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SOW – FOUNDATIONS AND TOWER REPLACEMENT

CONSTRUCTION CONTRACT

Cornwall Island, ON

MARITIME AND CIVIL INFRASTRUCTURE

Prepared by: LL

Approved by: LL

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SECTION: 011100 GENERAL INSTRUCTIONS

PART 1 - GENERAL

1.1 Minimum Standards

- .1 Perform work in accordance with National Building Code of Canada (NBC) and any other code of provincial, territorial or local application. In the case of any conflict or discrepancy, the more stringent requirements shall apply.
- .1 Meet or exceed requirements of:
 - .1 Contract documents; and
 - .2 Specified standards, codes and referenced documents.

1.2 Description of Work

- .1 Work under this Contract includes but is not necessarily limited to the provision of all labour, materials, and equipment required to:
 - .1 Remove and dispose of existing foundation and tower;
 - .2 Install new concrete foundation for new Aids to Navigation (AtoN) tower;
 - .3 Install one [1] new 50' steel AtoN tower including all appurtenances onto the new foundation;
 - .1 Tower must be transported to site by Contractor.
 - .4 Install new day-mark on new tower as well as replace the existing day-mark on the front tower.
 - .1 Front tower is located 600m away
 - .2 New day-marks must be transported to site by Contractor.
 - .5 Dispose of existing day-marks.
- .2 The following work will be undertaken by others and is hereby excluded:
 - .1 Supply of new day marks for installation;

1.3 Submittals

- .1 Mandatory submittals and schedule for submission are detailed below and in Appendix B. The following identifies general requirements only. The relevant sections must be consulted for a complete listing of mandatory content.
- .2 Detailed Schedule:



- .1 Deadline:
 - .1 No later than ten [10] working days following award.
- .2 Deliverables:
 - .1 The contractor shall furnish a high level schedule outlining the major construction milestones. Schedule shall clearly define the anticipated start and finish dates of the project.
 - .2 For fieldwork to proceed, all other mandatory submittals must be received and accepted by Coast Guard.
- .3 Proof of Qualifications (Mandatory):
 - .1 Deadline:
 - .1 No later than ten [10] working days following award.
 - .2 Deliverables:
 - .1 The Contractor shall provide the name and contact information for the following project team members:
 - .1 The Project Manager;
 - .2 The Site Forman; and
 - .2 The contractor shall also provide a detailed list of all subcontractors being used to complete the work described herein (Section 011100 – 1.4).
- .4 Construction Plan (Mandatory):
 - .1 Deadline:
 - .1 No less than ten [10] working days prior to mobilization.
 - .2 Deliverables:
 - .1 A Construction Plan of sufficient detail to demonstrate that the Contractor has considered all the challenges of the project and is prepared to undertake the works in a competent and professional manner in accordance with all legislation. The submission shall include:
 - .1 Project Specific Safety Program (Section 013530);
 - .2 Project Environmental Protection Plan (Section 013543);
 - .3 Detailed Demolition Plan (Section 024116);
 - .4 Foundation Construction Plan (Section 033000);



.5 Tower Erection Plan (Section 133613); and

.6 Excavation Plan (Section 310000).

.5 As-built and QA/QC (Mandatory):

.1 Deadline:

.1 No more than twenty eight [28] calendar days after construction.

.2 Deliverables:

.1 The following documents shall be forwarded upon completion of the contract:

.1 Set of red-lined as-built drawings (Sections 033000 & 133613);

1.4 Contractor Qualifications

.1 The work shall be carried out under the supervision and responsibility of a sole specialized Contractor.

.2 The Contractor must be experienced in the installation of aid to navigation structures or other similar free standing structures.

.3 The Contractor shall designate the following key project members, including any subcontractors. The project members shall have completed projects of similar scope and complexity to the work described herein.

.1 Project Manager: Contact information for the main point of contact for the project shall be provided by the contractor.

.2 Site Forman: Contact information for the main point of contact for the project fieldwork shall be provided by the contractor.

.3 The contractor shall provide a detailed list of all subcontractors being used to complete the work described herein.

.4 Requests to amend the project team, following contract award, must be forwarded in writing. Coast Guard reserves the right to reject any proposal to amend the project team.

1.5 Site Location

.1 The tower is located on Cornwall Island at the following coordinates.

.1 45° 0'44.18"N, 74°40'16.17"W

.2 The front tower is located at the end of Island Road at the following coordinates.

.1 45° 0'53.65"N, 74°39'52.02"W



1.6 Existing Conditions

- .1 Photographs of the existing towers have been included in Appendix A: Site Locations and Photographs.
- .2 Bidders must make their own estimate of the difficulties associated with all phases of the works.
- .3 The contractor must include in their costs all expenses related to the difficulties of working at the sites.
- .4 A geotechnical investigation has been completed for this location. A copy of the findings is provided in Appendix G.
- .5 Permission has been granted to work from the driveway immediately in front of the tower.

1.7 Contractor's Access to Site

- .1 Contractor is responsible for transportation of all labour, materials and equipment to and from the sites, including any and all material furnished or itemized for salvage by Coast Guard.
- .2 Both sites are accessible by standard vehicle.
- .3 Because Cornwall Island is a reserve with both American and Canadian members, you must go through Canadian customs when re-entering Cornwall upon leaving the island. American customs are on the American shore, but do not need to be passed to access the project site.
- .4 Coast Guard must also be notified at least five working days prior to any site access.

1.8 Completion, Scheduling and Planning of the Works

- .1 Work may commence as early as practical following Coast Guard's acceptance and approval of mandatory submissions.
- .2 Site work shall not commence without written authorization of Coast Guard Project Authority.
- .3 Because the tower is a seasonal Aid to Navigation, fieldwork can only be undertaken outside of the operational season.

- .1 Fieldwork cannot begin before January 2020 and construction work shall be completed no later than February 14, 2020.

- .1 Construction work includes the replacement of the day-mark on the front tower.

