PART 1 - GENERAL

1.1 Minimum Standards

1. Execute work to meet or exceed:

    1. National Building Code of Canada 2015, National Fire Code of Canada 2015, Ontario Building Code 2012 and any other code of provincial or local application, including all amendments up to project date, provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
    2. Rules and regulations of authorities having jurisdiction.
    3. Fire Commissioner of Canada, No. 301, Standard for Construction Operations, and No. 302, Standard for Welding and Cutting, June 1982.
    4. Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, O. Reg. 213/91 as amended, R.R.O. 1990, Reg. 834. O. Reg. 629/94 as amended, Diving Operations.
    5. Environmental Protection Act, O. Reg. 102/94, O. Reg. 103/94, and Regulation 347.
    6. Canadian Labour Code Part 2.

1.2 Taxes

1. Pay applicable Federal, Provincial and Municipal taxes.

1.3 Fees, Permits and Certificates

1. Provide authorities having jurisdiction with information requested.

2. Pay fees and obtain certificates and permits required.

3. Furnish certificates and permits when requested.

1.4 Examination

1. Before submitting tender, examine existing conditions and determine conditions affecting work.

2. Obtain all information which may be necessary for proper execution of Contract.

1.5 Site

1. Confine work, including temporary structures, plant, equipment and materials to the minimum required to complete construction. The drawings indicate permitted

access routes to the site and, permissible work and storage areas. Confine all operations to these locations. Ensure that public access is maintained to the Navy Monument throughout the duration of construction.

2. Contractor Parking is to be confined to the site, as indicated on the drawings, and not to interfere with the adjacent properties, driveways etc.

3. Make adjustments, as directed by the Engineer, to correct any issues which may affect neighbouring properties.

4. Off site work is required (construction of gangway, floating docks and strut system) to complete the work at a facility arranged and paid for by the contractor.

5. Locate temporary buildings, roads, walks, drainage facilities, services as directed and, maintain in a clean and orderly manner.

1.6 Construction and Storage Areas

1. The limits of the Construction and Storage Area are shown on the drawings. Should the Contractor require additional area(s) for work and storage, the Contractor will be responsible for arranging for permission to use these areas and for obtaining releases from the affected Owners at the end of the project indemnifying the Contract and the Owner from any claim from the Owner of the land used in the form acceptable to the Engineer.

1.7 Documents

1. Keep on site one copy of Contract Documents and reviewed Shop Drawings.

1.8 Engineer

1. The National Capital Commission will appoint or designate a representative for this contract who will be referred to as the Engineer. The Contractor will be informed of the designated individual or individuals. Should it be required to change the Engineer, the Contractor will be informed.

1.9 Additional Drawings

1. The Engineer may furnish additional drawings to clarify work.

2. Such drawings shall become part of the Contract Documents.

1.10 Reproduction of Contract Document

1. Reproduce and distribute Contract Documents and all drawings to all Sub-Contractor and Contractor employees required to adequately control the work and provide information to all trades.

1.11 Layout of Work

1. Immediately upon entering the site for purpose of beginning work on this project, locate all general reference points and take proper action necessary to prevent their disturbance.

2. Supply stakes and other survey markers required for this work. Employ competent personnel to lay out work in accordance with lines and grades provided.

3. Maintain all reference points and markers for duration of Contract.

1.12 Co-operation and Protection

1. Execute work with minimum disturbance to occupants, public and normal use of site (outside of delineated work and storage areas). Make arrangements with Engineer to facilitate execution of work.

2. Maintain access and exits.

3. Provide necessary barriers, warning lights and signs. Replace damaged existing and new signs and work with material and finish to match work of similar nature specified elsewhere in the Contract or to match the original in good condition if no similar work is specified.

1.13 Existing Utilities

1. Establish location, protect and maintain existing utilities.

2. Connect to existing utilities with minimum disturbance to pedestrian and vehicular traffic and only with the approval of the utility owner.

3. Power for construction is not available at the site. The Contractor shall arrange for and provide all power requirements necessary to complete the work.

1.14 Material and Equipment

1. Use new products unless otherwise specified.

2. Deliver and store material and equipment to manufacturer's instructions with manufacturer's labels and seals intact.

3. When material or equipment is specified by standard or performance specifications, upon request of Engineer, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.15 Inspection and Testing

1. The Engineer may employ an Inspection and Testing company to ensure work conforms with Contract Documents.

2. When initial tests and inspections reveal work not to Contract requirements, pay for additional tests and inspections required by Engineer on corrected work.

1.16 Fires

1. Burning any material or rubbish on site is not permitted.

1.17 Progress Photographs

1. As soon as work commences, take periodic progress electronic/digital photographs from four locations.

2. View points, which will best illustrate progress of work, will be selected by the Engineer.

3. Forward electronic photos to Engineer.

1.18 Datum

1. Elevations and soundings shown on Drawings are expressed in metres relative to the established bench mark.

1.19 Site Meetings

1. Site meetings will be held at a maximum interval of every two weeks, at a designated site (by the Engineer) unless otherwise directed by the Engineer.

2. Ensure that all key site personnel and a representative from the Contractor, who is designated to speak on behalf of the Contractor and can commit the Contractor to action and price, is present at the meetings.

1.20 Washroom Facilities

1. The Contractor shall supply an acceptable chemical toilet and locate as directed by the Engineer. The toilet shall be thoroughly cleaned at least once a week and shall be a minimum of 10 meters from the water.

2. No waste or chemicals will be allowed to stain or wet the ground or be washed by rain into the waterway. The Contractor will have a spill kit on site capable of preventing such an occurrence.

1.21 OPSS and OPSD

1. OPSS Ontario Provincial Standard Specifications and OPSD Ontario Provincial Standard Drawings are quoted in these specifications. Copies of these standards are not included in these documents but the latest editions will be considered to be an integral part of these specifications. Generally they are available online at http://www.raqsa.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage .

1.22 Protection of the Site

1. Prevent damage to any features of the site to remain (trees, structures, etc.). Modify operations, as directed by the Engineer, if the methods being used are considered to be detrimental to any site features to remain in place.

