required for seed establishment.
 - .4 Organic components derived from well-composted greenwaste organic matter, in accordance with Canadian Council of Ministers of the Environment (CCME) definition for Type "A" Compost.
- .2 Seed: Ontario Seed Co. Limited (OSC) Custom Seed Mixture.
- .3 Fertilizer:
 - .1 Granular form, dry, free flowing and free from lumps.
 - .2 Comply with Canada Fertilizers Act and Fertilizer Regulations.
 - .3 Supply in original bags bearing manufacturer's original label indicating mass and analysis.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PROTECTION OF EXISTING CONDITIONS

- .1 Protect structures, signs, guide rails, fences, plant material, utilities and other surfaces not intended for spray.
- .2 Immediately remove any material sprayed where not intended as directed by Departmental Representative.

3.3 SURFACE PREPARATION

- .1 Prepare surfaces in accordance with Section 32 91 19.13 Topsoil Placement and Grading.
- .2 Prepare surfaces to be seeded not more than 7 calendar days before seeding operation.
 - .1 If loosely placed topsoil has been compacted during installation: rake loose to allow for

adequate seed germination.

- .3 Do not perform work under adverse field conditions such as wind speeds over 10 km/h, high rain events, frozen ground or ground covered with snow, ice or standing water.
- .4 Fine grade areas to be seeded free of humps and hollows.
 - .1 Ensure areas are free of deleterious and refuse materials.
- .5 Ensure areas to be seeded are moist to depth of 150 mm before seeding.
- .6 Obtain Departmental Representative's approval of grade and topsoil depth before starting to seed.

3.4 SEEDING APPLICATION

- .1 Obtain approval of Departmental Representative to proceed with hydro-seeding or terra seeding after approval of final grade.
- .2 Do not perform Hydro-seeding or Terra seeding during the following conditions:
 - .1 Wind speeds exceed 10 km/h.
 - .2 Over frozen soil.
 - .3 On ground covered in snow, ice or standing water or during a concentrated flow of water such as high rain events.
- .3 Do not spray onto structures, signs, guardrails, fences, plant material and utilities.
- .4 Clean-up immediately, material sprayed on surfaces not indicated on Contract Drawings. Obtain Departmental Representative's review and approval of clean-up.
- .5 Hydro-Seeding and Mulch.
 - .1 Spray hydro-seeding and mulch on uniform depth of 150 mm topsoil within areas indicated by Departmental Representative.
 - .1 Apply hydraulic spraying at a rate of 4,500 kg/ha.
- .6 Terra Seeding.
 - .1 Maintain site and control erosion until conditions permit application or reapplication of seed and composted topsoil.
 - .2 Spray terra-seed on indicated surfaces only.
 - .3 Apply composted topsoil and seeding uniformly to depths and areas where specified on Contract Drawings or as directed by Departmental Representative.
 - .4 Apply growing medium and soil to minimum depth of 150 mm.
 - .5 Seed: Apply Growing Medium and OSC seed

- mixture uniformly and simultaneously directly to soil surface with pneumatic blower.
- .6 Growing medium and seed: overlap adjoining ground cover by 300 mm unless otherwise specified.
- .7 No contact permitted with foliage of trees, shrubs, or other vegetation during seeding and composted topsoil applications.
- .8 No contact permitted with water bodies during seed or composted topsoil applications.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Clean and reinstate areas affected by Work.
 - .2 Construction Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

3.6 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Ensure maintenance is carried out under supervision of certified Landscape Maintenance Supervisor.
- .2 Perform following operations from time of seed application until acceptance by Departmental Representative.
 - .1 OSC Custom Seed Mixture:
 - .1 Repair and reseed dead or bare spots. Allow establishment of seed prior to acceptance.
 - .2 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.

3.7 FINAL REVIEW AND ACCEPTANCE

- .1 Final review and acceptance criteria for seeded areas:
 - .1 Plants are uniformly established.
 - .2 Seeded areas are free of rutted, eroded, bare areas greater than 18 inches in diameter or dead spots.

END OF SECTION

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS .1 Section 01 14 00 - Regulatory Requirements
- .2 Section 01 35 43 - Archaeological, Cultural and Environmental Procedures
- .3 Section 01 22 01 - Measurement and Payment
- .4 Section 01 33 00 - Submittal Procedures
- .5 Section 01 35 43 - Environmental Procedures
- .6 Section 01 41 00 - Regulatory Requirements
- .7 Section 01 71 00 - Examination and Preparation
- .8 Section 01 78 00 - Closeout Submittals
- .9 Section 31 11 00 - Clearing and Grubbing
- 1.2 MEASUREMENT AND PAYMENT PROCEDURES .1 The work covered by this Section will not be considered separately for payment but will be considered as incidental to work of this specification.
- 1.3 ENVIRONMENTAL REQUIREMENTS .1 Operation of construction equipment in water is prohibited.
- .2 Constructing temporary crossings of watercourses may be permitted at discretion of Department Representative.
- .3 Dumping excavated fill, waste material, or debris in watercourse or wetland is prohibited.
- PART 2 - PRODUCTS
- 2.1 PREPARATION .1 Obtain work permits from governing Federal, Provincial, Municipal and/or Conservation Authority.
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PART 3 - Execution

- 3.1 EXISTING CONDITIONS .1 Maintain existing flow pattern in natural watercourse systems.
- 3.2 SITE CLEARING AND PLANT PROTECTION .1 Undertake site clearing to Section 31 11 00 - Clearing and Grubbing.
- .2 Minimize disturbance to vegetated buffer zones and protect trees and plants on site and adjacent properties where indicated.
- .3 Wrap trees and shrubs adjacent to construction work, storage areas and trucking lanes in burlap.
- .4 Protect roots of designated trees to dripline or as instructed by Departmental Representative during excavation and site grading to prevent disturbance or damage.
- .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .5 Leave cuttings from trees and other vegetation on site as brush piles on dryside slopes to allow for natural degradation.
- .1 Secure large piles with degradable materials to prevent interference with watercourse.
- .6 Maintain temporary erosion and pollution control features installed under this contract.
- 3.3 DRAINAGE .1 Pumping water containing suspended materials from construction activities into watercourse is prohibited.
- .2 Maintain existing drainage patterns on adjacent lands to the water course to the greatest extent possible.
- 3.4 SITE RESTORATION .1 Protect new planting material from disturbance by construction activities.
- .2 Remove sediment and erosion control measures with approval of Departmental Representative.
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END OF SECTION