1.9 Coast Guard Staging Location

- .1 Items to be supplied by, or salvaged to Coast Guard shall be collected or delivered by the Contractor to the following staging location. The Contractor shall be responsible for all



transportation costs between the project site and the identified staging location. Material drop off or access to stored goods outside of regular operating hours shall be at the discretion of Coast Guard and may be subject to cost recovery:

.1 Staging location:

CCG Base Prescott
401 King St. West.
Prescott, ON K0E 1T0

.2 Advise Coast Guard at least three (3) working days prior to pick-up/delivery

.3 Shipping/Receiving hours: Monday through Friday, 9:00AM to 3:00PM

1.10 Temporary Facilities

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Arrange, pay for, and maintain temporary electrical power supply as required for construction, and water supply as required, in accordance with governing regulations and ordinances.
- .3 Maintain emergency spills kit on-site at all times.

1.11 Fees, Permits, Certificates and Information

- .1 Contractor shall provide authorities having jurisdiction with all information requested.
 - .1 Contractor shall provide copies to Coast Guard of any documentation submitted to other authorities related to the work described in this document.
- .2 Contractor shall pay fees and obtain certificates and permits required.
- .3 Contractor shall furnish certificates and permits when requested.

1.12 Reference Documents

- .1 The most recent publication or edition of any document referenced in this specification should be used unless the referencing clause states that this clause does not apply.

1.13 Required Submissions

- .1 A summary of the minimum mandatory submissions required can be found in Appendix B. This summary is not an exhaustive list of all submissions required for the duration of the project.
- .2 Additional submissions may be required after award.



SECTION: 013300 SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 General

- .1 This section specifies general requirements and procedures for the Contractor's submissions of documents to Coast Guard for review.
- .2 For each phase of the project, work shall not progress until all mandatory submittals required before the start of that phase have been received, reviewed and accepted by Coast Guard.
- .3 Where items or information is not produced in SI Metric units, converted values are acceptable.
- .4 Contractor's responsibility for errors and omissions in submission is not relieved by Coast Guard's review of the submitted documents.
- .5 Notify Coast Guard, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .6 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Coast Guard's review of submission, unless Coast Guard gives written acceptance of specific deviations.
- .7 Make any changes to submissions that Coast Guard may require consistent with Contract Documents and resubmit as directed by Coast Guard.
- .8 Provide Coast Guard with a written notice, when resubmitting, of any revisions other than those requested by Coast Guard.

1.2 Submission Requirements

- .1 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.
- .2 Allow three [3] working days, or as stipulated in the specifications, for Coast Guard to review the submission.
- .3 The Contractor's Engineer shall stamp and sign any submissions requiring a Professional Engineer's seal certifying his approval of samples, verification of field measurements, and compliance with Contract Documents.



SECTION: 013530 HEALTH AND SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 Scope

- .1 The Contractor shall be responsible to develop, implement and enforce a safety program which addresses all elements of the work.

1.2 References

- .1 Work under this section shall be undertaken in strict conformance with all listed references, In the case of any conflict or discrepancy the more stringent requirements shall apply.
 - .1 Canada Labour Code Part II - January 2008;
 - .2 NRC-CNRC National Building Code of Canada, 2015;
 - .3 Ontario Occupational Health and Safety Act and Regulations, 2009;
 - .4 Any and all other Provincial/Territorial Regulations and Policies, Worker's Compensation Board Policies or Local municipal regulations pertaining to safety of the contractor's workers.

1.3 Submittals

- .1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013300.
- .2 Project Specific Safety Program
 - .1 Deadline:
 - .1 With Construction Plan
 - .2 Deliverables:
 - .1 Safety Program Document, include:
 - .1 A listing of all activities specific to each phase of the project and their Health & Safety risks or hazards;
 - .2 Detailed descriptions of how the activities are to be carried out as well as methods for mitigating hazards and risks;
 - .3 A listing of personnel responsible for health and safety measures, and Emergency procedures; and
 - .4 Material Safety Data Sheets for hazardous products to be utilized in the execution of the works.



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- .3 Proof that a Notice of Project has been filed with the Ontario Ministry of Labour; and
- .4 Contractor shall submit completed Field Level Hazard Assessment (FLHA) forms to Coast Guard upon request.



SECTION: 013543 ENVIRONMENTAL PROCEDURES

PART 1 - GENERAL

1.1 Scope of Work

- .1 The contractor must implement and enforce the following procedures throughout the duration of the work to mitigate potential negative impacts on the surrounding environment.

1.2 References

- .1 Work under this section shall be undertaken in strict conformance with all listed references, In the case of any conflict or discrepancy the more stringent requirements shall apply.
 - .1 Canadian General Standards Board (CGSB)
 - .2 Transportation of Dangerous Goods
 - .3 Canadian Council of Ministers of the Environment (CCME) Documentation
 - .4 Canadian Environmental Protection Act

1.3 Submittals

- .1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013300.
- .2 Contractor shall submit an Environmental Protection Plan
 - .1 Deadline:
 - .1 With Construction Plan
 - .2 Deliverables:
 - .1 Submit a plan addressing procedures to be implemented to mitigate any negative impact on the environment. Detail (if applicable):
 - .1 Equipment features (age, spill containment);
 - .2 Staging, refueling, and cleaning areas;
 - .3 Clean-up and/or containment procedures (including concrete/grout);
 - .4 Waste disposal methods and sites; and
 - .5 Sedimentation control measures.



PART 2 - PRODUCTS

2.1 General

- .1 Avoid use of hazardous products. Use environmentally friendly products where practical.

PART 3 - EXECUTION

3.1 Construction Area

- .1 Confine construction activities to as small an area as practical.
- .2 Establish material storage, cleaning, and refueling areas where impacts to the surrounding environment will be negligible or readily mitigated.

3.2 Stockpiling of materials

- .1 Materials must be stockpiled as far from the shoreline as practical. Tarps must be used to control dust and run-off.
- .2 Stockpiled excavated materials shall be skirted using filter fabric to control run-off of fines during rain and to prevent excavation of soils below stockpiles.

