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## **SOW: DESIGN BUILD - TOWER AND FOUNDATION REPLACEMENTS**

**FIVE [5] LOCATIONS**

**NEAR**

**NORTH BAY, ON**

MARITIME AND CIVIL INFRASTRUCTURE

Prepared by: AB

Approved by: BY

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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 (NBCC) 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 Mobilize to site with a work barge of appropriate size and certification;
  - .2 Install five [5] new foundations;
    - .1 Three [3] of the above shall be as per the supplied designs in this Contract; and,
    - .2 The other two [2] shall be adequately designed by the Contractor.
  - .3 Install five [5] new CCG supplied aid to navigation towers;
  - .4 Demolish and dispose five [5] existing foundations;
  - .5 Return the existing five [5] aids to navigation c/w all lighting equipment to CCG's Parry Sound base; and,
  - .6 Demobilize.
- .2 The following work will be undertaken by others and is hereby excluded:
  - .1 Supply of five [5] new aid to navigation towers with self-contained lanterns.

#### **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 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 of the project.
- .3 Proof of Qualifications:
  - .1 Deadline:
    - .1 No later than ten [10] working days following award.
  - .2 Deliverables:
    - .1 Contractor shall furnish proof of vessel registration (Section 011100 – 1.7.3.1);
    - .2 The contractor shall provide a detailed list of all subcontractors being used to complete the work described herein (Section 011100 – 1.4).
- .4 Preliminary Design Package:
  - .1 Deadline: twenty [20] working days following award
  - .1 Deliverables:
    - .1 Foundation design (Section 033000 – 3.3.2) and/or (Section 055000)
- .5 Final Design Package:
  - .1 Deadline: thirty [30] working days following award
  - .2 Deliverables:
    - .1 Final Foundation design (Section 033000 – 3.3.2) and/or (Section 055000)
- .6 Construction Plan:
  - .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, including:
      - .1 Project specific safety program (Section 013530);
      - .2 Project environmental protection plan (Section 013543);



- .3 Detailed demolition plan (Section 024116); and,
- .4 Detailed construction plan (Section 033000, Section 031500, and Section 055000).

.7 As-built and QA/QC:

.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; and,
- .2 Concrete test results (Section 033000 – 1.4.4).

1.4 Contractor Qualifications

- .1 The work shall be carried out under the supervision and responsibility of a sole specialized Contractor with experience in the construction of similar offshore structures by barge.
- .2 The Contractor shall designate a project manager or main point of contact for the contract.
- .3 The Contractor may retain subcontractors in accordance with their needs provided such subcontractors meet the requirements indicated below:
  - .1 Engineers retained by the Contractor must be licensed by the Professional Engineers Ontario in the appropriate discipline.
  - .2 Any fabrication facilities utilized must be accredited by the Canadian Welding Bureau to complete work in accordance with the requirements indicated in Section 055000.
  - .3 Marine access provider and plant must comply with the requirements indicated in Appendix B4, Marine Access Requirements.
  - .4 Concrete shall be supplied by a Ready Mix Facility accredited by Ready Mixed Concrete Association of Ontario (RMCAO).

1.5 Site Location

- .1 The site locations are all in Lake Nipissing (see Appendix B1 for map screenshots and photographs of the sites).
- .2 The closest major city is North Bay
- .3 Below is the list of sites:
  - .1 LL1420.8 La Vase River Entrance
    - .1 Coordinates: 46°14'32.30"N 79°25'29.70"W



- .2 LL1434 Keystone Rock
  - .1 Coordinates: 46°12'7.00"N 79°51'34.50"W
- .3 LL1420.7 Three Sisters
  - .1 Coordinates: 46°15'2.00"N 79°26'33.00"W
- .4 LL1432 Three Pine Island
  - .1 Coordinates: 46° 8'39.50"N 79°35'5.00"W
- .5 LL1427 Gull Rock
  - .1 Coordinates: 46°13'19.00"N 79°38'49.00"W

#### 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 sites.
- .3 Photographs of the existing sites are included in Appendix B1.

#### 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 The Sites are accessible by water. The sites are located in Lake Nipissing.
- .3 The Contractor is responsible for sourcing appropriate marine access to support all construction work. Contractors are also responsible for ensuring that all the requirements of Appendix B4 – Marine Access Requirements are met.
  - .1 Contractor shall provide proof of vessel registration in the 'proof of qualifications' submittal.

#### 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 Work shall be completed no later than October 31, 2017, unless otherwise negotiated and approved in writing.

#### 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 – Parry Sound, 28 Waubeek St, Parry Sound, ON P2A 1B9.
- .2 Advise Coast Guard at least three [3] working days prior to pick-up/delivery
  - .1 For Delivery or Pickup, contact Technical Authority (identified upon approval)
  - .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.
- .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 Not Used



## **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.



## **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 and 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 Location verification: The Coast Guard will confirm correct location for installation upon arrival of the barge at site. The contractor shall be required to provide access to the site at all times to CCG site staff.
  - .2 Pre-tensioning: The Coast Guard shall witness the pre-tensioning of the all-thread rods to the prescribed torque values.
  - .3 Installation of tower: The Coast Guard shall witness the erection of the new nav-aid tower and witness correct operation of the new light.

#### 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 - 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 Demolition and transportation of five [5] existing old towers with all lighting equipment from the five [5] identified locations in 011100 1.5.3 to CCG's Parry Sound base;
  - .2 Demolition and disposal at a licensed waste disposal facility of five [5] existing reinforced concrete piers located at the following locations:
    - .1 LL1420.8 La Vase River Entrance
    - .2 LL1434 Keystone Rock
    - .3 LL1420.7 Three Sisters
    - .4 LL1427 Gull Rock
    - .5 LL1432 Three Pine Island

#### 1.2 Related Sections

- .1 Concrete Work, Section 033000
- .2 Concrete Accessories, Section 031500
- .3 Metal Fabrications, Section 055000
- .4 Metal Towers, Section 133613

#### 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 - January 2008.
  - .2 NRC-CNRC National Building Code of Canada 2005.
  - .3 Ontario Occupational Health and Safety Act and Regulations, 2009.
  - .4 CSA S350L-[M1980(R1998)], Code of Practice for Safety in Demolition of Structures.

#### 1.4 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 Methods for protecting the site from demolition debris.

.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.

#### 1.5 Existing Conditions

.1 Existing piers are beyond their life expectancy, and multiple pieces of the reinforced concrete structures have failed. Contractor must insure the towers are dismantled and demolished in a safe manner.

.1 Photos of the existing piers and towers are included in Appendix B1.

## **PART 2 - PART 2 - PRODUCTS**

2.1 Not used.

## **PART 3 - 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 It is preferred that pieces are lifted onto the barge in one piece to avoid environmental issues.

### 3.2 Protection

.1 Implement effective controls to catch/collect all tower debris during demolition, specifically paint.

.2 Implement effective controls to prevent injury to workers, and mariners.

### 3.3 Preparation

.1 Erect warning signs and barricades.



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- .2 Ensure all environmental protection/mitigation measures are in place.
- .3 Ensure all items identified for salvage have been removed and stored.

### 3.4 Demolition

- .1 Remove and salvage old towers c/w all lighting equipment.
- .2 Demolish the existing reinforced concrete piers in their entirety.
- .3 Ensure that demolitions do not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
- .4 Ensure demolitions are 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.



## **SECTION: 033000 CONCRETE WORK**

### **PART 1 - GENERAL**

#### 1.1 Scope of Work

- .1 Work of this section includes the supply of all labour, material, and equipment, necessary to complete the following activities:
  - .1 Adequately design and install one [1] foundation at each of the following project sites;
    - .1 LL1420.8 La Vase River Entrance; and,
    - .2 LL1434 Keystone Rock.
  - .2 Install one [1] reinforced concrete foundation as per the attached drawings at the following site;
    - .1 LL1420.7 Three Sisters.
  - .3 This Section shall be followed if concrete designs are selected for 1.1.1.1. If metal designs are selected, Metal Fabrications, Section 055000, shall be followed.

#### 1.2 Related Sections:

- .1 Demolition of Structures, Section 024116
- .2 Concrete Accessories, Section 031500
- .3 Metal Fabrications, Section 055000
- .4 Metal Towers, Section 133613

#### 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 - 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

#### 1.4 Submittals

- .1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013300.
- .2 Preliminary Design Package
  - .1 Deadline:
    - .1 Twenty [20] working days following award
  - .2 Deliverables:
    - .1 The Preliminary Design Package shall include drawings showing plan and section views of the foundation(s)
- .3 Final Design Package:
  - .1 Deadline:
    - .1 Thirty [30] working days following award
  - .2 Deliverables:
    - .1 The Final Design Package shall include drawings showing plan and section views of the foundation(s)
    - .2 Drawings shall be sealed and signed by an engineer licensed to practice in the province of Ontario.
- .4 Construction Plan
  - .1 Deadline:
    - .1 No less than ten [10] working days prior to mobilization.
  - .2 Deliverables:
    - .1 Contractor shall provide a high level summary of mix properties and admixtures to demonstrate compliance with Coast Guard criteria.
    - .2 Excavation Plan detailing what methods will be used to excavate material as well as how the excavation will be protected from water.



- .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 Clean-up procedures; and
  - .7 Mitigation measures to account for hot or cold temperatures where reasonably anticipated during the construction period.
- .5 Mill Test Certificates
- .1 For any works fabricated of steel, the Contractor shall provide Mill Test Certificates.
  - .2 Deadline:
    - .1 Upon receipt of metal purchased.
  - .3 Deliverables:
    - .1 The contractor shall furnish proof that all metal received for the project is in compliance with CSA and ASTM International standards.
- 1.5 Performance Requirements
- .1 The foundations shall be designed to perform as reasonably expected for a life of 50 years.
- 1.6 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 Contractors expense. Work shall not progress until inspections have been completed and the Contractor has been provided with written notice to proceed with the works.
  - .4 The below list identifies key milestones for which Coast Guard will require an opportunity to take samples, inspect or witness testing:
    - .1 Concrete testing: The Contractor will be responsible to test concrete for air, slump and





strength during the pour.

- .1 The Contractor shall 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).
- .2 Final completion: The Coast Guard will conduct final inspection upon completion.

## **PART 2 - PRODUCTS**

### **2.1 General**

- .1 All concrete materials shall conform to specifications referenced in CAN/CSA-A23.1-04
- .2 All materials for the supplied designs shall be as specified in drawings in Appendix B3

### **2.2 Concrete**

- .1 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).
- .2 Concrete must possess the minimum characteristics detailed in supplied Contract Drawings as well as the approved Final Design Drawings submitted by the Contractor.
  - .1 The use of calcium chloride as an admixture is not permitted.

### **2.3 Reinforcement**

- .1 Reinforcing steel is to be detailed as per the supplied Contract Drawings as well as the approved Final Design Drawings submitted by the Contractor.

