



DGPS Reconstruction

Cardinal DGPS

CARDINAL, ONTARIO



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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 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;
 - .2 Specified standards, codes and referenced documents.

1.2 Description of Work

- .1 Work under this Contract includes but is not limited to the provision of all labour, materials, and equipment required to:
 - .1 Conduct a geotechnical subsurface evaluation;
 - .2 Design foundations for two [2] existing self-support towers;
 - .3 Construct two [2] new tower foundations;
 - .4 Remove existing towers from their foundations and relocate them to the newly constructed foundations;
 - .5 Construct a new waveguide bridge using provided drawings;
 - .6 Rewire all antennas on the existing towers to accommodate the relocation;
 - .7 Demolish the existing concrete foundations;

1.3 Submittals

- .1 Mandatory submittals and schedule for submission are detailed below and in Appendix B2. 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 twenty (20) 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 of the project.
- .3 Design Package:
 - .1 Deadline:
 - .1 October 15th.
 - .2 Deliverables:
 - .1 Drawings stamped and signed by a qualified Professional Engineer registered in the Province of Ontario. Drawings to conform to all requirements outlined in Section 033000
- .4 Construction Plan:
 - .1 Deadline:
 - .1 No less than 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, including:
 - .1 Bidder Qualifications (Section 011100 cl. 1.4), to include:
 - .1 Core Project member contact information (site foreman and project manager);
 - .2 Complete listing of all Subcontractors.
 - .2 Project specific safety program (Section 013530);
 - .3 Project environmental protection plan (Section 013543);
 - .4 Detailed demolition plan (Section 024116);
 - .5 Concrete construction plan (Section 033000);
 - .6 Tower erection plan (Section 133613);
- .5 Supplemental Material
 - .1 Deadline:
 - .1 21 calendar days following acceptance of the works
 - .2 Deliverables:
 - .1 As-built drawings



.2 Concrete test results

1.4 Bidder Qualifications

- .1 The work shall be carried out under the supervision and responsibility of a sole Contractor.
- .2 The Contractor shall demonstrate experience in the installation of telecommunication structures or other similar free standing steel structures.
 - .1 Provide one [1] current reference, complete with appropriate contact information for verification purposes only.
- .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 Site Foreman: Contact information for the main point of contact at site shall be provided by the contractor.
 - .2 Project Manager: Contact information for the main point of contact for the project shall be provided by the contractor.
 - .3 Contractor's Engineer: The Contractor's Engineer shall be responsible for overseeing/stamping the work itemized below and must verify compliance with the contract specifications and all applicable codes.
 - .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 location of the site is as follows:
 - .1 Lat./Long.: 44°47'17.20"N - 75°25'19.52"W.
 - .2 The closest settlement is Cardinal, Ontario.

1.6 Existing Conditions

- .1 Bidders must make their own estimate of the difficulties associated with all phases of the works.
- .2 The contractor must include in their costs all expenses related to the difficulties of working at the site.
- .3 Photographs of the existing site are included in Appendix B1.
- .4 The towers are currently being supported by temporary guys as the existing foundation has significantly settled.

1.7 Contractor's Access to Site

- .1 The Site is accessible by municipal roadways.



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- .2 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.
- .3 Access to the site will be coordinated with CCG representatives.

1.8 Completion, Scheduling and Planning of the Works

- .1 Work may commence as early as practical following coast guards acceptance and approval of mandatory submissions.
- .2 The towers are a key component for GPS services in the St. Lawrence River, as such, one of them must be operational at all times. Construction must be staged to allow for a survey to be completed after the first tower has been moved onto its new foundation. Only after this survey has been completed may the second tower be moved, and demolition of the foundation may begin. The survey may take up to a month to fully complete.
 - .1 The survey shall be completed by others.

1.9 Coast Guard Staging Location

- .1 Items itemized as 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 Queen St. W., Prescott, ON K0E 1T0.
 - .2 Advise Coast Guard at least three (3) working days prior to pick-up/delivery
 - .1 For Delivery or Pickup, contact will be provided after award.
 - .2 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.



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.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 B2. This summary is not an exhaustive list of all submissions required for the duration of the project. Additional submissions may be required after award.

PART 2 - PRODUCTS

2.1 Not Used

PART 3 - EXECUTION

3.1 Deadline

.1 All aspects of the project must be completed before March 2017.