3.3 Disposal of Wastes

- .1 Clean-up the site at the end of each working day.
- .2 All waste material is to be disposed of in a legal manner at a site approved by local authorities. Transporter/hauler must be appropriately licensed.
 - .1 Recycle or reuse materials where possible.
- .3 Fires and burning of rubbish on site not permitted.
- .4 Do not bury rubbish and waste materials on site.

3.4 Clearing and Grubbing

- .1 Only clear vegetation that interferes with construction once approved to do so by Coast Guard.

3.5 Drainage

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
 - .1 Suspend works during periods of heavy rainfall and add temporary covers to discourage run-off.
 - .2 Water pumped from excavation shall be adequately treated to ensure that water returning to



the watercourse contains minimal fines. Procedures anticipated for preventing the pumping of fines shall be identified in the environmental protection plan, and may include the following:

- .1 The use of filter bags;
- .2 Straw bale check dams or silt fence;
- .3 Discharge through naturally occurring vegetation.
- .3 The means for controlling silt run-off shall be dependent on the site and the quantity of water pumped, and shall be to the discretion of the CCG site staff.
- .4 Sediment control measures shall be inspected and improved/cleaned/replaced as necessary.

3.6 Pollution Control

- .1 Provide methods, means, and facilities to prevent the contamination of soil, water, and atmosphere from the discharge of pollutants produced by construction operations.
- .2 Vehicles, machinery, and equipment shall be in good repair, equipped with emission controls as applicable and operated within regulatory requirements.
- .3 Abide by local noise by-laws.
- .4 Avoid unnecessary idling of vehicles or heavy machinery.
- .5 Limit use of equipment around the shoreline where possible.
- .6 Implement and maintain dust and particulate control measures in accordance with provincial requirements:
 - .1 All bulk material haul equipment shall be appropriately tarped. Watertight vehicles shall be used to haul wet materials
- .7 Designate a cleaning area for tools to limit water use and runoff. Do not allow deleterious materials to enter waterways. Ensure emptied containers are sealed and stored safely for disposal.
- .8 The contractor shall take all necessary precautions to guard against the release of any noxious substance or pollutant to the environment. In the event of any spill the Contractor shall take immediate action to contain the release and mitigate any impact.
 - .1 Materials and equipment to intercept, contain, and clean-up any spill or other release shall be maintained on site throughout the construction period and must be readily accessible at



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all times.

- .2 Any uncontrolled release of a known contaminant (spills, fire/smoke) shall be reported to appropriate Provincial Authority and Coast Guard. Spills of deleterious substances to be immediately contained and cleaned up in accordance with provincial regulatory requirements.
- .3 Provincial Authority: Ontario Spill Action Centre: 1-800-268-6060

3.7 Traffic

- .1 Minimize soil compaction by driving, parking vehicles, and walking, etc. on existing paved roadways/laneways. If soil is impacted by compaction, compensate by restoring areas with new soil, as required.
- .1 Avoid the use of heavy machinery in areas of sensitive slopes. Avoid using machinery on land during wet weather.



SECTION: 014500 QUALITY CONTROL

PART 1 - GENERAL

1.1 Inspection

- .1 Coast Guard or its representative shall have access to the work at all times. If parts of the work are prepared off-site or in a shop, access shall be given to such work throughout the duration of the project.
- .2 In the event the work must be submitted to special testing, inspection or approvals prescribed by Coast Guard in these specifications or provided for in work-site regulations, the request for inspection must be made without unreasonable delay.
- .3 The below list identifies key milestones where the Coast Guard will require an opportunity to take samples/inspect:
 - .1 Tower Demolition: Coast Guard shall witness the demolition of the old nav-aid tower.
 - .2 Subgrade verification: Coast Guard will have the opportunity to inspect the subgrade prior to foundation installation.
 - .3 Concreting: Coast Guard shall verify rebar placement before concrete pour and witness concrete pour and testing.
 - .4 Installation of tower: Coast Guard shall witness the erection of the new nav-aid tower and witness the installation of both new day-marks.

1.2 Procedures

- .1 Provide Coast Guard with advance notice whenever testing is required in accordance with these specifications, so that all parties involved can be present.
- .2 Provide necessary manpower and installations for obtaining and handling samples and material on site.
- .3 Provide access to site if the site is of remote nature whereby the contractor is responsible for providing access to the site

1.3 Rejected Work

- .1 Remove defective work, whether incorporated into the work or not, which has been rejected by Coast Guard as failing to comply with the contract documents. Replace or re-execute in accordance with the Contract Documents.



1.4 Tests and Mixture Formulas

- .1 Supply test reports and required mixture formulas.

1.5 Factory Tests

- .1 Submit test certificates as prescribed in the relevant section of the specifications.

1.6 Acceptance of Work

- .1 Coast Guard will make acceptance visits of work executed by the Contractor at critical milestones identified in the following sections.
- .2 The Contractor shall inform Coast Guard at least three [3] working days before these inspection visits.
- .3 All work shall be completed in compliance with the specifications before requesting the visit for inspection. If the work is not completed or deemed non-compliant, the Contractor shall be responsible for all costs incurred for subsequent inspections.



SECTION: 016100 COMMON PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 General

- .1 Secure Coast Guard approval of all products to be incorporated into the works. Work shall not commence until product data and/or samples have received Coast Guard approval.
- .2 Supply and/or fabricate material and equipment of prescribed quality, with performance conforming to established standards.
- .3 Use new material and equipment unless otherwise specified.
- .4 Ensure replacement parts may be readily procured.
- .5 Use products from one manufacturer for material and equipment of same type or classification, unless otherwise specified.

1.2 Manufacturer's Instructions

- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
- .2 Notify Coast Guard in writing of any conflict between these specifications and manufacturer's instructions; Coast Guard will designate which document is to be followed.

