



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canadian
Coast Guard

Garde côtière
canadienne



SOW – TRENCHING, RIGGING WORK, AND BUILDING DEMOLITION

COAST GUARD IQALUIT MCTS RX SITE

IQALUIT, NU

MARITIME AND CIVIL INFRASTRUCTURE

Prepared by: LL

Approved by: LL

Revision: 5

Files: EWT 8055-526

Rev Date: July 16, 2018



TABLE OF CONTENTS

SECTION:	011100 GENERAL INSTRUCTIONS	2
SECTION:	013300 SUBMITTAL PROCEDURES	8
SECTION:	013530 HEALTH AND SAFETY REQUIREMENTS	9
SECTION:	013543 ENVIRONMENTAL PROCEDURES	11
SECTION:	014500 QUALITY CONTROL.....	15
SECTION:	016100 COMMON PRODUCT REQUIREMENTS	17
SECTION:	024117 STRUCTURE DEMOLITION.....	19
SECTION:	133613 RIGGING WORK.....	21
SECTION:	310000 EARTHWORK.....	26
APPENDIX A:	SITE LOCATIONS AND PHOTOGRAPHS.....	30
APPENDIX B:	SUMMARY OF SUBMITTALS.....	35
APPENDIX C:	SITE PLANS.....	36
APPENDIX D:	ANTENNA AND CABLE SCHEDULE.....	39
APPENDIX E:	DRAWINGS	41
APPENDIX F:	DESIGNATED SUBSTANCE SURVEY	67



SECTION: 011100 GENERAL INSTRUCTIONS

PART 1 - GENERAL

1.1 Minimum Standards

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

1.2 Description of Work

- .1 Work under this Contract includes but is not limited to the provision of all labour, materials, and equipment required to:
 - .1 Supply and install 135 m [443 ft] of 4" conduit for a new entrance cable;
 - .2 Replace 2 VHF antennas and install one UHF antenna;
 - .3 Fabricate and install parts for the modification of one antenna mount as per drawings provided;
 - .4 Fabricate and install three [3] new antenna mounts as per drawings provided;
 - .5 Dispose of two [2] VHF antennas removed from the tower;
 - .6 Supply and install new Tx brackets and cable hangers;
 - .7 Supply and install new cable runs for all CCG antennas;
 - .1 1850 ft of LDF4-50A; and
 - .2 145 ft of RG-213.
 - .8 Supply and install 6" PVC pipe for cable protection;
 - .9 Supply and install connectors for each end of new cables;
 - .10 Remove and dispose of any items remaining inside the old equipment building; and
 - .11 Demolish unused equipment building and its foundation.
 - .1 Drawings of the building are provided in Appendix E



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

- .1 Coast Guard shall supply two [2] VHF antennas for installation;
- .2 Coast Guard shall supply one UHF antenna for installation;
- .3 In addition to that supplied by Contractor, Coast Guard shall supply the following amounts of cable;
 - .1 416 ft of LDF4-50A; and
 - .2 658 ft of LDF5-50A.

1.3 Submittals

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

.2 Detailed Schedule:

.1 Deadline:

- .1 No later than ten [10] working days following award.

.2 Deliverables:

- .1 The contractor shall furnish a high level schedule outlining the major construction milestones. Schedule shall clearly define the anticipated start and finish dates of the project.
- .2 For fieldwork to proceed, all other mandatory submittals must be received and accepted by Coast Guard.

.3 Proof of Qualifications:

.1 Deadline:

- .1 No later than ten [10] working days following award.

.2 Deliverables:

.1 The Contractor shall provide the name and contact information for the following project team members:

- .1 The Project Manager;
- .2 The Site Forman; and

.2 The contractor shall also provide a detailed list of all subcontractors being used to



complete the work described herein (Section 011100 – 1.4).

.4 Construction Plan:

.1 Deadline:

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

.2 Deliverables:

.1 A Construction Plan of sufficient detail to demonstrate that the Contractor has considered all the challenges of the project and is prepared to undertake the works in a competent and professional manner in accordance with all legislation. The submission shall include:

- .1 Project Specific Safety Program (Section 013530);
- .2 Project Environmental Protection Plan (Section 013543);
- .3 Building Demolition Plan (Section 024117);
- .4 Installation Plan (Section 133613); and
- .5 Excavation Plan (Section 310000).

.5 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 (Section 133613);

1.4 Contractor Qualifications

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

.2 The Contractor must be experienced in the installation of buried conduit and antennas.

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

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

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



be provided by the contractor.

- .3 The contractor shall provide a detailed list of all subcontractors being used to complete the work described herein.
- .4 Requests to amend the project team, following contract award, must be forwarded in writing. Coast Guard reserves the right to reject any proposal to amend the project team.

1.5 Site Location

- .1 The work is to be completed at the Coast Guard Iqaluit Marine Communication and Traffic Services (MCTS) Receiver (Rx) Site in Iqaluit, NU. The coordinates for the site are: 63°46'9.73"N, 68°31'48.73"W.

1.6 Existing Conditions

- .1 Photographs of the site have been included in Appendix A: Site Locations and Photographs.
- .2 Bidders must make their own estimate of the difficulties associated with all phases of the works.
- .3 The contractor must include in their costs all expenses related to the difficulties of working at the site.

1.7 Contractor's Access to Site

- .1 Contractor is responsible for transportation of all labour, materials and equipment to and from the site, including any and all material furnished or itemized for salvage by Coast Guard.
- .2 The site is accessible by standard vehicle.
- .3 Access to the site is restricted and must be arranged through Coast Guard.
- .4 Contractor is to notify Coast Guard at least five [5] working days prior to any site access.