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 Do not proceed with the work until submitted documents or samples have been reviewed 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 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 Due to the specific requirements of the project the Contractor is required to include the following as minimum mandatory requirements of their submitted safety program.
 - .1 All persons working within the tower footprint shall be "Qualified" as defined in CAN-CSA S37-01

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
 - .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; Local municipal regulations; pertaining to safety of the contractors workers

1.3 Submittals

- .1 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 this 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.



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- .4 Material Safety Data Sheets for hazardous products to be utilized in the execution of the works.
- .5 Proof of any required certification/log books:
 - .1 Fall arrest certification for climbers;
 - .2 Mobile crane log book;
 - .3 Any other relevant certification for equipment or workers.



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 Environmental Protection Act

1.3 Related Sections

- .1 Not used.

1.4 Submittals

- .1 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:

- .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;
- .5 De-watering plan.

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.

3.3 Disposal of Wastes

- .1 Clean-up the site at the end of each working day.
- .2 All waste material 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.

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 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 Spills 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.



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- .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 Canadian 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 Canadian 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 Canadian Coast Guard will require an opportunity to take samples/inspect:
 - .1 Subgrade verification: The Coast guard will inspect the subgrade upon completion of the excavation
 - .2 Concrete testing: The contractor will be responsible to test concrete for air, slump and strength during the pour.
 - .3 Final completion: The Coast guard will conduct a final inspection upon completion.

1.2 Procedures

- .1 Provide Canadian 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 Canadian 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.



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1.6 Acceptance of Work

- .1 Canadian 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 Canadian 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 replacements 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 Canadian Coast Guard in writing of any conflict between these specifications and manufacturer's instructions; Canadian 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 Canadian 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 Canadian Coast Guard. Substitutions will be considered by Canadian 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,
 - .3 Alternative materials to those specified which are brought to the attention of and considered by Canadian Coast Guard as equivalent to the material specified will result in a credit to the Contract amount.



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- .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 Removal of existing steel towers from their bases;
 - .2 Removal of temporary guy anchors;
 - .3 Demolition of two [2] concrete foundations;
 - .4 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 2005.
 - .3 Ontario Occupational Health and Safety Act and Regulations, 2009.
 - .4 CSA S350-[M1980(R1998)], Code of Practice for Safety in Demolition of Structures.

1.3 Submittals

- .1 Contractor to provide demolition plan.
 - .1 Deadline:
 - .1 With Construction Plan.
 - .2 Deliverables:
 - .1 Method of demolition including all associated tasks and schedule;
 - .2 The ultimate disposal location of all waste materials and debris.
 - .1 Include documentation detailing regulatory approval for waste disposal facility and transporter.
 - .3 Submit copies of certified receipts from the disposal sites for all material removed from the work site upon request.



- .3 Work under this section shall not proceed until written approval of the demolition plan has been received from the Coast Guard.

1.4 Existing Conditions

- .1 The existing towers are temporarily guyed and show severe foundation settlement. The towers are otherwise in good condition.
- .1 Photos of the towers are provided in appendix B1.

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 As this is a critical DGPS site no outages are permitted. Work must be staged as identified in section 011000 cl.1.8.
- .3 Tower shall be removed from its base as a single part, unless otherwise approved in writing by the Coast Guard.

3.2 Protection

- .1 Prevent movement, settlement or damage of adjacent structures/vegetation.
- .2 Implement effective controls to prevent injury to workers, mariners, motorists, and pedestrians.

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 Remove tower from its foundation ensuring the tower base plates remain intact.
- .2 Demolish all existing concrete foundations in their entirety. Drawings are provided in Appendix B3.



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.3 Remove temporary guys supporting the towers. The concrete and steel anchor blocks are to be salvaged and stored on site in a location determined by CCG representatives.

.1 The guy wires are to be disposed of offsite at an approved recycling facility.

.4 Ensure that demolition does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.5 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 is to be disposed of off-site and 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 of this section includes the design of two [2] reinforced concrete foundations.
- .2 Work of this section includes the supply of all labour, material, and equipment, necessary to complete the following activities:
 - .1 Construction of the tower foundations;
 - .2 Construction of two of waveguide bridge foundations.