1.23 Measurement and Payment

1. No measurement for payment will be made for the work of this section. Payment shall be by lump sum under the item, “Balance of Project”. This item includes all costs for material, equipment, personnel, overhead, etc. required to do the work called for in this section as well as for work which is not specifically designated under the payment clauses in other sections of these specifications and is required to complete the work of the project. Items of work included in the item, “Balance of Project”, but not restricted to, are:

    1. Mobilization and Demobilization,
    2. Designing and installing all temporary means of access to the work areas, temporary barriers and enclosures,
    3. Providing construction fencing and perimeter security measures around the work area,
    4. Maintaining the work and storage area for the duration of the work,
    5. Fees and permits,
    6. Layout of the work,
    7. Temporary utilities and construction facilities,
    8. Removal of temporary means of access,
    9. Progressive and final site cleaning, and
    10. Landscaping and site restoration (with regard to areas of the site that have been damaged as a result of the work of this 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 Section Includes

1. Shop Drawings and Product Data.
2. Samples.
3. Certificates and transcripts.
4. Fees and permits.

1.2 Administrative

1. Submit to Engineer submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
2. Work affected by submittal shall not proceed 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 and stamp with the Contractor's submittal stamp or sign indicating conformance prior to submission to Engineer. This review represents that necessary requirements have been determined and verified, and that each submittal has been checked and coordinated 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 shall not be considered.
6. Notify Engineer, in writing at time of each submission on the transmittal and on the submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
7. Verify field measurements and affected adjacent Works are coordinated.
8. Contractor's responsibility for errors and omissions in submission is not relieved by Engineer's review of submittals or review by their designates.
9. Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Engineer's review or review by their designates.

10. Keep one reviewed copy of each submission on site.

11. Submit number of hard copies specified for each type and format of submittal and submit also in electronic format as pdf files. Forward pdf files on CD or through email.

12. Confirm receipt of submission and check on progress of review.

1.3 Shop Drawings and Project Data

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

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

3. Where technical sections specify that shop drawings bear the stamp of a Professional Engineer, registered/licensed in the Province of Ontario, submit same with contact information for the Contractor's Engineer. Note that in all cases, the Contractor’s Engineer must be experienced in the work for which he/she is providing their stamp and must be able to provide proof of this experience when requested by the Engineer.

4. Allow ten business days for Engineer's review of each submission.

5. If adjustments made on shop drawings by the Engineer affect value of work, state such in writing to Engineer prior to proceeding with work and explain the full reason as to why it is thought that the changes affect the price. In accordance with the Contemplated Change Notice and Change Order process, no change is valid unless agreed upon by the Engineer.

6. Make changes on shop drawings as Engineer may require for consistency with Contract Documents. When resubmitting, notify Engineer in writing of any revisions other than those requested on both the submission and the submission transmittal.

7. Accompany submissions with transmittal letter, 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 shall include:
    1. Date and revision dates.
    2. Project title and number.
    3. Name and address of:
        1. Sub-Contractor.
        2. Supplier.
        3. Manufacturer.
    4. Contractor's stamp, signed by Contractor's authorized Representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
    5. Details of appropriate portions of Work as applicable:
        1. Fabrication.
        2. Layout, showing dimensions, including identified field dimensions, and clearances.
        3. Setting or erection details.
        4. Capacities.
        5. Performance characteristics.
        6. Standards.
        7. Erection Sequence and Procedures
        8. Operating weight.
        9. Relationship to adjacent work.

9. After Engineer's review, provide a minimum of five (5) copies to the Engineer, unless stipulated otherwise.

10. The Engineer will attempt to return the shop drawings as expeditiously as possible. If at a later date an error or omission is noted, a revised reviewed shop drawing will be issued and the Contractor shall distribute and enact the changes.

11. Submit 3 prints and 1 electronic copy of shop drawings for each requirement requested in specification Sections and as the Engineer may reasonably request.

12. Submit 3 prints and 1 electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by the Engineer where shop drawings will not be prepared due to standardized manufacture of product.

13. Submit 3 prints and 1 electronic copy of test reports for requirements requested in specification Sections and as requested by the Engineer.
    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 accordance with specified requirements.
    2. Testing must have been within six months of date of Contract award for project or after Contract award.

14. Submit 3 prints and 1 electronic copy of certificates for requirements requested in specification Sections and as requested by the Engineer.

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.

15. Submit 3 prints and 1 electronic copy of manufacturer's instructions for requirements requested in specification Sections and as requested by the Engineer.
    1. Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

16. Submit 3 prints and 1 electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by the Engineer.
    1. 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. Following the shop drawing review by the Engineer, 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 the Engineer is for the sole purpose of ascertaining conformance with general concept. This review shall not mean that the Engineer approves detail design and field measurements 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 all requirements of construction and Contract Documents. 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 all sub-trades.

1.4 Samples

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

2. Deliver samples prepaid to the Engineer's business address.

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

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

5. If adjustments made on samples by the Engineer affect value of Work, state such in writing to the Engineer prior to proceeding with Work.

6. Make changes in samples which the Engineer may require, consistent with Contract Documents.

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

1.5 Fees, Permits and Certificates

1. Provide authorities having jurisdiction with information requested.

2. Pay fees and obtain certificates and permits required.

3. Furnish certificates and permits.

1.6 Correspondence

1. All correspondence shall conform to a standard such that it is easily identifiable and referenced.

2. Each submittal shall be numbered and shall include a title page describing the date and version of the submittal.

3. Electronic submissions shall:
    1. Have a title format that identifies the project, the nature of the submittal, the number of the submittal and the contents of the submittal such that they are easy to electronically sort and identify. The titles will be similar in form to "DC4260-17 Richmond Landing Shoreline Access – Ceremonial Landing (pier, dock and gangway): Shop Drawings 7 – Gangway Details" or, “DC4260-17 Richmond Landing Shoreline Access – Ceremonial Landing (pier, dock and gangway): Mill Certificates 3 – Concrete Mix Design Materials".
    2. The format of electronic submissions shall be pdf.
    3. The electronic mail submissions shall be divided into sections such that the file size of each submission is receivable by the recipient.

1.7 Measurement and Payment

1. The work considered under this Section will not be measured for payment but will be considered an integral part of the work of the Contract and a condition for payment.

PART 2 - PRODUCTS

2.1 Not Used

1. Not Used.

PART 3 - EXECUTION

3.1 Not Used

1. Not Used.

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

PART 1 - GENERAL

1.1 References

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

2. National Building Code 2015 (NBC):
    1. Division B, Part 8 Safety Measures at Construction and Demolition Sites

3. National Fire Code 2015 (NFC):
    1. NFC 2015, division B, Part 2 Emergency Planning, subsection 2.8.2 Fire Safety Plan.