### **2.4 Water**

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

### **2.5 Anchor Bolts**

- .1 Anchor bolts shall be as per Contract Drawings for the supplied designs
- .2 All anchor bolts are to conform to ASTM A36, ASTM A325, ASTM A193, Grade B7 high strength carbon steel ,or CSA G40.21.
- .3 The anchor rods are to be hot dip galvanized and sized as indicated in drawings provided.
- .4 Threads shall be long enough to accommodate two heavy hex nuts as well as a heavy flat washer.



## **PART 3 - EXECUTION**

### **3.1 General**

- .1 Concrete must be placed, finished, and cured in accordance with CSA A23.1, the Contractor's approved construction plan/Final Designs, and Contract Drawings.

### **3.2 Design Requirements**

- .1 The Contractor's Engineer must design suitable load bearing foundations for the pipe masts in consideration of the insitu soil/rock conditions.
  - .1 A foundation design based on "normal" soil conditions is unacceptable.
  - .2 The Final Foundation Design Package submitted shall bear the seal of a professional engineer, licensed to practice in the province of Ontario. The finished package is expected to contain mainly drawings. Drawings shall clearly identify the following:
    - .1 Applicable codes and standards used in the design of the foundation/pier;
    - .2 Applicable codes and standards to be used in construction;
    - .3 All relevant material properties;
    - .4 All checks or inspections that are required to be complete on-site during construction;
    - .5 Climactic loading used in the design of the foundation/pier
    - .6 Canadian Coast Guard is a federal agency and, as such, the design shall be completed so as to account for all requirement of the Canadian Labor Code.
  - .3 Tower loading is provided in Appendix B3: Drawings. Each foundation design shall account for loads imparted by the pipe mast and loads that could be reasonably anticipated to affect the foundation. All loads shall be identified on the finalized drawing and as the lake is subject to freezing in the winter, particular attention should be paid to ice loading.
  - .4 The Foundation/Pier design requires the top of the finished pier to stand at least 2ft [610mm] above the high water level. The Pier shall be designed to include a system which will allow workers to safely access the pipe-mast ladder, even in low water conditions. If the design calls for a tapered pier, the angle of taper must be steep enough to allow safe approach by boat.
  - .5 The design process shall allow for two review/consultation phases with Coast Guard:
    - .1 Coast Guard should be consulted as to the determination of the foundation style. Calculations should be prepared with respect to feasibility of various foundation options.
    - .2 Secondly, upon completion of the preliminary design, drawings should be stamped and



submitted for review by Coast Guard.

- .3 Coast Guard review will be focused mainly around constructability and access. Focus will be on keeping construction costs down, while ensuring that the pier works with our needs for accessing the site regularly by boat.

### 3.3 Preparation

- .1 Remove all deleterious material.
- .2 Construct forms and reinforcement in accordance with the engineer's specifications.
- .3 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 regiment employed must take into account local climatic conditions reasonably anticipated to occur during the curing period.

### 3.6 Inspection



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

### 3.7 Clean up

- .1 Contractor must remove all forms and falsework not designated to be left in place.
- .2 Forms and falsework shall not be removed until the concrete has achieved suitable strength and the temporary work platform is no longer required.
- .3 All means used to anchor the falsework to the existing pier are to be removed and restored to the satisfaction of Coast Guard representative.



## **SECTION: 031500 CONCRETE ACCESSORIES**

### **PART 1 - GENERAL**

#### 1.1 Scope of Work

- .1 Work of this section includes the supply of all labour, material, and equipment, necessary to complete the following activities:

- .1 Installation of one [1] drilled rock anchor foundation as per the Contract Drawings at the following locations:

- .1 LL1420.7 Three Sisters;
- .2 LL1432 Three Pine Island; and,
- .3 LL1427 Gull Rock.

#### 1.2 Related Sections:

- .1 Demolition of Structures, Section 024116
- .2 Concrete Work, Section 033000
- .3 Concrete Accessories, Section 031500
- .4 Metal Towers, Section 133613

#### 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 - January 2008
  - .2 NRC-CNRC National Building Code of Canada 2015
  - .3 Ontario Occupational Health and Safety Act and Regulations
  - .4 HIT-RE 500 V3 Epoxy Adhesive Anchoring System
  - .5 CAN/CSA G164 - Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .6 ASTM E488 Standard Test Methods for Strength of Anchors in Concrete Elements
  - .7 ASTM A36-14 - Standard Specification for Carbon Structural Steel
  - .8 ASTM A615-15 – Standard Specification for Deformed and Plan Carbon-Steel Bars for Concrete reinforcement
  - .9 ASTM A615-15 – Standard Specification for Deformed and Plan Carbon-Steel Bars for



Concrete reinforcement

- .10 CAN/CSA-A23.1-04 Concrete Materials and Methods of Concrete Construction
- .11 CAN/CSA A23.2-04 Methods of Test and Standard Practices for Concrete
- .12 CAN/CSA A23.3-04 Design of Concrete Structures

#### 1.4 Submittals

- .1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013530.
- .2 Drilling Plan:
  - .1 Deadline:
    - .1 Furnish with Construction Plan (Section 011100)
  - .2 Deliverables:
    - .1 Description of the equipment that will be utilized to install the drilled anchors;
    - .2 Description of the methods that will be implemented to stabilize the drilling equipment, and to ensure verticality of piles;
    - .3 Description of drilling methods;
    - .4 Description of how grouting will occur;
    - .5 Provide cut-sheets for the HILTI epoxy product to be used;
    - .6 Provide cut-sheets for the grout to be used; and,
    - .7 Describe how works will be undertaken to mitigate impacts on the surrounding watercourse.

#### 1.5 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 Coast Guard is to confirm the correct location of the foundations.



## **PART 2 - PRODUCTS**

### **2.1 Adhesive**

- .1 HILTI HIT-RE 500 V3 Epoxy Adhesive Anchoring System

### **2.2 All-thread rod, accompanying washers & nuts**

- .1 All-threaded rods shall be ASTM A193, Grade B7 high strength carbon steel anchor as per the attached drawings

### **2.3 Grout**

- .1 Grout shall Sika M-Bed, or approved equivalent

## **PART 3 - EXECUTION**

### **3.1 General**

- .1 The installation shall be as per the Contract Drawings in Appendix B3 and Product Technical Guide Excerpt for HIT-RE 500 V3 Epoxy Adhesive Anchoring System

### **3.2 Installation**

- .1 Use templates to locate bolts accurately and securely in formwork.
- .2 All holes shall be drilled perpendicular to the surface of installation
- .3 Drill bits diameter shall be 28.575mm [1-1/8"] drilled using one of the following methods:
  - .1 Rotary impact hammer drills using carbide-tipped bit
  - .2 Hollow drill bit and VC 20/40 Vacumm, D
  - .3 Core drills using diamond core bit with Hilti TE-YRT roughening tool
- .4 All holes shall be drilled vertically to insure towers sit plumb
- .5 Clean all holes per manufacturer instructions to remove loose material and drilling dust prior to installation of adhesive.
- .6 Inject adhesive into holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive. Follow manufacturer recommendations to ensure proper mixing of adhesive components. Sufficient adhesive shall be injected in the hole to ensure that the annular gap is filled to the surface. Remove excess adhesive from the surface. Shim anchors with suitable device to center the anchor in the hole. Do not disturb or load anchors before manufacturer specified cure time has elapsed

### **3.3 Repair of Defective Work**



- .1 Remove and replace misplaced or malfunctioning anchors. Fill empty anchor holes and patch failed anchor locations with high-strength non-shrink, nonmetallic grout. Anchors that fail to meet proof load or installation torque requirements shall be regarded as malfunctioning.

### 3.4 Field Quality Control

#### .1 General:

Coast Guards 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 [3] 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 upon completion of the work to ensure towers are plumb and that the lights are operating correctly.
- #### .2 Proof Load Test:
- .1 The Contractor shall arrange for proof load testing of a minimum of one [1] anchor at location where rock anchors are to be installed
  - .2 Loads shall be applied with a calibrated hydraulic ram or approved equivalent method. Displacement of the anchors at the proof load of 30KN shall not exceed 25.4mm [1"].





## **SECTION: 055000 METAL FABRICATIONS**

### **PART 1 - GENERAL**

#### 1.1 Scope of Work

- .1 Work of this section includes the supply of all labour, material, and equipment, necessary to complete the following activities:
  - .1 Adequately design and install one [1] foundation at each of the following project sites;
    - .1 LL1420.8 La Vase River Entrance; and,
    - .2 LL1434 Keystone Rock.
  - .2 This Section shall be followed if metal fabricated designs are selected for 1.1.1.1. If concrete designs are selected, Concrete Work, Section 033000, shall be followed.

#### 1.2 Related Sections:

- .1 Demolition of Structures, Section 024116
- .2 Concrete Work, Section 033000
- .3 Concrete Accessories, Section 031500
- .4 Metal Towers, Section 133613

#### 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 - January 2008
  - .2 NRC-CNRC National Building Code of Canada 2015
  - .3 Ontario Occupational Health and Safety Act and Regulations
  - .4 CAN/CSA G40.20-13 – General Requirements for Rolled or Welded Structural Quality Steel
  - .5 CAN/CSA G164 - Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .6 ASTM A36-14 - Standard Specification for Carbon Structural Steel
  - .7 ASTM A615-15 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete reinforcement
  - .8 ASTM A513-15 – Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing



#### 1.4 Submittals

.1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013300.

##### .2 Preliminary Design Package

.1 Deadline:

.1 Twenty [20] working days following award

.2 Deliverables:

.1 The Preliminary Design Package shall include drawings showing plan and section views of the foundation(s)

##### .3 Final Design Package:

.1 Deadline:

.1 Thirty [30] working days following award

.2 Deliverables:

.1 The Final Design Package shall include drawings showing plan and section views of the foundation(s)

.2 Drawings shall be sealed and signed by an engineer licensed to practice in the province of Ontario.

##### .4 Construction Plan

.1 Deadline:

.1 No less than ten [10] working days prior to mobilization.

.2 Deliverables:

.1 Description of the equipment that will be utilized for the installation;

.2 Description of the methods that will be implemented to stabilize the drilling equipment, if applicable;

.3 Description of how grouting and pre-tensioning activities will occur, if applicable;

.4 Provide cut-sheets for the grout to be used, if applicable;

.5 Describe how works will be undertaken to mitigate impacts on the surrounding watercourse.

#### 1.5 Performance Requirements



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

## 1.6 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.

## **PART 2 - PRODUCTS**

### 2.1 Structural Metals

- .1 Structural metals shall conform to and possess the dimensions and grade in the approved and stamped Final Design Drawings submitted by the Contractor.