1.8 Completion, Scheduling and Planning of the Works

- .1 Work may commence as early as practical following Coast Guard's acceptance and approval of mandatory submissions.
- .2 Site work shall not commence without written authorization of Coast Guard Project Authority.
- .3 Trenching and rigging work shall be completed no later than August 31, 2018, unless otherwise negotiated and approved in writing.
- .4 Building demolition work may commence as early as practical following Contractor's completion and Coast Guard's acceptance of the cable installations and trenching work.
- .5 Building demolition work shall be completed no later than March 29, 2019, unless otherwise



negotiated and approved in writing.

1.9 Coast Guard Staging Location

.1 Items to be supplied by, or salvaged to Coast Guard shall be collected or delivered by the Contractor to the following staging location. The Contractor shall be responsible for all transportation costs between the project site and the identified staging location. Material drop off or access to stored goods outside of regular operating hours shall be at the discretion of Coast Guard and may be subject to cost recovery:

.1 Staging location:

Iqaluit MCTS Centre
1063 Niuraivik Lane
Iqaluit, NU X0A 0H0

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

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

1.10 Temporary Facilities

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Arrange, pay for, and maintain temporary electrical power supply as required for construction, and water supply as required, in accordance with governing regulations and ordinances.

.3 Maintain emergency spills kit on-site at all times.

1.11 Fees, Permits, Certificates and Information

.1 Contractor shall provide authorities having jurisdiction with all information requested.

.1 Contractor shall provide copies to Coast Guard of any documentation submitted to other authorities related to the work described in this document.

.2 Contractor shall pay fees and obtain certificates and permits required.

.3 Contractor shall furnish certificates and permits when requested.

1.12 Reference Documents

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

1.13 Required Submissions

.1 A summary of the minimum mandatory submissions required can be found in Appendix B. This



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canadian
Coast Guard

Garde côtière
canadienne



summary is not an exhaustive list of all submissions required for the duration of the project.

.2 Additional submissions may be required after award.



SECTION: 013300 SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 General

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

1.2 Submission Requirements

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



SECTION: 013530 HEALTH AND SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 Scope

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

1.2 References

- .1 Work under this section shall be undertaken in strict conformance with all listed references, In the case of any conflict or discrepancy the more stringent requirements shall apply.
 - .1 Canada Labour Code Part II - January 2008;
 - .2 NRC-CNRC National Building Code of Canada, 2015;
 - .3 Nunavut Occupational Health and Safety (OHS) Regulations, 2016;
 - .4 Nunavut Safety Act, 2016;
 - .5 Any and all other Provincial/Territorial Regulations and Policies, Worker's Compensation Board Policies or Local municipal regulations pertaining to safety of the contractor's workers.

1.3 Submittals

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



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canadian
Coast Guard

Garde côtière
canadienne



- .4 Material Safety Data Sheets for hazardous products to be utilized in the execution of the works.
- .3 Contractor shall submit completed Field Level Hazard Assessment (FLHA) forms to Coast Guard upon request.
- 1.4 Existing Conditions
 - .1 Handling and removal of designated substances identified in Designated Substance Survey shall be undertaken as per industry best practices and using recommendations provided in survey.
 - .1 Designated Substance Survey is provided in Appendix F.



SECTION: 013543 ENVIRONMENTAL PROCEDURES

PART 1 - GENERAL

1.1 Scope of Work

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

1.2 References

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

1.3 Submittals

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



PART 2 - PRODUCTS

2.1 General

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

PART 3 - EXECUTION

3.1 Construction Area

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

3.2 Stockpiling of materials

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

3.3 Disposal of Wastes

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

3.4 Clearing and Grubbing

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

3.5 Drainage

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



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

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

3.6 Pollution Control

- .1 Provide methods, means, and facilities to prevent the contamination of soil, water, and atmosphere from the discharge of pollutants produced by construction operations.
- .2 Vehicles, machinery, and equipment shall be in good repair, equipped with emission controls as applicable and operated within regulatory requirements.
- .3 Abide by local noise by-laws.
- .4 Avoid unnecessary idling of vehicles or heavy machinery.
- .5 Limit use of equipment around the shoreline where possible.
- .6 Implement and maintain dust and particulate control measures in accordance with territorial 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



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canadian
Coast Guard

Garde côtière
canadienne



all times.

- .2 Any uncontrolled release of a known contaminant (spills, fire/smoke) shall be reported to appropriate Territorial Authority and Coast Guard. Spills of deleterious substances to be immediately contained and cleaned up in accordance with territorial regulatory requirements.
- .3 Territorial Authority: Nunavut 24-Hour Spill Report Line 1-867-920-8130

3.7 Traffic

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



SECTION: 014500 QUALITY CONTROL

PART 1 - GENERAL

1.1 Inspection

- .1 Coast Guard or its representative shall have access to the work at all times. If parts of the work are prepared off-site or in a shop, access shall be given to such work throughout the duration of the project.
- .2 In the event the work must be submitted to special testing, inspection or approvals prescribed by Coast Guard in these specifications or provided for in work-site regulations, the request for inspection must be made without unreasonable delay.
- .3 The below list identifies key milestones where the Coast Guard will require an opportunity to take samples/inspect:
 - .1 Location verification: Coast Guard will confirm correct location for trenching of conduit, installation of antennas and termination of cable runs upon arrival of the Contractor to the site. The contractor shall be required to provide access to the site to CCG site staff at all times.
 - .2 Termination of works: Coast Guard shall verify the termination location of the buried conduit and of the new cable runs upon completion.

1.2 Procedures

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

1.3 Rejected Work

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

1.4 Factory Tests

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



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canadian
Coast Guard

Garde côtière
canadienne



1.5 Acceptance of Work

- .1 Coast Guard will make acceptance visits of work executed by the Contractor at critical milestones identified in the following sections.
- .2 The Contractor shall inform Coast Guard at least five [5] working days before these inspection visits.
- .3 All work shall be completed in compliance with the specifications before requesting the visit for inspection. If the work is not completed or deemed non-compliant, the Contractor shall be responsible for all costs incurred for subsequent inspections.