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 2010
 - .3 Ontario Occupational Health and Safety Act and Regulations
 - .4 CAN/CSA-A23.1-04 Concrete Materials and Methods of Concrete Construction
 - .5 CAN/CSA A23.2-04 Methods of Test and Standard Practices for Concrete
 - .6 CAN/CSA-G30.18 Billet Steel Bars for Concrete Reinforcement
 - .7 CAN/CSA S269.3 Concrete Formwork
 - .8 ACI Specification 306 Cold Weather Concreting (if relevant)

1.3 System Description

- .1 The foundation system shall be suitable to adequately support the tower loads, as determined in the structural analysis, given the soil conditions of the site.
 - .1 Existing tower drawings are provided in the appended drawings.
 - .2 Tower loads are not available with the drawings. A new structural analysis shall be completed to determine the foundation loading. Structural analysis shall be in conformance with CAN/CSA S37-13.
- .2 Foundation location shall be as identified in the appended drawings.

1.4 Performance Requirements



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

1.5 Submittals

- .1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013530.

- .1 Foundation Design Package

- .1 Deadline:

- .1 October 15th.

- .2 Deliverables:

- .1 Foundation design package shall include drawings(s) showing plan and section views of the foundation.
 - .2 Drawing shall be sealed and signed by an engineer licensed to practice in the province of Ontario.

- .2 Foundation Construction Plan:

- .1 Deadline:

- .1 Furnish with Construction Plan (Section 011100)

- .2 Deliverables:

- .1 Provide a high level summary of mix properties and admixtures to demonstrate compliance with Coast Guard Criteria and completed foundation design;
 - .2 Concrete placing 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 the required amount of time;
 - .3 Finishing procedures;
 - .4 Curing methods and schedule;
 - .5 Clean-up procedures; and,
 - .6 Mitigation measures to account for hot or cold temperatures where reasonably anticipated during the construction period.

1.6 Quality Assurance

- .1 Coast Guard's minimum inspection requirements are detailed below. 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 three (3) working days in advance to permit scheduling of quality assurance testing. 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. 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.
- .2 The Contractor shall be responsible to arrange for concrete testing on site the day of the pour. This shall include at minimum a test for slump, air entrainment and strength (3 cylinders, one [1] 7 day, and two [2] 28 day).
 - .1 Extra concrete cylinders shall be cast and broken to determine foundation strength prior to tower erection. This will be coordinated by CCG staff upon request from the contractor.
 - .2

PART 2 - PRODUCTS

2.1 Formwork

- .1 Shall be in accordance with CAN CSA S269.3.

2.2 Concrete

- .1 Concrete shall possess the minimum characteristic detailed below, and as detailed in the submitted foundation design.
 - .1 Plastic state,
 - .1 Plastic characteristics of the supplied mix may be modified when it is clearly demonstrated that any such amendment will have no detrimental impact on the hardened properties, long term durability or visual appearance of the cured mix.
 - .2 Hardened state
 - .1 Class of exposure: F-1 or better
 - .2 Air entrainment: Category 1
 - .3 Compressive strength: as determined by the engineer
 - .4 Creep and shrinkage to be minimized as practical
 - .3 For clarity, concrete employed shall be locally available ready-mix concrete.

2.3 Water

- .1 Water utilized for the production concrete must be potable, unless otherwise approved in writing by Coast Guard.

2.4 Reinforcement



- .1 Shall be as detailed in the submitted foundation design
- .2 Reinforcing steel must be as mandated in CAN CSA A23.1
 - .1 Grade 400W unless otherwise identified in the foundation design.
 - .1 All bars shall be deformed, uncoated unless otherwise identified.
- .3 Bar supports must be as mandated in CAN CSA A23.1, 6.6.7.2

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 contractor's engineered drawings.

3.2 Design Requirements

.1 Foundations

- .1 The Contractor's Engineer must design two [2] suitable load bearing foundations for the towers in consideration of the specific soil conditions obtained through a subsurface geotechnical investigation.
 - .1 Any soil characteristics outlined in the attached drawings are considered to be incorrect and are not to be used.
 - .2 Designers shall perform a structural analysis in conformance with CAN/CSA S37-13 in order to determine foundation loads. Drawings for the existing towers are provided in appendix B3.
- .2 A foundation design based on "normal" soil conditions is unacceptable.
- .3 Design shall account for loads as provided and any other loads that could be reasonably anticipated to affect the foundation. All loads shall be identified on the finalized drawings.
- .4 The drawings shall be signed and stamped by an engineer licensed to practice in the province of Ontario.
- .5 The drawings shall include references to all applicable standards. This being a design for a federal agency, the Canada labour code and National building code (most recent editions) shall be included.
- .6 The design shall clearly indicate in the notes all loads considered in the design of the foundation.