## **PART 3 - EXECUTION**

### 3.1 General

- .1 All aspects of work shall be in accordance with CAN/CSA S16.1, the Contractor's approved construction plan, and the approved engineered drawings

### 3.2 Design Requirements

- .1 The Contractor's Engineer must design suitable load bearing foundations for the pipe masts in consideration of the insitu soil/rock conditions.
  - .1 A foundation design based on "normal" soil conditions is unacceptable.
- .2 The Final Foundation Design Package submitted shall bear the seal of a professional engineer, licensed to practice in the province of Ontario. The finished package is expected to contain mainly drawings. Drawings shall clearly identify the following:
  - .1 Applicable codes and standards used in the design of the foundation/pier;
  - .2 Applicable codes and standards to be used in construction;
  - .3 All relevant material properties;
  - .4 All checks or inspections that are required to be complete on-site during construction;
  - .5 Climactic loading used in the design of the foundation/pier
  - .6 Canadian Coast Guard is a federal agency and, as such, the design shall be completed so as to account for all requirement of the Canadian Labor Code.



- .3 Tower loading is provided in Appendix B3: Drawings. Each foundation design shall account for loads imparted by the pipe mast and loads that could be reasonably anticipated to affect the foundation. All loads shall be identified on the finalized drawing and as the lake is subject to freezing in the winter, particular attention should be paid to ice loading.
- .4 The Foundation/Pier design requires the top of the finished pier to stand at least 2ft [610mm] above the high water level. The Pier shall be designed to include a system which will allow workers to safely access the pipe-mast ladder, even in low water conditions. If the design calls for a tapered pier, the angle of taper must be steep enough to allow safe approach by boat.
- .5 The design process shall allow for two review/consultation phases with Coast Guard:
  - .1 Coast Guard should be consulted as to the determination of the foundation style. Calculations should be prepared with respect to feasibility of various foundation options.
  - .2 Secondly, upon completion of the preliminary design, drawings should be stamped and submitted for review by Coast Guard.
  - .3 Coast Guard review will be focused mainly around constructability and access. Focus will be on keeping construction costs down, while ensuring that the pier works with our needs for accessing the site regularly by boat.

### 3.3 Fabrication

- .1 Shall be as per the approved and stamped Final Design Drawings submitted by the Contractor.
- .2 All welding shall be carried out by a welding shop certified to CWB div. 2 or greater.
- .3 Metal structures shall be fully fabricated prior to being hot dip galvanized.
- .4 Hot dip galvanizing shall conform to CAN/CSA G164, most recent edition.

### 3.4 Installation

- .1 Installation shall be carried out as per the installation directions outlined by in the approved Final Design Package.



## **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 the following:
  - .1 Transportation of five [5] 16' pipe mast towers and all associated hardware to site from the designated staging area;
  - .2 The installation of the five [5] towers detailed in the appended Contract Drawings;
  - .3 The installation of a self-contained lantern on to the tower, and confirmation of proper operation.
- .2 Work of this section excludes:
  - .1 Fabrication and Supply of the tower, by CCG.
  - .2 Supply of the navigational lantern, by CCG.

#### 1.2 Related Sections:

- .1 Demolition of Structures, Section 024116
- .2 Concrete Work, Section 033000
- .3 Concrete Accessories, Section 031500
- .4 Metal Fabrications, Section 055000

#### 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.
  - .5 CAN/CSA G164 - Hot Dip Galvanizing of Irregularly Shaped Articles.

#### 1.4 Submittals

- .1 No submittals required in this section



### 1.5 Quality Assurance

- .1 Coast Guards 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 [3] 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 upon completion of the work to ensure towers are plumb and that the lights are operating correctly.

## **PART 2 - PRODUCTS**

### 2.1 Materials

- .1 Steel:
  - .1 The tower is structural grade steel 350W and 300W.
- .2 Coatings:
  - .1 Galvanizing:
    - .1 All materials, structural steel, pipe and fittings, including bolts, nuts and washers shall be hot dip galvanized to the requirement of the National Building Code, CAN/CSA S16.1, and CSA-G164 and as otherwise specified therein.

## **PART 3 - EXECUTION**

### 3.1 Fabrication

- .1 Fabrication has been completed by the Canadian Coast Guard. This includes everything shown on the drawing which comprises the tower.

### 3.2 Protective Coatings

- .1 Galvanizing:
  - .1 The tower and all hardware are hot dip galvanized. The contractor shall be prepared to make repairs to the coating as needed.



### 3.3 Handling of Material and Transportation

- .1 The Contractor shall take all necessary precautions to avoid damage to the tower members or to tower coating during transport, unloading and erection. All components or damaged members shall be replaced to the satisfaction of Coast Guard at the expense of the Contractor.
- .2 It is the responsibility of the Contractor to ensure that the tower sections, particularly the joints are protected from bending and alignment damage.
- .3 The contractor will be asked to identify how he would like the tower packaged for shipping shortly after award. This will be coordinated by CCG.

### 3.4 Tower Installation

- .1 Each anchor bolt shall have two [2] galvanized heavy hex nuts.
  - .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 The Contractor shall touch up in the field all areas of the towers where the galvanized finish has been scraped or chipped during erection using zinc-enriched or Galvicon paint, or an approved equal.
  - .3 The Contractor shall field paint all areas of the towers where the painted finish has been scraped or chipped during erection in the field.
- .1 The Contractor shall be responsible for damage done by paint spraying or dripping on the Owner's or other's property.



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## **APPENDIX B1: SITE LOCATION AND PHOTOGRAPHS**



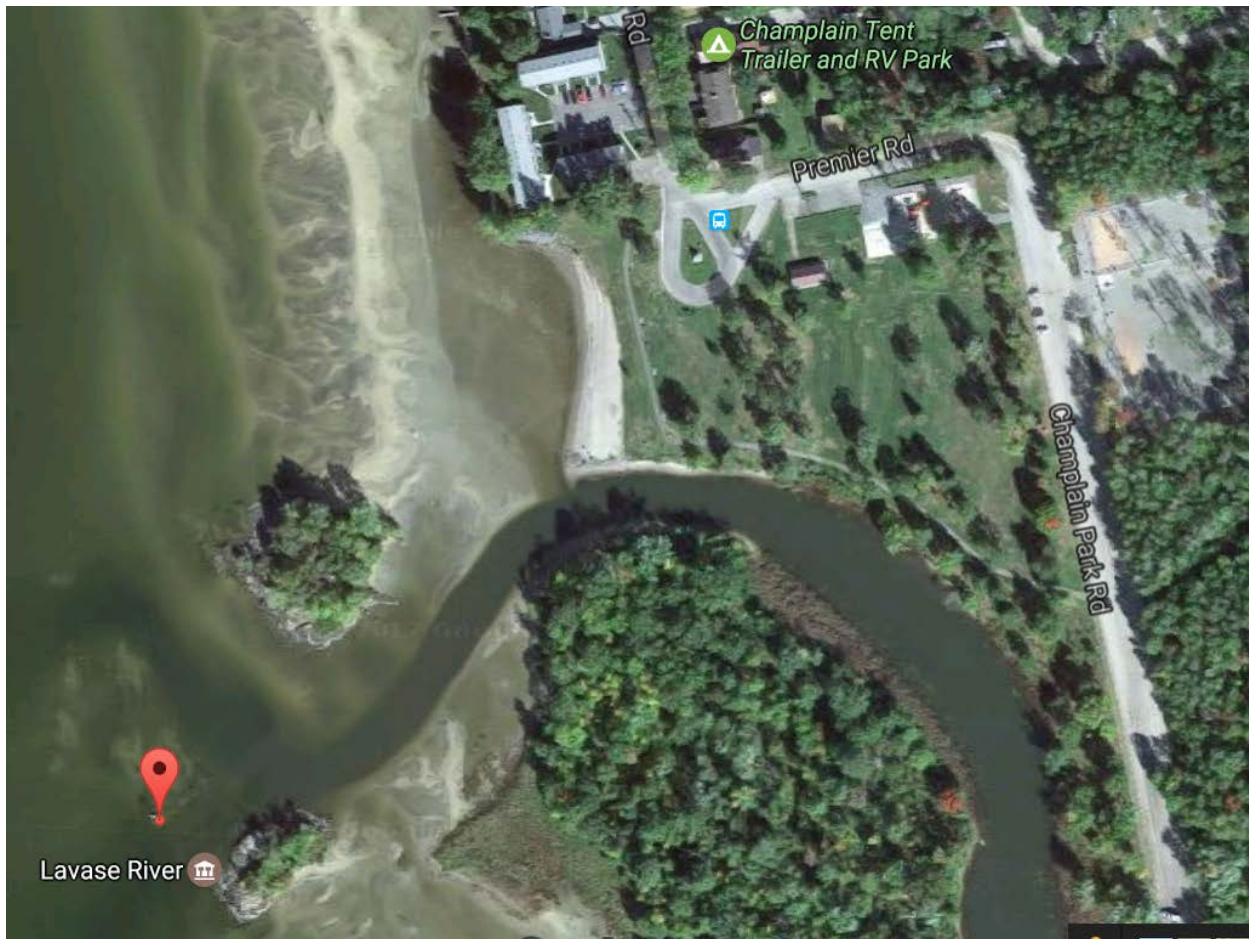


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**Figure 1:** LL1420.8 La Vase River Entrance Map  
Coordinates: 46°14'32.30"N 79°25'29.70"W



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**Figure 2:** Existing LL1420.8 La Vase River Entrance as seen from shore (to be removed)



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**Figure 3:** Existing LL1420.8 La Vase River Entrance as seen from a boat (to be removed)



