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SOW –TOWER REPLACEMENT

LL 248 – Light 81

**Lake St. Lawrence
Morrisburg, ON**

MARITIME AND CIVIL INFRASTRUCTURE

Prepared by: DJ

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 (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 Definitions

- .1 ATON: Aid to Navigation
- .2 CCG: Canadian Coast Guard, Central and Arctic Region
- .3 Engineer: Manager of Engineering, CCG MCI Central and Arctic Region or designate
- .4 MCI: Maritime Civil Infrastructure
- .5 PA: Project Authority, as indicated in the Contract Documents.

1.3 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 Salvage existing ATON appurtenances (lantern, solar panels, batteries and battery box);
 - .3 Remove and recycle existing ATON tower, steel handrails, and access ladder;
 - .4 Complete pier repairs as detailed, including:
 - .1 Partial depth removal of existing concrete;
 - .2 Fabricate and install new concrete armouring;
 - .3 Installation of new reinforced concrete pier cap; and,
 - .4 Fabricate and install new access facilities (ladder, platform, and handrails).
 - .5 Install new aid to navigation tower and salvaged ATON appurtenances; and,



.6 Demobilize.

.2 The following work will be undertaken by others and is hereby excluded:

.1 Supply of the new ATON tower.

1.4 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: 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 Project Participants Listing:

.1 Deadline: With schedule.

.2 Deliverables:

.1 Contractor shall furnish listing of all core project team members and all relevant subcontractors. Listing must include; but, is not limited to the following:

.1 Project Manager, prime point of contact

.2 Contractor's Engineer responsible for the design of formwork and falsework

.3 Fabrication facility undertaking the construction of those components identified in Section 055000.

.4 Marine access provider (if subcontracted); and,

.5 Concrete Supplier.

.2 Document must include satisfactory evidence that project team members are compliant with mandatory qualifications indicated below, as listed in the following sections, and as contained in appendices.

.4 Fabrication Plan

.1 Deadline: As indicated in the submitted schedule.

.2 Deliverables:

.1 Fabrication package Section 055000.



.5 Contract Construction Plan:

.1 Deadline:

- .1 As indicated in submitted schedule; and,
- .2 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);
 - .4 Detailed construction plan (Section 055000); and,
 - .5 Erection plan (Section 133613).

.6 Contract Maintenance Package

- .1 Deadline: No more than 30 working days following substantial completions of the works.
- .2 Deliverables:
 - .1 Waste disposal receipts or records of disposal (Section 024116)
 - .2 Quality assurance test results (Section 033000)
 - .3 Fabrication maintenance package (Section 055000)

1.5 Contractor's Qualifications

- .1 The work shall be carried out under the supervision and responsibility of a sole specialized Contractor with experience in the erection of equivalent facilities offshore by barge.
- .2 The Contractor may retain subcontractor's in accordance with their need provided such subcontractors meet the requirements indicated below:
 - .1 Engineers retained by the Contractor must be licensed by the Professional Engineers of Ontario in the appropriate discipline.
 - .2 Fabrication facilities 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 D, Marine Access Requirements.



- .4 Concrete supplier is expected to be by Ready Mix Facility accredited by Concrete Ontario / Ready Mix Concrete Association of Ontario (RMCAO).

1.6 Site Location

- .1 The location of the site is as follows:
 - .1 Lat./Long.: 44°54'1.91"N 75°08'57.45"W
 - .2 The closest settlement is Morrisburg, Ontario (approximately 42 km west of Cornwall, ON)
- .2 The site is located on a shallow shoal, offshore adjacent to the main commercial shipping channel of the St. Lawrence Seaway.

1.7 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 site are included in Appendix B1.
- .4 A geotechnical investigation has not been completed for this location.

1.8 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 CCG.
- .2 The Site is accessible by water only..
- .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.

1.9 Completion, Scheduling and Planning of the Works

- .1 Work may commence as early as practical following CCGs acceptance and approval of mandatory submissions.
- .2 Site work shall not commence without written authorization of CCG PA.
- .3 Work shall be completed no later than 31 OCT 2017 unless otherwise negotiated and approved in writing.

1.10 Canadian Coast Guard Staging Location

- .1 Items itemized as supplied by, or salvaged to CCG 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 CCG PA and may be subject to cost recovery:

- .1 Staging location: CCG Base – Prescott, 401 King St W, Prescott ON K0E 1T0.
- .2 Advise CCG at least three (3) working days prior to pick-up/delivery
 - .1 Shipping/Receiving hours: Monday through Friday, 9:00AM to 3:00PM.

1.11 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.

1.12 Fees, Permits, Certificates and Information

- .1 Contractor shall provide authorities having jurisdiction with all information requested.
 - .1 Contractor shall provide copies to CCG PA 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.

1.13 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.

1.14 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 CCG for review.
- .2 Do not proceed with the work until submitted documents or samples have been reviewed by CCG PA.
- .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 CCG PA's review of the submitted documents.
- .5 Notify CCG PA 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 CCG PA's review of submission, unless CCG gives written acceptance of specific deviations.
- .7 Make any changes to submissions that CCG may require consistent with Contract Documents and resubmit as directed by CCG.
- .8 Provide CCG with a written notice, when resubmitting, of any revisions other than those requested CCG.

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 Documents may be forwarded via email to the CCG PA. Documents are expected to be provided in .pdf or standard microsoft office format (.doc, .xls).
- .3 Allow three (3) working days, or as stipulated in the specifications, for CCG to review the submission.
- .4 The Contractor's Engineer shall stamp and sign any submissions requiring a Professional Engineer's seal certifying his approval of samples, verification of field measurements, and compliance with Contract Documents.



SECTION: 013530 HEALTH AND SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 Scope

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

1.2 References

- .1 Work under this section shall be undertaken in strict conformance with all listed references, In the case of any conflict or discrepancy the more stringent requirements shall apply.

- .1 Canada Labour Code Part II - January 2008
- .2 NRC-CNRC National Building Code of Canada
- .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.
- .4 Material Safety Data Sheets for all 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;

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 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



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- .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 CCG. 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



SECTION: 014500 QUALITY CONTROL

PART 1 - GENERAL

1.1 Inspection

- .1 CCG 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 CCG in these specifications or provided for in work-site regulations, the request for inspection must be made without unreasonable delay.

1.2 Procedures

- .1 Provide CCG 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 CCG as failing to comply with the contract documents. Replace or re-execute in accordance with the Contract Documents.

1.4 Tests and Mixture Formulas

- .1 Supply test reports and required mixture formulas.

1.5 Factory Tests

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

1.6 Acceptance of Work

- .1 CCG will make acceptance visits of work executed by the Contractor at critical milestones identified in the following sections.
- .2 The Contractor shall inform CCG 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 CCG approval of all products to be incorporated into the works. Work shall not commence until product data and/or samples have received CCG 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 CCG in writing of any conflict between these specifications and manufacturer's instructions; CCG 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 CCG, 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 CCG. Substitutions will be considered by CCG 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 CCG 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 CCG.



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 Salvage existing ATON equipment (lantern, solar panel, batteries/battery box);
 - .1 Existing electrical distribution cabling may be disposed of.
 - .2 Removal and disposal of the existing aluminum ATON tower, steel handrails and access ladder; and,
 - .3 Partial depth removal of existing concrete.

1.2 Related Sections

- .1 Concrete Work, Section 033000
- .2 Metal Fabrications, Section 055000
- .3 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
 - .2 NRC-CNRC National Building Code of Canada.
 - .3 Ontario Occupational Health and Safety Act and Regulations.
 - .4 CSA S350-[M1980(R1998)], Code of Practice for Safety in Demolition of Structures.

1.4 Submittals

- .1 Contractor to provide demolition plan.
 - .1 Deadline: 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.

.2 Work under this section shall not proceed until written approval of the demolition plan has been received from the CCG.

.3 Waste disposal receipts or records of disposal

.1 Deadline:

.1 with Contract Maintenance Package

.2 Deliverables:

.1 Copies of certified receipts from the disposal sites for all material removed from the work site upon request.

1.5 Existing Conditions

.1 Contractor must insure the tower is dismantled and demolished in a safe manner.

.1 Photos of the existing pier and tower 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 CCG.

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.

.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 existing aluminum tower.
- .2 Remove existing concrete to the depths indicated in the contract drawings.
 - .1 Work is to be completed utilizing saw and chipping hammer(s) to avoid damage to the existing pier armouring, unless otherwise approved in writing.
 - .1 Chipping hammers shall have a maximum weight of 9 kg prior to any handle modification
 - .2 Vertical bars are to be preserved.
 - .3 Debris is to be removed from the removal area on an ongoing basis to ensure that removals do not exceed the boundaries and depths specified for removal.
 - .3 Ensure that demolition does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .4 Ensure demolition is undertaken safely. If at any period during demolition the safety of the Contractor's staff cannot be maintained take preventative measures, stop work and immediately notify CCG.

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:
 - .1 Design and installation of falsework; and
 - .2 Installation of a new reinforced concrete pier cap.
- .2 Work includes any and all provisions necessary to ensure that the anticipated performance of the placed concrete will be obtained if work is undertaken in cold weather.
- .3 Work under this section excludes:
 - .1 Partial depth removals (see, Section 024116 Demolition of Structures)
 - .2 Concrete armouring (see, Section 055000 Metal Fabrications)
 - .3 Grouting (see, Section 133613, Metal Towers)

1.2 Related Sections

- .1 Demolition, Section 024116
- .2 Metal Fabrications, Section 055000
- .3 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 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

1.4 Submittals

.1 Submittals shall be forwarded to CCG in accordance with the provisions of section 013530.

.2 Concrete Mix Parameters:

.1 Deadline: with Construction Plan (Section 011100)

.2 Deliverables:

.1 Provide high level summary of mix properties and admixtures to demonstrate compliance with CCG criteria.

.2 Provide MSDS, (pre-mixed products only).

.3 Concrete placement methods and curing procedures.

.1 Deadline: with Construction Plan (Section 011100)

.2 Deliverables:

.1 Detailed written description of concrete placement, including:

.1 Anticipated haul routes and distances;

.2 Engineered shop drawings for falsework and formwork;

.1 Drawings are to be stamped by a licensed Professional Engineer.

.3 Placement methods and procedures to control consolidation/segregation;

.4 Location of necessary cold joints;

.5 Finishing procedures;

.6 Curing methods and schedule;

.7 Strength requirements for structural stability (removal of forms);

.8 Clean-up procedures; and,

.9 Mitigation measures to account for hot or cold temperatures where reasonably anticipated during the construction period.

.10 MSDS and Manufacturers instructions for secondary products incorporated into the works including; but not limited to:

.1 Dowel adhesive

.2 Curing compound



.4 Quality Assurance Test Results

.1 Deadline: With Contract Maintenance Package (Section 011100)

.2 Deliverables

.1 Records of all plastic property testing completed on the date of placement.

.2 Records of all strength development testing completed following initial placement.

1.5 Quality Assurance

.1 CCG's minimum inspection requirements are detailed below. The Contractor shall be responsible to notify CCG of the date and time that the works may be inspected.

.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 Testing is to be completed by a third party independent Consultant and is to be completed by a certified technician in accordance with CAN CSA A23.2.

PART 2 - PRODUCTS

2.1 Formwork / Falsework

.1 Existing and new concrete armoring (Section 055000 Metal Fabrications) is expected to be utilized as formwork.

.2 Falsework is expected to be suitably designed and anchored bridge overhang brackets

2.2 Concrete

.1 Concrete must possess the minimum characteristic detailed in the Contract Drawings.

2.3 Water

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

2.4 Reinforcement

.1 Reinforcing steel is to be detailed in Contract Drawings.

2.5 Dowels

.1 Dowels must be as detailed in Contract Drawings.



2.6 Adhesive

- .1 Hilti HY-200 Safe Set or equal.

2.7 Anchor bolts

- .1 As detailed in the Contract Drawings.

2.8 Curing Compound

- .1 White pigmented, Type 2 – Class B or approved alternative.

PART 3 - EXECUTION

3.1 General

- .1 Concrete must be placed, finished, and cured in accordance with the Contractor's submitted construction plan.

3.2 Falsework and Formwork

- .1 Falsework is to be designed and stamped by the Contractor's Engineer.
 - .1 Shop drawings of the proposed falsework are to be provided to CCG PA with Contractor's Construction Plan.
 - .2 Falsework must be adequate to support the loads of the placed concrete but must also serve as a work platform through the construction period and be suitably designed and constructed in accordance with referenced legislation.

3.3 Preparation

- .1 Preparation shall not commence until bearing surfaces have been inspected by CCG PA.
- .2 Remove all loose and deleterious material.
- .3 Place reinforcement in accordance with Contract Drawings.
 - .1 Dowels are to be installed to the embedment depth indicated in the Contract Drawings
- .4 Surface is to be clean and free of deleterious material. Historical concrete at the bondig face is to be moistened to a surface saturated condition (no standing water) prior to placement.
- .5 Surfaces must be heated as necessary to account for climatic conditions at the time of the pour.

3.4 Placement

- .1 Concrete placement shall not commence until formwork and reinforcement have been inspected by CCG PA.



- .2 Contractor shall place, finish and cure concrete as per CAN CSA A23.1 making all adjustment 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 must be previously approved in writing.
- .4 Finish exposed concrete surfaces to provide a lightly brushed non-skid surface.
- .5 Contractor shall provide samples as required during placement operation for the performance of quality assurance testing.