4. Province of Ontario:
    1. Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, O. Reg. 213/91 as amended, Reg. 834, 0. Reg. 278/05 (Asbestos - Construction).
    2. Workplace Safety and Insurance Act, 1997
    3. Municipal statutes and authorities.

5. Fire Commissioner of Canada (FCC):
    1. FC-301 Standard for Construction Operations, June 1982.

    2. FC-302 Standard for Welding and Cutting, June 1982.

6. Canadian Labour Code Part 2.

1.2 Submittals

1. Make submittals in accordance with Sections 01 01 00 and 01 33 00.

2. Submit site-specific Health and Safety Plan: Within 5 days after date of Award of Contract and prior to commencement of Work. Health and Safety Plan must include:
    1. Results of site specific safety hazard assessment.
    2. Results of safety and health risk or hazard analysis for site tasks and operations.
    3. Measures and controls to be implemented to address identified safety hazards and risks.
    4. Contractor's and Sub-contractors' Safety Communication Plan.
    5. Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during

emergency situations, including evacuating injured personnel from the site and areas of limited or special access such as height.

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

4. Engineer's review of Contractor's final Site Specific Health and Safety Plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction site health and safety.

5. Submit records of Contractor's Safety Meetings at site meetings.

6. Submit 1 copy of the Contractor's authorized representative's work site health and safety inspection reports to Engineer when requested.

7. Submit copies of reports or directions issued by safety inspectors of authority having jurisdiction.

8. Submit copies of near-miss, incident, and accident reports, and/or confirmation monthly that no incidents have occurred.

9. Submit Material Safety Data Sheets (MSDS) for all products and items used on site to Departmental Representative.

10. Submit names of personnel and alternates responsible for site safety and health.

11. Submit Workplace Safety and Insurance Board (WSIB), Experience Rating Report for Province of Ontario.

1.3 Filing of Notice

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

1.4 Safety Assessment

1. Perform site specific safety hazard assessment, related to project, identifying all potential hazards.

1.5 Meetings

1. Pre-construction meeting: schedule and administer Health and Safety meeting with Engineer prior to commencement of work.

1.6 Regulatory Requirements

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

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

3. In event of conflict between any provisions of specified standards and regulations, the most stringent provision governs.

1.7 Project Site Conditions

1. Work at the site will also involve:
    1. A Hazard Assessment and listing of designated substances on site such as contaminated soils.
    2. Contact with silica/dust in Concrete.
    3. Work near water.
    4. Ice (depending on timing of construction of shore pier).
    5. Work near utilities including overhead utilities.

1.8 General Requirements

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

2. Relief from or substitution for any portion or provision of minimum Health and Safety Guidelines specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Engineer in writing. Engineer will respond in writing, where deficiencies are noted and request resubmission with correction of deficiencies either accepting or requesting improvements.

1.9 Responsibility

1. Be responsible for safety of persons and property on site and for protection of environment to extent that they may be affected by conduct of Work.

2. Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

3. The Contractor shall be designated "Constructor", as defined by Ontario Act.

1.10 Compliance Requirements

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

1.11 Unforeseen Hazards

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

2. Follow procedures in place for Employees Right to Refuse Work as specified in the Act for the Province of Ontario and Canada Labour Code Part 2.

1.12 Health and Safety Coordinator

1. Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must:
    1. Have site-related working experience specific to activities associated with abatement of lead containing materials.
    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.

1.13 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 Engineer.
    1. Contractor's Safety Policy.
    2. Constructor's Name.
    3. Notice of Project.
    4. Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members.
    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 Safety Plan.
    11. Copy of Valid certificate of 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 or procedures specific to the site.

2. Comply with Provincial general posting requirements.

1.14 Correction of Non-Compliance

1. Immediately address health and safety non-compliance issues identified by Engineer and regulatory agency having jurisdiction in the Province or any individual who notes a safety related issue.

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

3. Engineer may stop Work if a perceived non-compliance of health and safety regulations is perceived to not be immediately corrected.

1.15 Work Stoppage

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

2. Assign responsibility and obligation to Competent Supervisor to stop or start Work when, at Competent Supervisor's discretion, it is necessary or advisable for reasons of health or safety. Engineer or, their designates, may also stop Work for health and safety considerations.

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 of the Work

1. The work of this section covers the requirements for the supply and placement of concrete, including formwork, reinforcing steel, anchor bolts, drains, backfill to interior of pier, etc. for the construction of the new pier structure.

2. Comply with restrictions stipulated in this and other sections of these specifications.

3. Note: the intent is that the pier construction will take place during low water level periods on the river so that the concrete in the structure foundation can be cast in the dry. The bottom elevation of the footing has been selected to be at or slightly above the normal water level of the river in the fall of the year. It is therefore imperative that the contractor commence work as soon as possible on this structure, following award of the contract, so that water levels will not be an issue for casting the footing concrete in the dry.

1.2 Related Sections

1. Section 31 23 10 - Earth Excavation and Backfilling.

2. Section 05 12 33 – Floating Dock, Gangway and Strut Support Structure.

3. Section 26 05 00 – Common Work Results for Electrical

1.3 Measurement for Payment Procedures

1. No measurement for payment will be made for the item, “Pier Construction”. Payment shall be by lump sum and shall include all costs for labour, materials, and equipment necessary to complete the work of this item in accordance with the drawings and specifications and including the supply, installation and removal of formwork, the supply and installation of reinforcing steel and concrete (footing, walls and slab), the placement of anchor bolts/plates (gangway and strut supports), supply and placement of non-metallic pipe drains, the supply and placement of granular backfill to interior of pier (including clear stone filter and geotextile wrap) and, the supply and placement of composite decking and electrical works for lighting (includes but not limited to junction boxes, embedded duct, direct buried duct, expansion joints, all fixtures and fittings).

2. Heating and cooling of water and aggregates, and providing hot and cold weather protection will not be measured but are considered incidental to the work.

3. All other work, necessary for the completion of the work of the item, “Pier Construction”, will not be measured separately for payment, but will be considered incidental to the work of the item, “Pier Construction”.

1.4 References

1. All concrete supply and placement shall conform to CAN/CSA A23.1-14, Concrete Materials and Method of Concrete Construction.

2. All formwork shall conform to CAN/CSA S269.3-M92 (R2013), Concrete Formwork as supplemented by the Contract Specifications.

3. All falsework shall conform to CSA S269.1-1975 (R2003). Falsework for Construction Purposes.

4. American Concrete Institute (ACI): ACI 315R-94, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.

5. American National Standards Institute/American Concrete Institute (ANSI/ACI): ANSI/ACI 315-99, Details and Detailing of Concrete Reinforcement.