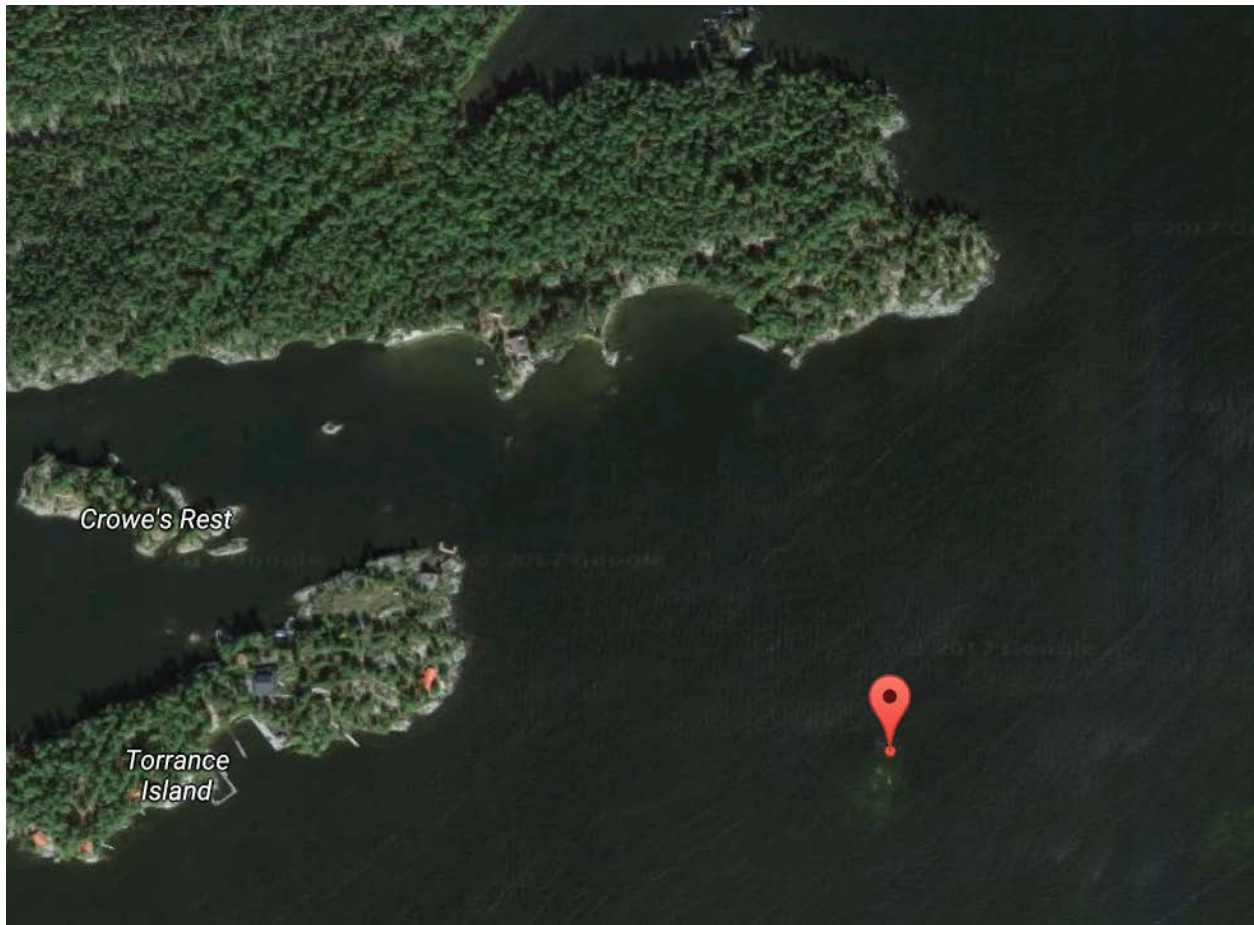


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**Figure 4:** LL1434 Keystone Rock Map  
Coordinates: 46°12'7.00"N 79°51'34.50"W



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**Figure 5:** Existing LL1434 Keystone Rock as seen from a boat (to be removed)



**Figure 6:** Existing LL1434 Keystone Rock (to be removed)



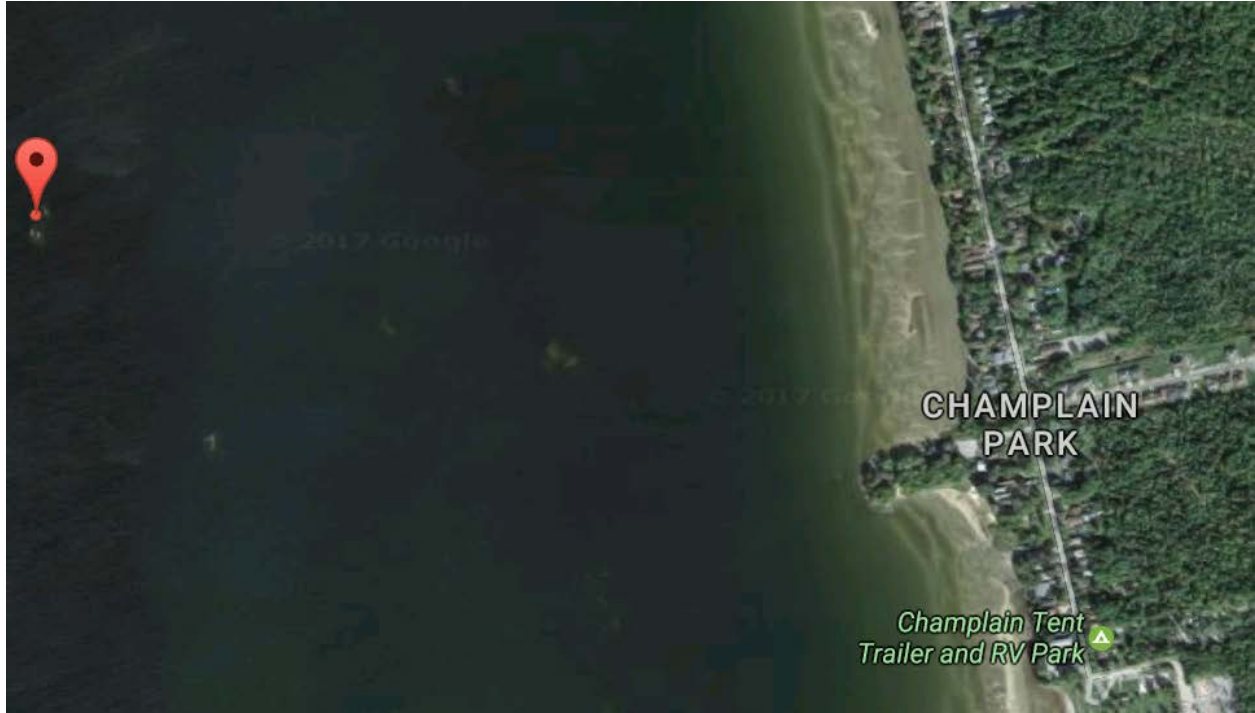


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**Figure 7:** LL1420.7 Three Sisters Map  
Coordinates: 46°15'2.00"N 79°26'33.00"W



**Figure 8:** Existing LL1420.7 Three Sisters as seen from a boat (to be removed)





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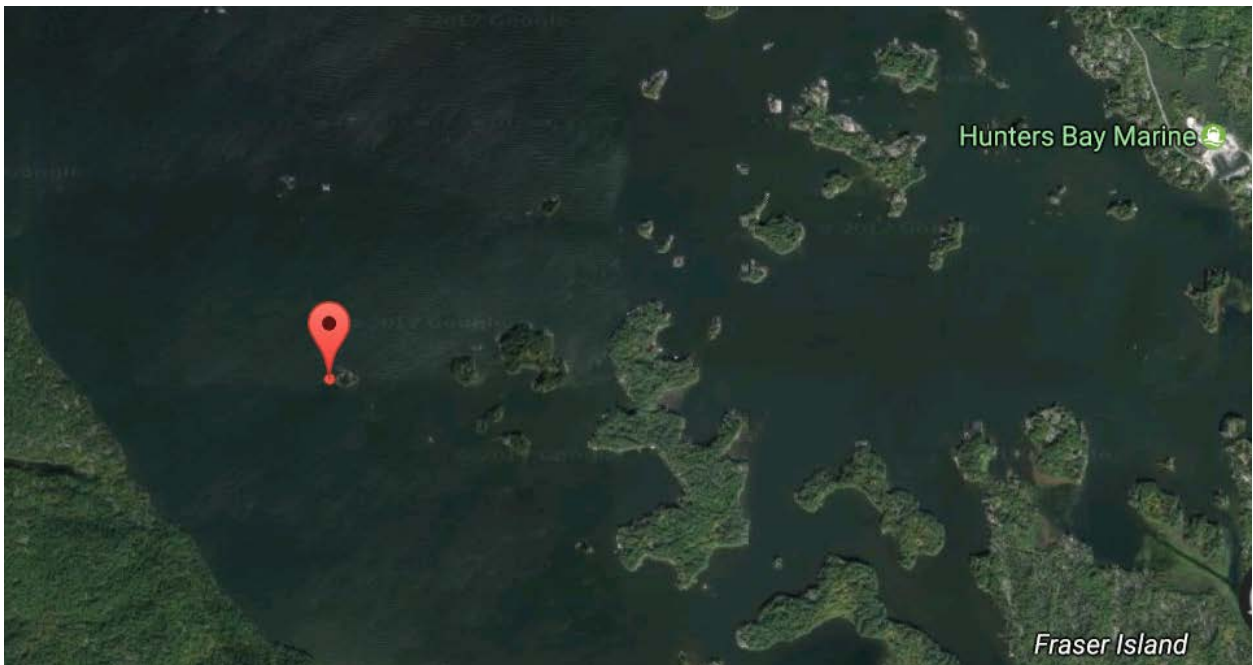
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**Figure 9:** Existing LL1420.7 Three Sisters (to be removed)



**Figure 10:** LL1432 Three Pine Island Map  
Coordinates: 46° 8'39.50"N 79°35'5.00"W





**Figure 11:** Existing LL1432 Three Pine Island). Foundation to be demolished.



**Figure 12:** Existing LL1432 Three Pine Island. Foundation to be demolished.





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**Figure 13: LL1427 Gull Rock**  
Coordinates: 46°13'19.00"N 79°38'49.00"W



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**Figure 14:** Existing LL1427 Gull Rock. Foundation not to be demolished.



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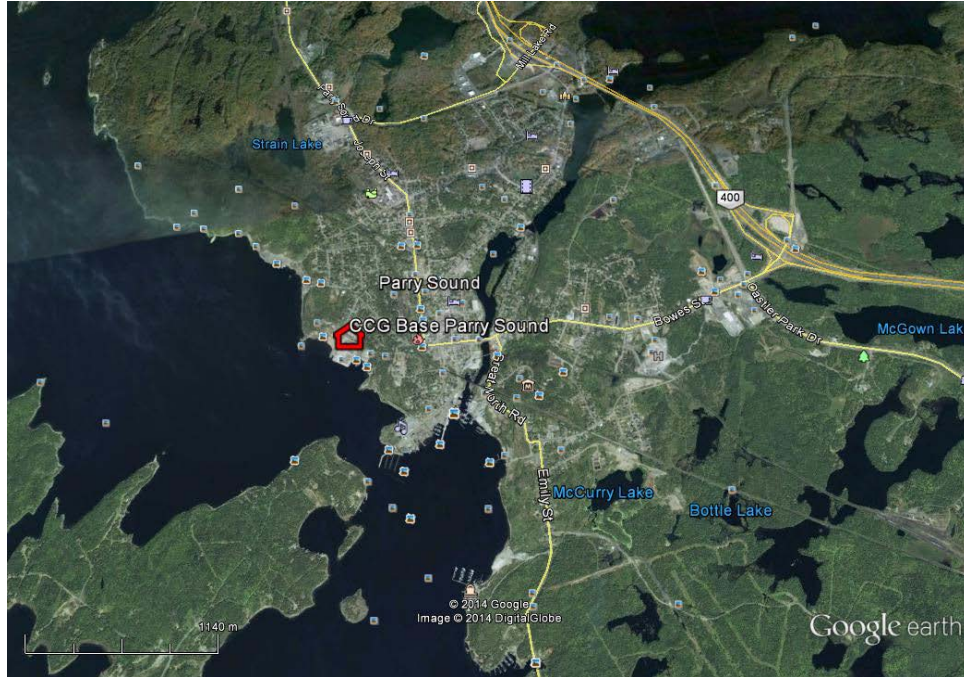
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**Figure 15:** Existing LL1427 Gull Rock. Foundation not to be demolished.