SECTION: 016100 COMMON PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 General

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

1.2 Manufacturer's Instructions

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

1.3 Compliance

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

1.4 Substitution

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



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canadian
Coast Guard

Garde côtière
canadienne



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



SECTION: 024117 STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 Scope of Work

- .1 Work under this section consists of the removal of concrete floor slab, concrete foundation, wood-studded and gypsum covered walls, any and all roofing materials, windows and doors and any other items that might be uncovered during demolitions. Removal of existing remaining furnishings – steel racks, wiring, etc. is included under this section.

1.2 References

- .1 CAN/CSA-S350 (Latest Edition) Code of Practice for Safety in Demolition of Structures;
- .2 Canada Labour Code Part II – January 2008;
- .3 NRC-CNRC National Building Code of Canada 2015 Part 8 Safety Measures at Construction and Demolition Sites, and local Authority having jurisdiction.

1.3 Submittals

- .1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013300.
- .2 Building Demolition Plan
 - .1 Deadline:
 - .1 No less than ten [10] working days prior to mobilization.
 - .2 Deliverables:
 - .1 List of equipment to be used for demolition of building; and
 - .2 Detailed plan for handling designated substances identified in the Designated Substance Survey provided in Appendix F.

1.4 Protection

- .1 All work is to be completed in accordance with section of Health and Safety Requirements
- .2 Prevent movement, settlement, or damage to adjacent structures.

1.5 Description of existing structures to be removed

- .1 *Note: additional drawings are not available for the building to be removed; bidders shall provide quote based on the following assumptions; if foundations are found to be different than described,*



a revision of cost based on agreed quantities and rates will be agreed in accordance with Contract Terms & Conditions. Refer to Appendix A for pictures of existing installation.

.2 Main building including foundations:

- .1 *Overburden on site, over unexposed rock, is presumed to be 1.2m deep. The exterior walls are assumed to be wood bearing on the concrete foundation. The floor is presumed to be 600 mm thick reinforced concrete. The building is 6.1 m by 12.2 m (20 ft x 40 ft) wood building with steel exterior siding and cement board interior (in the HVAC room) and gypsum board (in other rooms) with a flat roof. The building comprises a large equipment room, an EPU room, an HVAC room/storage area, two (2) small hallways and a small entrance.*

The equipment room has a suspended acoustic ceiling and fluorescent lighting is present throughout the building. The floor throughout is concrete and is covered with vinyl asbestos tiles (in good condition). There are equipment troughs in the floor throughout the equipment room with steel covers.

The flat roof has a metal flashing all around the fascia. The building is equipped with wood exterior doors.

1.6 Site restoration

- .1 After removal off site and disposal of all building and foundation material, contractor is to make good to compound area by importing clean backfill material to restore grade as follows:
- .1 Common pit-run granular material, maximum size 100 mm;
- .2 150 mm Granular B, type II subbase; and
- .3 150 mm Granular A granular base.
- .2 Granular A and B are to OPSS 1010. All materials to be compacted in 150 mm lifts to 95% modified proctor density.



SECTION: 133613 RIGGING WORK

PART 1 - GENERAL

1.1 Scope of Work

- .1 Work under this section includes the supply of all labor, material and equipment required to complete the following:
 - .1 Retrieve from or deliver to Coast Guard all items to be supplied by or salvaged to Coast Guard.
 - .2 Replace 2 VHF antennas and install one UHF antenna;
 - .1 Salvage existing UHF antenna to CCG.
 - .3 Fabricate and install parts for the modification of one antenna mount as per drawings provided;
 - .4 Fabricate and install three [3] new antenna mounts as per drawings provided;
 - .5 Dispose of two [2] VHF antennas removed from the tower;
 - .6 Supply and install new Tx brackets and cable hangers;
 - .7 Supply and install new cable runs for all CCG antennas;
 - .1 1850 ft of LDF4-50A; and
 - .2 145 ft of RG-213.
 - .8 Supply and install 6" PVC pipe for cable protection; and
 - .9 Supply and install connectors for each end of new cables;
 - .2 The following work will be undertaken by others and is hereby excluded:
 - .1 Coast Guard shall supply of two [2] VHF antennas for installation;
 - .2 Coast Guard shall supply of one UHF antenna for installation;
 - .3 In addition to that supplied by Contractor, Coast Guard shall supply the following amounts of cable;
 - .1 416 ft of LDF4-50A; and
 - .2 658 ft of LDF5-50A.

1.2 References



- .1 Canada Labour Code Part II – January 2008
- .2 National Building Code of Canada – 2015
- .3 Nunavut Occupational Health and Safety (OHS) Regulations, 2016
- .4 Nunavut Safety Act, 2016
- .5 CSA S37-13 - Antenna Towers and Antenna Supporting Structures
- .6 CAN/CSA S16.1 - Limit States Design of Steel Structures.
- .7 CAN/CSA G164 - Hot Dip Galvanizing of Irregularly Shaped Articles.
- .8 CSA Z259.2.4-15 – Fall Arresters and Vertical Rigid Rails

1.3 Submittals

- .1 Submittals shall be forwarded to Coast Guard in accordance with the provisions of section 013300.
- .2 Installation Plan
 - .1 Deadline:
 - .1 With Construction Plan
 - .2 Deliverables:
 - .1 Plan must clearly demonstrate procedures and methods to be employed to:
 - .1 Install new antennas and mounts;
 - .2 Remove existing cables and install replacement cables.
- .3 As-Built Drawings:
 - .1 Deadline:
 - .1 No later than twenty-eight [28] calendar days after project completion
 - .2 Deliverables:
 - .1 A complete set of as-built drawings detailing any and all amendments or revisions to the previously submitted design drawings or documentation indicating final works are as detailed in design drawings.