3.3 Preparation

- .1 Preparation shall not commence until bearing surfaces have been inspected by Coast Guard.



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- .2 Remove all loose and deleterious material.
- .3 Construct forms and reinforcement in accordance with the engineer's specifications.
- .4 All exposed 90° edges shall be chamfered.

3.4 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.

3.5 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.



SECTION: 133613 METAL TOWERS

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:
 - .1 The relocation of the towers from their current foundations onto their new foundations;
 - .1 Rewire both towers to accommodate the change in location.
 - .2 Construct a waveguide bridge to service both towers as shown on provided drawings in Appendix B3.

1.2 Related sections

- .1 Section 024116
- .2 Section 033000

1.3 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 CSA S37-01 - Antenna Towers and Antenna Supporting Structures.
 - .4 CAN/CSA S16.1 - Limit States Design of Steel Structures.

1.4 Submittals

- .1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013530.
- .2 Erection Plan:
 - .1 Deadline:
 - .1 With construction plan.
 - .2 Deliverables:
 - .1 Plan must clearly demonstrate procedures and methods to be employed to:
 - .1 Remove the towers from their foundation;



- .2 Place tower on new foundation;
- .3 Monitor that turn of nut has been completed;
- .4 Field remedies to address any damage to the coating system incurred during erection;
- .5 Coast Guard reserves the right to request additional documentation verifying the suitability of the proposed labour and equipment anticipated to be employed in the erection of the tower. Certification required may include:
 - .1 Crane certification/helicopter capacity.

1.5 Quality Assurance

- .1 Coast Guards minimum inspection requirements are detailed below. 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 three (3) working days in advance to permit scheduling of quality assurance testing. 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. Work shall not progress until inspections have been completed and the Contractor has been provided with written notice to proceed with the works:
 - .1 During erection to confirm all procedures are being followed.

PART 2 - PRODUCTS

2.1 Materials

- .1 Waveguide Bridge:
 - .1 Materials as specified in Contract Drawings.
- .2 Base grout:
 - .1 Non shrink, gassing, cementitious grout.



PART 3 - EXECUTION

3.1 Site preparation

- .1 Complete installation of all foundation elements prior to tower erection.
- .2 Adjust supporting/leveling nuts to uniform elevation.

3.2 Erection

- .1 Erect towers in accordance with submitted plan.
- .2 The tower is to be secured to the foundation in a similar manner to how it is currently secured.
- .3 The towers shall be placed upon a single levelling nut with double nuts on top of each anchor bolt.
- .4 Care must be taken to ensure no damage occurs to the existing installations on the tower.
 - .1 Any damage to the tower must be corrected by the Contractor
- .5 Preserve electrical continuity between all sections.
- .6 Grout between tower base and prepared concrete foundation.
- .7 There must be one [1] tower operational at all times as this installation is a critical DGPS system. The exact location of each tower must be surveyed after it has been moved. This survey may take up to a month to complete and as such the towers must be moved separately and construction appropriately staged.
 - .1 This survey will be completed by others.

3.3 Waveguide Bridge

- .1 The bridge is to be constructed to protect and support the wires traveling from the tower into the adjacent building.
- .2 Drawings for the bridge have been provided in Appendix B3 Drawings.

3.4 Restoration

- .1 Rewire all antennas on the towers
 - .1 Ensure that all antennas have the same azimuth as before the relocation.



SECTION: 310000 EARTHWORK

PART 1 - GENERAL

1.1 General

- .1 Work of this section includes the supply of all labour, material and equipment required to complete:
 - .1 The excavation for the installation of tower base foundation and grounding, including:
 - .1 Stripping and stockpiling of existing topsoil or granular materials to expose subgrade;
 - .2 Backfilling of the excavation;
 - .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 - January 2008.
 - .2 NRC-CNRC National Building Code of Canada 2010.
 - .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 013530.
- .2 Construction procedures
 - .1 Deadline:
 - .1 With Construction Plan.
 - .2 Deliverables
 - .1 Written plan: Excavation and backfill procedures detail:
 - .1 Proposed side and control measures;



- .2 Include shop drawings of any shoring or bracing required. Drawings must be stamped by a licensed professional engineer;
- .3 Dewatering measures, if necessary;
- .4 Stockpile locations and methods for controlling erosion;
- .5 Backfill placement: document equipment and procedures. Provide methods for undertaking backfill placement in cold weather, if reasonably anticipated.