3.5 Curing

- .1 Concrete curing must be undertaken in accordance with CAN CSA A23.1 and the Contractor's approved Construction Plan. Curing compound is preferred given mobilization requirements.
 - .1 Curing regiment employed must take into account local climatic conditions reasonably anticipated to occur during the curing period.
 - .2 Contractor is to apply curing compound 2-4 min. following finishing operation, completely covering the surface of the concrete. A second application of curing compound shall be applied within 30 to 60 minutes after the first application.

3.6 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 the CCG PA.



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 Fabricate and install concrete armouring;
 - .2 Fabricate and install new access facilities (ladder, platform, and handrails); and,
 - .3 Transportation of access facilities to and from CCG staging location for final coating application.
- .2 The following work is to be completed by others and is excluded from the requirements of this section:
 - .1 Coating application

1.2 Related Sections

- .1 Demolition, Section 024116
- .2 Concrete Work, Section 033000
- .3 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
 - .2 NRC-CNRC National Building Code of Canada
 - .3 Ontario Occupational Health and Safety Act and Regulations
 - .4 CAN/CSA G40.20-13 & G40.21-13– General Requirements for Rolled or Welded Structural Quality Steel
 - .5 CAN/CSA G164 - Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .6 CAN/CSA G401-14 – Corrugated Steel Pipe Products
 - .7 ASTM A36-14 - Standard Specification for Carbon Structural Steel
 - .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 CCG PA in accordance with the provisions of section 013530.
- .2 Fabrication Package
 - .1 Deadline: As indicated in Contractor's submitted schedule
 - .2 Deliverables
 - .1 Fabrication drawings for concrete armouring and access facilities
- .3 Fabrication Maintenance Package:
 - .1 Deadline: Furnish with Contract Maintenance Package (Section 011100)
 - .2 Deliverables:
 - .1 Material cut sheets for all incorporated products
 - .2 Amended fabrication drawings detailing any and all approved modifications to the Contract Drawings
 - .3 Amended Contract Drawings detailing:
 - .1 Installed orientation of the access facilities;
 - .2 Height of platform above water elevation (date of installation); and,
 - .3 Height of lowest rung relative to water elevation (date of installation).

1.5 Quality Assurance

- .1 CCGs minimum inspection requirements are detailed below. The Contractor shall be responsible to notify CCG of the date and time that the works may be inspected.
 - .1 Upon completion of fabricated facilities prior to galvanizing
 - .2 Upon installation of fabricated facilities at the project site.

PART 2 - PRODUCTS

2.1 Corrugated Steel Pipe

- .1 As detailed in the Contract drawings.

2.2 Structural metals

- .1 Structural metals must conform to the dimensions and grade indicated in the Contract Drawings.



2.3 Anchor bolts

- .1 Anchors are to meet the requirements listed in the Contract drawings

2.4 Adhesive

- .1 Hilti HY-200 Safe Set or approved equal.

PART 3 - EXECUTION

3.1 Fabrication

- .1 All members shall be fabricated in accordance with the Contract Drawings and as per the specified references.
- .1 In any bending or reworking of any material, methods employed shall ensure that the physical properties of the material are not impaired.

3.2 Galvanizing

- .1 All materials are to be hot dipped galvanized unless otherwise indicated.

3.3 Coating

- .1 CCG will complete the application of the final coating system to the fabricated access facilities.
- .2 The Contractor is responsible for the transporting the access facilities to and from the designated staging location (see Section 011000).
 - .1 The Contractor's schedule must allow for at least seven (7) days for CCG to complete the application of the coating system.

3.4 Installation

- .1 The Contractor must take all reasonable precautions to avoid damage to the fabricated elements during transport, unloading and installation. All components or damaged members must be repaired or replaced to the satisfaction of the CCG PA at the Contractor's expense.
- .2 Concrete armouring is to be installed as detailed in the Contract Drawings.
- .3 Access facilities are to be installed as detailed in the Contract Drawings.
 - .1 Access facilities are to be aligned with the tower door as indicated and must be positioned on the downstream face of the pier.
 - .2 All damage to the coating system is to be repaired to the satisfaction of the CCG PA.
- .4 Contractor shall note azimuth of access ladder location, elevation of work platform and lowest ladder rung relative to water elevation on date of installation.



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 Transportation of the tower and all associated hardware to site from the designated staging area;
 - .2 The installation of the tower detailed in the appended Contract Drawings;
 - .3 Transportation and installation of all salvaged ATON appurtenances.
- .2 Work of this section excludes:
 - .1 Supply of the new ATON tower; and,
 - .2 Commissioning of ATON equipment.

1.2 Related Sections

- .1 Demolition, Section 024116
- .2 Concrete Work, Section 033000
- .3 Metal Fabrications, 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.
 - .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 Erection Package
 - .1 Deadline: with Construction Plan



.2 Deliverables

- .1 Written plan detailing proposed labour, equipment and timings to complete the installation of the new ATON tower. Plan must clearly demonstrate procedures and methods to be employed to hoist the tower into position.
- .2 CCG 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; but is not limited to:
 - .1 Crane/helicopter lift capacity; and/or,
 - .2 Vessel stability.

.2 Tower maintenance package

- .1 Deadline: with Contract Maintenance Package.
- .2 Deliverables:
 - .1 As-built drawings detailing any and all amendments or revisions not indicated elsewhere
 - .2 Site photographs

1.5 Quality Assurance

- .1 CCGs minimum inspection requirements are detailed below. The Contractor shall be responsible to notify CCG of the date and time that the works may be inspected.
 - .1 Upon completion of the work to ensure tower is plumb and that light is operating correctly;

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 Handling of Material and Transportation

- .1 The Contractor shall take all reasonable 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 CCG at the expense of the Contractor.
- .2 It is the responsibility of the Contractor to ensure that the towers are protected from bending and alignment damage.

3.2 Site preparation

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



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3.3 Erection

- .1 Ensure that each tower is plumb and level
 - .2 Tighten the first nut using turn of nut method associated to the length of bolt provided. The second nuts shall be snug tight.
 - .3 Install grout as indicated in the attached drawings.
 - .4 Install or suitably secure salvaged ATON appurtenances
- .1 Lantern is to be installed on the provided mount. Solar panel and batteries and housing are to be secured in the base of the tower unless alternative arrangements are approved by CCG PA.



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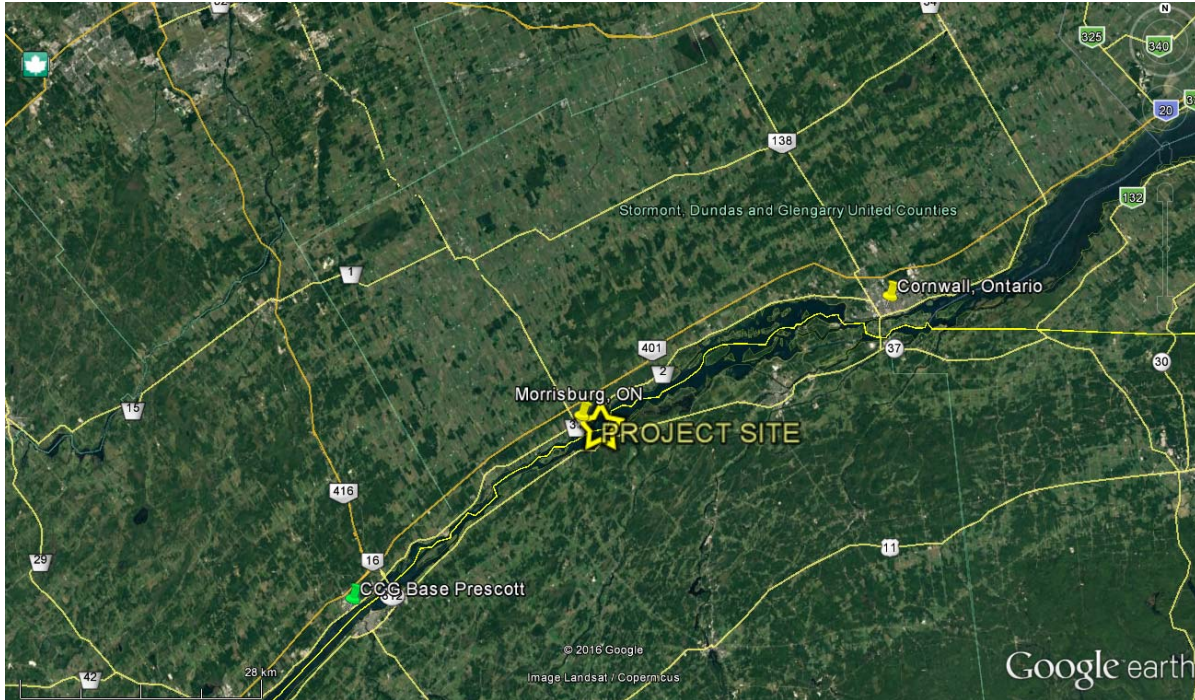
Pêches et Océans
Canada

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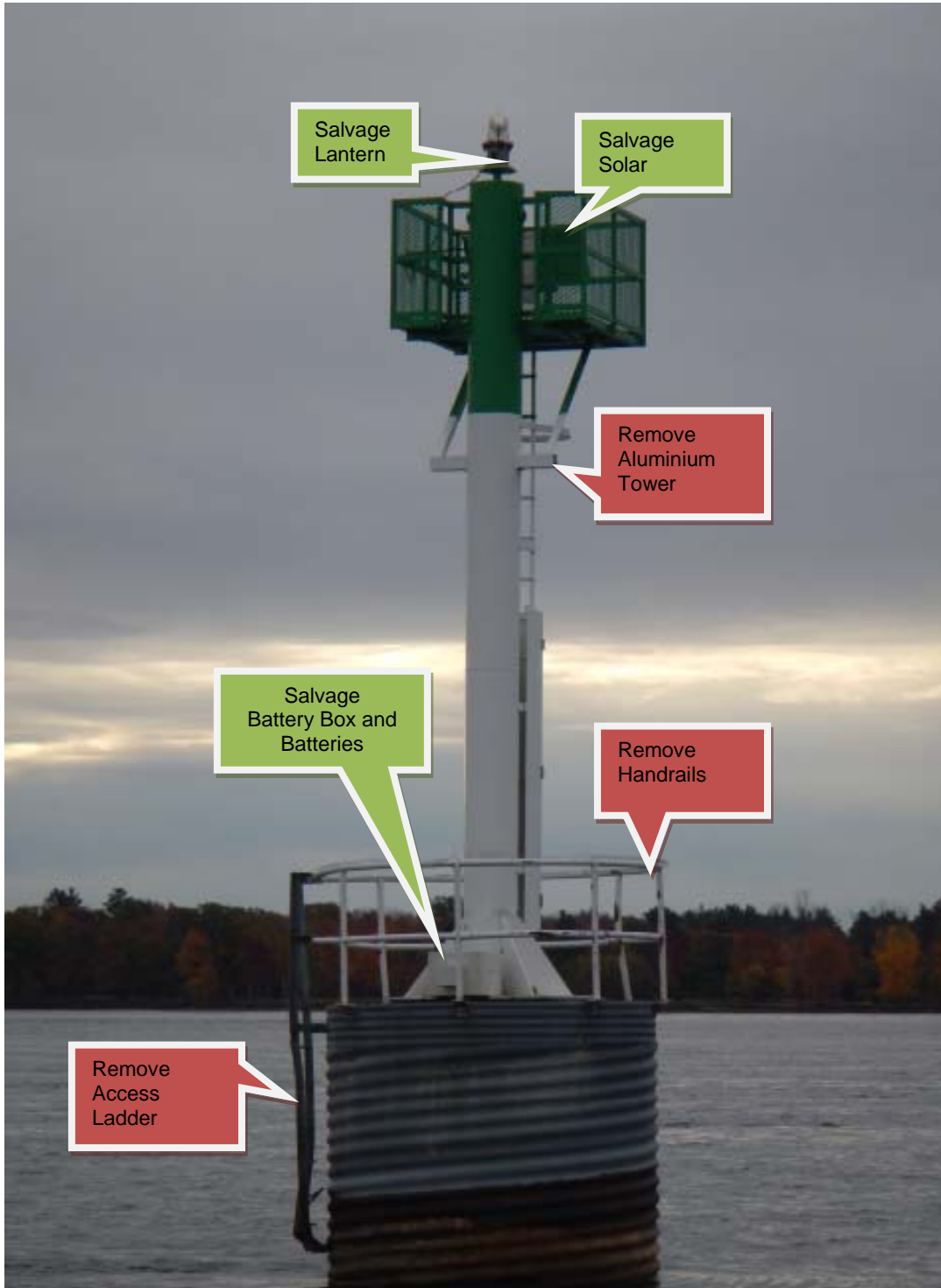
APPENDIX B1: SITE LOCATION AND PHOTOGRAPHS



LL 248, Light 81, Lake St. Lawrence (44°54'1.91"N, 75° 8'57.45"W)



Project Site



Existing conditions and expect action



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Existing pier top and soil anchors. Removals must preserve integrity of anchors



Existing tower anchors



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APPENDIX B2 – SUMMARY OF CONTRACT SUBMITTALS (a)