1.4 Quality Assurance

- .1 Coast Guard's minimum inspection requirements are detailed below:



- .1 The Contractor shall be responsible to notify Coast Guard of the date and time that the works may be inspected.
 - .1 Notice must be provided no less than five [5] working days in advance to permit scheduling of quality assurance testing
 - .2 All deficiencies in the works identified at the time of inspection shall be remedied to the satisfaction of Coast Guard, by the Contractor at their expense.
 - .3 Work shall not progress until inspections have been completed and the Contractor has been provided with written notice to proceed with the works
- .2 Inspections shall take place during tower rigging work to confirm proper placement of mounts, antennas and cables.
 - .3 Inspections shall take place upon completion of the work to ensure cables have been terminated to required location and that all equipment operates as expected.

PART 2 - PRODUCTS

2.1 Materials

- .1 Bolts, nuts & washers:
 - .1 As specified in Mount Installation/Retrofit drawings provided in Appendix E.

2.2 TX Brackets

- .1 TX brackets shall be provided by Contractor and shall have enough capacity to accommodate the cable runs shown in the Mount Installation/Retrofit drawings included in Appendix E.

2.3 Transmission Lines

- .1 Cable types and lengths required can be found in Appendix D: Antenna and Cable Schedule.

2.4 Cable Hangers

- .1 Cable hangers shall be provided by Contractor and must include hangers for all cable runs shown in the Mount Installation/Retrofit drawings included in Appendix E.

2.5 Connectors

- .1 All new CCG cables shall be fitted with N-Type connectors at both ends.
 - .1 A male N-Type connector shall be fitted to the antenna end; and
 - .2 A female N-Type connector shall be fitted to the shelter end.



2.6 PVC Pipe

- .1 PVC pipe will be used to protect the cable from damage.
- .2 For bidding purposed, assume that 50% of the existing PVC pipe can be reused, therefore:
 - .1 366 m (1200 ft) of new PVC pipe shall be provided by Contractor.
- .3 PVC pipe for this portion of the work shall be 6" in diameter.
- .4 Drain holes must be drilled into one side of the pipe to ensure water can escape.
 - .1 See pictures provided in Appendix A for example.

PART 3 - EXECUTION

3.1 Fabrication

- .1 Fabrication will be completed by the Contractor and includes all items shown on the Mount Installation/Retrofit drawing package provided in Appendix E.

3.2 Installation

- .1 Install all antennas and mounts as per Mount Installation/Retrofit drawing package provided in Appendix E.

3.3 Antennas

- .1 Care shall be taken to ensure that no damage is done to any antenna or mounting hardware during removal, storage and handling of any antenna.

3.4 Transmission Lines

- .1 All cabling shall be mounted to mounting plates supplied and installed by Contractor. Cabling shall be supported at intervals and with materials as recommended by manufacturer. Support intervals must also meet CSA S37-13 requirements. The cables are to be supported by proper hoisting grips during installation and attached to the tower using clips designed to remove tension from the cables.
 - .1 The use of wrap lock/tie wrap devices to secure TX lines or cables is not acceptable.
 - .2 All lines shall be mounted on the outside of the tower.
 - .3 Antennas shall be mounted to the tower leg at the azimuth indicated in Appendix C.
 - .4 Transmission lines shall be routed through PVC pipe, for protection. Contractor shall provide any materials required to weather proof cable entry.



- .1 Contractor must terminate all antenna cables inside shelter to length determined by Coast Guard.
 - .5 The cables are to be terminated at the upper end with connectors appropriate for that cable.
 - .6 The free ends will extend into the equipment buildings/racks and will be terminated by the contractor at a location to be determined by Coast Guard at the time of installation.
 - .7 Cable and connector types are specified in Appendix D.
 - .8 Every effort shall be made to ensure that the external connections are made waterproof using the best commercial practice.
- 3.5 PVC Pipe
- .1 The property consists of largely uneven terrain and a significant amount of rock is present at the surface. PVC pipe shall be installed such that the shortest reasonable path between the shelter and any tower is used. Connections between sections of conduit shall be attached so as to prevent separation when installed on uneven ground.



SECTION: 310000 EARTHWORK

PART 1 - GENERAL

1.1 General

- .1 Work under this section includes the supply of all labour, material and equipment required to complete the following:
 - .1 The excavation of a trench of adequate size to install a 4" conduit, including:
 - .1 Stripping and stockpiling of existing topsoil or granular materials to expose subgrade;
 - .2 Backfilling of the excavation, including:
 - .1 Supply of all required materials;
 - .2 Supply of imported granular materials (if necessary); and
 - .3 Placement and/or compaction of granular material.
 - .2 The restoration of all disturbed areas within the work site.

1.2 References

- .1 Work under this section shall be undertaken in strict conformance with all listed references. In the case of any conflict or discrepancy, the more stringent requirements shall apply.
 - .1 Canada Labour Code Part II
 - .2 NRC-CNRC National Building Code of Canada
 - .3 Nunavut Occupational Health and Safety (OHS) Regulations, 2016
 - .4 Nunavut Safety Act, 2016
 - .5 CAN/CSA-A23.1-04 Concrete Materials and Methods of Concrete Construction
 - .6 Any and all other Provincial/Territorial Regulations and Policies; Worker's Compensation Board Policies; Local municipal regulations; pertaining to work of this section.

1.3 Submittals

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



.2 Deliverables:

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

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

1.4 Existing Conditions

- .1 An electrical power cable was installed in 2017 along the route for the proposed entrance cable. The entrance cable shall follow the same route as the power cable.
- .2 Prior to commencing excavation, document the condition of all existing structures, landscaping, roadways and other adjacent facilities anticipated to be impacted by the work.
- .3 Before commencing work under this section, the Contractor must:
 - .1 Establish the location of all buried services that may interfere with the execution of work;
 - .1 Care shall be taken not to damage the existing power cable. For this reason, the entrance cable shall be buried adjacent to the power cable and not over top.
- .4 All work of this section shall be witnessed by Coast Guard or its representative unless permission is received in writing stating otherwise.