1.4 Existing Conditions

- .1 Before commencing work under this section the Contractor must establish the location of all buried services that may interfere with the execution of the work.

1.5 Quality Assurance

- .1 Coast Guards minimum inspection requirements are detailed below. 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 three (3) working days in advance to permit scheduling of quality assurance testing. 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. Work shall not progress until inspections have been completed and the Contractor has been provided with written notice to proceed with the works.

- .1 Bearing surfaces prior to backfill or formwork placement.

PART 2 - PRODUCTS

2.1 General

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

2.2 Water

- .1 Shall be free of deleterious materials.

2.3 Backfill

- .1 Must be in accordance to the Contractor's engineer's drawings and specifications.

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. Stockpile materials on-site
- .2 Take all reasonable precautions to minimize the disturbance of the existing vegetation.

3.3 Backfill

- .1 Ensure that surrounding soil is unfrozen or take measures required to thaw frozen materials.
- .2 Backfill to be placed in accordance with engineers provided drawings.

3.4 Restoration

- .1 Restore all disturbed areas within work area and along haul routes. Fill and grade all ruts. Ensure positive drainage away from completed and existing foundations.
- .2 Excavated materials shall not be removed from site, but shall be used given the following priority:
 - .1 Backfill around new foundation;
 - .2 Backfill any voids created during the demolition of existing tower foundations;
 - .3 Spread remaining soils on site to the discretion of the CCG staff representative on-site.

3.5 Brushing

- .1 Clear only the area required for construction work.



SECTION: 337900 GROUNDING

PART 1 - GENERAL

1.1 General

- .1 Work of this section includes the supply of all labour, material and equipment required to complete:
 - .1 Installation of all tower grounds as identified in appendix B3 Drawings.

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 NRC-CNRC Canadian Building Code of Canada
 - .2 Canada Labour Code Part II
 - .3 Motorola Standards and Guidelines for Communication Sites (2005)
 - .4 CSA S37-01 - Antenna Towers and Antenna Supporting Structures.
 - .1
 - .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 013530.
- .2 Construction procedures
 - .1 Deadline
 - .1 With construction plan
 - .2 Deliverables
 - .1 As-built drawings

1.4 Existing conditions

- .1 The existing grounding may not be reused.
- .2 Before commencing work under this section the Contractor must establish the location of all buried services which may interfere with the execution of the work.



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PART 2 - PRODUCTS

2.1 General

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

2.2 Materials

- .1 All grounding materials are to be bare, tinned, copper conductor.

PART 3 - EXECUTION

3.1 Installation

- .1 Install grounding for the tower conforming to CSA S37-01..
 - .1 The grounding shall consist of down leads from the tower to a ground ring with ground rods.
 - .1 Bond all grounding components together using either an exothermic or irreversible high compression fitting.
 - .2 The new grounds are to be joined to the existing ground ring of the adjacent building in at least two [2] places.
 - .3 All grounding shall be covered by at least 760mm of soil.



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APPENDIX B1: SITE LOCATION AND PHOTOGRAPHS



Figure 1: Project Site
Cardinal DGPS
44°47'17.20"N - 75°25'19.52"W



Figure 2: Project Site



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Figure 3: Coast Guard Staging Area
CCG Base Prescott
401 King Street West Prescott, ON K0E 1T0
44°42'23.16"N - 75°31'3.22"W



Figure 4: Coast Guard Staging Area



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Figure 5: Existing Towers



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Figure 6: Current Temporary Guy Support



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APPENDIX B2 – SUMMARY OF SUBMITTALS

Following Contract Award	
Submission Description	Section(s)
Deadline: 20 working days following award	
Detailed schedule:	011100
Deadline: October 15th	
Design Package: Including drawings stamped and signed by the Contractor's Engineer	033000
Deadline: 10 working days prior to mobilization	
Proof of registration with Ontario WSIB Construction Plan – Final Submission	
a) Complete listing of personnel (inc. subcontractors)	011100
b) Final project specific safety plan	013530
c) Project environmental protection program	013543
d) Detailed demolition plan	024116
e) Concrete construction plan (include Concrete Mix Parameters)	033000
Deadline: 21 calendar days following acceptance of the works	
As-built drawings:	133613
Concrete test results:	033000

