PART 1 - GENERAL

1.1 Related Sections

1. Section 03 30 00 – Cast-in-Place Concrete.

1.2 Description

1. The work of this section covers the requirements for all earth excavation and backfilling required for the installation of the pier structure. A 1.0 x 1.0 x 1.0 (approximate) concrete block, located at the east end of the landing, is also to be removed from the site as part of this work.

2. Earth Excavation includes the excavation of all materials of whatever nature, including broken concrete and stone, topsoil, granular, dense tills, and frozen materials that can be ripped and excavated with heavy construction equipment.

3. Note that all excavated materials shall be considered as contaminated and shall be disposed of in accordance with applicable legislation and the requirements presented elsewhere in this specification.

4. Earth excavation shall include any required shoring, bracing, and dewatering of the excavation as well as the supply/installation, maintenance and removal of silt net (turbidity curtain) protection in the waterway.

5. If any archaeological resources or human remains are discovered during construction activities, all work at the location concerned must be halted immediately and Ian Badgley, Archaeologist, NCC Heritage Program (613-239-5678, Ext. 5751, ian.badgley@ncc-ccn.ca) must be notified forthwith. Work shall not be resumed at that location until measures for the protection of those resources or remains have been put in place.

1.3 Measurement Procedures

1. No measurement for payment will be made for the item "Earth Excavation and Backfilling". Payment shall be by lump sum. Include all costs for labour, materials and equipment necessary for the completion of the work of this item, to the limits as shown on the drawings and as directed by the Engineer. Note that the supply and installation of the fill to the interior of the pier, as well as the supply and installation of the crushed stone filter and geotextile wrap, is paid for under the item "Pier Construction" (see Section 03 30 00, Cast-in-Place Concrete). All costs for labour, materials and equipment to install the direct buried duct and hand hole are also included in the lump sum item.

2. The work of the item “Earth Excavation and Backfilling” also includes all costs for the disposal of contaminated soils off site (note that all excavated materials are considered to be contaminated) as well as all costs for the supply/installation, maintenance and removal of silt net (turbidity curtain) protection in the waterway and, the removal of the 1.0 x 1.0 x 1.0 (approximate) concrete block at the east end of the landing.

1.4 References

1. ASTM C 117-13, Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.

2. ASTM C 136-06, Method for Sieve Analysis of Fine and Coarse Aggregates.

3. ASTM D 422-63 (2007), Method for Particle-Size Analysis of Soils.

4. ASTM D 1557-12e1, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbs/ftü) (2,700 kN-m/mü).

5. ASTM D 4318-10e1, Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

6. Ontario Regulation 347 General – Waste Management, made under the Environmental Protection Act.

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

8. OPSS 1004 Aggregates – Miscellaneous.

9. OPSS 1010 Aggregates – Base, Subbase, Select Subgrade, and Backfill Material.

10. OPSS 1860 Geotextiles.

1.5 Definitions

1. Unclassified excavation: excavation of deposits of whatever character encountered in work.

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

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

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

5. Unsuitable materials:

1. Weak and compressible materials under excavated areas.
2. Frost susceptible materials under excavated areas.
3. Frost susceptible materials:
    1. Fine grained soils with plasticity index less than 10 when tested to ASTM D 4318-10e1, and gradation within limits specified when tested to ASTM D 422-63(2007) and ASTM C 136-14: Sieve sizes to CAN/CGSB-8.1-88.

Sieve Designation	% Passing
2.000 mm	100
0.100 mm	45 - 100
0.020 mm	10 - 80
0.005 mm	0 - 45

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

1.6 Protection of Existing Features

1. Existing buried utilities and structures:

    Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
    1. Prior to commencing excavation work, arrange with the designated utility locator to stake existing Municipal, Federal and private utility locations.
    2. Existing utilities to be exposed in advance by hand excavation.
    3. Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
    4. Where utility lines or structures exist in area of excavation, obtain direction of the Engineer before removing or re-routing.
    5. Record location of maintained, re-routed and abandoned underground lines.

2. Existing features:
    1. Protect existing features from damage while work is in progress. Existing risk management measures include soil caps at some locations on Richmond Landing. Contractor must ensure that cap is not damaged by the work. In event of damage, immediately make repair to approval of the Engineer.
    2. Install protection fences on ground around trees located nearby the construction site to prevent damage to their root systems. These fences shall be installed at the vertical limit of tree crown to be protected.
    3. Except for trees shown on drawings, trees (with outside diameter larger than 10cm) shall not be cut. If cutting of trees with outside diameter larger than 10cm is required, an authorization from NCC Project Manager shall be obtained by Contractor.