1.5 Quality Assurance

- .1 Coast Guard's minimum inspection requirements are detailed herein.
- .2 The Contractor shall be responsible to notify Coast Guard of the date and time that the works may be inspected. Notice must be provided no less than five [5] working days in advance to permit scheduling of quality assurance testing.
- .3 All deficiencies in the works identified at the time of inspection shall be remedied to the satisfaction of Coast Guard, at the Contractor's expense. Work shall not progress until inspections have been completed and the Contractor has been provided with written notice to



proceed with the works.

PART 2 - PRODUCTS

2.1 General

- .1 All materials described in this section shall be supplied by the Contractor.
- .1 Water shall be free of deleterious materials.
- .2 Backfill may consist of stockpiled native (excavated) materials and must not be frozen.

2.2 Backfill

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

PART 3 - EXECUTION

3.1 Site Preparation

- .1 Prior to commencing excavation, document the condition of all existing structures, landscaping, roadways and other adjacent facilities anticipated to be impacted by the work.
- .2 Install any features required to protect existing infrastructure.

3.2 Excavation

- .1 Strip topsoil over areas impacted by new construction and stockpile materials on-site;
- .2 Side slopes must be maintained around the perimeter of the excavation in accordance with provincial legislation;
- .3 Take all reasonable precautions to minimize the disturbance of the existing vegetation;
- .4 Install measures as detailed in Construction Plan to prevent excavation from freezing.

3.3 Backfill

- .1 Ensure that surrounding soil is unfrozen or take measures to thaw frozen materials;
- .2 Backfill to be placed in uniform lifts to a maximum depth of 0.2 m (8 in) and compacted to 95% SPMDD.

3.4 Restoration

- .1 Restore all disturbed areas within work sites and along haul routes. Fill and grade all ruts. Ensure positive drainage away from completed and existing foundations.
- .2 Excavated materials shall be used given the following priority:



Fisheries and Oceans Canada Pêches et Océans Canada

Canadian Coast Guard

Garde côtière canadienne



- .1 Backfill of the excavation;
- .2 Removed from site.



APPENDIX A: SITE LOCATIONS AND PHOTOGRAPHS



Figure 1: City Overview, Iqaluit, NU
Note location of project site and staging location



Figure 2: Project Site – Iqaluit MCTS Rx site
63°46'9.73"N, 68°31'48.73"W



Figure 3: Staging Location - Iqaluit MCTS Centre
1063 Niuraivik Lane
Iqaluit, NU X0A 0H0



Figure 4: Existing conduit installed on site



Figure 5: Existing conduit, note drain holes



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canadian
Coast Guard

Garde côtière
canadienne



Figure 6: Trench containing existing power cable



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canadian
Coast Guard

Garde côtière
canadienne



Figure 7: Building viewed from West



Figure 8: Building viewed from North



Figure 9: Building viewed from East



Figure 10: Building viewed from South



APPENDIX B: SUMMARY OF SUBMITTALS

Following Contract Award

Deadline	Submission Description	Reference Section(s)
10 working days following award	Detailed schedule	011100 – 1.3.2
	Proof of Qualifications	011100 – 1.3.3
10 working days prior to mobilization	Construction Plan	
	a) Project Specific Safety Program	013530 – 1.3.2
	b) Project Environmental Protection Plan	013543 – 1.3.2
	c) Building Demolition Plan	024117 – 1.3.2
	d) Installation Plan	133613 – 1.3.2
	e) Excavation Plan	310000 – 1.3.2
28 calendar days after construction	As-built and QA/QC documents	011100 – 1.3.5
		133613 – 1.3.3
Upon request of Coast Guard	Completed Field Level Hazard Assessment (FLHA) forms	013530 – 1.3.3
	Product specifications and/or samples	016100 – 1.5
	Copies of certified receipts from the disposal sites	024116 – 1.3.4