1.3 Compliance

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

1.4 Substitution

- .1 Where specific products have been specified, proposals for substitution may only be submitted after award of contract. Such requests must include statements of respective costs of items originally specified and the proposed substitution.
- .2 No substitutions will be permitted without prior written approval of Coast Guard. Substitutions will be considered by Coast Guard only when:
 - .1 Materials specified in Contract Documents, are not available or,
 - .2 Delivery date of materials selected from those materials specified would unduly delay completion of contract or,



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- .3 Alternative materials to those specified which are brought to the attention of and considered by Coast Guard as equivalent to the material specified will result in a credit to the Contract amount.
 - .3 Should the proposed substitution be accepted either in whole or in part, the Contractor must assume full responsibility and costs when such substitution affects other work on the project including any and all design or drawing changes required as a result of substitution.
- 1.5 Submittals
- .1 Provide product specifications and/or samples upon request from Coast Guard.



SECTION: 024116 DEMOLITION OF STRUCTURES

PART 1 - GENERAL

1.1 Scope of Work

- .1 Work under this section consists of the provision of all labour, materials, and equipment necessary to complete the following activities:
 - .1 Salvage of lighting equipment and all related appurtenances for reinstallation;
 - .2 Removal and disposal of existing day-mark from both the front and rear towers;
 - .3 Removal and disposal of existing rear range tower;
 - .4 Removal of existing rear tower foundation; and
 - .5 Disposal of all waste at a licensed waste disposal facility.

1.2 References

- .1 Work under this section shall be undertaken in strict conformance with all listed references, in the case of any conflict or discrepancy the more stringent requirements shall apply.
 - .1 Canada Labour Code Part II - January 2008.
 - .2 NRC-CNRC National Building Code of Canada 2015
 - .3 Ontario Occupational Health and Safety Act and Regulations, 2016
 - .4 CSA S350-[M1980 (R1998)], Code of Practice for Safety in Demolition of Structures.

1.3 Submittals

- .1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013300.
- .2 Contractor to provide a Demolition Plan
 - .1 Deadline:
 - .1 With Construction Plan
 - .2 Deliverables:
 - .1 Method of demolition including all associated tasks and schedule;
 - .2 Methods for protecting the site from demolition debris; and
 - .3 The ultimate disposal location of all waste materials and debris.



- .1 Include documentation detailing regulatory approval for waste disposal facility and transporter.
 - .3 Work under this section shall not proceed until written approval of the demolition plan has been received from the Coast Guard.
 - .4 Submit copies of certified receipts from the disposal sites for all material removed from the work site upon request.
- 1.4 Existing Conditions
- .1 Photos of the existing aid to navigation towers are included in Appendix A.

PART 2 - PRODUCTS

- 2.1 Not used.

PART 3 - EXECUTION

3.1 General

- .1 Work under this section shall be continuous and proceed without interruption unless otherwise approved by Coast Guard.
- .2 Tower shall not be felled without the specific authorization of Coast Guard.
- .3 Demolition work of the front tower shall not to commence until the Coast Guard has put a temporary aid in place. Contractor shall allow for 2 full days for temporary aid installation.
- .4 Demolition work of the rear tower shall not commence until the new rear tower has been fully commissioned by Coast Guard. The Contractor shall allow for two full days after tower erection for commissioning work.

3.2 Protection

- .1 Prevent movement, settlement or damage of adjacent structures/vegetation.
- .2 Implement effective controls to catch/collect all tower debris during demolition, specifically paint.
- .3 Implement effective controls to prevent injury to workers, property, and local traffic.

3.3 Preparation

- .1 Erect warning signs and barricades.
- .2 Ensure all environmental protection/mitigation measures are in place.
- .3 Ensure facilities have been de-energized.



- .4 Ensure all items identified for salvage have been removed and stored.

3.4 Demolition

- .1 Demolish existing steel structure in its entirety;
- .2 Demolish existing rear foundation in its entirety;
- .3 Ensure that demolition does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
- .4 Ensure demolition is undertaken safely. If at any period during demolition the safety of the Contractor's staff cannot be maintained take preventative measures, stop work and immediately notify Coast Guard.

3.5 Disposal

- .1 All material for disposal is to be disposed of off-site at a licensed disposal/recycling facility.

3.6 Restoration

- .1 The site in its entirety must be restored to an equal or greater condition after completion of construction.



SECTION: 033000 CONCRETE WORK

PART 1 - GENERAL

1.1 Scope of Work

- .1 Work under this section includes the supply of all labour, material and equipment required to complete the following:
 - .1 Install one [1] reinforced concrete foundation to support the new rear tower as per drawings provided;
 - .2 Install two [2] bollards in front of the rear tower foundation;
 - .3 Installation of bearing grout between completed foundation and tower base/anchor plate; and
 - .4 Any and all provisions necessary to ensure that the anticipated performance of the placed concrete will be obtained if work is undertaken in cold weather.

1.2 References

- .1 Work under this section shall be undertaken in strict conformance with all listed references, In the case of any conflict or discrepancy the more stringent requirements shall apply.
 - .1 Canada Labour Code Part II - January 2008
 - .2 NRC-CNRC National Building Code of Canada 2015
 - .3 Ontario Occupational Health and Safety Act and Regulations
 - .4 ASTM A615-15 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete reinforcement
 - .5 CAN/CSA-A23.1-04 Concrete Materials and Methods of Concrete Construction
 - .6 CAN/CSA A23.2-04 Methods of Test and Standard Practices for Concrete
 - .7 CAN/CSA A23.3-04 Design of Concrete Structures
 - .8 CAN/CSA-G30.18 Billet Steel Bars for Concrete Reinforcement
 - .9 CAN/CSA S269.3 Concrete Formwork

1.3 Performance Requirements

- .1 The foundation shall be designed to perform as reasonably expected for a life of 50 years.