Sect 011100 General Requirements		Sect 013530 Health and Safety Requirements	Sect 013543 Environmental Procedures	Sect 024116 Demolition	Sect 033000 Concrete Work	Sect 055000 Metal Fabrications	Sect 133613 Metal Towers
Deliverable	Deadline						
Detailed Schedule	<i>10 working days following award</i>						
Project Participants Listing	<i>With schedule</i>						
Fabrication Package	As detailed in Contractor's submitted schedule					<i>Fabrication Package</i>	
Contract Construction Plan	As detailed in Contractor's submitted schedule	<i>Project specific safety program</i>	<i>Environmental protection plan</i>	<i>Demolition Plan</i>	<i>Concrete mix parameters Concrete placement methods</i>		<i>Erection package</i>
Contract Maintenance Package	<i>No more than 30 days following substantial completion</i>			<i>Waste disposal receipts or records of disposal</i>	<i>Quality assurance test results</i>	<i>Fabrication maintenance package</i>	<i>Tower maintenance package</i>



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Canada

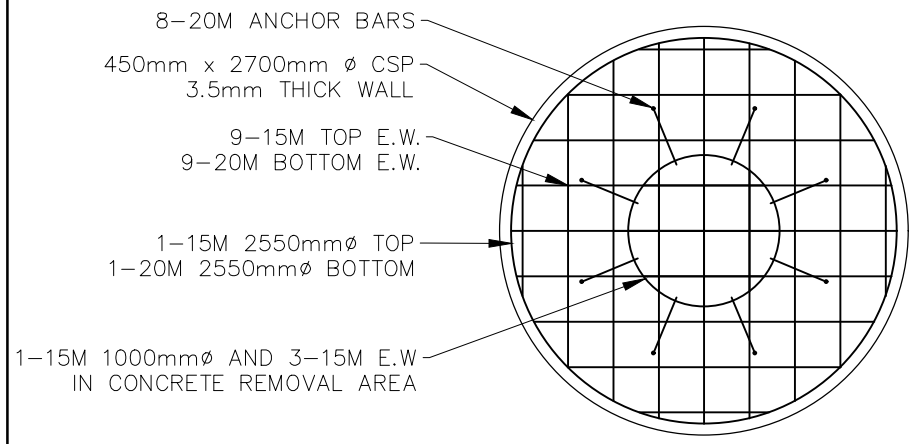
Pêches et Océans
Canada

Canadian
Coast Guard

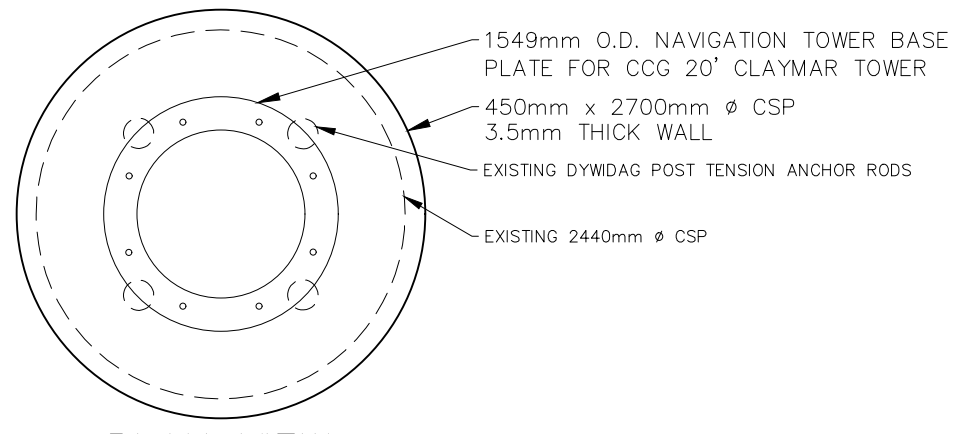
Garde côtière
canadienne



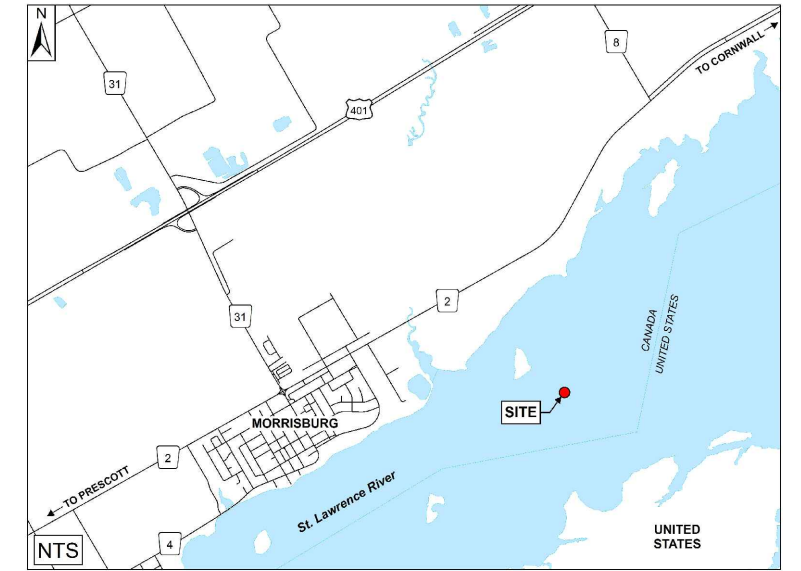
APPENDIX B3 – DRAWINGS



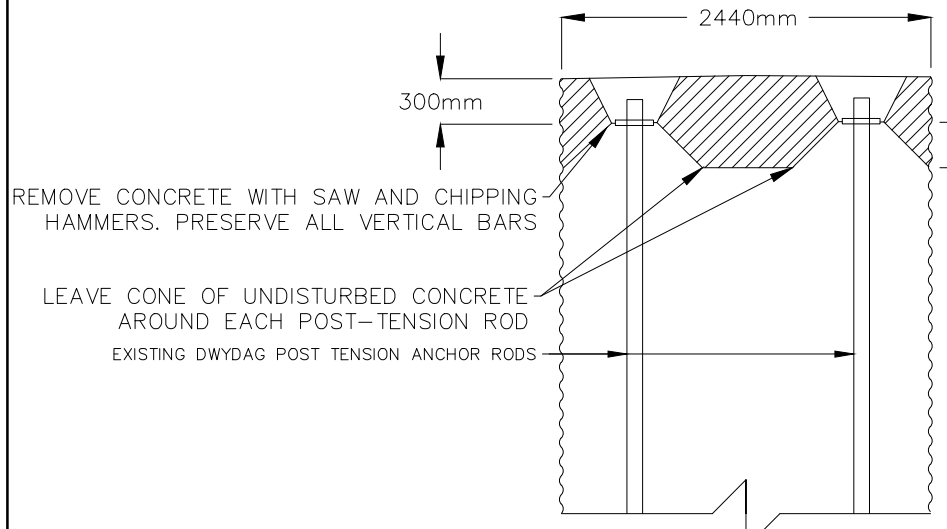
**PLAN VIEW:
 REINFORCING**
 SCALE 1:50



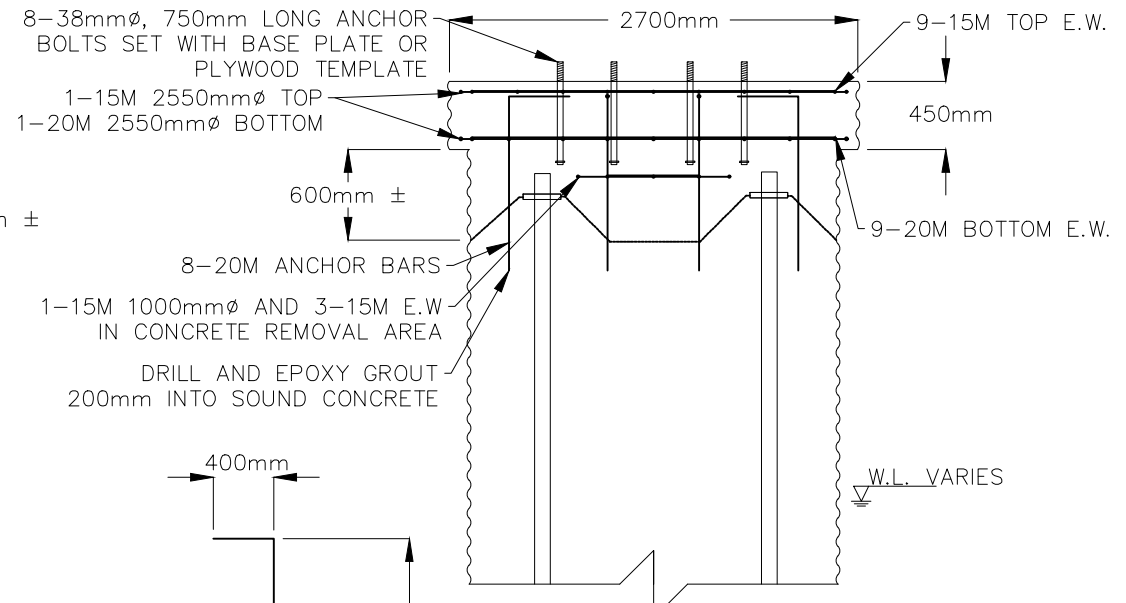
**PLAN VIEW:
 BASE PLATE**
 SCALE 1:50



KEY PLAN
 N.T.S.



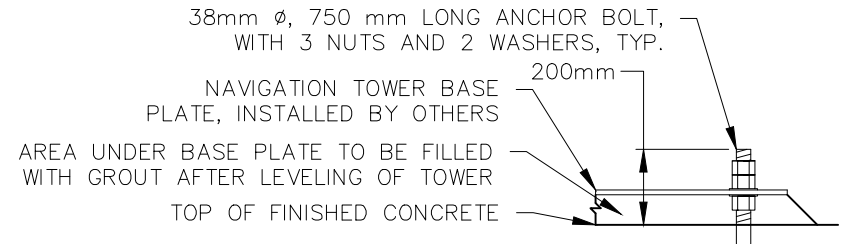
**ELEVATION VIEW:
 EXISTING**
 SCALE 1:50



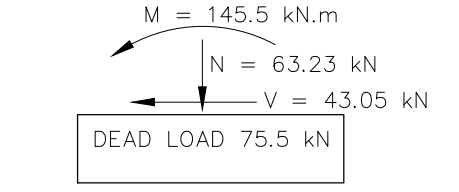
**ELEVATION VIEW:
 PROPOSED**
 SCALE 1:50

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 F-1 (35 MPa compressive strength), air entrained.
3. Reinforcing steel shall be grade 400 deformed bars. Bars shall be pre-bent at suppliers plant.
4. Chamfer all exposed corners 25mm.
5. Cover to reinforcing steel 70mm \pm 20mm except where noted.
6. Lap splice information (unless noted otherwise)
 Uncoated: 15M - 480mm; 20M - 640mm
7. Corrugated steel pipe shall be CSA standard G401-14, zinc galvanized, 125mmx25mm corrugated 3.5mm wall thickness. May be fabricated by Coast Guard personnel.
8. Supply and installation of the anchors bolts will be by the contractor. ASTM specification A449 or greater, hot dip galvanized. Supply 2 washers and 3 nuts per bolt, plus nut and washer on bottom for anchorage.



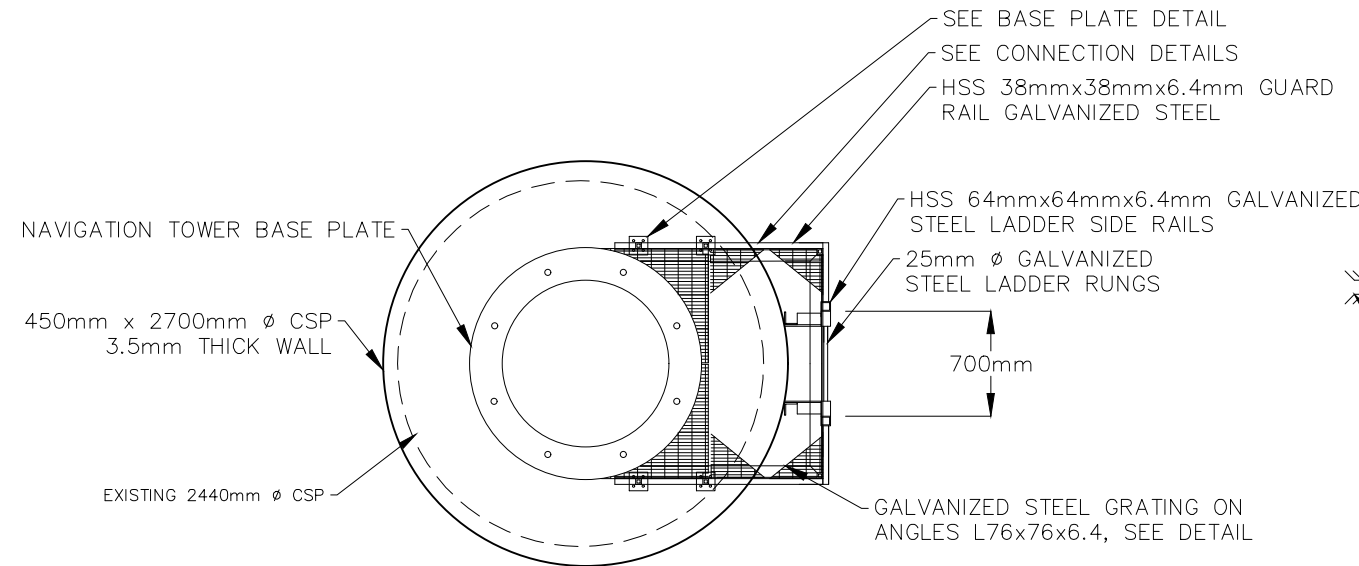
ANCHOR BOLT DETAIL
 SCALE 1:20



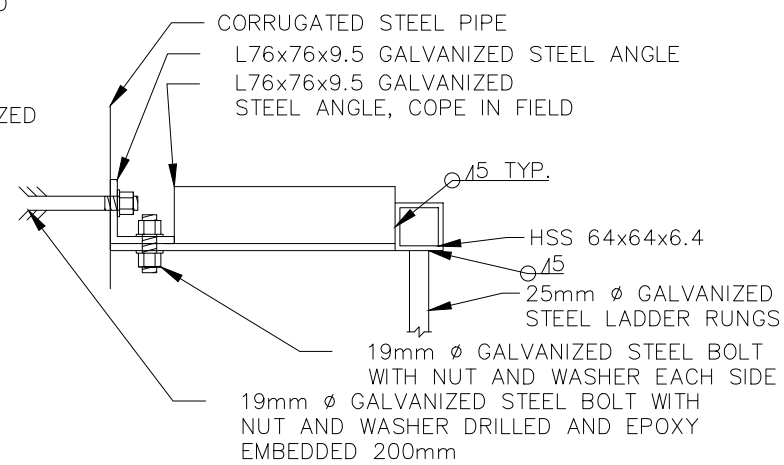
**FOUNDATION DESIGN
 LOADS**
 NTS



Department of Fisheries and Oceans Canada Navigation Aid LL248 Light 81 Foundation Concrete Cap Design	DATE: Mar. 20, 2017	PROJECT No. 17030
	SCALE As Shown	DRAWING No. 1 of 2