**Figure 16: Coast Guard Staging Area**  
CCG Base Parry Sound  
28 Waubeek St. Parry Sound, ON P2A 1B9  
45°20'38.93"N - 80° 2'34.46"W



**Figure 17: Coast Guard Staging Area**



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**Figure 18:** Sample 16' pipemast navaid (concrete base and solar powered lantern are not included)





**Figure 19:** Typical strut connected to the top point of 16' pipemast navaid for transporation (strut supplied by CCG)



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## **APPENDIX B2 – SUMMARY OF SUBMITTALS**



<b>Following Contract Award</b>	
<b>Submission Description</b>	<b>Section(s)</b>
<b>Deadline: 10 working days following award</b>	
Detailed schedule: Proof of qualifications: a) Proof of Vessel Registration	<i>011100</i>
<b>Deadline: 20 working days following award</b>	
Preliminary Design Package a) Preliminary Foundation Designs	<i>011100, 033000, and 055000</i>
<b>Deadline: 30 working days following award</b>	
Final Design Package a) Final Foundation Designs	<i>011100, 033000, and 055000</i>
<b>Deadline: 10 working days prior to mobilization</b>	
Construction Plan b) Project specific safety plan c) Project environmental protection program d) Detailed demolition plan e) Construction plan	<i>011100 011100 024116 011100, 033000, 031500, and</i>





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Coast Guard

Garde côtière  
canadienne



	<i>055000</i>
<b>Deadline: 21 calendar days following acceptance of the works</b>	
Waste disposal receipts	<i>024116</i>
As-built drawings	<i>011100, 033000, 031500, and</i>



Fisheries and Oceans  
Canada

Pêches et Océans  
Canada

Canadian  
Coast Guard

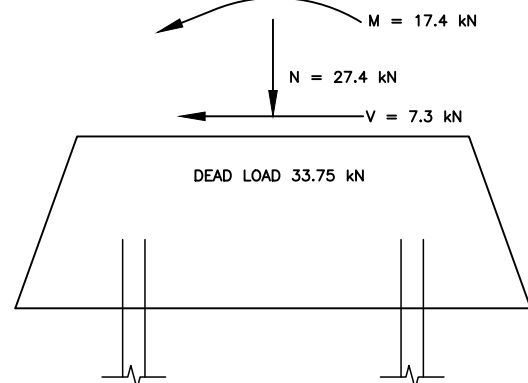
Garde côtière  
canadienne



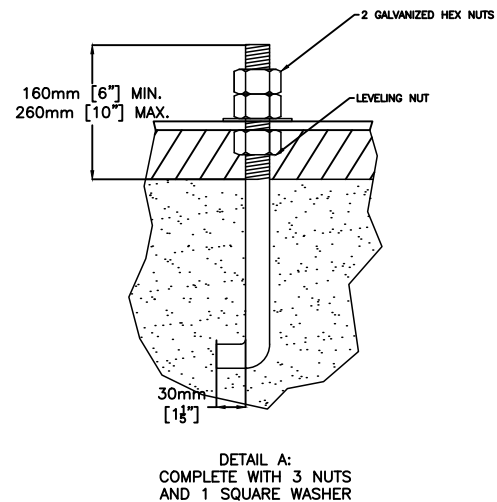
## APPENDIX B3 – DRAWINGS

Vendor / Sous-traitant

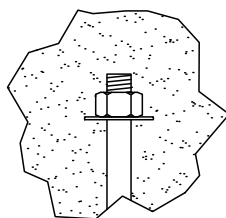
DESIGN LOADING NOTES:  
Wind pressure of 600Pa was used in calculating factored load combinations. Ice accretion thickness of 50mm was used. All loads were factored per NBCC 2010.



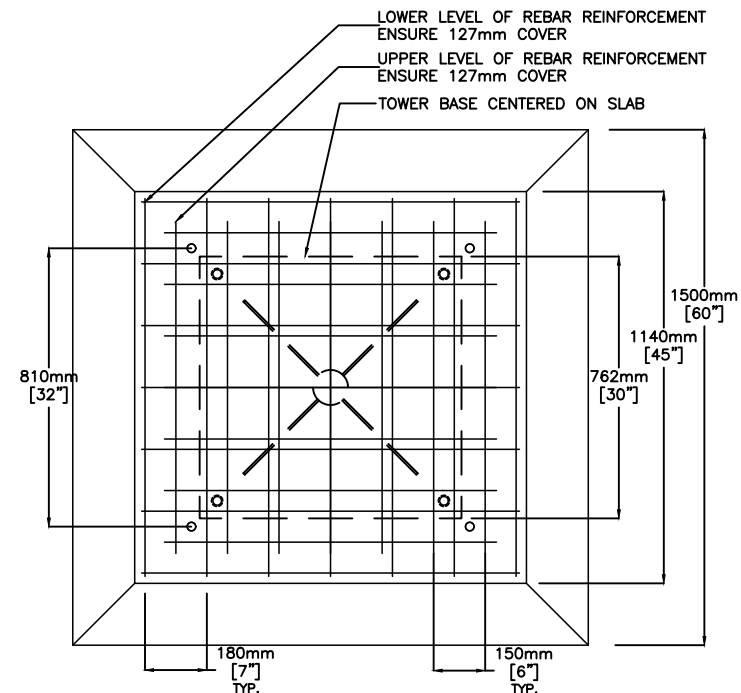
16' PIPEMAST FOUNDATION DESIGN LOADS  
NTS



DETAIL A:  
COMPLETE WITH 3 NUTS  
AND 1 SQUARE WASHER



DETAIL B:  
COMPLETE WITH 1 NUT  
AND 1 SQUARE WASHER



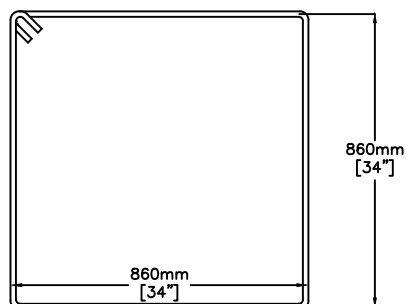
PLAN VIEW Note: Stirrup not shown. See detail

ORDER OF INSTALLATION NOTES:

1. LOCATE INSTALLATION LOCATION AS PER CONFIRMATION BY COAST GUARD
2. USING PLYWOOD TEMPLATE, DRILL 4-#28.58MM [1-1/8"] HOLES USING ONE OF THE APPROVED METHODS OUTLINED UNDER CONCRETE ACCESSORIES, SECTION 031500
3. CLEAN ALL HOLES AND REMOVE ANY LOOSE MATERIALS
4. INJECT HILTI RE 500 V3 EPOXY ADHESIVE TO COVER 3/4<sup>TH</sup> TO 7/8<sup>TH</sup> THE DEPTH OF EACH HOLE
5. USE ONE [1] 47.3 FL OZ CARTRIDGE OR TWO [2] 16.9 FL OZ CARTRIDGES PER HOLE
6. PLACE 4-#25MM [1"] ASTM A193 GR B7 ZINC PLATED THREADED RODS IN HOLES IMMEDIATELY AFTER EPOXY INJECTION
7. REPEAT STEPS 2-6 FOR PROOF LOAD TEST ANCHOR
8. PROOF LOAD TEST SHALL BE COMPLETED 12 HOURS [MINIMUM] FOLLOWING INSTALLATION
9. INSTALL CONCRETE FOOTING AS PER CONCRETE NOTES BELOW