1.4 Submittals



- .1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013300.
- .2 Foundation Construction Plan
 - .1 Deadline:
 - .1 With Construction Plan
 - .2 Deliverables:
 - .1 Contractor shall provide a high level summary of mix properties and admixtures to demonstrate compliance with Coast Guard criteria;
 - .2 Provide MSDS (pre-mixed products only);
 - .3 Concrete Placement Plan identifying the location of the source of ready mix concrete, the haul route and any other relevant information required to demonstrate a plan for getting the concrete into the forms in a timely manner;
 - .4 Finishing procedures;
 - .5 Curing methods and schedule;
 - .6 Strength requirements for structural stability (removal of forms);
 - .7 Clean-up procedures; and
 - .8 Mitigation measures to account for hot or cold temperatures where reasonably anticipated during the construction period.
- .3 As-Built Drawings:
 - .1 Deadline:
 - .1 No later than twenty-eight [28] calendar days after project completion
 - .2 Deliverables:
 - .1 A complete set of as-built drawings detailing any and all amendments or revisions to the previously submitted design drawings or documentation indicating final works are as detailed in design drawings.
 - .2 A drawing or sketch indicating the position of the constructed pier relative to the former installation, detail:
 - .1 Difference in elevation from top of former foundation to top of new foundation;
 - .2 Horizontal offsets to the center of new foundation (north, south, east, & west) relative



to former foundation.

1.5 Quality Assurance

- .1 Coast Guard's minimum inspection requirements are detailed herein.
- .2 The Contractor shall be responsible to notify Coast Guard of the date and time that the works may be inspected. Notice must be provided no less than five [5] working days in advance to permit scheduling of quality assurance testing.
- .3 All deficiencies in the works identified at the time of inspection shall be remedied to the satisfaction of Coast Guard, at the Contractor's expense. Work shall not progress until inspections have been completed and the Contractor has been provided with written notice to proceed with the works.
 - .1 Upon completion of formwork and placement of reinforcement;
 - .2 During execution of concrete placement;
- .4 The below list identifies key milestones for which Coast Guard will require an opportunity to take samples, inspect, or witness testing:
 - .1 Subgrade verification: Coast Guard will arrange for a Geotechnical Engineer to inspect the sub-grade upon completion of any excavating where a design bearing surface is to be achieved. The Engineer shall indicate in writing that the sub-grade surface conditions are acceptable.
 - .1 The Contractor shall inform Coast Guard no less than five [5] working days prior to beginning any excavation and foundation installation cannot proceed without a Geotechnical Engineer's approval.
 - .2 Concrete testing: Coast Guard will arrange for concrete testing of air, slump and strength during the pour.
 - .1 The Contractor shall inform Coast Guard no less than five [5] working days prior to the day of the pour and be prepared to provide concrete samples. Testing shall consist of, at minimum, a test for slump, air entrainment and strength (4 cylinders: one [1] 7 day, two [2] 28 day and one [1] to verify concrete strength before tower erection).
 - .3 Final completion: The Coast Guard will conduct final inspection upon completion of the tower installation.

PART 2 - PRODUCTS

2.1 General



.1 All concrete materials shall conform to specifications referenced in CAN/CSA-A23.1-04.

2.2 Formwork

.1 Formwork shall be in accordance with CAN/CSA S269.3.

2.3 Concrete

- .1 Concrete shall possess the minimum characteristic detailed in the Contract Drawings;
- .2 Concrete supplier shall be a holder of a valid "Certificate of Ready Mixed/Mobile Mix Concrete Production Facilities" as issued by the Ready Mixed Concrete Association of Ontario (RMCAO).
- .3 Concrete mix to be determined by Contractor and shall be indicated on engineering plans.
 - .1 The use of calcium chloride as an admixture is not permitted.

2.4 Bollards

- .1 The bollards are to be comprised of 150mm (6 in) diameter galvanized steel pipe;
- .2 The base of the pipe shall be encased in a concrete cylinder 460mm (18 in) in diameter.
- .3 The galvanized pipes are to be top filled with concrete to provide a crown. The bollard, including concrete and pipe, is to be painted hazard yellow.
- .4 Bollards shall be constructed as per the sketch found in Appendix F.

PART 3 - EXECUTION

3.1 General

- .1 Concrete must be placed, finished, and cured in accordance with the Contractor's submitted construction plan and the engineered drawings.
 - .1 Ensure that the top of the concrete is no less than 150 mm (6 in) above the surrounding grade, unless otherwise approved in writing.
 - .2 Installation shall be undertaken in accordance with the engineered drawings and accompanying materials as contained in the Contractor's Summary Report.
 - .3 Locations shall be in conformance with positions detailed in Appendix A.
 - .1 A field survey must be arranged by the Contractor and conducted prior to any other fieldwork taking place in order to accurately layout the location of the new rear tower.
 - .2 Installation of the towers and foundations must not disturb the integrity of the existing facilities or the continued operation of the existing light station.



3.2 Preparation

- .1 Preparation shall not commence until bearing surfaces have been inspected by a geotechnical engineer.
- .2 Remove all deleterious material.
- .3 Construct forms and reinforcement in accordance with the engineer's specifications.
- .4 All exposed 90° edges shall be chamfered.

3.3 Placement

- .1 Concrete placement shall not commence until formwork and reinforcement have been inspected by Coast Guard.
- .2 Contractor shall place, finish and cure concrete as per CAN CSA A23.1 making all adjustments necessary to account for climatic conditions anticipated during the curing period.
- .3 Concrete shall be placed in one continuous pour.
 - .1 The development of cold joints shall be avoided. Alternately, cold joints must be previously approved in writing by CCG.
- .4 Finish exposed concrete surfaces to provide a lightly brushed non-skid surface, unless otherwise specified in the submitted design.
- .5 Cut control joints where specified.
- .6 Contractor shall provide samples as required during placement operation for the performance of quality assurance testing.
- .7 Concrete shall be finished so as to slope gently away from the center of the slab. No water shall pond on the finished surface.

3.4 Curing

- .1 Shall be undertaken in accordance with CAN CSA A23.1 and the Contractor's approved construction plan.
 - .1 Curing regimen employed must take into account local climatic conditions reasonably anticipated to occur during the curing period.