6. Canadian Standards Association (CSA).
    1. CAN/CSA-A3001-13, Cementitious Materials for use in Concrete.
    2. CAN/CSA-A23.1-14, Concrete Materials and Methods of Concrete Construction.
    3. CAN/CSA-A23.2-14, Methods of Test for Concrete.
    4. CAN/CSA-G30.18-09 (R1998), Carbon Steel Bars for Concrete Reinforcement.
    5. CAN/CSA-G40.21-13, Structural Quality Steels.
    6. CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
    7. CSA W186-M1990 (R2012), Welding of Reinforcing Bars in Reinforced Concrete Construction.

7. Abrasive blast cleaning of concrete to general method and cleanliness of SSPC-SP6-89, Commercial Blast Cleaning.

8. Composite decking to be as called for in Section 05 12 33, Floating Dock, gangway and Strut Support System.

9. Granular fill and clear crushed stone (for filter) to be as called for in Section 31 23 10, Earth Excavation and Backfilling.

10. OPSS 405 Pipe Sub-Drains

11. OPSS 1860 Geotextiles

1.5 Shop Drawings

1. Submit Shop Drawings for formwork, and including placing of reinforcement, in accordance with Section 01 33 00 - Submittal Procedures. All reinforcing dimensioning to be based on Contract Drawing information and as confirmed by field measurements. Formwork shop drawings to indicate all elevations for finished concrete elements as well as finishes of exposed concrete surfaces.

2. Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by the Engineer, with identifying code marks to permit correct placement without reference to structural drawings. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada.

3. Detail lap lengths and bar development lengths to CAN3-A23.3, unless otherwise indicated.

1.6 Samples

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

2. At least 2 weeks prior to commencing work, inform the Engineer of proposed source of aggregates and provide access for sampling.

3. At the start of the project, the Contractor shall provide samples of concrete proposed for use. At least three samples (0.1 m^3 min.) shall be moist cured for 7 days and air cured thereafter. The concrete samples shall be cast from aggregates typical of those to be used at the time the works are to be constructed and shall be produced at the same plant as the proposed concrete supplier. The mass of the test samples shall be measured at 28-days and regular intervals thereafter until the mass is stabilized. If the experimental density differs from that used in design, adjustment of the counterweight deck thicknesses may be required.

1.7 Certificates

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

2. A minimum of 2 weeks prior to starting concrete work, submit to Departmental Representative manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements.
    1. Portland Cement.
    2. Blended hydraulic cement.
    3. Supplementary cementing materials.
    4. Admixtures.
    5. Aggregates.

6. Water.

3. Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.

4. Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1.

1.8 Quality Assurance

1. A minimum of 2 weeks prior to starting concrete work, submit proposed quality control procedures for the Engineer's approval for following items:
   1. .1 Falsework erection.
   2. .2 Hot weather concrete.
   3. .3 Cold weather concrete.
   4. .4 Curing.
   5. .5 Finishing.
   6. .6 Formwork removal.
   7. .7 Joints.

1.9 Waste Management and Disposal

1. Carefully coordinate the specified concrete work with weather conditions.

2. Choose least harmful, appropriate cleaning method which will perform work adequately.

PART 2 - PRODUCTS

2.1 Substitution

1. Substitution of specified products may be considered by the Engineer provided that the Contractor requests the use of alternative products in writing and such request includes a certificate of compliance from an independent CSA certified testing laboratory that the proposed product meets or exceeds the specified products performance criteria tested in accordance with standards designated in the specified product manufacturer's technical data sheet.

2. Substitute products shall be composed of constituent material similar to those comprising the specified product(s) and shall have similar performance characteristics. They must be fully compatible with other repair products specified or substituted.

3. Submittals to Section 01 33 00 - Submittal Procedures.

2.2 Concrete Materials

1. Portland Cement: to CAN/CSA-A3001.

2. Supplementary cementing materials: to CAN/CSA- A3001.

3. Cementitious hydraulic slag: to CAN/CSA-A363.

4. Water: to CAN/CSA-A23.1.

5. Aggregates: to CAN/CSA-A23.1. Coarse aggregates to be normal density.

6. Abrasive for blast cleaning shall be angular or sub-angular in shape and, not more than 1% shall pass the 300 sieve. Adjustments to the type and angularity of the aggregate shall be made as necessary to produce the desired results.

7. Air entraining admixture: to ASTM C 260.

8. Chemical admixtures: to ASTM C 494. Engineer to approve accelerating or set retarding admixtures during cold and hot weather placing.

9. Non-Metallic Pipe Drains: to be from PVC pipe conforming to OPSS 405.

2.3 Concrete Mixes

1. Concrete for this project shall be supplied on the basis of “Performance” in accordance with Table 5 of CSA A23.1 with an exposure class of F-1 (in accordance with Table 2).

2. Ensure that aggregate sources conform to the requirements of Clause 5.5, "Deleterious Reaction" of CAN/CSA-A23.1 and that performance certification includes certification that the aggregate is non-reactive.

2.4 Equipment

1. Air Compressors:
    1. The air compressor for air blasting shall have a minimum capacity of 3.5 m3/min. The compressed air shall be free from oil when testing in conformance with ASTM D4285.
    2. The air compressor for abrasive blast cleaning shall supply a minimum pressure, in the hose, of 620 kPa within 3 m of the nozzle. The air shall be free from oil when tested in conformance with ASTM D4285.

2. Straight Edge:
    1. The straight edges for checking alignment shall be 1.5 m and 3 m long and commercially made of metal with little or no deviation from a straight line.

3. Vibrators:
    1. Vibrators shall be used during the placing of concrete to ensure that voids are eliminated and the cavity is completely filled. The use of the vibrator shall be coordinated with the amount of admixtures to ensure that the concrete does not segregate.

2.5 Reinforcing Steel Materials

1. Reinforcing steel: carbon steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.

2. Substitute different size bars only if permitted in writing by the Engineer.

3. Cold-drawn annealed steel wire ties: to CSA G30.3.

4. Deformed steel wire for concrete reinforcement: to CSA G30.14.

5. Chairs, bolsters, bar supports, spacers: to CAN/CSA-A23.1.

6. Mechanical splices: subject to approval of the Engineer.

2.6 Reinforcing Steel Fabrication

1. Fabricate reinforcing steel in accordance with CAN/CSA-A23.1, ANSI/ACI 315, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

2. Obtain the Engineer's approval for locations of reinforcement splices other than those shown on placing drawings.

3. Welding of reinforcing steel is not permitted unless approved by the Engineer.

4. Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists

2.7 Granular Fill

1. Granular fill to the interior of the pier shall be granular ‘A’ in accordance with Section 31 23 10, “Earth Excavation and Backfilling”.