4. All tree pruning activities (including root pruning) must be conducted under the supervision of a certified arborist.
5. The residues of pruning, branches or tree parts that present signs of disease or pest infestation must be disposed of properly in accordance with all federal, provincial and local regulations to minimize the spread of disease (e.g., Dutch elm disease, Emerald ash borer, etc.).
6. If any breeding birds are observed, a mitigation plan (which may include establishing appropriate buffers around active nests) must be developed to address potential impacts to migratory birds or their active nests. This must be carried out in consultation with the Canadian Wildlife Services.
7. If trees are accidentally damaged or removed as a result of the works, the contractor will plant two trees for each tree damaged or removed (a 2:1 ratio). Contractor shall get a planting plan approved by NCC before the planting of trees. Contractor will monitor the success of all plantings and re-vegetation for two years and will undertake any remedial actions that may be required.
8. Workers must be formally informed that it is forbidden to harm wildlife. If animals are encountered, workers must allow the animal to leave the premises on its own by walking slowly towards the animal.

3. Pollution Control
   1. An Environmental Emergency Plan (EEP) shall be prepared by the Contractor which outlines spill response procedures and any other procedures required to deal with potential emergencies. In the event of a spill, the contractor shall immediately clean up any spills of contamination, water or other substances which may be either detrimental to marine or terrestrial life or quality of surface water, groundwater or soil in accordance with the appropriate federal and provincial guidelines/regulations. Any environmental spills (biological, chemical or petroleum based) must be reported to the NCC 24 Hour Emergency Communication Service at 613-239-5353.

   2. Ensure that building material used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.

   3. Invasive buckthorns and honeysuckles are present in the work area. The Contractor shall avoid further dispersion of these species by abiding by best management practices identified by the Ontario Invasive Plant Council (http://www.ontarioinvasiveplants.ca/resources/best-management-practices) including inspecting, cleaning and removing mud, seeds and plant parts from clothing, vehicles, and equipment such as mowers and tools. Vehicles and equipment are to be cleaned in an area where plant seeds or parts are not likely to spread (hardstand, carwash facilities). Fruit shall be removed from species such as invasive honeysuckle and buckthorn prior to chipping.

4. Do not store any machinery, equipment or materials within 30m of natural high water mark of the watercourse. Wash-down of wheel barrows, paving tools, concrete mixers or other equipment used for mixing concrete must not be carried out within 30 meters of the Ottawa River and shall be prevented from discharging into the Ottawa River or catch basins.

5. Wheeled or tracked machinery or equipment used in connection with the activity must be operated from dry land, on ice surface or operated from a barge or vessel, and must be stored on dry land or stored on a barge or vessel.

6. Do not store, handle, or transfer petroleum or lubricating products within 60m of the natural high water mark of the watercourse. All tools and equipment shall be refueled at a distance of at least 60m from the natural high water mark of watercourse.

7. All concrete trucks must collect their wash water and recycle it into their trucks for disposal off site at a location meeting all regulatory requirements. No excess concrete may be disposed of on-site.

8. Gather and dispose of waste and debris in conformity with regulations in force and other sections of this specification. No debris, concrete or wet mortar residue can be released into the aquatic environment. All debris accidentally introduced into the aquatic environment must be immediately recovered and disposed of on dry land and in a manner that prevents it from entering or re-entering the watercourse. All debris shall be collected and eliminated each day, or stocked in safe containers to prevent effects on garbage consuming animals.

4. Restoration

1. Contractor shall be responsible for the re-instatement of all areas of fauna habitat in and around the site that has been degraded as a result of the Work.

2. ~~Re-instate to original condition shorelines~~Restore excavation area using known vegetal stabilization technologies ~~which consider stability, erosion sensitivity, slope and height of embankment. Re-vegetation works shall be done as soon as possible following earthwork completion~~to protect area until final landscaping is conducted under separate contract in spring 2017.

1.7 Protective Measures for Excavation of Contaminated Materials

1. Establish methods and maintain facilities to ensure that contaminated soil/materials and ground water are managed in accordance with applicable legislation. Do not allow discharge of contaminants or pollutants from the excavation area or shore line activities, to surrounding soil or surface water.

2. Establish and maintain dust, erosion and sediment control measures to prevent the release of contaminants from the work area. Contractor is responsible to satisfactorily address any complaints related to the construction activities, including dust.
3. Establish and maintain spill response equipment for the intended work and known potential for contamination in soil and groundwater.
4. Establish and maintain a health and safety plan for the protection of the workers and the public. The plan must include measures associated with the known contaminants identified in the environmental reports (copies of which are available from NCC on request). Worker protection is to include training in the risks and hazards of the work, use and maintenance of appropriate personnel protective equipment, incorporation of hygiene and site maintenance. Protection of the public is to be achieved by controlling exposure to contaminants from the work area.