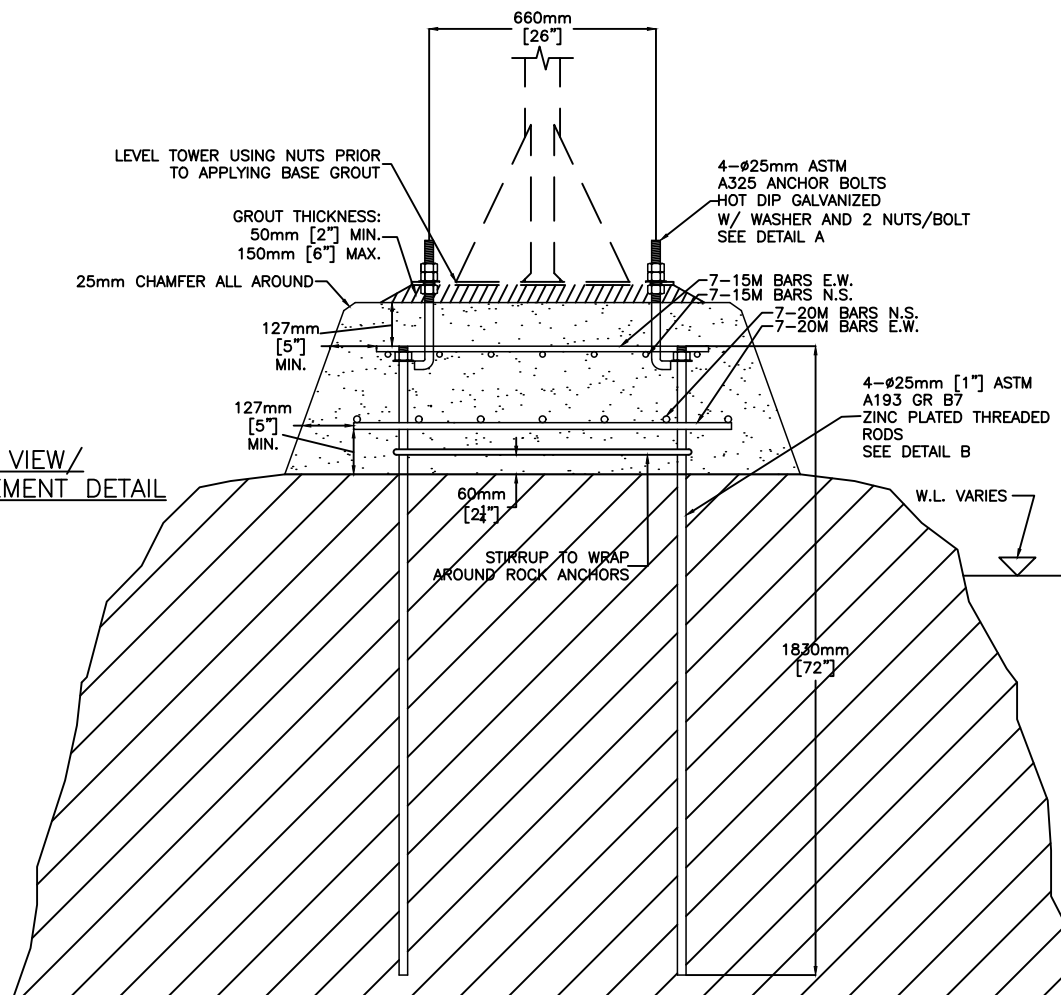
CONCRETE NOTES

1. WORK TO BE DONE IN ACCORDANCE WITH THE LATEST REVISION OF ONTARIO PROVINCIAL STANDARD SPECIFICATIONS FOR STRUCTURES.
2. CLASS OF CONCRETE: CSA EXPOSURE CLASS C-1 (35 MPA COMPRESSIVE STRENGTH), AIR ENTRAINED.
3. CONTRACTOR SHALL SUBMIT A SUMMARY OF CONCRETE PROPERTIES WITH CONSTRUCTION PLAN
- 3.1. SUPPLEMENTAL ADMIXTURES IMPACTING PLASTIC AND HARDENED PERFORMANCE SHALL BE SUBJECT TO APPROVAL OF COAST GUARD
4. REINFORCING STEEL SHALL BE GRADE 400 DEFORMED BARS. BARS SHALL BE PRE-BENT AT SUPPLIERS PLANT
5. PLACEMENT OF REINFORCEMENT TO BE CONFIRMED BY COAST GUARD PRIOR TO CONCRETE PLACEMENT
6. CHAMFER ALL EXPOSED CORNERS 25MM.
7. COVER TO REINFORCING STEEL 127MM ± 20MM EXCEPT WHERE NOTED.
8. LAP SPLICE INFORMATION (UNLESS NOTED OTHERWISE)  
UNCOATED: 15M - 480MM, 20M - 640MM
9. THE ANCHOR BOLTS SHALL BE GRADE A325 OR GREATER, HOT DIP GALVANIZED. SUPPLY WASHER AND 3 NUTS PER BOLT.
10. FORMWORK AND FALSEWORK SHALL BE AS DETAILED IN APPROVED CONSTRUCTION PLAN
11. CONTRACTOR TO ASSIST WITH COLLECTION OF SAMPLES FOR CONFIRMATION OF CONCRETE QUALITY.
12. CURING SHALL BE COMPLETED IN ACCORDANCE WITH APPROVED CONSTRUCTION PLAN
13. TOWER SHALL NOT BE ERECTED UNTIL CONCRETE TESTING INDICATES ADEQUATE STRENGTH DEVELOPMENT
10. USE LEVELING NUT AS NOTED IN DETAIL A TO INSURE THE TOWER IS PLUMB
11. UPON COMPLETION OF INSTALLATION, CUT ANY EXCESS THREADS EXTENDING 25MM BEYOND TOP NUT, AND COLD-GALV SPRAY 2 COATS ON EXPOSED END OF ROD.
12. GROUT - SIKA M-BEDOR APPROVED ALTERNATE.



STIRRUP DETAIL  
NTS

ELEVATION VIEW/  
REINFORCEMENT DETAIL



C

B

A

DWG NO - NO DES

0	DESCRIPTION	BY	yyyy-mm-dd
rev	description	by	date

Asset - Actif

LL1420.7 THREE SISTERS

Drawing - Dessin

16' PIPEMAST FOUNDATION

designed - conception

A.B 2017-06-15

drawn - dessiné

MF 2017-06-08

checked - vérifié

A.B 2017-06-08

approved - approuvé

BY 2017-06-08

CCG ref. no. - no. réf. GCC

LAKE NIPISSING MULTI-SITE

drawing no. - no. dessin

DWG NO - NO DES

01/01

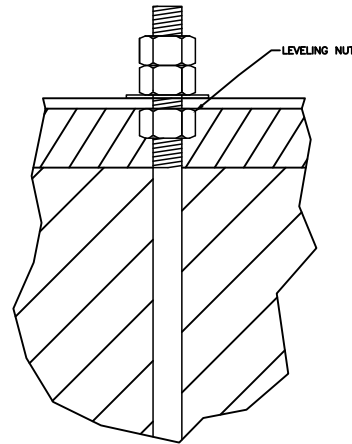
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Vendor / Sous-traitant

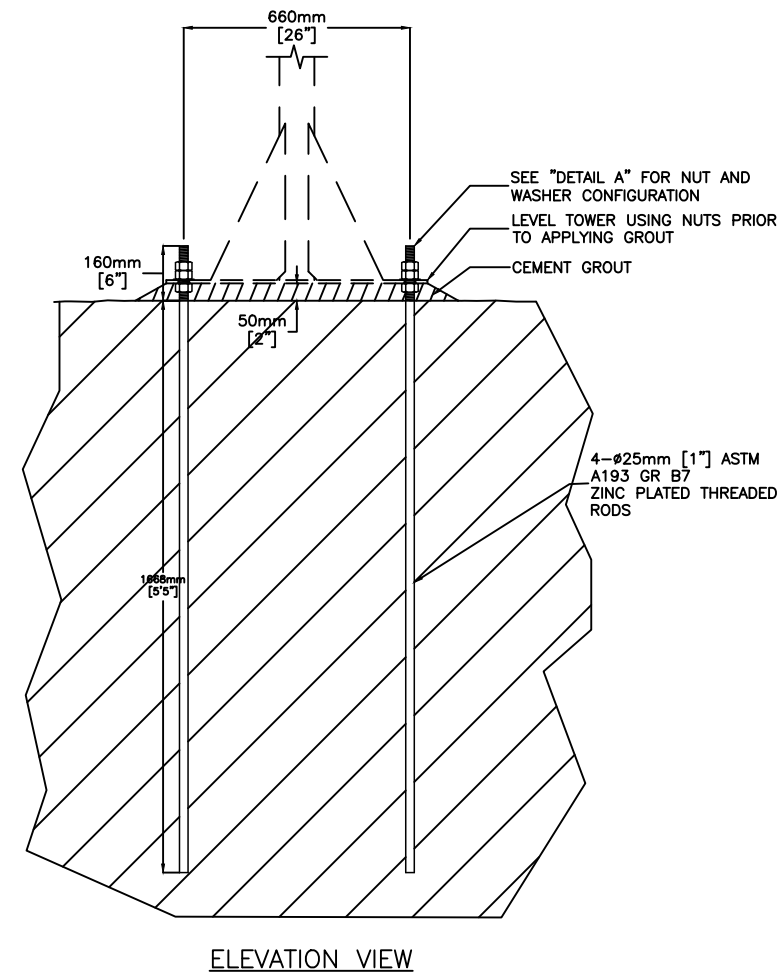
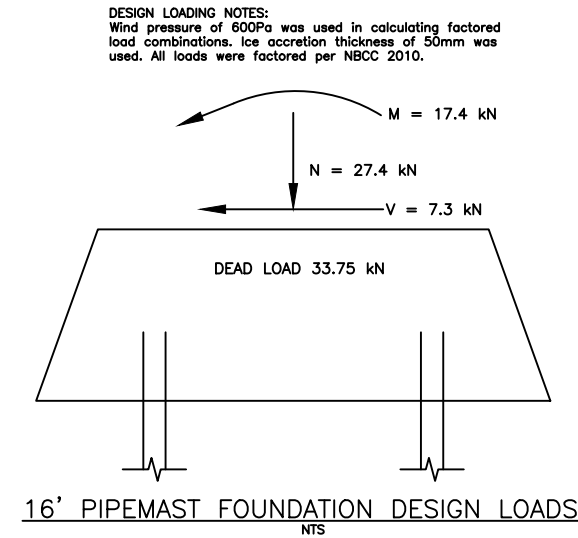
DWG NO - NO DES

**ORDER OF INSTALLATION NOTES:**

1. LOCATE INSTALLATION LOCATION AS PER CONFIRMATION BY COAST GUARD
2. ESTIMATE THE DEPTH REQUIRED FOR LEVELING PRIOR TO DRILLING OF ANY HOLES
3. USING PLYWOOD TEMPLATE, DRILL 4-Ø28.58MM [1-1/8"] HOLES USING ONE OF THE ACCEPTABLE METHODS OUTLINED UNDER CONCRETE ACCESSORIES, SECTION 031500
4. CLEAN ALL HOLES AND REMOVE ANY LOOSE MATERIALS
5. INJECT HILTI RE 500 V3 EPOXY ADHESIVE TO COVER 3/4<sup>TH</sup> TO 7/8<sup>TH</sup> THE DEPTH OF EACH HOLE
6. USE ONE [1] 47.3 FL OZ CARTRIDGE OR TWO [2] 16.9 FL OZ CARTRIDGES PER HOLE
7. PLACE 4-Ø25MM [1"] ASTM A193 GR B7 ZINC PLATED THREADED RODS IN HOLES IMMEDIATELY AFTER EPOXY INJECTION
8. REPEAT STEPS 2-6 FOR PROOF LOAD TEST ANCHOR
9. PROOF LOAD TEST SHALL BE COMPLETED 12 HOURS [MINIMUM] FOLLOWING INSTALLATION
10. INSTALL CONCRETE FOOTING AS PER CONCRETE NOTES BELOW
11. TOWER SHALL NOT BE ERECTED UNTIL CONCRETE TESTING INDICATES ADEQUATE STRENGTH DEVELOPMENT
10. USE LEVELING NUT AS NOTED IN DETAIL A TO INSURE THE TOWER IS PLUMB
11. UPON COMPLETION OF INSTALLATION, CUT ANY EXCESS THREADS EXTENDING 25MM BEYOND TOP NUT, AND COLD-GALV SPRAY 2 COATS ON EXPOSED END OF ROD.
12. GROUT - SIKA M-BEDOR APPROVED ALTERNATE.



DETAIL A:  
COMPLETE WITH 3 NUTS  
AND 1 SQUARE WASHER



0	DESCRIPTION	BY	yyyy-mm-dd
rev	description	by	date

Asset - Actif  
**LL1427 - GULL ROCK**  
**LL1432 THREE PINE ISLAND**

Drawing - Dessin  
**16' PIPEMAST FOUNDATION**

designed - conception	date
AB	2017-05-15
drawn - dessiné	date
MF	2017-08-06
checked - vérifié	date
AB	2017-08-06
approved - approuvé	date
BY	2017-08-06

CCG ref. no. - no. réf. GCC	scale - échelle
LAKE NIPISSING MULTI-SITE	N.T.S
drawing no. - no. dessin	sheet-feuille
DWG NO - NO DES	01/01
rev	0