3.5 Grout

- .1 Supply and install load bearing grout between the top of each foundation and each tower base.
 - .1 Edges of grout shall be chamfered.



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3.6 Bollards

- .1 There shall be one [1] bollard installed at the North corner and one [1] bollard installed at the East corner of the tower.

3.7 Inspection

- .1 Concrete pour(s) to be witnessed by Coast Guard representative. Concrete testing to CAN/CSA-A23.2 by testing laboratory will be arranged by Coast Guard. Contractor shall provide samples as required during concreting operation for test purposes.



SECTION: 133613 STEEL TOWERS

PART 1 - GENERAL

1.1 Scope of Work

- .1 Work under this section includes the supply of all labor, material and equipment required to complete the following:
 - .1 Transport one [1] new AtoN tower from staging location to the project site;
 - .2 Transport two [2] new day-marks and all other associated tower accessories from the staging location to the project site;
 - .3 Install the new tower including all appurtenances onto it's new foundation;
 - .4 Install a new day-mark on the existing front tower;
- .2 The following work will be undertaken by others and is hereby excluded:
 - .1 Supply of the new tower, the day-marks and their associated hardware.

1.2 References

- .1 Canada Labour Code Part II – January 2008
- .2 National Building Code of Canada – 2015
- .3 Ontario Occupational Health and Safety Act and Regulations, 2016
- .4 CAN/CSA S16.1 - Limit States Design of Steel Structures.
- .5 CAN/CSA G164 - Hot Dip Galvanizing of Irregularly Shaped Articles.
- .6 CSA Z259.2.4-15 – Fall Arresters and Vertical Rigid Rails
- .7 ASTM F593 – 17 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- .8 ASTM F594 -09(2015) Standard Specification for Stainless Steel Nuts
- .9 ASTM A240 / A240M – 17 Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and General Applications



1.3 Submittals

- .1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013300.
- .2 Tower Erection Plan
 - .1 Deadline:
 - .1 With Construction Plan
 - .2 Deliverables:
 - .1 Plan must clearly demonstrate procedures and methods to be employed to:
 - .1 Erect the tower;
 - .2 Monitor that turn of nut has been completed;
 - .3 Field remedies to address any damage to the tower's finish incurred during transportation and erection;
 - .4 Install the new daymarks;
 - .5 CCG reserves the right to request additional documentation verifying the suitability of the proposed layout and equipment anticipated to be employed in the erection of the tower. Certification may include:
 - .1 Crane/helicopter capacity.
- .3 As-Built Drawings:
 - .1 Deadline:
 - .1 No later than twenty-eight [28] calendar days after project completion
 - .2 Deliverables:
 - .1 A complete set of as-built drawings detailing any and all amendments or revisions to the previously submitted design drawings or documentation indicating final works are as detailed in design drawings.

1.4 Quality Assurance

- .1 Coast Guard's minimum inspection requirements are detailed below:
 - .1 The Contractor shall be responsible to notify Coast Guard of the date and time that the works may be inspected.
 - .1 Notice must be provided no less than three [5] working days in advance to permit



scheduling of quality assurance testing

- .2 All deficiencies in the works identified at the time of inspection shall be remedied to the satisfaction of Coast Guard, by the Contractor at their expense.
- .3 Work shall not progress until inspections have been completed and the Contractor has been provided with written notice to proceed with the works
- .2 Inspections shall take place during tower erection to confirm that turns of nut procedures are being followed.
- .3 Inspections shall take place upon completion of the work to ensure tower is plumb and that accessories have been installed correctly.

PART 2 - PRODUCTS

2.1 Materials

.1 Galvanized steel:

- .1 The towers are made of galvanized steel.

.2 Bolts, nuts & washers:

- .1 As specified in tower drawings provided in Appendix E.

.3 Anchor bolts:

- .1 As specified in tower drawings provided in Appendix E.

- .1 Anchor bolts must possess sufficient threaded length above the top of the foundation to allow configuration specified in above mentioned drawings.

.4 Miscellaneous Materials:

.1 Fall arrest system:

- .1 Trylon TSF Cougar Rail safety.

- .1 Safety rail to be supplied with the tower by Coast Guard.

PART 3 - EXECUTION

3.1 Handling of Material and Transportation

- .1 The Contractor shall take all necessary precautions to avoid damage to the tower members during transportation, unloading and erection. All components or damaged members shall be replaced to the satisfaction of Coast Guard, at the Contractor's expense.



- .2 It is the Contractor's responsibility to ensure that the tower sections, particularly the joints are protected from ending and alignment damage.
- .3 Installation of the towers and foundations must not disturb the integrity of the existing facilities or other structures.

3.2 Site Preparation

- .1 Complete installation of all foundation elements prior to tower erection.

3.3 Tower Installation

- .1 Each anchor bolt shall have two [2] heavy hex steel nuts meeting the requirements of the provided drawings.
 - .1 Contractor shall tighten the first nut using Turn of Nut method associated to the length of bolt provided. The second nuts shall be snug tight to lock into place the two nuts.
 - .2 Erect towers in accordance with contractor submitted Tower Erection Plan;
 - .3 Grout between tower bases and prepared concrete foundations
 - .4 All bolted connections shall be made following the turn of nut procedure.



SECTION: 310000 EARTHWORK

PART 1 - GENERAL

1.1 General

- .1 Work under this section includes the supply of all labour, material and equipment required to complete the following:
 - .1 The excavations for the installation of the rear tower base foundation, including:
 - .1 Stripping and stockpiling of existing topsoil or granular materials to expose subgrade;
 - .2 Backfilling of the excavation, including:
 - .1 Supply of all required materials;
 - .2 Supply of imported granular materials (if necessary); and
 - .3 Placement and/or compaction of granular material.
 - .2 The restoration of all disturbed areas within the work site;

1.2 References

- .1 Work under this section shall be undertaken in strict conformance with all listed references. In the case of any conflict or discrepancy, the more stringent requirements shall apply.
 - .1 Canada Labour Code Part II
 - .2 NRC-CNRC National Building Code of Canada
 - .3 Ontario Occupational Health and Safety Act and Regulations
 - .4 CAN/CSA-A23.1-04 Concrete Materials and Methods of Concrete Construction
 - .5 Any and all other Provincial/Territorial Regulations and Policies; Worker's Compensation Board Policies; Local municipal regulations; pertaining to work of this section.