PART 2 - PRODUCTS

2.1 Materials

1. Backfill to the interior of the pier shall be Granular 'A' in accordance with OPSS 1010.

2. Clear Crushed Stone shall be in accordance with OPSS 1004. Clear crushed stone for backfill to the underside of the pier footing shall be 53 mm in accordance with Table 2 of OPSS 1004 and, clear crushed stone for the interior of the pier, at the through wall drains, shall be 19 mm Type I, in accordance with Table 2.

3. Geotextile to be used at the through wall drains of the pier shall be a Class I non-woven material with an FOS of 80 to 120 and, conforming to Table 1 of OPSS 1860.

4. Backfill to the exterior of the pier shall be approved excavated material or Granular ‘B’, Type II, in accordance with the provisions of OPSS 1010.

5. Silt net/turbidity curtain to be a fast water turbidity curtain system. Contractor to submit details of proposed system for approval.

PART 3 - EXECUTION

3.1 Site Preparation

1. Remove obstructions and, if necessary, ice and snow, from surfaces to be excavated within limits indicated.

2. Establish any protection measures for the control of contaminants during excavation and disposal.

3. Install approved silt screen/turbidity curtain protection system in the waterway before commencing excavation.

3.2 Excavation

1. Excavate to lines, grades, elevations and dimensions as indicated and slope excavation as required (into the embankment) to ensure a stable slope after work is complete.

2. Dispose of waste material (i.e., asphalt, excess or unsuitable excavated material for backfill to the pier) off site. All waste material and excess excavated material is to be considered as contaminated and shall be disposed of as solid, non-hazardous waste in accordance with Ontario Regulation 347 – General Waste, made under the Environmental Protection Act. Confirmation of waste characterization is ~~provided in the Environmental Report~~to be obtained by Contractor at project initiation through a representative sample submitted for TCLP analysis, including those parameters required by the intended waste receiving site and at a minimum: metals and inorganics, petroleum hydrocarbon compounds, polycyclic aromatic hydrocarbons and volatile organic compounds. Sampling conducted at nearby locations, as documented in the Environmental Reports provided by NCC indicated the contaminated soil can be managed as solid, non-hazardous waste.

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

4. Do not allow surface run-off from the excavation and work areas off site. Be prepared to intercept and clean-up any releases from the work area. Maintain adequate clean-up material at hand for the duration of the works.

5. Notify the Engineer when bottom of excavation is reached.

6. Obtain the Engineer's approval of completed excavation.

7. If additional works require casting the structure foundation in the dry (ex. cofferdams), Contractor must inform Engineer immediately to confirm next steps include appropriate environmental protection.

8. Correct unauthorized over-excavation as follows:
   1. Fill with clear crushed stone to levels (bottom of pier footing) indicated on Contract Drawings, compacted to not less than 95% of Standard Proctor Maximum Dry Density.

3.3 Hauling and Disposal

1. Haul all contaminated material from the work area in accordance with municipal and provincial regulations. Use approved vehicles licensed by Ontario Ministry of the Environment and Climate Change. Travel on approved truck routes in a manner to prevent release of any contaminants to the environment. Contractor is responsible to

amend any wet excavated material as necessary to allow transport and disposal within applicable regulations and guidelines.

2. The contractor is responsible for the effective management of contaminated materials once removed from the work area. Disposal of contaminated materials must be at an approved waste management facility licensed to accept soli/materials as solid, non-hazardous waste.

3.4 Backfilling

1. Do not proceed with backfilling operations until the Engineer has inspected and approved pier elements installation.

2. Due to the proximity of the river and the nature of the existing earth/fill materials, it is assumed that the lower portion of the excavation may have standing water in it prior to backfilling. The intent is not to dewater to place backfill but, to place clean crushed stone in the excavated area up to the underside of footing elevation where it is assumed that the top of the crushed stone will be above any standing water levels. This will allow the footing concrete to be cast in the dry. Top of the crushed stone fill shall be compacted to 90% Standard Proctor Dry Density.

3. If for any reason groundwater must be removed from the excavation, collected groundwater is to be disposed of in accordance with municipal regulations to a sewer discharge location. A permit may be required for sewer discharge. Groundwater quality is characterized in the Environmental Report.

4. Areas to be backfilled around the pier (exterior), after the pier construction, to be free from debris, snow, ice, water and frozen ground. Backfill to the exterior of the pier shall be granular “B’ Type II. Excavated material is not to be used for backfill.

5. Backfill inside the pier shall be granular ‘A’ material and shall be placed in compacted layers not exceeding 150 mm in thickness and to the lines as indicated on the drawings (also see section 03 30 00, “Cast-in-Place Concrete”). Compact each layer before placing succeeding layer.

********** END OF SECTION **********