2. Clear crushed stone, to be placed at the inlets to the pipe drains, shall be in accordance with the requirements of OPSS 1004.

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.

2.8 Source Quality Control

1. Upon request, provide the Engineer with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to commencing reinforcing work.

2. Upon request, inform the Engineer of proposed source of material to be supplied.

2.9 Composite Decking

1. Composite decking and screws to be as called for in Section 05 12 33, Floating Dock, Gangway and Strut Support Structure.

2. Waterproofing membrane to be applied between the underside of sleepers and top of concrete slab to be a self-adhering membrane with Grace “Ice and Water Shield” being an acceptable product.

PART 3 - EXECUTION

3.1 Housing and Heating

1. Protection - General:
    1. The Contractor shall protect the concrete during cold weather in accordance with CSA A23, and as augmented below.
    2. The protection system shall be designed for the worst conditions that can be reasonably anticipated from local weather records, forecasts, site conditions and past experience for the time period during which the protection is required. Concrete placement locations are to be housed, heated and protected from inclement and/or cold weather conditions by constructing protective enclosures as required to complete concrete pouring and curing without delay.
    3. The Contractor shall monitor the conditions and modify the protection system as required.

2. Protection - Minimum Requirements:
    1. The formwork and existing concrete shall be heated to a temperature of 5°C for a period of 36 hours prior to pouring concrete.
    2. During the 7 days following placing, the concrete temperature shall not fall below 10°C or exceed 70°C.
    3. For cold weather conditions, protection of concrete shall at least conform to Table 1. However the temperature of the concrete shall be checked to ensure that at least the minimum temperature specified above is maintained at all times.

TABLE 1 - MINIMUM COLD WEATHER PROTECTIVE MEASURES ALL CONCRETE

Anticipated Minimum Air Temperature	Thickness			
(°C)	>1.0m	1.0-0.5m	<0.5-0.25m	<0.25m
+5 to 0	pm1	pm1	pm1	pm2
-1 to -10	pm2	pm2	pm3	pm4
-11 to -20	pm3	pm3	pm4	pm5
less than-20	pm4	pm5	pm5	pm5

Maximum Allowable Drop in Concrete or Patching Temperature / 24h

>2.0m	10°C
1.0-0.99m	15°C
<1.0m	20°C

PROTECTIVE MEASURE

- pm1 - Cover concrete with a moisture vapour barrier as specified for curing with moisture vapour barrier.
- pm2 - Cover concrete as for pm1, then cover the moisture vapour barrier with insulation having an R-Value of 0.67**.
- pm3 - Cover concrete as for pm1, then cover the moisture vapour barrier with insulation having an R-Value of 1.33**.
- pm4 - Cover concrete as for pm1, then cover the moisture vapour barrier with insulation having an R-Value of 2.00**.
- pm5 - House and heat as specified for housing and heating.

**NOTE: All R values are metric. The conversion factor from metric to imperial is Metric "R" value x 5.678 = Imperial "R" value.

3. Housing and Heating:
   1. The design of the protective housing shall take into account the effects of construction activities such as placing concrete, and grouting. Heating equipment of sufficient capacity to establish and maintain the specified curing conditions shall be used throughout the curing period and for such time thereafter as is necessary for the completion of the work. Heating equipment used within the housing shall be vented outside the housing. Heating equipment having an open flame will not be permitted.

2. The ambient air temperature adjacent to the concrete or formwork within the housing shall not be permitted to vary, from location to location, by more than 8°C.

4. Withdrawal of Protection
   1. The cold weather protection shall be gradually removed or reduced in such a manner that the maximum allowable drop of concrete temperature for each 24 h period, as specified in Table 1, is not exceeded.
   2. The protection shall not be totally removed nor shall the concrete be fully exposed to the air until the average temperature of the concrete is within 10°C of the air temperature.

3.2 Reinforcing Steel - Field Bending

1. Do not field bend or field weld reinforcement except where indicated or authorized by the Engineer.

2. When field bending is authorized, bend without heat, applying a slow and steady pressure and proper bending tools.

3. Replace bars which develop cracks or splits.

3.3 Placing Reinforcement

1. Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CAN/CSA-A23.1.

2. Prior to placing concrete, obtain the Engineer's approval of reinforcing material and placement.

3. Ensure cover to reinforcement is maintained during concrete pour.

4. Protect bars with covering during transportation and handling. During placing, use vibrators with protective sheaths.

3.4 Preparation

1. Obtain the Engineer's written approval before placing concrete. Provide 24 hours' notice prior to placing of concrete.

2. Pumping of concrete is permitted only after approval of equipment and mix. The mix supplier and mix designer must certify that the mix can be pumped using the proposed equipment and not affect the concrete properties.

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

4. Before placing concrete, obtain the Engineer's written approval of proposed method for protection of concrete during placing and curing.

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

6. Do not place load upon new concrete until authorized in writing by the Engineer.

3.5 Construction

1. Do cast-in-place concrete work in accordance with CAN/CSA A23.1 and including the supply (if not covered by other sections) and installation of miscellaneous items such as conduit, junction boxes, anchor plates, drains, etc.

2. Finishing:
    1. Finish concrete in accordance with CAN/CSA-A23.1.
    2. Use procedures acceptable to the Engineer or those noted in CAN/CSA A23.1 to remove excess bleed water. Ensure surface is not damaged.
    3. Provide screed float finish unless otherwise indicated.
    4. Chamfer and rub exposed sharp edges of concrete or patching with carborundum to produce 3 mm radius edges unless otherwise indicated.

3.6 Placement of Granular

1. Place granular fill to interior of pier only after concrete in walls has cured for 7 days and/or has reached 70% of the design strength.

2. Place granular in lifts not to exceed 150 mm in thickness. Compact to 100% standard Proctor.

3. At drains, install geotextile and crushed stone as called for on the drawings.

3.7 Placement and Curing of Concrete

1. Before placing concrete, and as applicable, thoroughly dampen the concrete surfaces to promote bond. Immediately before placing concrete, place bonding agent to ASTM C1059 or cement slurry bonding agent.

2. Consolidate concrete with mechanical vibration and cast and finish by approved methods. Contractor must be able to demonstrate satisfactory placement and finishing with experienced concrete finishers.