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canadian
Coast Guard

Garde côtière
canadienne



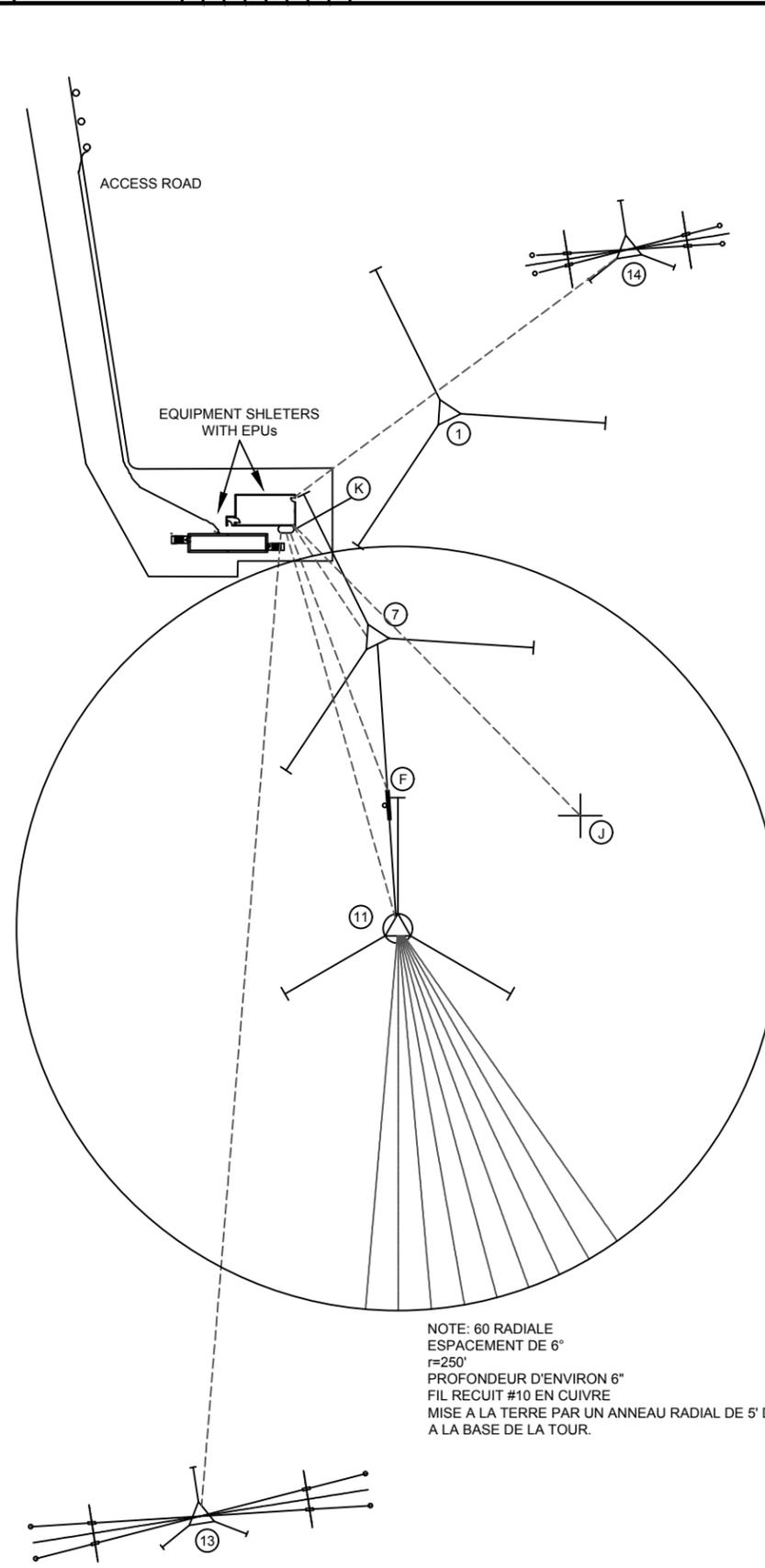
APPENDIX C: SITE PLANS



Key Map for Iqaluit - Site coordinates: 63°46'9.73"N, 68°31'48.73"W

TOWER	HEIGHT	TYPE	FACE WIDTH	MANUFACTURER	OBSTRUCTION LIGHTING
1	110'	GUYED - ALL WELD	36'	ALLAN PIPE FAB	DDLs
7	140'	GUYED - ALL WELD	24'	ADVANCED TOWER	DDLs
11	110'	GUYED - ALL WELD	24'	ADVANCED TOWER	N/A
13	30'	GUYED - ALL WELD	24'	ALLAN PIPE FAB	N/A
14	30'	GUYED - ALL WELD	24'	ALLAN PIPE FAB	N/A

ANTENNA	HOST TOWER	TYPE	OWNER	MANUFACTURER	AZIMUTH	HEIGHT	DESCRIPTION	POLARITY	FREQUENCY	CABLE	LENGTH
A	7	210A4	CCG	SINCLAIR	120°	100'	VHF	VERT.	16, 26	LDF4-50A	295'
B	7	210A4	CCG	SINCLAIR	120°	80'	VHF	VERT.	VOIE 12, 19, 26	LDF4-50A	265'
C	13	TWA	CCG		99°	30'	TRAVELNF WAVE ANT.		4083 4195.6 6298 6206	LDF4-50A	607'
D	14	TWA	CCG		99°	30'	TRVAELINE WAVE ANT.		8228 8360 12474 12230	LDF4-50A	530'
E	1	BVR	CCG	CCG	DMNI	110'	BROADBAND VERT. RADIATOR	VERT.	2182 MAIN 2206 B/U	LDF4-50A	432'
F	7, 11	CFT	CCG		188°	105'	CENTER FEED 'T'		500R VAR.R 2182 R	RG218	288'
H	7	210A2	CCG		190°	9'	TEST ANTENNA VHF	VERT.	172.44	LDF4-50A	135'
I	7	224	NUNAVUT GOVERNMENT	SINCLAIR	120° 120° 80° 240°	140'	EMD ANTENNA	VERT.	148.685	LDF4-50A	265'
J	N/A	625L	CCG	TCI		12'	HF DSC RECEIVING VERTICAL LOOP	VERT.	4207-16804	RG218	445'
K	OLD RX BUILDING	DISH	NAV CANADA	TIL-TEK TA-2424R			LINK ANT.		2.4 GHz		
L	OLD RX BUILDING	UHF COMPROD 426-70	CCG	Yagi	175°	10'	LINK ANT.			LDF4-50A	165'



Vendor / Sous-traitant

NOTES:

1. TRANSMISSION LINES IDENTIFIED AS DASHED LINES.

rev	description	by	date
U	GENERAL REVISION	LL	2018-06-15
T	GENERAL REVISION	SK	2010-02-24
S	REM ANT G, MOVED TOWER 7	SK	2005-03-16
R	GENERAL REVISION	SK	2003-09-19

Asset - Actif	date
IQUALUIT RX SITE	

Drawing - Dessin	date
SITE PLAN ANTENNA LAYOUT	

drawn - dessiné	date
C.H.S	1971-01-05
designed - conception	date
checked - vérifié	date
approved - approuvé	date

CCG ref. no. - no. réf. GCC	scale - échelle
EWT 8055-526	N.T.S
drawing no. - no. dessin	sheet-feuille
CM181-001-AL	01/01
	rev
	U