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DWG NO - NO DES

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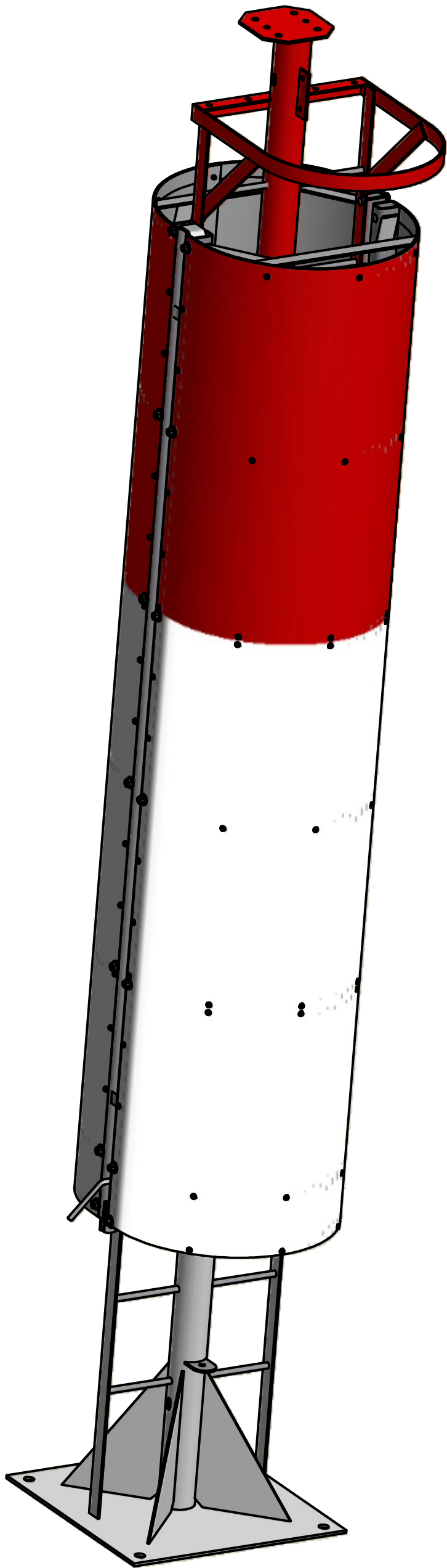
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 Fisheries and Oceans Canada	Pêches et Océans Canada
Canadian Coast Guard Centre de Recherche et de Développement	Garde côtière canadienne Direction du Centre et de l'Est
Architecture and Construction Infrastructure	Integrated Technical Services Outcomes

**16 FT PIPEMAST ANTI-CLIMB**

FILE No.		EWTM 8010-6-1	SCALE:	N.T.S.	DWG No.	
Rv.	DATE	DESCRIPTION	DRAWN	APP'D		
0	29 FEB 12	DRAWING INITIATED	A.J.E.	A.W.W.		
1	23 MAR 12	FOR PRODUCTION	A.J.E.	A.W.W.		
2	27 JUN 12	SHEET THICKNESS REDUCED	M.H.	B.Y.		
3	04 JAN 13	P1 MODIFIED AND S2 CREATED	M.H.	B.Y.		
4	11 JAN 13	FINAL DRAWING COMPLETED	E.J.G.	B.Y.		

4

3

2

1

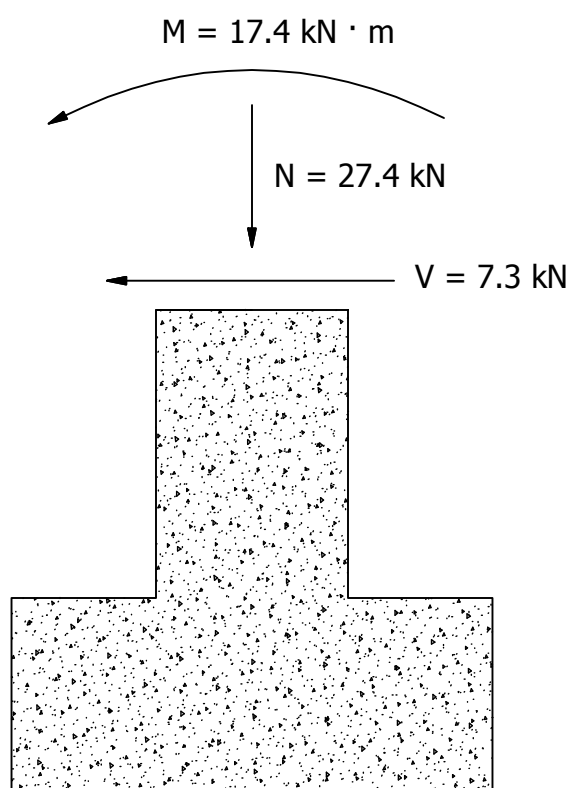
4

3

2

1

PARTS LIST				
PART NO.	QTY	PART	DESCRIPTION	DRAWING NO.
A1	1	DOOR OF ANTI-CLIMB	SEE ASSEMBLY	3
A2	1	BACK OF ANTI-CLIMB	SEE ASSEMBLY	4
S1	2	RIBBING SKELETON SUB-ASSEMBLY	SEE SUB-ASSEMBLY	5
S2	10	RIBBING SUB-ASSEMBLY	SEE SUB-ASSEMBLY	6
S3	2	TOP RIBBING SUB-ASSEMBLY	SEE SUB-ASSEMBLY	7
S4	2	BOTTOM RIBBING SUB-ASSEMBLY	SEE SUB-ASSEMBLY	8
S5	1	LATCH SUB-ASSEMBLY	6 X 57mm[1/4 X 2 1/4in] FLAT BAR	9
P1	4	MALE HINGE	SEE PART	10
P2	4	FEMALE HINGE	SEE PART	11
P3	14	STANDARD RIB BRACING	6 X 51mm[1/4 X 2in] FLAT BAR	12
P4	8	DIAGONAL RIB BRACING	6 X 51mm[1/4 X 2in] FLAT BAR	12
P5	2	SECONDARY RIB BRACING	6 X 51mm[1/4 X 2in] FLAT BAR	12
P6	14	RIB	6 X 51mm[1/4 X 2in] FLAT BAR	13
P7	1	LATCH HOOK	SEE PART	14
P8	1	HANDLE	16mm[5/8in] ROUND BAR	15
P9	2	SHEETING	6 X 1254 X 1245mm[1/8 X 49 3/8 X 49in] SHEET - RED	16
P10	2	SHEETING	6 X 1254 X 1219mm[1/8 X 49 3/8 X 48in] SHEET - WHITE	16
P11	2	SHEETING	6 X 1254 X 813mm[1/8 X 49 3/8 X 32in] SHEET - WHITE	16
P12	1	DOOR REST	6 X 51mm[1/4 X 2in] FLAT BAR	17
P13	2	HSS VERT	129in LONG 6 X 51 X 76mm[1/4 X 2 X 3in] RECTANGULAR TUBE	18
P14	2	HSS VERT WITH HOLE	129in LONG 6 X 51 X 76mm[1/4 X 2 X 3in] RECTANGULAR TUBE	19
P15	1	RUBBER STOPPER	SEE PART	20
P16	2	SQUARE STOPPER	SEE PART	21
P17	2	TALL RIB REINFORCEMENT	6 X 51mm[1/4 X 2in] FLAT BAR	22



16' PIPEMAST FOUNDATION LOADS

## STRUCTURAL NOTES:

- WIND PRESSURE OF 600Pa WAS USED IN CALCULATING FACTORED LOAD COMBINATIONS. ICE THICKNESS OF 50mm WAS USED IN CALCULATING LOADING PER S37-01, ICE CLASS IV. ALL LOADS WERE FACTORED PER NBCC 2010
- ALUMINUM ALLOYS SHALL CONFORM TO THE 'ALUMINUM ASSOCIATION' PUBLICATION 'ALUMINUM STANDARD AND DATA' AND HAVE A MINIMUM YIELD STRENGTH OF 240 MPa, GRADE 6061-T6.
- ALL STRUCTURAL MEMBERS SHOWN ARE NEW.
- METAL AND ARC WELDING SHALL CONFORM TO CSA W59.2 AND IS TO BE UNDERTAKEN TO CSA W47.2 DIVISION 1, 2.1, OR 2.2.
- ENSURE THAT STRUCTURAL COMPONENTS AND WELDS ARE NOT OVER STRESSED DURING CONSTRUCTION.
- FASTENERS SHALL BE GALVANIZED STEEL BOLTS A325 OR GREATER.
- LARGE B/W/N REFERS TO A BOLT WASHER AND NUT ASSEMBLY CONSISTING OF 18-8 STAINLESS STEEL 1/2" X 4" ROUND HEAD CARRIAGE BOLT, 1/2" SMALL OD FLAT WASHER (1 1/4" OD) AND 1/2" NYLON INSERT LOCK NUT
- SMALL B/W/N # 1 REFERS TO A BOLT WASHER AND NUT ASSEMBLY CONSISTING OF 18-8 STAINLESS STEEL 3/8" X 1" HEX CAP SCREW, 3/8" SMALL OD FLAT WASHER (1" OD) AND 3/8" NYLON INSERT LOCK NUT
- SMALL B/W/N # 2 REFERS TO A BOLT WASHER AND NUT ASSEMBLY CONSISTING OF 18-8 STAINLESS STEEL 3/8" X 3/4" HEX CAP SCREW, 3/8" SMALL OD FLAT WASHER (1" OD) AND 3/8" NYLON INSERT LOCK NUT
- UNLISTED BOLTS ARE 18-8 STAINLESS STEEL WITH NYLON INSERT LOCK NUTS
- DRAWINGS NOT TO SCALE.