3. Ensure that rate of placing is sufficient to complete proposed placing, finishing and curing operations within scheduled time.

4. Install wet burlap and white plastic over the newly placed concrete after it has initially set and so the placement of the burlap and plastic will not damage the surface. Install cold weather protection as required. Maintain moist curing on the concrete for a minimum of 7 days.

3.8 Site Tolerance

1. Unless otherwise noted, concrete application tolerance shall be in accordance with CAN/CSA-A23.1 straight edge method.

3.9 Field Quality Control

1. Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Engineer in accordance with CAN/CSA-A23.1.

2. The Engineer will pay for costs of tests. If retesting is required due to non-conformance, the contractor shall pay all costs associated with retesting.

3. The Engineer will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

3.10 Placement of Composite Decking and Fascia

1. Install composite sleepers on concrete deck with waterproofing membrane between bottom of sleeper and top of concrete. Installation to be done with approved stainless steel fasteners (screws).

2. Start decking installation at east face of pier, with outer edge of first deck board to butt to back of fascia board. Notch first deck board to fit around gangway support angle, if required.

3. Install decking as recommended by composite decking manufacturer, with stainless steel fasteners.

4. On east face of pier, install composite spacers to ensure drainage of water, from under the deck, behind the fascia board. All fasteners for composite spacers and fascia to be approved stainless steel fasteners (screws).

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

PART 1 - GENERAL

1.1 Description of Work

1. This section covers the requirements for the supply, fabrication and installation of the new floating dock, gangway and strut support structure.

2. While it is intended that the pier will be constructed this fall (2016), the floating dock, gangway and strut support system are not to be installed until the spring of 2017; in May during a three day period as directed by the Engineer. It is therefore expected that the fabrication of the dock, gangway and strut system will be carried out over the winter period (2016-2017).

3. All steel components for the dock, gangway and strut system shall be hot dip galvanized and all bolts shall be hot dipped galvanized or, stainless steel. The drawings provide more details. All decking is to be a wood thermoplastic composite lumber. Pressure treated or cedar lumber is not to be used.

1.2 Related Sections

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

2. Section 26 05 00 – Common Work Results for Electrical

1.3 Measurement and Payment

1. The work of this Section, for the supply, fabrication and installation of the new dock, gangway and strut support system, will not be measured for payment and will be paid for under the lump sum price item, "New Floating Dock, Gangway and Strut Support System". All costs for labour materials and equipment necessary for the completion of the work of this item shall be included in the lump sum price for this item.

2. Under the item, "New Floating Dock, Gangway and Strut support System", the anchorage assemblies to the strut support system are to be fabricated and provided for incorporation in the cast-in-place work for the pier.

1.4 References

1. American Society for Testing and Materials (ASTM)
    1. ASTM A 325-09 ASTM A 325M-09, Specification for Structural Bolts, Steel, Heat Treated 120/105 ksi Minimum Tensile Strength.

2. Canadian Standards Association (CSA)
    1. CSA G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel.
    2. CSA G40.21-04 R2009, Structural Quality Steels.

3. CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
4. CAN/CSA-S16.1-01 (R2007), Limit States Design of Steel Structures.
5. CSA W48 Series, Electrodes.
6. CSA W59-13, Welded Steel Construction, (Metal Arc Welding).
7. CSA W47.1 -09 (R2014) Certification of Companies for fusion welding of steel.

1.5 Shop Drawings

1. Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures. Shop drawings to be stamped and signed by a Professional Engineer licensed in the Province of Ontario and who is experienced in the work.

2. Shop drawings to clearly show the free board anticipated for the dock (without superimposed loading) as well as the flotation capacity of the dock floats and the design loads for the struts. Provide copies of calculations, when requested by the Engineer, and showing all dock weights and flotation capacities.

3. Indicate all details for the dock, gangway and strut system including, cuts, copes, connections, holes, bolts, welds and the supply, fabrication and installation of appurtenances and all details of the decking systems and connection to the supporting dock structure. Indicate welds by CSA W59 welding symbols. Proposed welding procedures to be stamped and approved by Canadian Welding Bureau.

1.6 Delivery, Storage and Handling

1. Ensure safe delivery of the dock, gangway and strut system to the site. It is assumed that the docks, gangways and strut systems will be delivered (possibly floated) to the site and immediately installed in May (2017), or earlier, as directed by the Engineer.

2. Provide protective blocking for lifting, transportation and storing. Exercise care during fabrication, transportation and installation so as not to damage the dock system components. Do not cause excessive stresses.

3. Protect threads of bolts and nuts during storage.

4. Ensure that no portion of delivered docking system comes into contact with the ground. Support all material on wood blocking and keep all bolts, nuts and washers in containers, protected from moisture.

5. Provide the Engineer with delivery schedules a minimum of 7 days prior to shipping and installation.

1.7 Record Drawings

1. The Contractor shall complete As-Built drawings for the floating dock, gangway and strut system. It is anticipated for the most part that the shop drawings will form

the basis for the As-Built Drawings, for these constructions, with changes that occurred during fabrication and/or installation.

PART 2 - PRODUCTS

2.1 Materials

1. Structural steel: to CSA G40.21-13, grade and types, 300W or 350W.

2. High strength bolts, nuts and hardened washers: to ASTM A 325.

3. Welding electrodes: to CSA W48 series.

4. Hot dip galvanizing: to CAN/CSA-G164-M92 (R2003), minimum zinc coating of 600 g/m ý.

5. Composite Decking: composite lumber shall be wood thermoplastic lumber made from 50 percent wood fiber and 50 percent polyethylene by weight (often referred to as Trex). Colour to be as directed by the Engineer.

6. Deck Screws: No. 10 stainless steel deck screws or screws as recommended by composite decking manufacturer.

7. Boat Mooring Cleats: mooring cleats to be “Dock Cleat” style with open base/flat head in cast aluminum; minimum 250 mm in length and 60 mm high. Submit sample of proposed cleat to Engineer for approval. Attachment hardware to be as recommended by the cleat manufacturer.

8. Solar Lighting: Solar lights on the dock to be Carmanah M550 solar powered LED marine lanterns with a 1 to 3 NM range.

9. Rubber Washers: washers, to be used at the end connections to the strut system, to be neoprene rubber and sized to suit the application. Submit samples to Engineer for approval.

10. Gangway Lighting: Lighting on gangway to be dimmable wet location LED linear flex system. An acceptable product is Aquaflex Ext 2400k by Moda Light, with MP87 24V drivers.