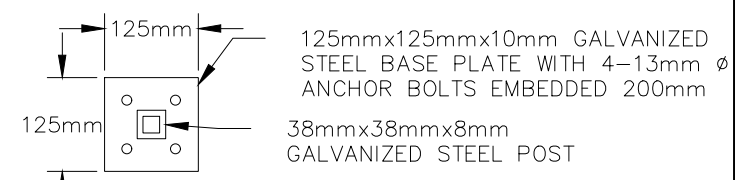


**PLAN VIEW:
LADDER DESIGN**
SCALE 1:50



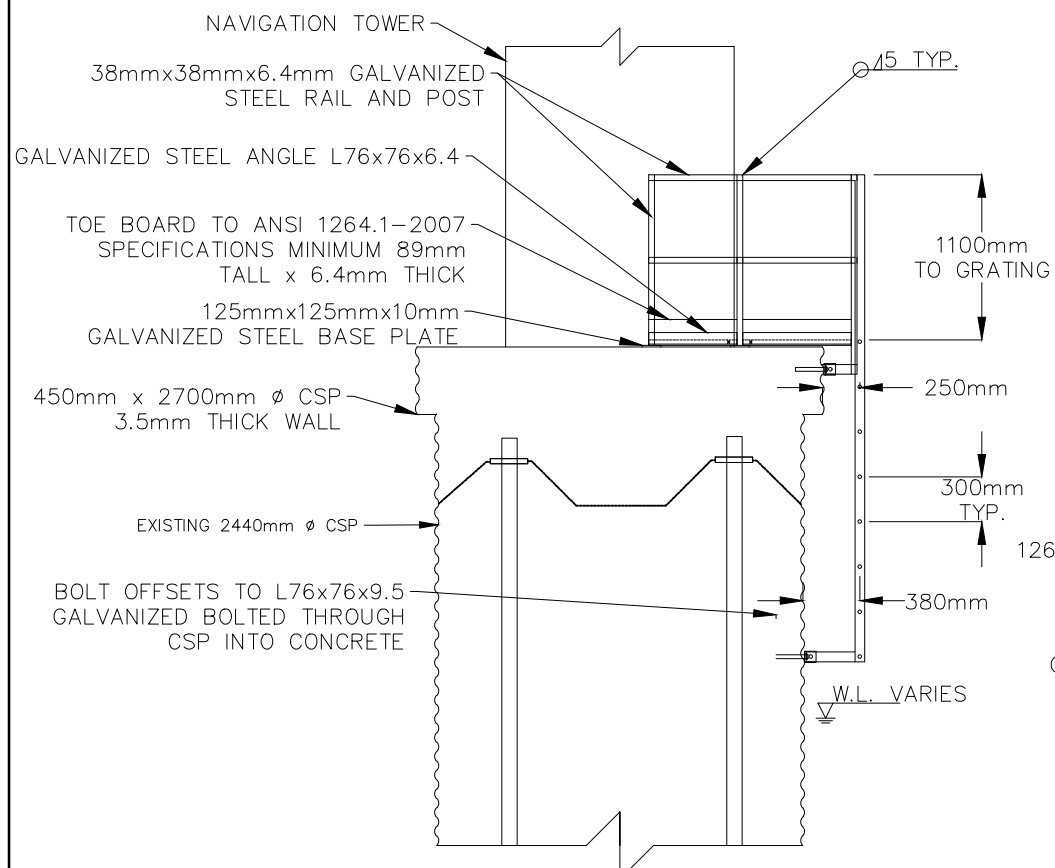
LADDER OFFSET CONNECTION DETAIL
SCALE 1:10

- NOTES:**
- Ladder Designed to American National Standards for Ladders (ANSI-ASC A14.3-2008.).
 - Hot dip galvanize to ASTM A 123 after fabrication.
 - Location of ladder and handrails to be aligned with access door after tower installation.
 - Grating to be galvanized steel, design load 3.6 kPa with hold down clips. Borden 8HD15-4 or accepted equivalent, cut to fit in field.
 - Galvanized steel toe board shall be minimum 89mm in height securely fastened in place, with not more than 6mm clearance above floor level.
 - Structural steel sections and plates to CSA G40.20/G40.21, Grade 350W.

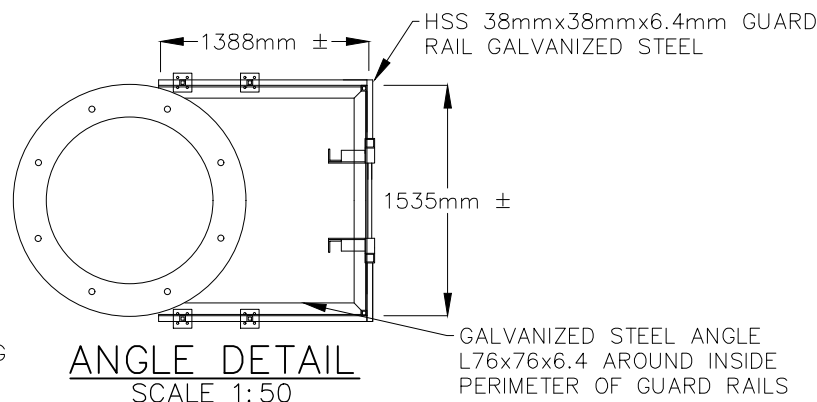


**BASE PLATE DETAIL
INTERIOR ATTACHMENT**
SCALE 1:10

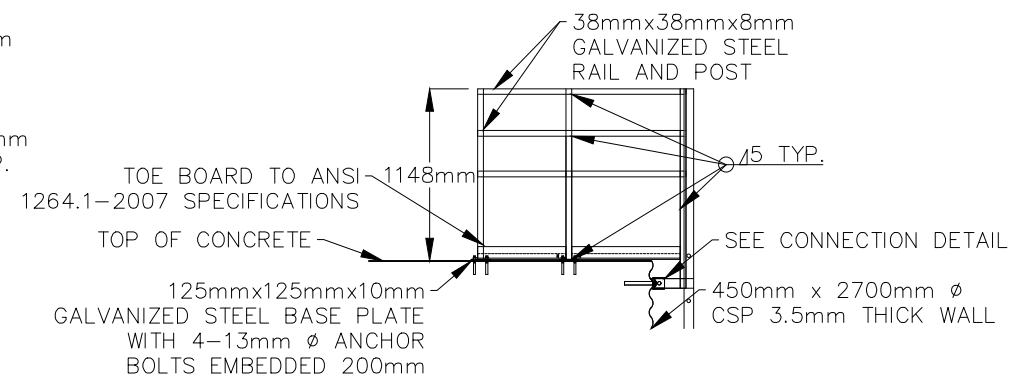
*NOTE: MINIMUM BOLT EDGE DISTANCE 30mm
MINIMUM C/C DISTANCE BETWEEN BOLTS 35mm



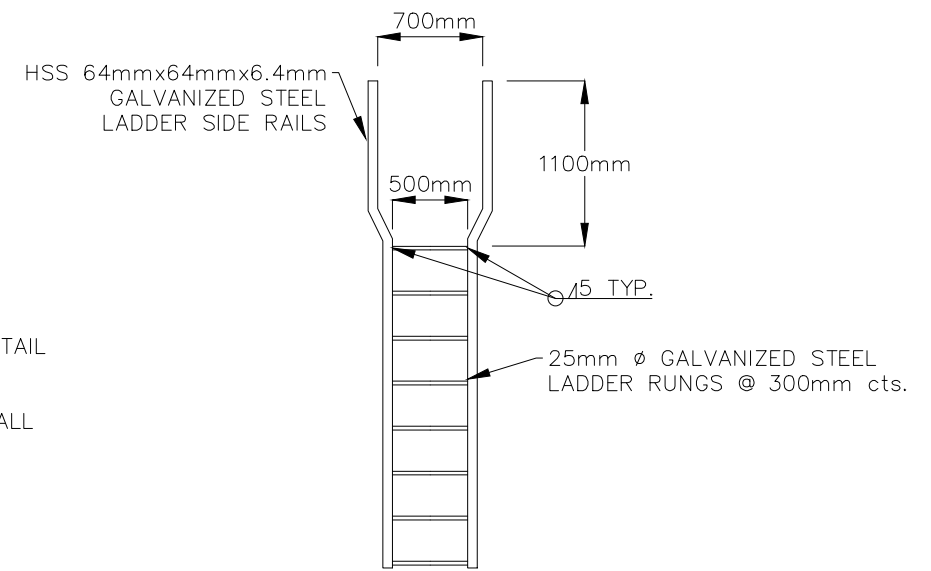
**ELEVATION VIEW:
LADDER DESIGN**
SCALE 1:50
*CONCRETE REINFORCEMENT NOT SHOWN IN THIS DETAIL