1.3 Submittals

- .1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013300.
- .2 Excavation Plan
 - .1 Deadline:
 - .1 With Construction Plan
 - .2 Deliverables:



.1 The Excavation Plan shall outline the Contractor's planned excavation and backfill procedures and should detail the following.

- .1 Proposed side slopes and control measures;
- .2 Dewatering measures, if necessary;
- .3 Measures to be taken to prevent exposed soils from freezing;
- .4 Stockpile locations and methods for controlling erosion;
- .5 Backfill equipment types and procedures. Contractor shall provide methods for undertaking backfill placement in cold weather, if reasonably anticipated;
- .6 Include shop drawings of any shoring or bracing required. Drawings must be stamped by a licensed professional engineer;

1.4 Existing Conditions

- .1 A geotechnical investigation has been completed at this site and a copy of the report is included in Appendix G.
- .2 Prior to commencing excavation, document the condition of all existing structures, landscaping, roadways and other adjacent facilities anticipated to be impacted by the work.
- .3 Before commencing work under this section, the Contractor must:
 - .1 Establish the location of all buried services that may interfere with the execution of work; and
 - .2 Hire and arrange for a surveyor to conduct a field survey.
 - .1 The purpose will be to ensure that the new towers are installed in the correct positions and face the required direction.
 - .2 It shall be the contractor's responsibility to establish markers in addition to those provided by the surveyor such that references will not be obstructed or altered by excavation or construction activities and can then be used to accurately verify the proper location of each tower.
- .4 All work of this section shall be witnessed by coast Guard or its representative unless permission is received in writing otherwise.

1.5 Quality Assurance

- .1 Coast Guard's minimum inspection requirements are detailed herein.
- .2 The Contractor shall be responsible to notify Coast Guard of the date and time that the works may be inspected. Notice must be provided no less than five [5] working days in advance to



permit scheduling of quality assurance testing.

.3 All deficiencies in the works identified at the time of inspection shall be remedied to the satisfaction of Coast Guard, at the Contractor's expense. Work shall not progress until inspections have been completed and the Contractor has been provided with written notice to proceed with the works.

.1 Subgrade verification: Coast Guard will arrange for a Geotechnical Engineer to inspect the sub-grade upon completion of any excavating where a design bearing surface is to be achieved. The Engineer shall indicate in writing that the sub-grade surface conditions are acceptable.

.1 The Contractor shall inform Coast Guard no less than five [5] working days prior to beginning any excavation and foundation installation cannot proceed without a Geotechnical Engineer's approval.

PART 2 - PRODUCTS

2.1 General

.1 All materials described in this section shall be supplied by the Contractor.

.1 Water shall be free of deleterious materials.

.2 Backfill may consist of stockpiled native (excavated) materials and must not be frozen.

.3 Granular materials shall be as per approved design drawings.

2.2 Backfill

.1 Either 19mm [3/4"] clear crush stone (gravel) or granular B per OPSS 1001

PART 3 - EXECUTION

3.1 Site Preparation

.1 Prior to commencing excavation, document the condition of all existing structures, landscaping, roadways and other adjacent facilities anticipated to be impacted by the work.

.2 Install any features required to protect existing infrastructure.

3.2 Excavation

.1 Strip topsoil over areas impacted by new construction and stockpile materials on-site;

.2 Side slopes must be maintained around the perimeter of the excavation in accordance with provincial legislation;



.3 Take all reasonable precautions to minimize the disturbance of the existing vegetation;

.4 Install measures as detailed in Construction Plan to prevent excavation from freezing.

3.3 Backfill

.1 Ensure that surrounding soil is unfrozen or take measures to thaw frozen materials;

.2 Backfill to be placed in uniform lifts to a maximum depth of 0.2 m (8 in) and compacted to 95% SPMDD.

3.4 Restoration

.1 Restore all disturbed areas within work sites and along haul routes. Fill and grade all ruts. Ensure positive drainage away from completed and existing foundations.

.2 Excavated materials shall be used given the following priority:

.1 Backfill around new foundation;

.2 Removed from site.