2.2 Source Quality Control

1. Provide to the Engineer, prior to fabrication, two copies of steel producer certificates, in accordance with CSA G40.20/G40.21.

PART 3 - EXECUTION

3.1 General

1. Fabrication of steel to be in accordance with CAN/CSA-S6-14. Do welding in accordance with CSA W59-13.

2. All fabrication and installation of steel work to be completed by a fabricator and the fabricator's workers certified under division 1 or 2 of CSA W47.1 -09 (R2014) Certification of Companies for fusion welding of steel. The fabricator must provide proof that the workers have been employed by the fabricator for a period of longer than 1 year completing similar tasks or, the workers experience must be reviewed and approved by the Engineer.

3. High strength bolting: in accordance with CAN/CSA-S6-14. Use 'turn-of-nut' tightening method.

4. Allowable tolerance for bolt holes:
    1. Matching holes for bolts to line up so that a dowel 1 mm less in diameter than the hole diameter passes freely through assembled members at right angles to such members.
    2. Finish holes not more than 2 mm in diameter larger than diameter of bolt unless otherwise specified by The Engineer.
    3. Center-to-center distance between any two holes of group to vary by not more than 1 mm from dimensioned distance between such holes.
    4. Center-to-center distance between any two groups of holes to vary not more than following:

Centre-to-Centre distance in meters	Tolerance in plus or minus mm
less than 10	1
10 to 20	2
20 to 30	3

Correct miss-punched or miss-drilled members only as directed by the Engineer.

5. Finish: members true to line, free from twists, bends, open joints, sharp corners and sharp edges. Grind sharp edges and square corners to ensure a suitable surface is obtained after galvanizing.

3.2 Dock Fabrication

1. Construct number and type of steel floats as indicated on the reviewed shop drawings. Build work square, true, straight and accurate to the required size.

2. Install plugs on top section of pipe floats to permit pressure testing for air tightness and allow for escaping air during hot dip galvanizing. Carry out air testing at 150 kPa for 15 minutes. Repair leaks and repeat test.

3. Fabricate and install steel saddle frames and spacer tubes. Hot dip galvanize the completed base assembly. If the completed assembly is too long for the galvanizing vat, a mid-point splice is permitted to allow the assembly to be dipped in half lengths. If the contractor wishes to use a mid-point splice, complete details of the splice are to be provided on the shop drawings submitted for the dock assembly.

4. Fabricate and install remaining galvanized steel components (all components to be bolted to the base assembly) as per the reviewed shop drawings. Restrict drifting during assembly to a minimum required to bring parts into position without enlarging or distorting holes, and without distorting, kinking or sharply bending metal of any member or unit.

5. Supply and install all composite attachment strips, decking and curbing as per the reviewed shop drawings.

6. Supply and install all appurtenances such as cleats and solar lights.

3.3 Gangway Construction

1. Fabricate all channel members, including end plates (for pinning to shore pier and fitting rollers) as per the reviewed shop drawings and, pre-assemble to check fit. Once fit is confirmed, hot dip galvanize all components.

2. Assemble hot dipped galvanized components and install composite nailer joists (sistered to channels), decking and fascia components.

3. Fabricate, galvanize and install handrail components as per the reviewed shop drawings. Ensure that all burrs in the galvanizing are filed off to prevent injury to users of the railing.

4. Fabricate, galvanize and install the kick plate curbs, with LED mounts as per reviewed shop drawings. Supply and install LED lights as per manufacturer's recommendations and tested to ensure lights are operating as required.

3.4 Strut System

1. Fabricate all HSS members, including end plates (for pinning to pier and dock) as per the reviewed shop drawings and, pre-assemble to check fit. Once fit is confirmed, hot dip galvanize all components.

2. Once dock is floated into its' approximate final location, assemble galvanized HSS struts and fit to dock and pier. Install stainless steel bolts, complete with rubber washers, and pins in sleeve connections of HSS components to hold assembly and dock in place. Ensure end connections are free to rotate (with rising and lowering water levels) without binding.

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

PART 1 - GENERAL

1.1 Related Sections

1. Section 26 05 02 Electrical Basic Material and Methods

2. Section 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings

1.2 References

1. Canadian Standards Association (CSA International)

    1. CSA C22.1-06, Canadian Electrical Code, Part 1 (20th Edition), Safety Standard for Electrical Installations.
    2. CAN/CSA-C22.3 NO 1-06, Overhead Systems.
    3. CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50 000 V
    4. IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

2. Ontario provincial Standard Specifications:

    1. OPSS 106 – General Specification for Electrical Work
    2. OPSS 602 – Construction Specification for Installation of Electrical Chambers
    3. OPSS 603 - Construction Specification for Installation of Duct

1.3 Definitions

1. Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

1.4 Design Requirements

1. Operating voltages: to CAN3-C235.

2. Electrical devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.

    .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

3. Language operating requirements: provide identification labels for control items in English and French.

1.5 Submittals

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

2. Quality Control: in accordance with Section 01 45 00 - Quality Control.

    1. Provide CSA certified equipment and material.
    2. Where CSA certified equipment and material is not available, submit such equipment and material to the Departmental Representative for approval before delivery to site.
    3. Submit test results of installed electrical systems and instrumentation.
    4. Permits and fees: in accordance with General Conditions of contract.
    5. Submit certificate of acceptance from authority having jurisdiction upon completion of Work to the Departmental Representative.

1.6 Quality Assurance

1. Quality Assurance: As per OPSS 106

1.7 Delivery, Storage and Handling

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

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

1.8 System Start-up

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

1.9 Basis of Payment

1. All tender items at the contract price to be paid as per OPS standards unless otherwise noted.

PART 2 - PRODUCTS

2.1 Materials and Equipment

1. Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from the Departmental Representative before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.

PART 3 - EXECUTION

3.1 Installation

1. Do complete installation in accordance with CSA C22.1 except where specified otherwise.

2. Do overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.

3.2 Conduit Installation

1. Install conduit and sleeves prior to pouring of concrete.

3.3 Mounting Heights

1. Mounting height of equipment is from finished grade to centreline of equipment unless specified or indicated otherwise.