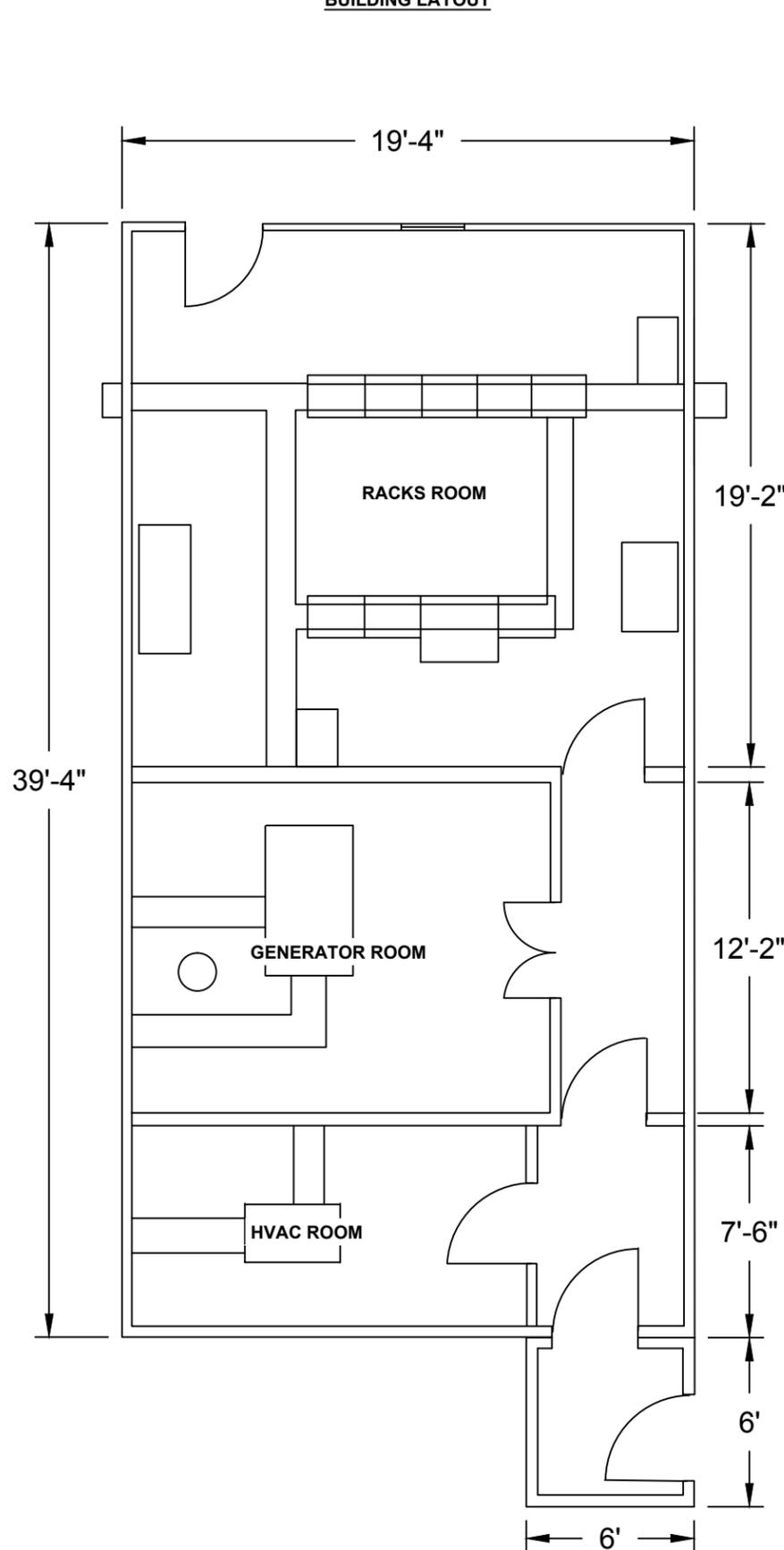
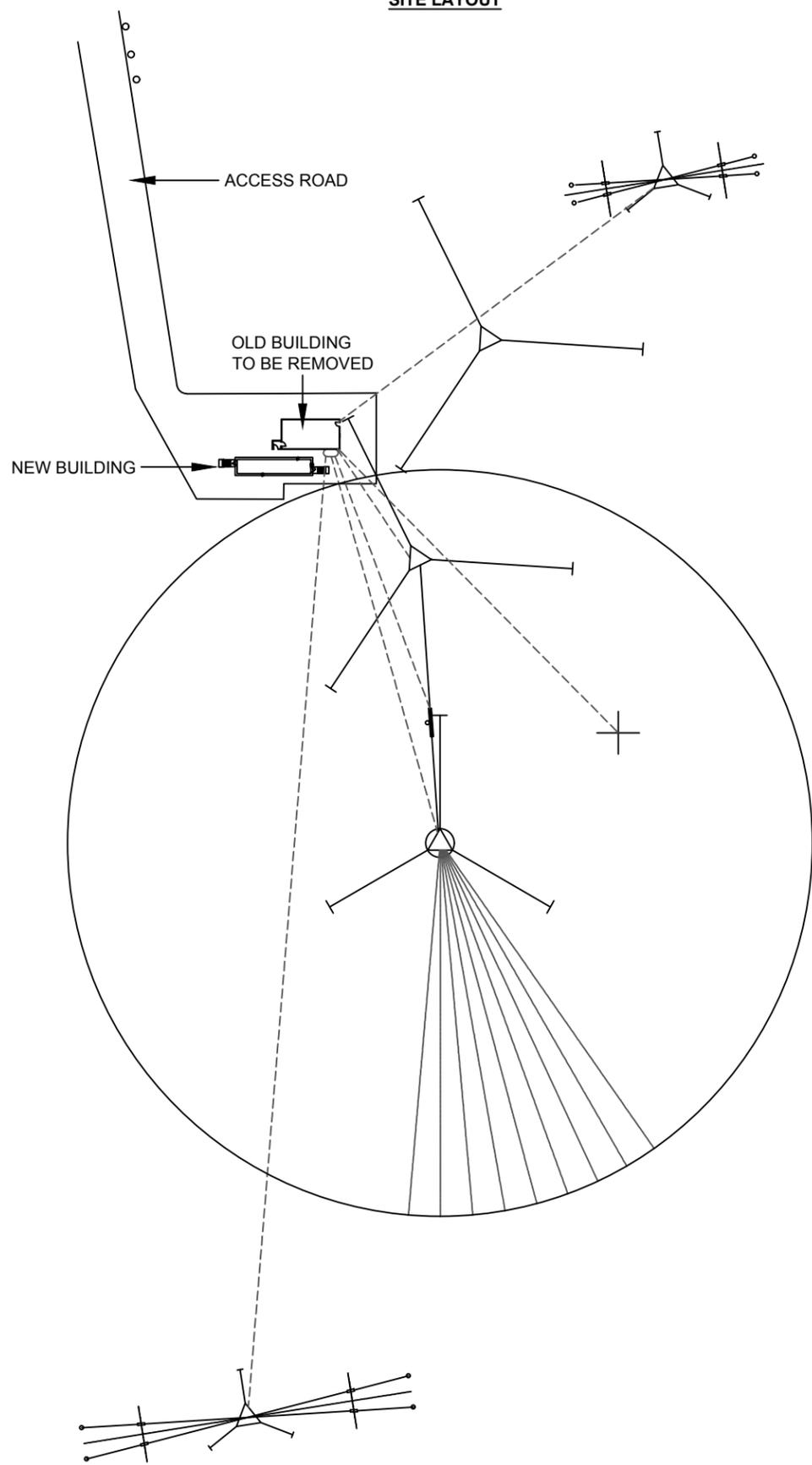
SITE LAYOUT