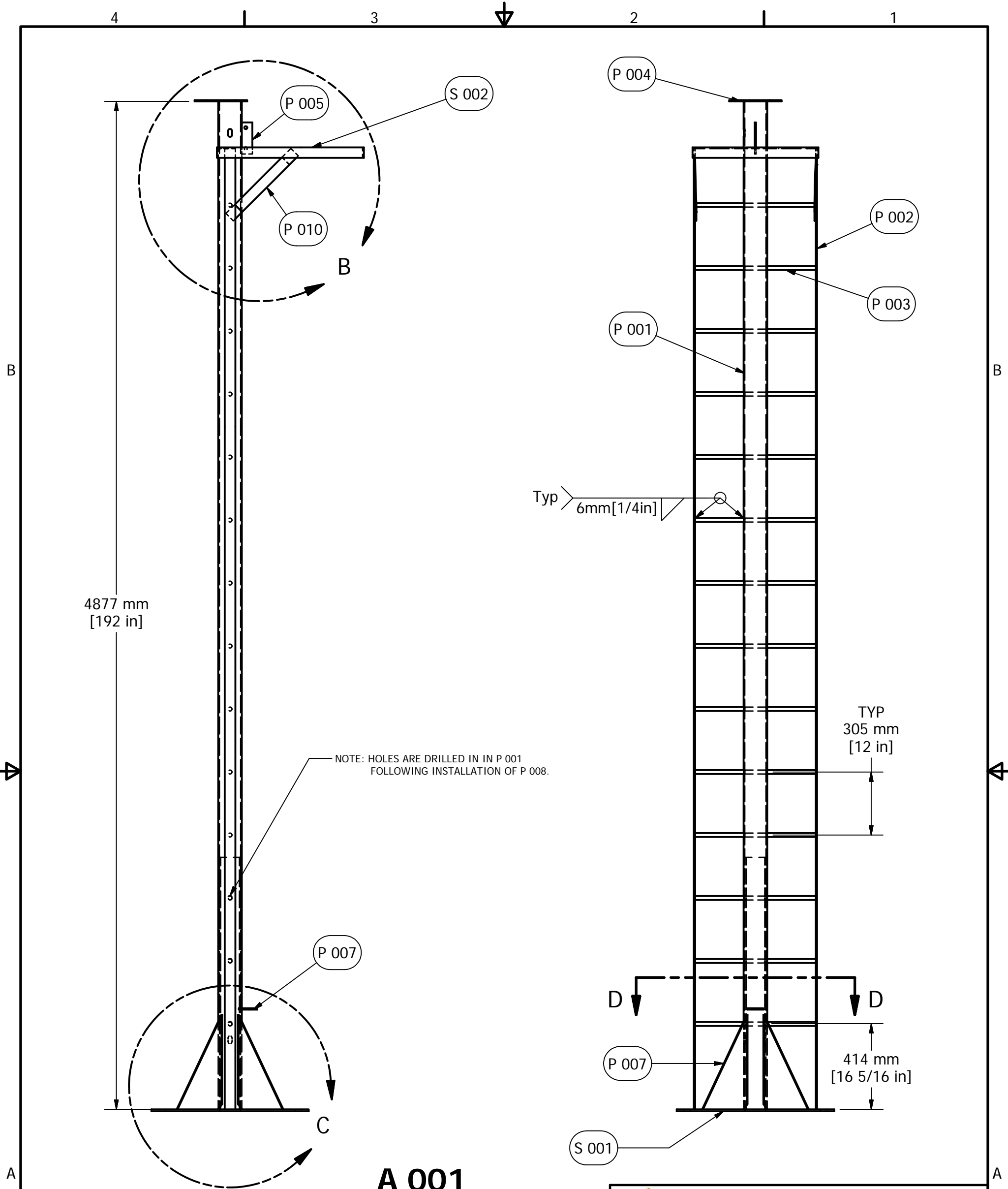
 is: eries and ceans Canada Canadian Coast Guard Centra Arctic e: ion artile and Cl in rastructure out t: amia		é: es et céans Canada Garde côtière canadienne é: ion du centre et de rti: ue C: é: nte: rated ec: nica: er: ices		
<b>16 FT PIPEMAST ANTI-CLIMB</b>				
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		DWG No.	0	
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1	23 MAR 12	FOR PRODUCTION	A.J.E.	A.W.W.
2	27 JUN 12	SHEET THICKNESS REDUCED	M.H.	B.Y.
3	04 JAN 13	P1 MODIFIED AND S2 CREATED	M.H.	B.Y.
4	11 JAN 13	FINAL DRAWING COMPLETED	E.J.G.	B.Y.

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2

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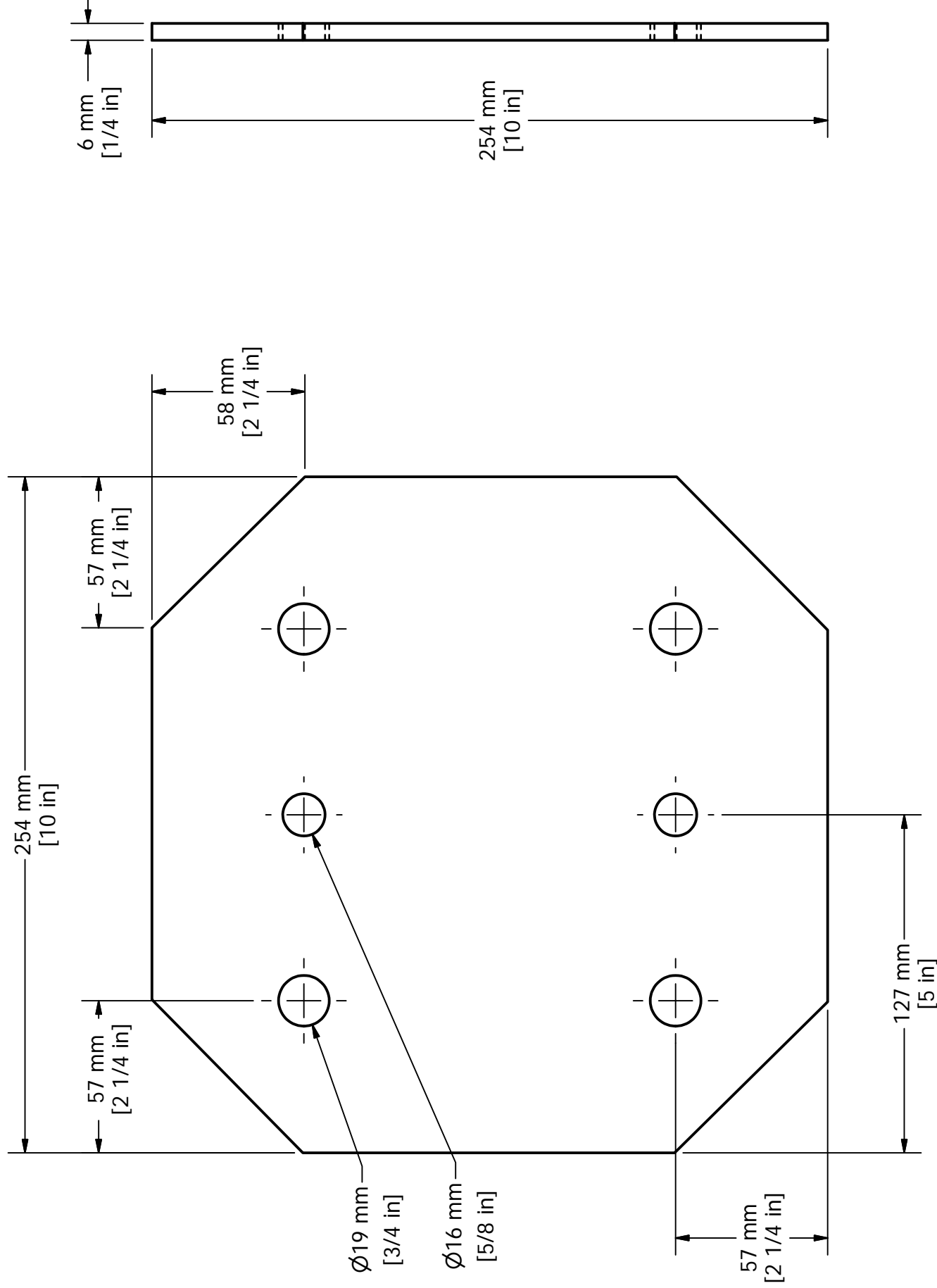


**A 001**  
**16ft Pipe Mast Tower**  
 Page 1

PARTS LIST		
PART NUMBER	QTY	PART
P 001	1	Pipe Mast
P 002	2	Side Rails
P 003	14	Rung
P 004	1	Lantern Mount
P 005	1	Fall Arrest Bracket
P 006	4	Gusset Plate
P 007	1	Fall Arrest Tension Bracket
P 010	1	Hoop Support Brace
S 001	1	Base Assembly
S 002	1	Hoop Assembly

 Fisheries and Oceans Canada <b>Canadian Coast Guard</b> Central & Arctic Region <small>Maritime and Civil Infrastructure (MCI), Integrated Technical Services          520 Exmouth St., Sarnia, ON N7T 8B1</small>	Pêches et Océans Canada <b>Garde côtière canadienne</b> Région du centre et de l'Arctique			
<b>A 001</b> <b>16ft Pipe Mast Tower</b>				
FILE No. EWTM-8010-6	SCALE: NTS	DWG No. 1		
Rv.	DATE	DESCRIPTION	DRAWN	APP'D
0	DD MAR YY	DRAWING INITIATED	R.C.S.	R.C.S.
1	13 JAN 12	FOR PRODUCTION	A.J.E.	A.W.W.
2	19 APR 12	REVISION	A.J.E.	A.W.W.

1 2 3 4



**P 004**  
Lantern Mount

PARTS LIST		
PART NUMBER	PART NUMBER	DESCRIPTION
P 004	Lantern Mount	6mm [1/4in] Thick Plate
Fisheries and Oceans Canada		
Canadian Coast Guard Central & Arctic Region		
Pêches et Océans Canada		
Garde côtière canadienne Région du centre et de l'Arctique		
Maritime and Civil Infrastructure (MCI), Integrated Technical Services 520 Exmouth St., Sarnia, ON N7T 8B1		

**P 004**  
Lantern Mount

FILE No.	EWTM-8010-6	SCALE:	NTS	DWG No.	7
Rv.	DATE	DESCRIPTION	DRAWN	APP'D	
0	DD MAR YY	DRAWING INITIATED	R.C.S.	R.C.S.	
1	13 JAN 12	FOR PRODUCTION	A.J.E.	A.W.W.	
2	19 APR 12	REVISION	A.J.E.	A.W.W.	

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Fisheries and Oceans  
Canada

Pêches et Océans  
Canada

Canadian  
Coast Guard

Garde côtière  
canadienne



## **APPENDIX B4 – MARINE ACCESS REQUIREMENTS**

.1 Marine Access

- .1 Vessel(s) employed in the performance of the contract shall be certified as required by the Canada Shipping Act 2001 and its applicable regulations including Marine Personnel Regulation.
  - .1 The bidder shall ensure that the vessel(s) proposed for the work meets all requirements of the Canada Shipping Act 2001 and the applicable Regulations under the Canada Shipping Act.
  - .2 Bidders shall provide copies of the following documentation to facilitate evaluation and award:
    - .1 Proof of vessel registration as a commercial vessel in accordance with the Canada Shipping Act 2001. Either one of two registrations will be accepted:
      - .1 Proof of commercial vessel registration in the Small Vessel Register (SVR) if less than 15 Gross Tons or;
      - .2 Proof of commercial vessel registration in the Canadian Register of Vessels (CRV) if more than 15 Gross Tons.
      - .3 NOTE: Pleasure Craft and Fishing Vessels are not acceptable for the performance of this work – it must be a commercially registered vessel.
    - .2 Where the vessel is registered in the SVR the bidder shall also provide the following:
      - .1 Copy of vessel certification and any limitations the vessel is operating under. Where the vessel is restricted, the operator shall ensure that the vessel can be used to safely perform the work in this specification;
      - .2 Copy of inspection according to the Small Vessel Compliance Program; Bidder shall submit proof of enrolment in the compliance program and;
      - .3 Either a copy of the initial inspection report or the most recent copy of an annual inspection report and;
      - .4 Copy of the crew certification that will be operating the vessel. Crewing and certification of crew shall be in accordance with the Marine Personnel Regulations, latest edition.
    - .3 Where the vessel is registered in the CRV the bidder shall also provide the following:
      - .1 Copy of the latest Annual Inspection Certificate endorsement and;

- .2 Copy of any restrictions that the vessel is operating under and the general sailing limitations of the vessel. Where the vessel is restricted, the operator shall ensure that the vessel can be used to safely perform the work in this specification;
  - .3 Copies of the crew certification that will be operating the vessel. Crewing and certification of crew shall be in accordance with the Marine Personnel Regulations, latest edition.
- .2 Vessels and crew found to be in contravention of the act will not be permitted to be engaged in any elements of the works identified herein. In the event that a vessel or crew is found non compliant a suitable replacement vessel and/or crew will be retained by the Contractor at their sole expense.