ANGLE DETAIL
SCALE 1:50



RAILING DETAIL
SCALE 1:50

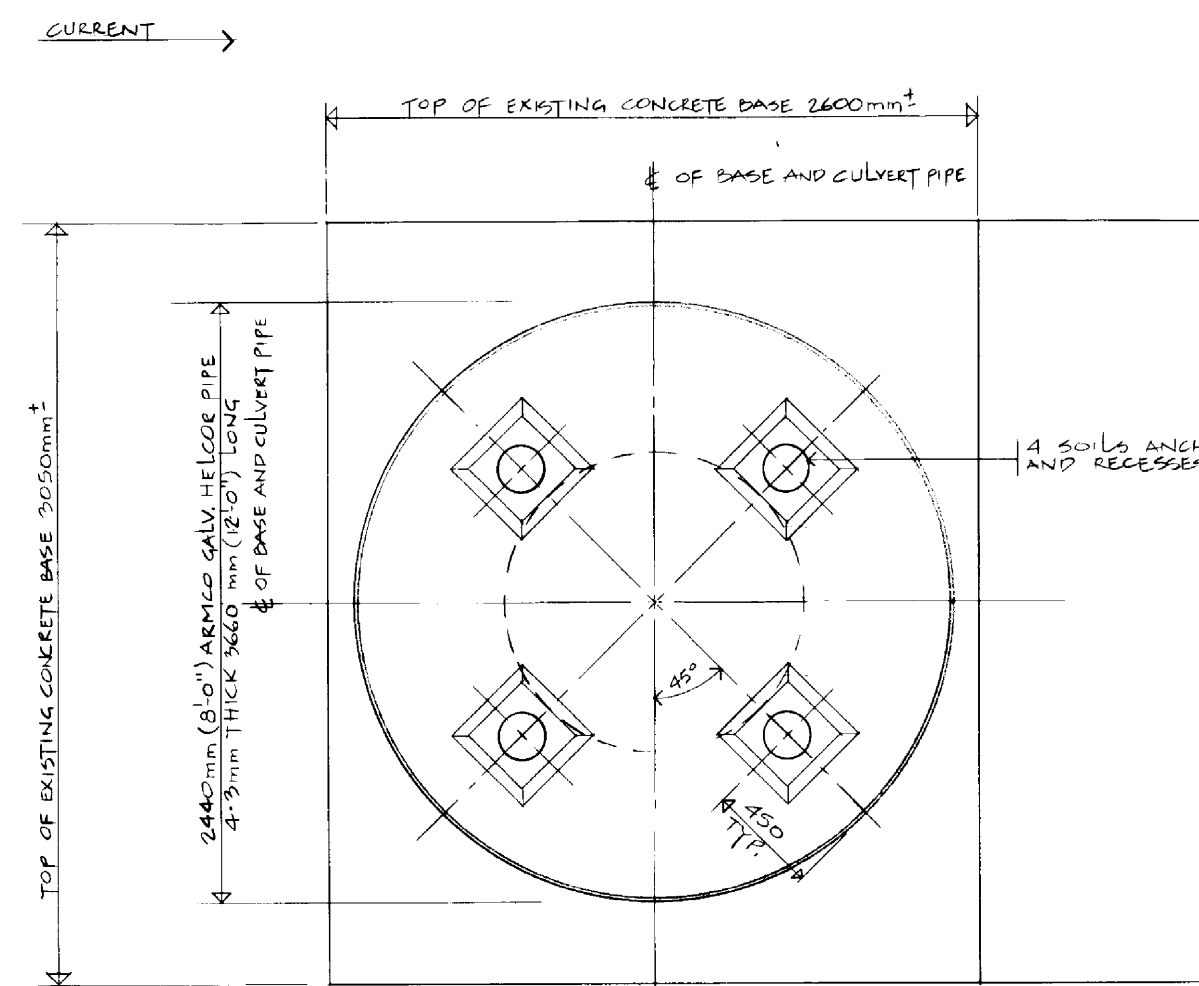


LADDER DETAIL
SCALE 1:50



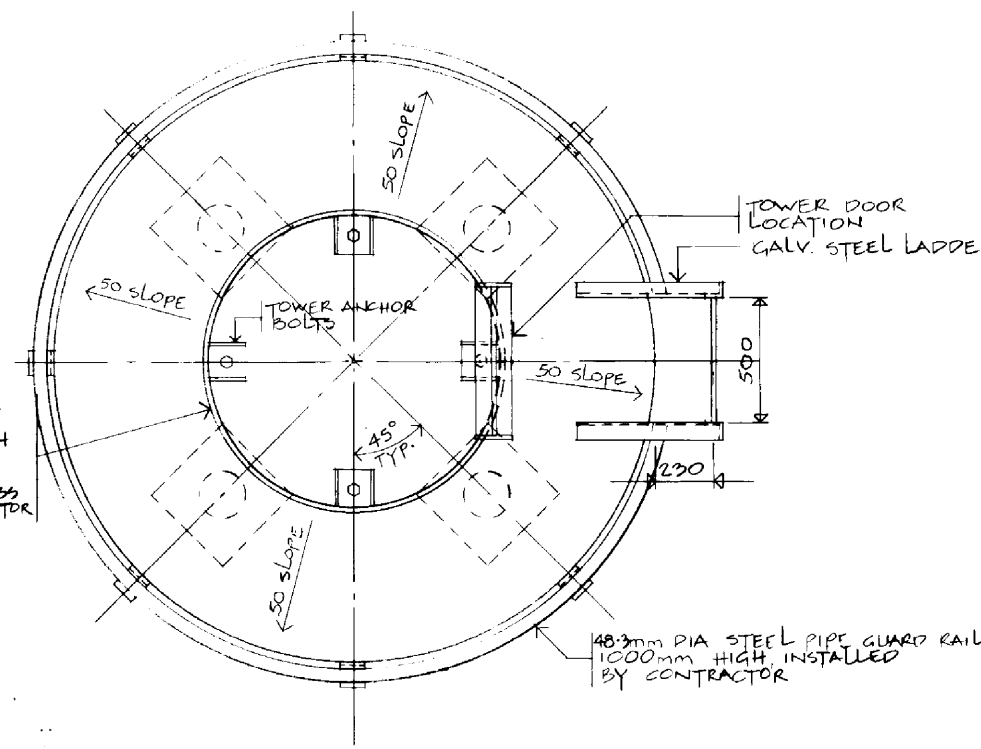
Department of Fisheries and Oceans Canada
Navigation Aid LL248
Light 81 Foundation
Ladder and Railing

DATE: Mar. 20, 2017	PROJECT No. 17030
SCALE As Shown	DRAWING No. 2 of 2



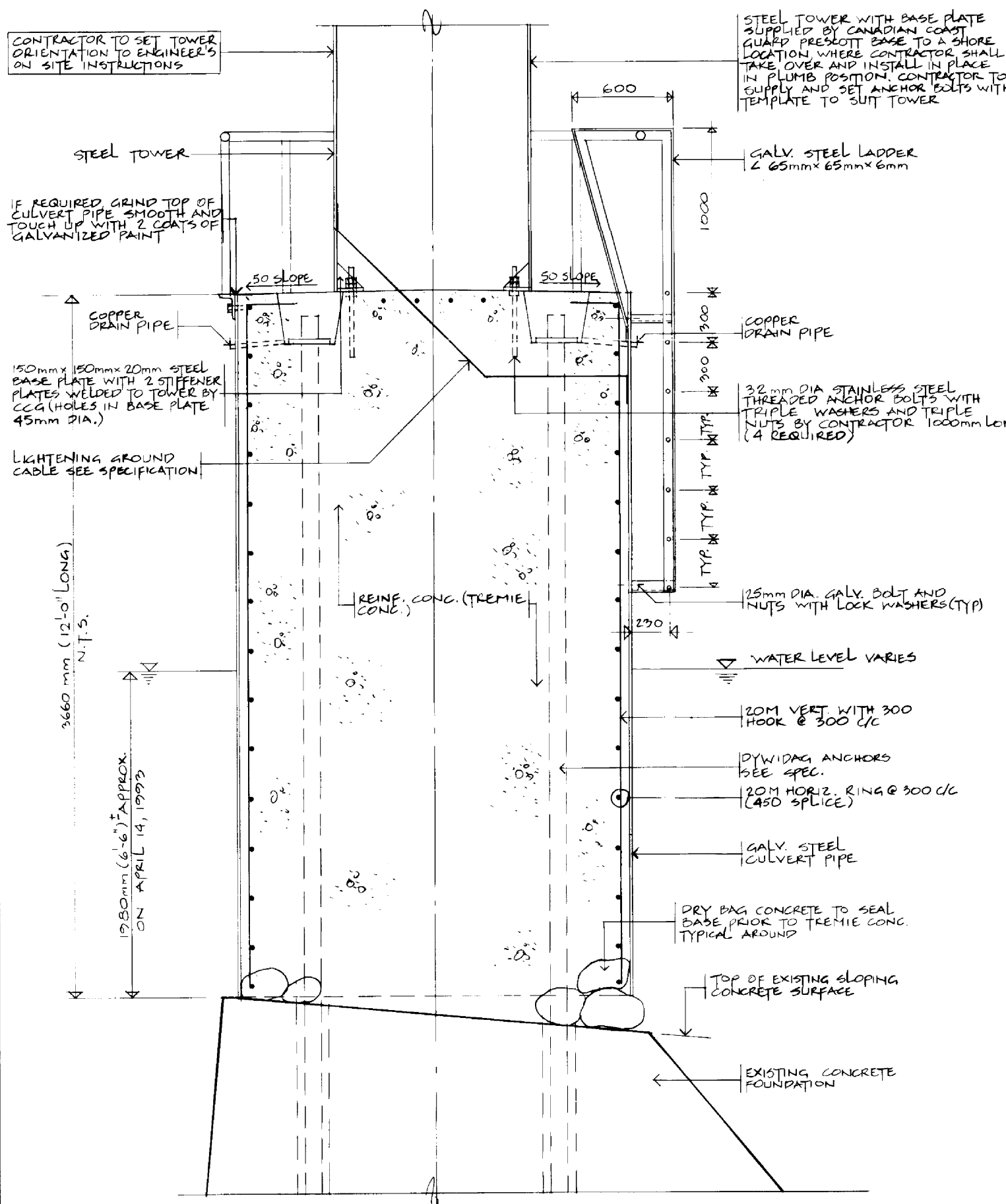
PLAN OF LIGHTPIER AND ANCHOR LOCATION

SCALE 1:20



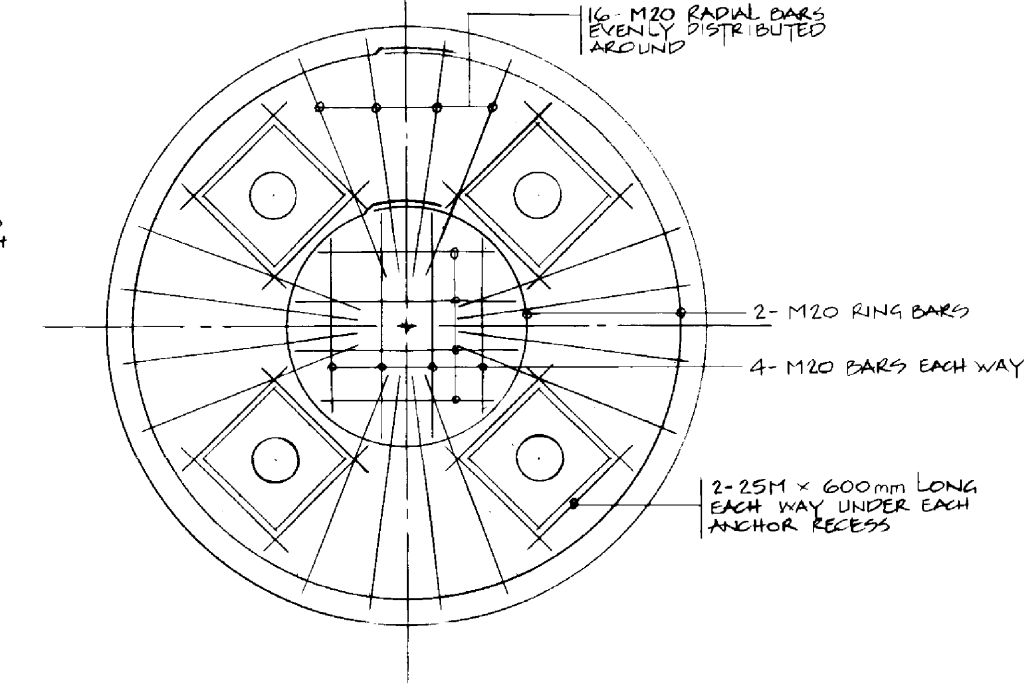
PLAN OF STEEL TOWER LOCATION

SCALE 1:20



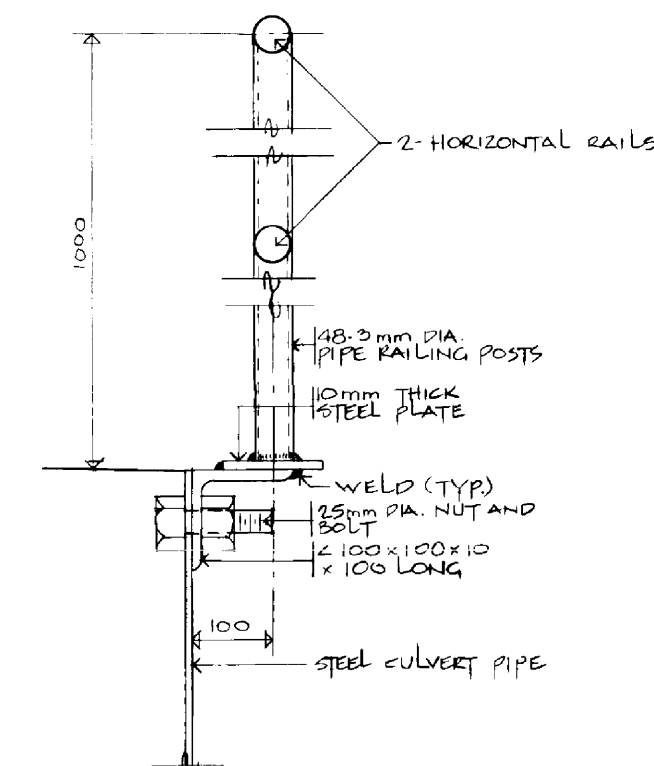
LIGHTPIER SECTION

SCALE 1:20



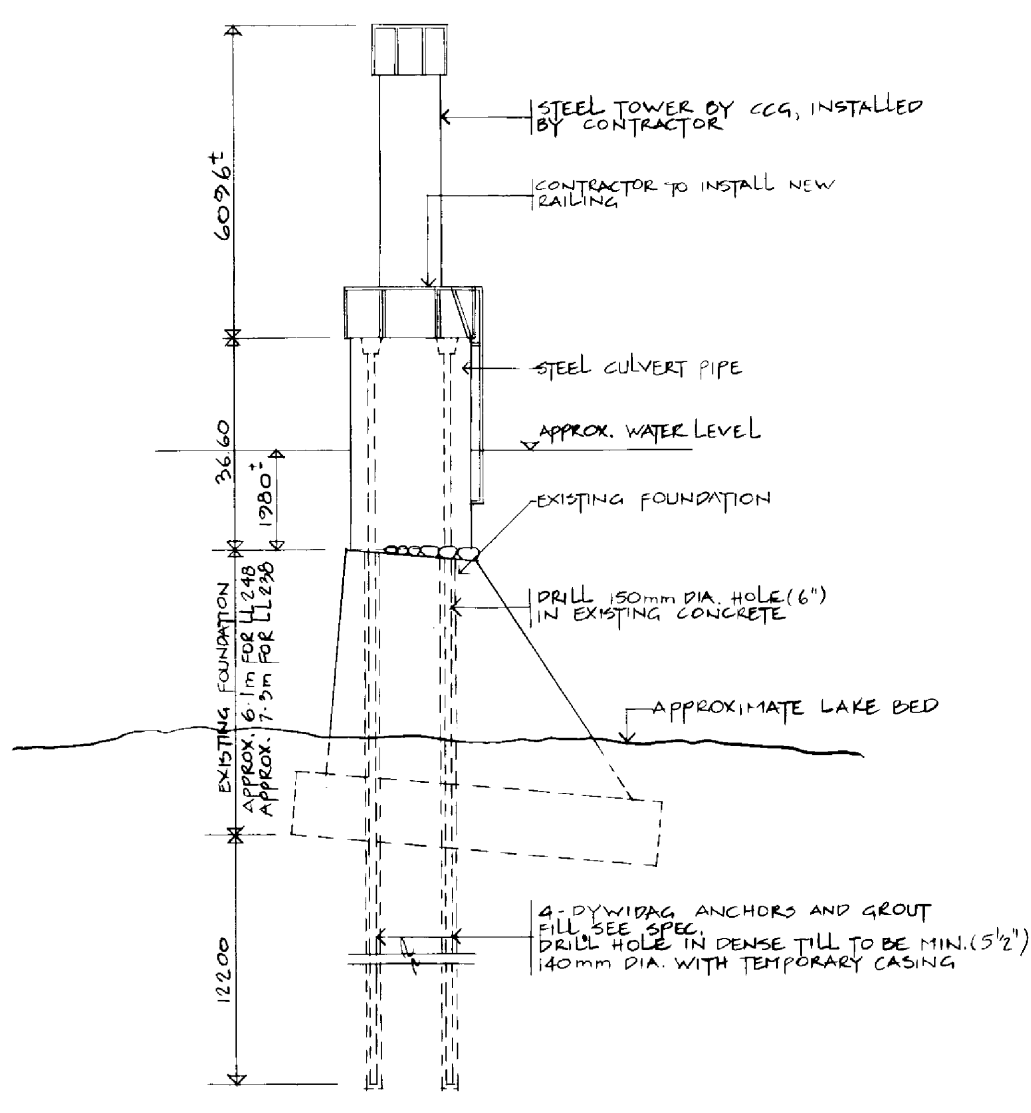
REINFORCING PLAN AT 50mm BELOW TOP OF CONCRETE