2. If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

3.4 Co-Ordination of Protective Devices

1. Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.5 Field Quality Control

1. Carry out tests in presence of the Departmental Representative.

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

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

PART 1 - GENERAL

1.1 Related Sections

1. Section 26 05 00 Common Work Result – for Electrical
2. Section 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings
3. Section 26 05 55 Installation of Cables in Duct

1.2 References

1. Canadian Standards Association (CSA International):
    1. CAN/CSA C22.2 No.18 - Conduit Boxes, and Fittings
    2. CSAC22.2 No.38-M - Thermoset lnsulated Wires and Cables
    3. CSAC22.2 No.40-M - Junction and Pull Boxes
    4. CSAC22.2 No.65 - Wire Connectors
    5. CSAC222 No.75-M - Thermoplastic lnsulated Wires and Cables
    6. CAN/CSA-C22.2 No.8$M - Rigid PVC Boxes and Fittings
    7. CSAC222No.211.2-M - Rigid PVC (Unplasticized) Conduit
    8. CSAC22.2 No. 45.1-07 - Electrical Rigid Metal Conduit – Steel
2. Ontario provincial Standard Specifications:
    1. OPSS 106 – General Specification for Electrical Work
    2. OPSS 602 – Construction Specification for Installation of Electrical Chambers
    3. OPSS 603 - Construction Specification for Installation of Duct
    4. OPSS 604 - Construction Specification for Installation of Cable
    5. OPSS 609 – Construction Specification for Grounding

1.3 Submittals

1. Consultant reserves the right to require Contractor to submit samples of any materials to be used in this project.

PART 2 - PRODUCTS

2.1 Wire Low Voltage Up To 1000v Service

1. Conductors
    1. ASTM Class B, soft drawn, electrolytic copper
    2. Stranded

2. Insulation

    1. CSA type RWU90 XLPE (-40'C):
        1. Heat and moisture resistant
        2. Low temperature, chemically cross-linked thermosetting polyethylene material
        3. 1000V rated
        4. For maximum 90"C conductor temperature
        5. For installation at minimum -40oC
        6. To CSA C22.2 No.38

3. Acceptable Manufacturers

    1. Alcan Cable
    2. Alcatel Canada Wire
    3. Pirelli Cables

2.2 Wire and Cable Connectors

1. Copper compression type wire and cable terminations for #8 AWG and larger conductors, colour keyed, sized to suit. Long barrel NEMA 2 hole lugs for sizes #1/0 AWG and larger.
    1. Acceptable Manufacturers
        1. Thomas & Betts series 54000
        2. Ideal Powr-Connect
        3. Burndy Hylug

2. Twist type splicing connectors, copper, sized to suit, with nylon or plastic shroud for tee connections in #10 AWG and smaller conductors.
    1. Acceptable Manufacturers
        1. Thomas & Betts spring type
        2. Ideal Twister
        3. Marr Marrette

3. Conductor compression splice for #10 AWG or smaller.
    1. Acceptable Manufacturers
        1. Thomas & Betts STA-Kon series
        2. Ideal Splices
        3. Burndy

2.3 Conduit and Fittings

1. Rigid PVC Conduit
    1. To CSA C22.2No.211.2-M Rigid PVC conduit

2. PVC Coated Rigid Steel Conduit & Fittings
    1. To CSA C22.2No.45.1-07 Electrical Rigid Metal Conduit - Steel

3. Electrical Non-Metallic Tubing
    1. To CAN/CSA C22.2 No. 227.1

4. Rigid PVC Conduit Fittings
    1. To CSA C22.2 No.85-M
    2. Rigid PVC fittings of same manufacture as rigid PVC conduit

PART 3 - EXECUTION

3.1 Wire and Cable

1. Install wiring in duct unless noted otherwise.

2. Minimum wire sizes:
    1. Power and lighting
        1. No. 8 AWG
        2. No. 6 AWG

3. Wire and cable application and type:

Application	**Type**
Equipment feeders, circuits	RW90
Underground duct	RWU90

3.2 Connectors

1. Make splices in junction boxes and pole handholes. Underground splices shall be permitted only with water proof splice kit.

2. Make connections in lighting circuits with compression connectors protected with insulating covers.

3. Seal terminations and splices exposed to moisture, corrosive conditions or mechanical abrasions with heavy wall heat shrinkable insulation.

3.3 Conduit General

1. Run parallel or perpendicular to building lines.

2. Group conduits wherever possible.

3. Install expansion joints as required.

4. Do not drill structural members to pass through.

5. PVC conduits to contain insulated green ground wire.

6. Install 6 mm diameter nylon pull cord in empty conduits.

3.4 Conduit and Fittings

1. Minimum conduit sizes:

    1. Directly buried:53 mm trade size conduit

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

PART 1 - GENERAL

1.1 Related Sections

1. Section 26 05 00 Common Work Result – for Electrical.

2. Section 26 05 02 Electrical Basic Material and Methods.

1.2 References

1. Canadian Standards Association (CSA International)
   1. CAN/CSA C22.2 No. 18-98 (R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
   2. CSA C22.2 No. 211.2-M1984 (R2003), Rigid PVC (Unplasticized) Conduit.
   3. CSA C22.2 No. 45.1-07 Electrical Rigid Metal Conduit – Steel
   4. CSA C22.2 No. 227.1 Electrical Non-Metallic Tubing
   5. CSA C22.2 No. 85-M89 (R2006)Rigid PVC Boxes and Fittings

2. Ontario Provincial Standard Specifications
   1. OPSS 106 - General Specification for Electrical Work.
   2. OPSS 603 - Construction Specification for Installation of Duct.

1.3 Submittals

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

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

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

4. Instructions: submit manufacturer's installation instructions.

1.4 Waste Management And Disposal

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

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

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

PART 2 - PRODUCTS

2.1 Conduits

1. Rigid pvc conduit: to CSA C22.2 No. 211.2.

2.2 Conduit Fittings

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

2. Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.

2.3 Fish Cord

1. Polypropylene.

PART 3 - EXECUTION

3.1 Manufacturer's Instructions

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

3.2 Installation

1. Install PVC conduits underground, in accordance with OPSS 603 and as indicated.

2. Install electrical non-metallic tubing into sleeves in pole footings in accordance with OPSS 603 and as indicated.

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

4. Install fish cord in empty conduits.

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

6. Dry conduits out before installing wire.

3.3 Conduits Underground

1. Slope conduits to provide drainage.

3.4 Cleaning

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

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

PART 1 - GENERAL

1.1 Related Sections

1. Section 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. 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. 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.

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.

    2. Do not store any machinery, equipment or materials within 30m of natural high water mark of the watercourse.

    3. 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.

    4. Gather and dispose of waste and debris in conformity with regulations in force and other sections of this specification. 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 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

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.

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. 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.

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** **********