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APPENDIX A: SITE LOCATIONS AND PHOTOGRAPHS

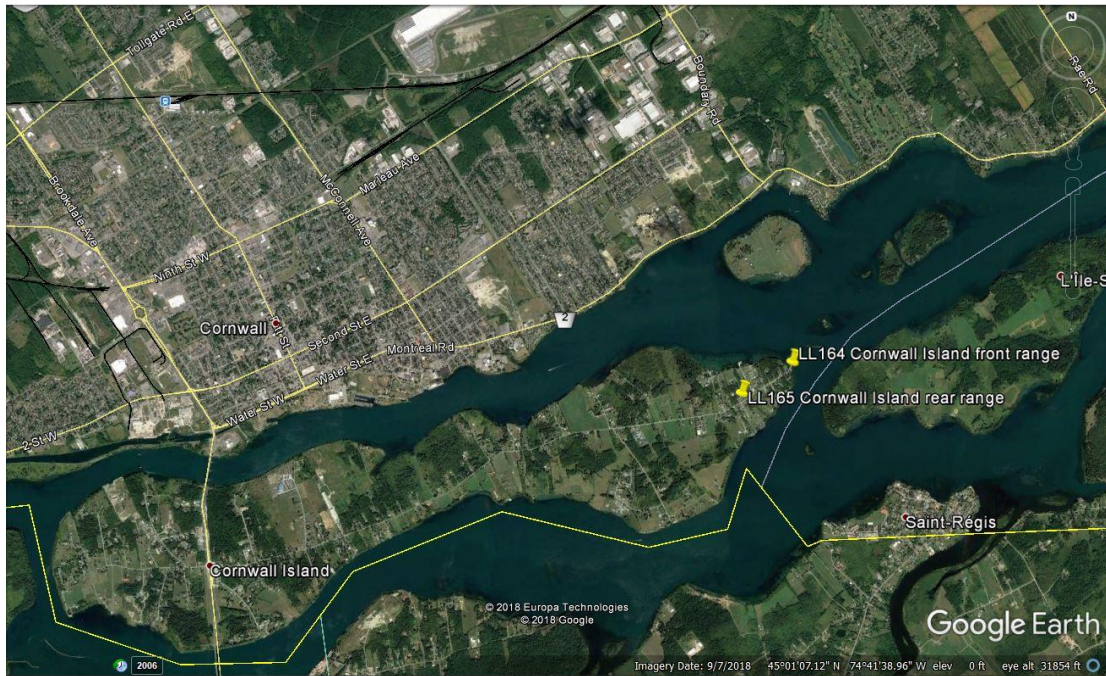


Figure 1: Project Site
Cornwall Island, ON



Figure 2: Project Site – Cornwall Island

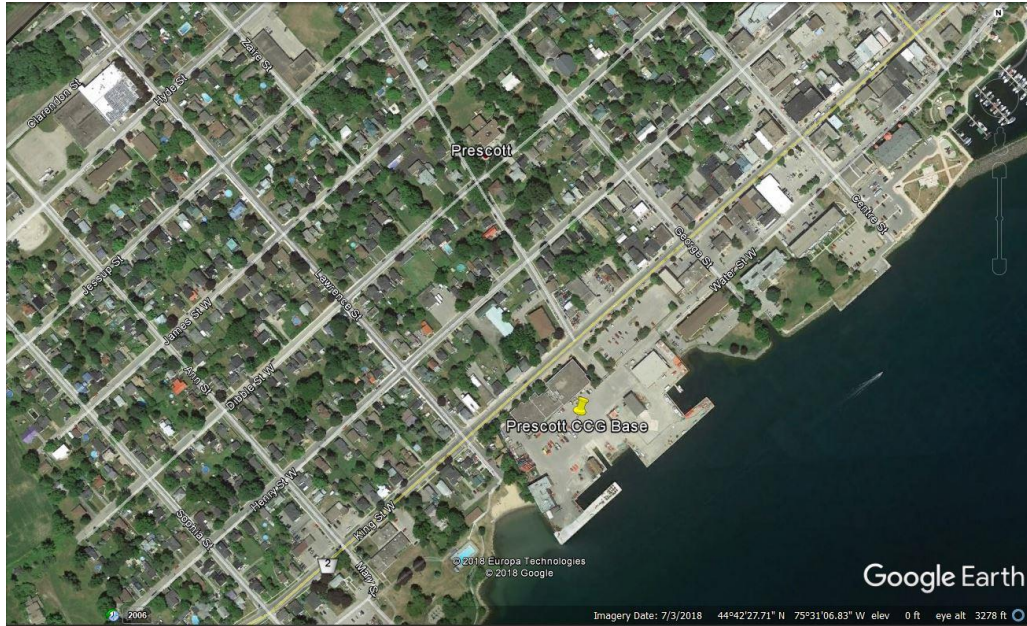


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**Figure 3: Staging Location, CCG Base Prescott
Prescott, ON**



**Figure 4: LL780 Goderich North Pier Front Range
45° 0'53.65"N, 74°39'52.02"W**



**Figure 5: LL781 Goderich North Pier Rear Range
45° 0'44.18"N, 74°40'16.17"W**



APPENDIX B: SUMMARY OF SUBMITTALS

Following Contract Award

Deadline	Submission Description	Reference Section(s)
10 working days following award	Detailed schedule	011100 – 1.3.2
	Proof of Qualifications	011100 – 1.3.3
10 working days prior to mobilization	Construction Plan	
	a) Project Specific Safety Program	013530 – 1.3.2
	b) Project Environmental Protection Plan	013543 – 1.3.2
	c) Detailed Demolition Plan	024116 – 1.3.2
	d) Foundation construction Plan	033000 – 1.4.2
	e) Tower Erection Plan	133613 – 1.3.2
	f) Excavation Plan	310000 – 1.3.2
28 calendar days after construction	As-built and QA/QC documents	011100 – 1.3.5
		033000 – 1.4.3
		133613 – 1.3.3
Upon request of Coast Guard	Completed Field Level Hazard Assessment (FLHA) forms	013530 – 1.3.4
	Product specifications and/or samples	016100 – 1.5
	Copies of certified receipts from the disposal sites	024116 – 1.3.4



APPENDIX C: SUMMARY OF WORK REQUIRED

Work Required

Items	Description	Service Required
Note: Fieldwork must begin no sooner than January 1, 2020 and end no later than February 15, 2020.		
Front Tower	45 ft steel tower	<ol style="list-style-type: none"> 1. Transport new day-mark to site from staging location; 2. Remove and dispose of existing day-mark; 3. Install new day-mark.
Rear Tower	Existing: 40 ft steel tower	<ol style="list-style-type: none"> 1. Transport new tower and day-mark to site from staging location; <ol style="list-style-type: none"> a. Tower is stored in 2 sections. One 9.1 m (30 ft) bottom section and one 4.6 m (15 ft) top section. All hardware is included. 2. Salvage existing light and associated accessories for reinstallation; 3. Remove and dispose of tower and appurtenances; 4. Remove existing foundation in its entirety.
	New: 45 ft steel tower	<ol style="list-style-type: none"> 1. Install new foundation as per drawings provided; 2. Install new day-mark; <ul style="list-style-type: none"> • Light and associated electrical equipment to be installed and commissioned by Coast Guard staff.



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APPENDIX D: EXISTING TOWER DRAWINGS



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APPENDIX E: NEW TOWER DRAWINGS



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APPENDIX F: NEW FOUNDATION DRAWINGS



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APPENDIX G: GEOTECHNICAL INVESTIGATION