SCALE 1:20



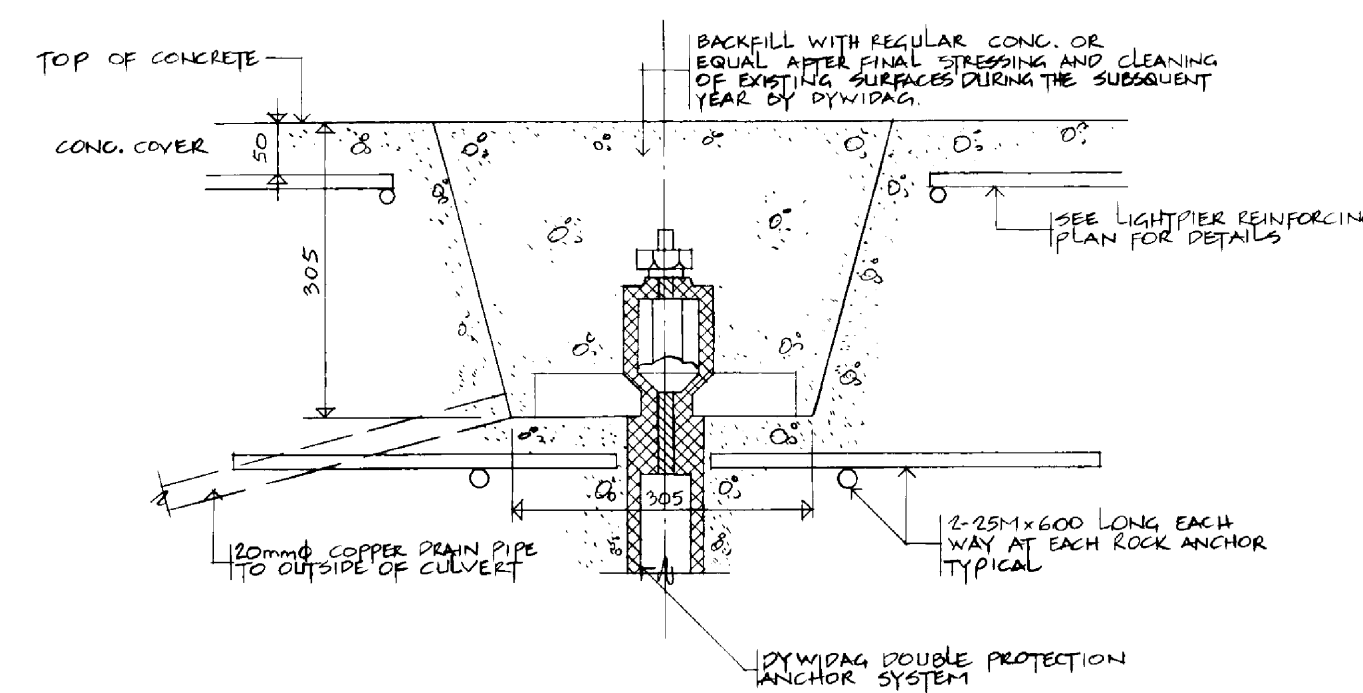
RAILING DETAIL

SCALE 1:5



TYPICAL ELEVATION

SCALE 1:100



TYPICAL ANCHOR DETAIL

SCALE 1:5

no.	by	date	approved	revisions

**CANADIAN COAST GUARD
CENTRAL REGION**

scale 0

designed by A. KWAN drawn by R. C. S. checked by A. KWAN date APRIL, 1993

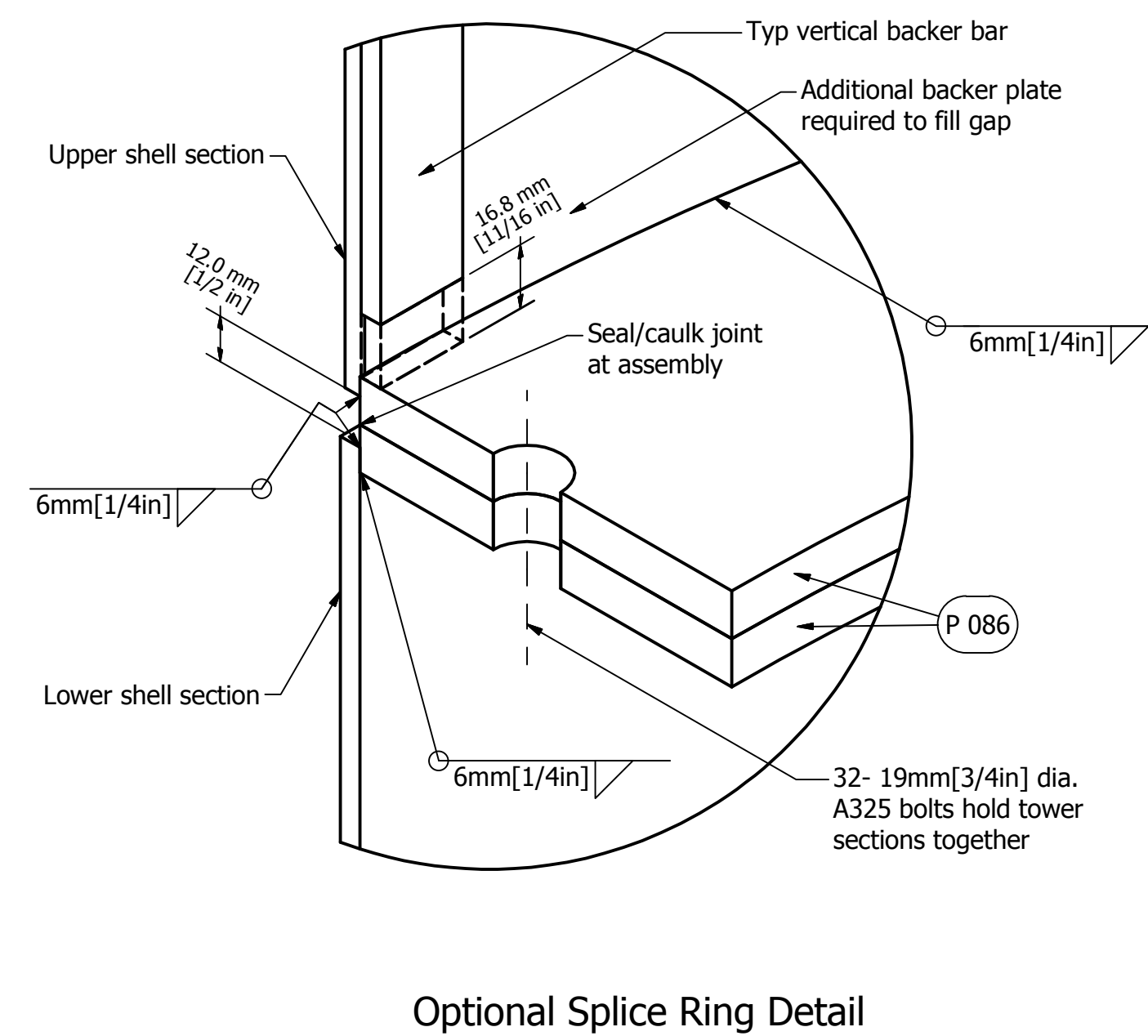
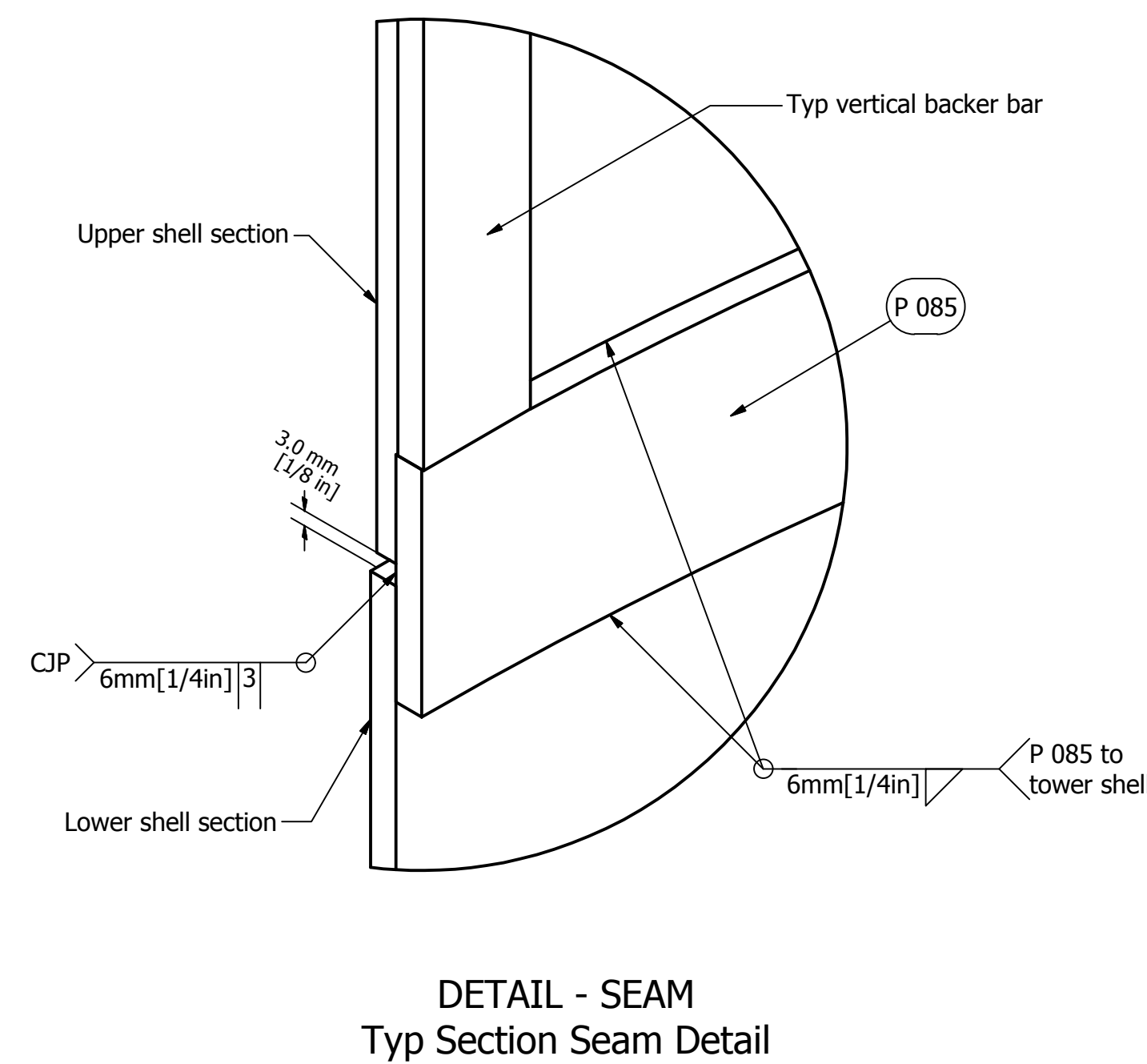
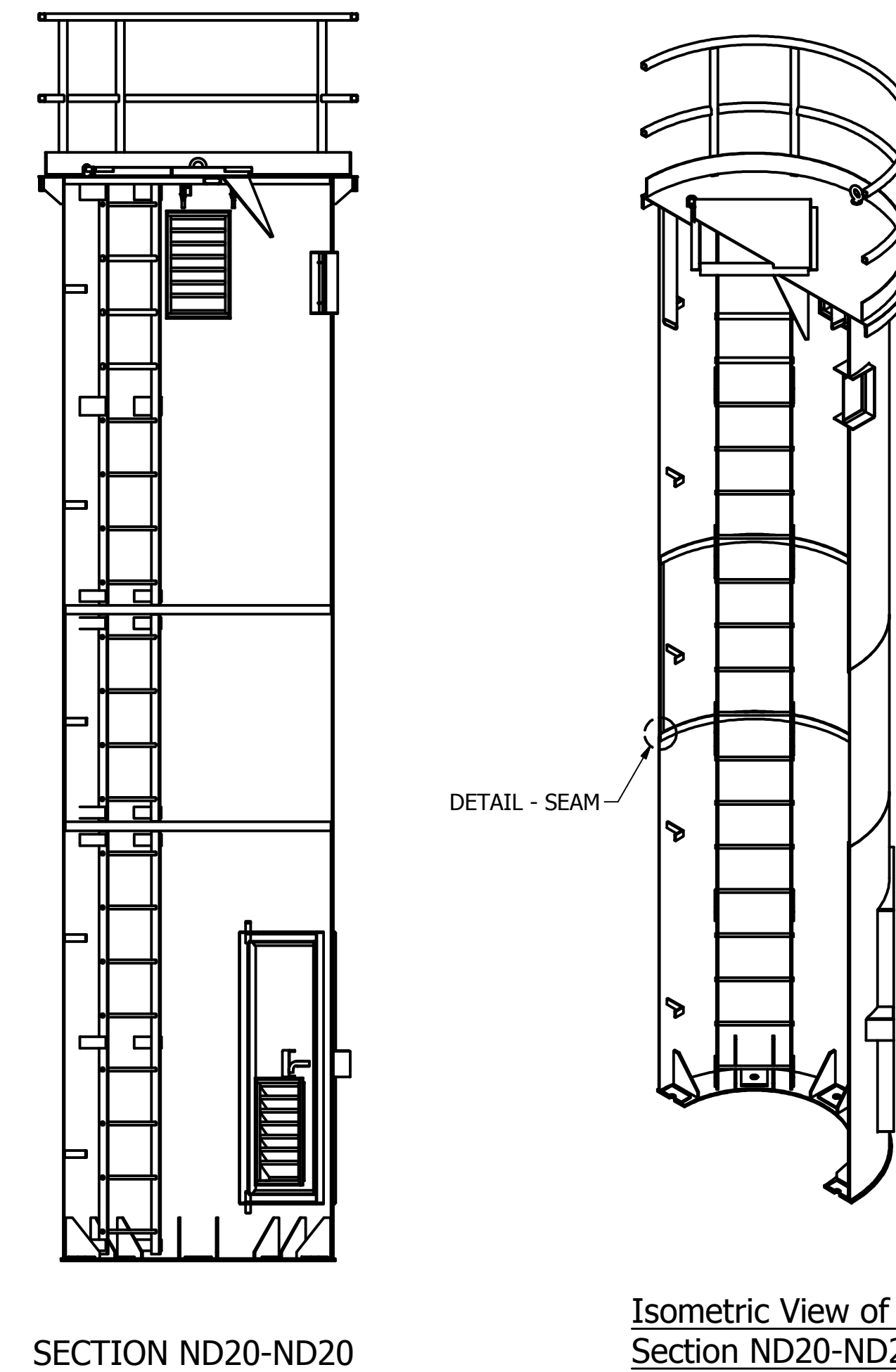
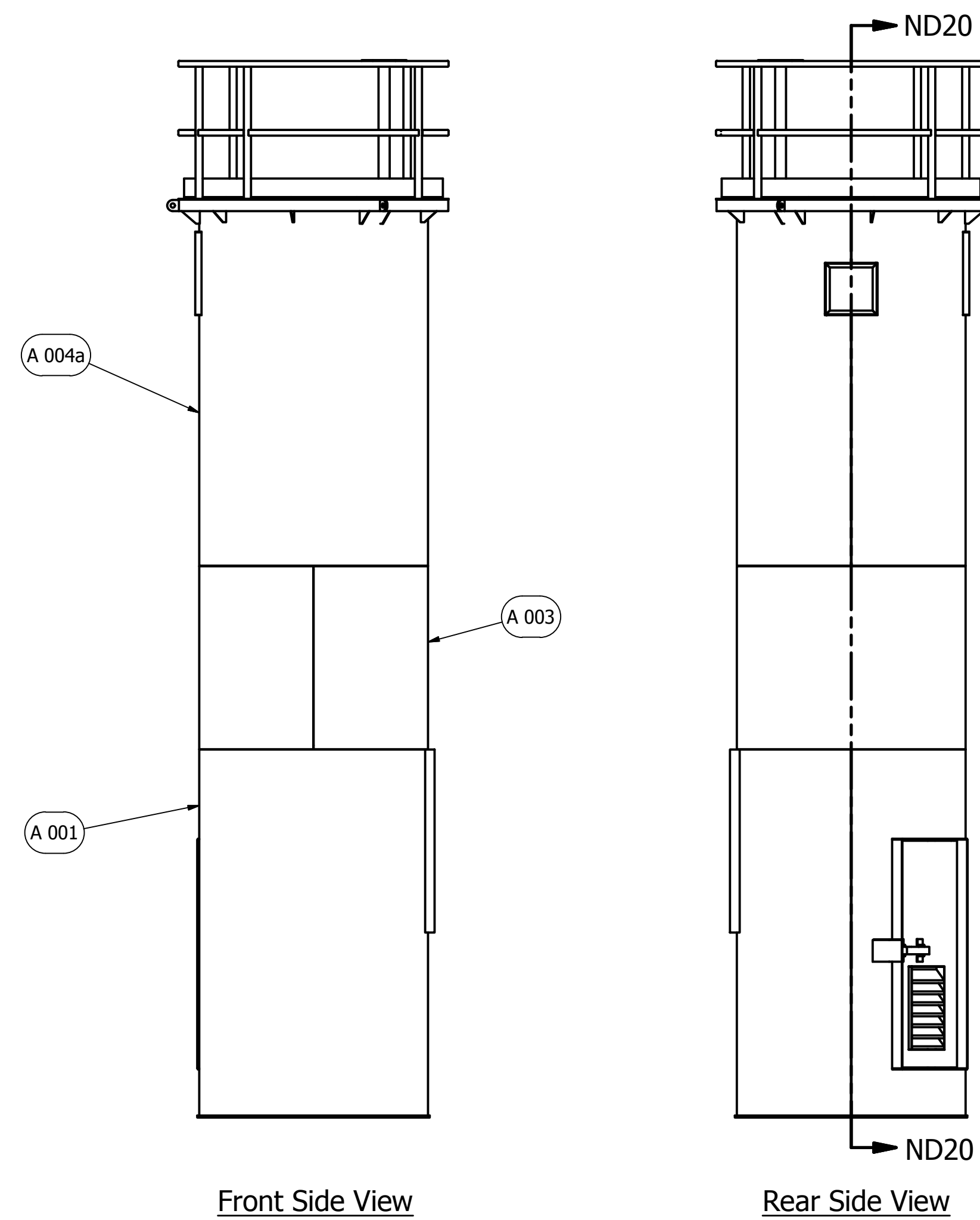
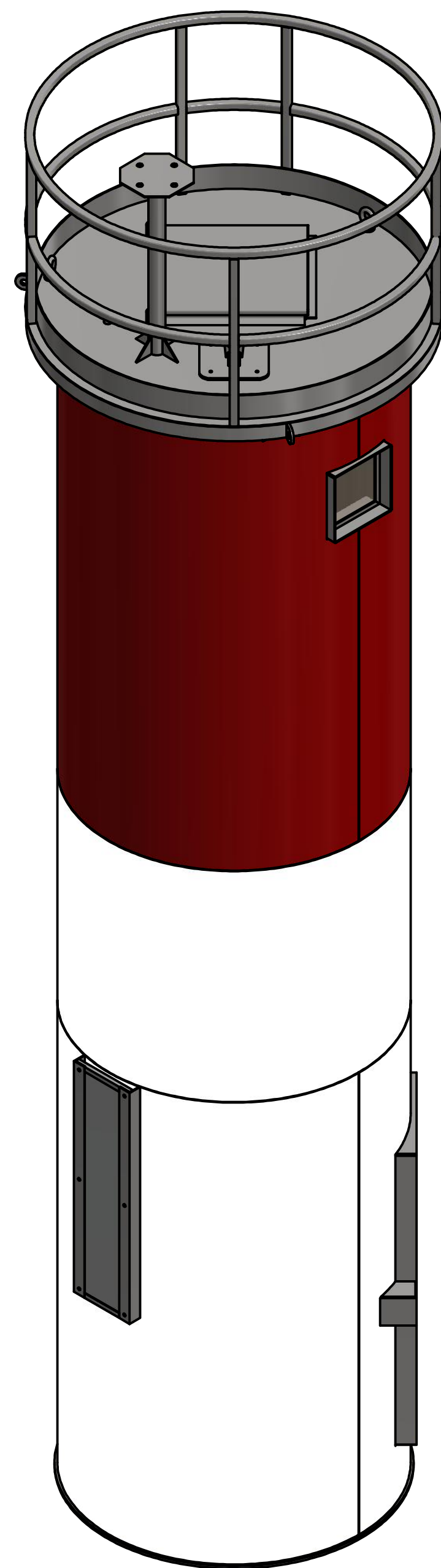
r.s.c.s. approval A. KWAN, P. ENG c.c.g.'s approval A. KWAN, P. ENG REGIONAL MANAGER

project RECONSTRUCTION OF 4 LIGHTPIERS IN ST LAWRENCE RIVER, ONTARIO

title PLANS, SECTIONS, AND DETAILS FOR RECONSTRUCTION OF LL 238 (PIER 70) AND LL 248 (PIER 81)

consultant project no. c.c.g. project no. 0234

drawing no. 13



Note: Splice can be utilized in place of the usual backer bar, in situations where erecting the tower in multiple sections is advantageous and/or necessary

Notes:

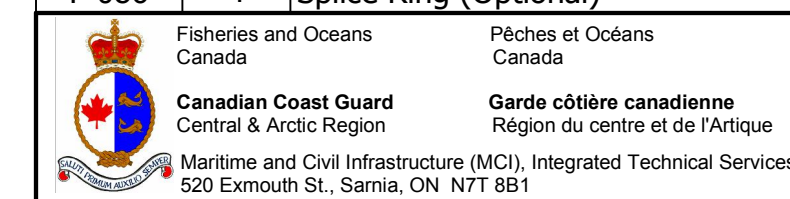
1. Design Location - Great Lakes, Ontario shore line, from Cornwall to Thunder Bay. Wind design loads include allowance for wind speed up on hill top location (Maximum hill height = 45m).
2. Design shall be in accordance with the National Building Code of Canada. (NBC 205), NBC 1995 Structural Commentaries (wind) and CSA S16-01.
3. All work to comply with CSA S16-01, NBC 2005 & Canada Labour Code.
4. **Materials**
 - Structural Shapes - CSA G40.21M, Grade 300W.
 - HSS - CSA G40.21M, Grade 350W, CL. C.
 - Plates & Bar - CSA G40.21M Grade 300W.
 - Grating - Type 19W4, welded 32x5mm [1 1/4x3/16in].
 - Serrated bearing bars, band edges, hot dipped galvanized finish.
 - Pipe - ASTM A53.
5. **Welding**
 - Electrodes - E49XX (E70XX).
 - All connections shall be fully welded U.N.O.
 - Fabricator must be certified by CWB to CSA standard W47.1, division 1 or 2.1
 - Shall be in accordance with CSA S16-01, W47 & W59, latest version.
 - Remove all weld splatter, sharp edges & corners
 - Provide 6x50mm [1/4x2in] Backer Bar on all tower fabricated seams, weld 100% inside.
6. **Galvanization**
 - Tower to be hot dip galvanized
 - Hot dip galvanizing shall conform to CAN/CSA-G164
7. **Bolts**
 - Structural Bolts - ASTM A325 U.N.O.
 - Secondary Connections - SAE J429, Grade 5.
8. **Paint**
 - Primer - CAN/CGSB-1.40 ALKYD Type.
 - Paint - CAN/CGSB-1.60 ALKYD Enamel or High Build Mastic Epoxy or Polyurethane.
 - Apply in accordance with CGSB 85-GP-14M.

9. **Fall Protection**
 - Provide fall protection in accordance with Canada Occupational Health and Safety Regulations, Section 12.10.- System has a maximum capacity of two users (1 user + 1 rescuer) with a maximum combined weight of 1.4 kN (315 lbs) per user, including tools and equipment.
 - Provide capacity signage at base of ladder.
 - Ladder - DBI SALA "LAD-SAF" Flexible Cable Ladder Safety System.
 - Minimum 4 rungs attachment required for top bracket installation.
 - Install and maintain in accordance with manufacturers specifications.
 - D-Ring Anchorage - DBI SALA D-Ring Anchorage Connector, Stainless Steel D-Ring, Stainless Steel Anchorage Plate with 9/16in Dia. mounting holes.
 - 9.5mm [3/8 in] doubler Plate to be installed as shown.

10. **Foundations**
 - Provide detailed foundation design for individual locations.
 - Concrete - 25 MPa minimum.
 - Anchor Rods - CSA G40.21M, Grade 300W.
 - Grout - SIKA M-BED standard or equal.

11. **Manufacturing Tolerance**
 - Maximum out of roundness of 1% on diameter, Dmax - Dmin = 0.6in.

PARTS LIST		
ITEM	QTY	DESCRIPTION
A 001	1	Bottom Assembly
A 003	1	4' Middle Assembly
A 004a	1	Top Assembly
P 085	2	Backer Bar
P 086	4	Splice Ring (Optional)

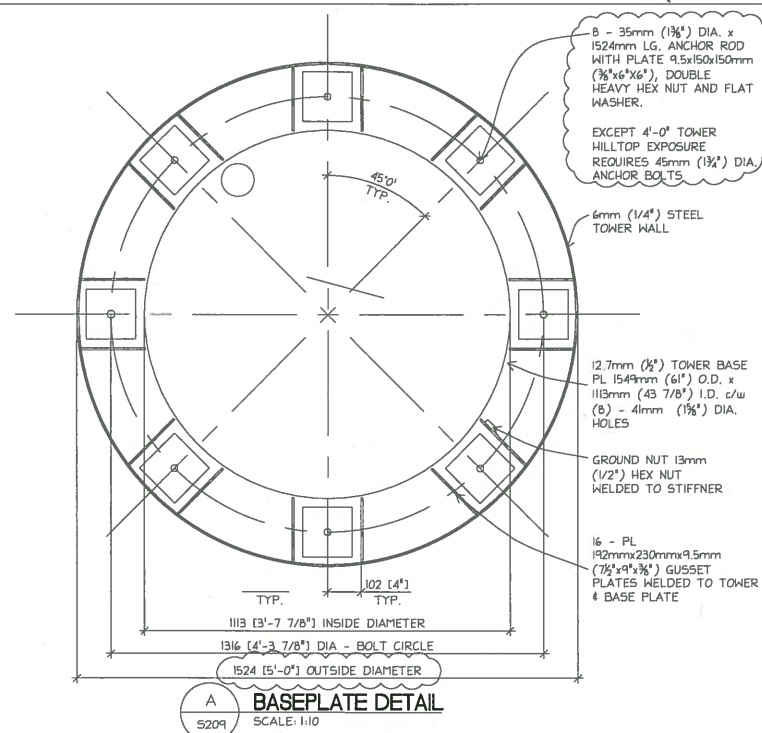


Cover Page

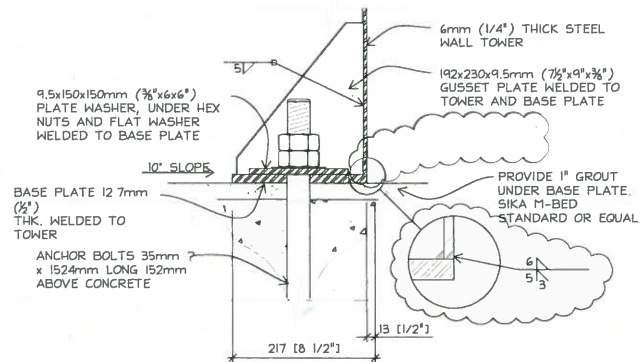
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Rv.	DATE	DESCRIPTION	DRAWN	APP'D	
0	N/A	DRAWING INITIATED	A.W.	A.W.	
1	8 Mar 13	UPDATED DRAWINGS BASED ON GLOS REVISIONS	E.G.	B.Y.	
2	26 Apr 13	TOWER DRAWING COMPLETED	E.G.	B.Y.	
3	5 Nov 13	REDESIGNED COVER PAGE AND SPLICE DETAILS	G.L.	B.Y.	

All Dimensions in mm unless otherwise noted.

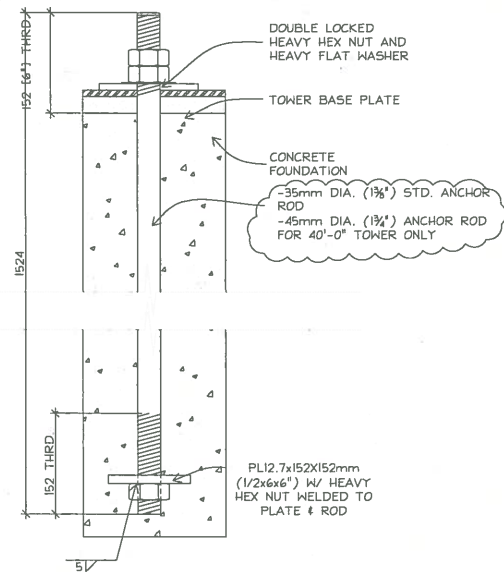
**Canadian Coast Guard
20' Claymar Tower**



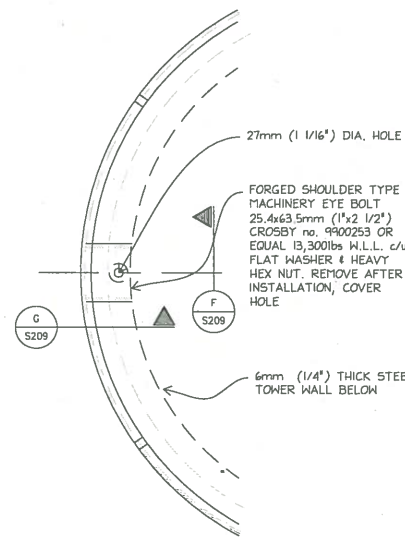
A BASEPLATE DETAIL
SCALE: 1:10



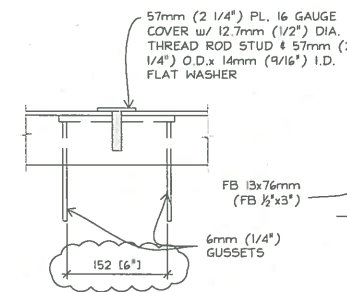
B ANCHOR BOLT DETAIL
SCALE: 1:5



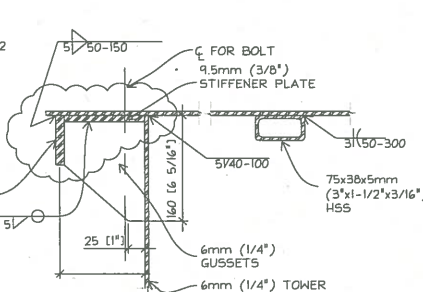
C ANCHOR BOLT DETAIL
SCALE: 1:5



D LIFTING LUG DETAIL
SCALE: 1:5



F LIFTING LUG DETAIL
SCALE: 1:5



G LIFTING LUG DETAIL
SCALE: 1:5

FOUNDATION LOADS (UNFACTORED) - NORMAL OPEN EXPOSURE

TOWER HEIGHT (m (ft.))	GRAVITY LOADS		BASE SHEAR (kN)	BASE MOMENT (kN-m)	MAXIMUM ANCHOR ROD LOAD (kN)
	DL (kN)	LL (kN)			
12.192m (40'-0")	39.9	25.4	49.7	346.0	133.8
10.973m (36'-0")	36.8	24.8	42.9	270.4	104.6
9.754m (32'-0")	33.6	24.1	39.5	221.6	85.7
8.534m (28'-0")	30.5	23.4	36.3	176.1	68.9
7.315m (24'-0")	27.4	22.7	31.8	152.5	51.3
6.096m (20'-0")	24.3	21.9	28.7	97.0	37.5
4.877m (16'-0")	21.2	21.3	25.7	64.7	25.0
3.658m (12'-0")	18.1	20.1	22.0	34.8	13.4

FOUNDATION LOADS (UNFACTORED) - HILLTOP EXPOSURE

TOWER HEIGHT (m (ft.))	GRAVITY LOADS		BASE SHEAR (kN)	BASE MOMENT (kN-m)	MAXIMUM ANCHOR ROD LOAD (kN)
	DL (kN)	LL (kN)			
12.192m (40'-0")	39.9	25.4	114.1	792.5	306.6**
10.973m (36'-0")	36.8	24.8	82.0	514.8	199.1
9.754m (32'-0")	33.6	24.1	70.4	393.8	152.4
8.534m (28'-0")	30.5	23.4	65.9	322.1	124.6
7.315m (24'-0")	27.4	22.7	63.5	262.6	101.6
6.096m (20'-0")	24.3	21.9	66.0	232.9	90.1
4.877m (16'-0")	21.2	21.3	53.3	133.1	51.5
3.658m (12'-0")	18.1	20.5	48.4	74.8	28.9

** REQUIRES 45mm (1 3/4") DIA. ANCHOR BOLTS

DESIGN LOADS

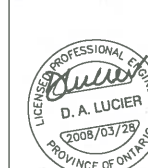
TOP DECK L.L. (SNOW) 2.4kPa (50psf)

WIND LOAD

MAXIMUM REFERENCE VELOCITY PRESSURE, $q=0.60$ kPa (12.5psf).
WIND LOADS CALCULATED PER NBC 1995.
BASE MOMENT INCLUDES ACROSS WIND LOADS DUE TO VORTEX SHEDDING.

ICE LOADS

1" THICK WINDWARD FACE TO TOWER,
1" THICK BOTH SIDES OF DAYMARK, LADDER & PLATFORM
0.25kPa (5.2psf) PER INCH OF THICKNESS



GLOS ASSOCIATES INC.

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Windsor, Ontario FAX: (519) 846-6753
N6W 5R7

ISO 9001:2000 REGISTERED PROJECT: 06044

Notes

- DESIGN LOCATION - GREAT LAKES, ONTARIO SHORE LINE, FROM CORNHILL TO THUNDER BAY. WIND DESIGN LOADS INCLUDE ALLOWANCE FOR WIND SPEED UP ON HILL TOP LOCATION (MAXIMUM HILL HEIGHT 45m.)
- DESIGN SHALL BE IN ACCORDANCE WITH THE NATIONAL BUILDING CODE OF CANADA (NBC 2005), NBC 1995 STRUCTURAL COMMENTARIES (WIND) AND CSA 516-01.
- ALL WORK TO COMPLY WITH CSA 516-01, NBC 2005 & CANADA LABOUR CODE
- MATERIALS**
 - STRUCTURAL SHAPES - CSA G40.21M GRADE 300M
 - HSS - CSA G40.21M, GRADE 350M, CL. C.
 - PLATES & BARS - CSA G40.21M, GRADE 300M
 - GRATING - TYPE 1904, WELDED, 32mm X 5mm (1 1/4"x3/8")
 - SERRATED BEARING BARS, BAND EDGES, HOT DIPPED GALVANIZED FINISH.
 - PIPE - ASTM A53
- WELDING**
 - ELECTRODES: E490X (E70XX)
 - ALL CONNECTIONS SHALL BE FULLY WELDED U.N.O.
 - SHALL BE IN ACCORDANCE WITH CSA 516-01, W47 AND W59, LATEST EDITION
 - REMOVE ALL WELD SPATTER, SHARP EDGES & CORNERS.
 - PROVIDE #50 (1/4"x2") BACKER BAR ON ALL TOWER FABRICATED PLATE SEAMS. WELD 100% INSIDE.
- BOLTS**
 - STRUCTURAL BOLTS - ASTM A325 U.N.O.
 - SECONDARY CONNECTIONS - SAE J429, GRADE 5
- PAINT**
 - PRIMER: CAN/CGSB-140 ALKYL D TYPE
 - PAINT: CAN/CGSB-160 ALKYL ENAMEL OR HIGH BUILD MASTIC EPOXY OR POLYURETHANE
 - APPLY IN ACCORDANCE WITH CGSB 85-GP-14M.
- FALL PROTECTION**
 - PROVIDE FALL PROTECTION IN ACCORDANCE WITH CANADA OCCUPATIONAL HEALTH AND SAFETY REGULATIONS SECTION 12.10.
 - SYSTEM HAS A MAXIMUM CAPACITY OF TWO USERS (1 USER + 1 RESCUER) WITH A MAXIMUM COMBINED HEIGHT OF 1.4 m (315 lbs) PER USER INCLUDING TOOLS AND EQUIPMENT
 - PROVIDE CAPACITY SIGNAGE AT BASE OF LADDER.
- LADDER** - DBI SALA "LAD-SAF" FLEXIBLE CABLE LADDER SAFETY SYSTEM.
 - MINIMUM 4 RUNG ATTACHMENTS REQUIRED FOR TOP BRACKET INSTALLATION.
 - LADDER RINGS ARE SUITABLE FOR CENTER MOUNTING OF TOP & BOTTOM BRACKETS
 - INSTALL AND MAINTAIN IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.
 - D-RING ANCHORAGE - DBI SALA D-RING ANCHORAGE CONNECTOR, STAINLESS STEEL
 - D-RING, STAINLESS STEEL ANCHORAGE PLATE WITH 3/8" DIA. MOUNTING HOLES.
 - 9.5 mm (3/8") DOUBLER PLATE TO BE INSTALLED AS SHOWN.
- FOUNDATIONS**
 - PROVIDE DETAILED FOUNDATION DESIGN FOR INDIVIDUAL LOCATIONS.
 - CONCRETE - 25 MPa MINIMUM
 - ANCHOR RODS - CSA G40.21M GR. 300M
 - GROUT - SIKKA M-BED STANDARD OR EQUAL
- MANUFACTURING TOLERANCE**
 - MAXIMUM OUT OF ROUNDNESS OF IS ON DIAMETER, $D_w - D_m = 0.6"$

Revision	Date	By	Description
01	MAR 28/08	GLOS	MINOR REVISIONS AS NOTED

FACILITIES ENGINEERING AND CONSTRUCTION
FACILITES INGENIERIE ET CONSTRUCTION

project title
1524m (5'-0") DIA. CLAYMAR TOWER

drawing title
TOWER DETAILS

date - date	drawn - dessine	checked - verifie	approved - approuve
04/05/2006	AS/AG/DP	DL	
scale - echelle	reference - reference	drawing no. - no du dessin	sheet - feuille
AS NOTED		5209	1



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APPENDIX B4 – MARINE ACCESS REQUIREMENTS



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.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.