BUILDING LAYOUT

Vendor / Sous-traitant

NOTES:

1. TRANSMISSION LINES IDENTIFIED AS DASHED LINES.



rev	description	by	date
U	GENERAL REVISION	LL	2018-06-15
T	GENERAL REVISION	SK	2010-02-24
S	REM ANT G, MOVED TOWER 7	SK	2005-03-16
R	GENERAL REVISION	SK	2003-09-19

Asset - Actif	IQUALUIT RX SITE		
---------------	-----------------------------	--	--

Drawing - Dessin	SITE PLAN OLD BUILDING LAYOUT		
------------------	--	--	--

drawn - dessiné	C.H.S	date	1971-01-05
-----------------	-------	------	------------

designed - conception		date	
-----------------------	--	------	--

checked - vérifié		date	
-------------------	--	------	--

approved - approuvé		date	
---------------------	--	------	--

CCG ref. no. - no. réf. GCC	EWT 8055-526	scale - échelle	N.T.S
-----------------------------	--------------	-----------------	-------

drawing no. - no. dessin	CM181-001-AL	sheet-feuille	01/01	rev	U
--------------------------	--------------	---------------	-------	-----	---

SITE PLAN - IQUALUIT.DWG - July-11-18 3:38:14 PM
ANSI B

C

B

A



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canadian
Coast Guard

Garde côtière
canadienne



APPENDIX D: ANTENNA AND CABLE SCHEDULE



SCHEDULE - ANTENNA AND TRANSMISSION LINES									
ELEMENT / ANTENNA	OWNER	Host Tower	DESCRIPTION	ELEVATION	CONNECTOR	Cable Type	Cable Length Required (ft)	SERVICE REQUIRED	Materials Source
OBSTRUCTION LIGHTING	CCG	7	DOLS	43 m (141 ft)	N/A	Teck	N/A	Hang existing cable in new cable hangers.	Contractor: Cable hangers, TX brackets, Cable
A	CCG	7	Sinclair 210A4	37.8 m (124 ft)	Type N	LDF5-50A	245	Remove and dispose of existing antenna and mount; Remove and dispose of existing cable from tower; Install new antenna mount as per drawings provided; Install new cable on tower in new cable hangers; Install new connectors on new cable; Install new antenna on tower.	Contractor: Connectors, Antenna mount Cable hangers TX brackets
B	CCG	7	Sinclair 210A4	27.7 m (90.9 ft)	Type N	LDF5-50A	215	See Antenna A	See Antenna A
C	CCG	13	TRAVELNF WAVE ANT.	9.1 m (30 ft)	Type N	LDF4-50A	557	Replace existing cable with new cable; Install new connectors on new cable; Dispose of existing cable.	Contractor: Cable, Connectors
D	CCG	14	TRAVELNF WAVE ANT.	9.1 m (30 ft)	Type N	LDF4-50A	480	See Antenna C	Contractor: Cable, Connectors
E	CCG	1	Broadband Vertical Radiator	33.5 m (110 ft)	Type N	LDF4-50A	382	See Antenna C	Contractor: Cable, Connectors
F	CCG	7, 11	Center Feed "T"	32 m (105 ft)	Type N	LDF4-50A	238	See Antenna C	CCG: Cable
H	CCG	7	Sinclair 210A2	2.7 m (9 ft)	Type N	RG-213	145	Remove and dispose of existing cable from tower; Install new cable on tower in new cable hangers; Install new connectors on new cable.	Contractor: Connectors, Cable, Connectors, Cable hangers, TX brackets
I	NUNAVUT GOVERNMENT	7	Sinclair 224	43 m (141 ft)	N/A	LDF4-50A	267	Modify existing mount as per drawings provided; Hang existing cable in new cable hangers.	Contractor: Cable hangers, TX brackets
J	CCG	N/A	HF DSC Receiving Vertical Loop	3.7 m (12 ft)	Type N	LDF4-50A	395	Replace existing cable with new cable; Install new connectors on new cable; Remove and dispose of existing cable and 2 additional abandoned runs.	Contractor: Cable, Connectors
L	CCG	7	Yagi 425-70	12.2 m (40 ft)	Type N	LDF4-50A	175	Install new antenna mount as per drawings provided; Install new cable on tower in new cable hangers; Install new connectors on new cable; Install new antenna on tower.	See Antenna A

Cable Lengths to be supplied (ft)		
Type	By CCG	By Contractor
LDF4-50A	416	1850
LDF5-50A	658	0
RG-213	0	145



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canadian
Coast Guard

Garde côtière
canadienne



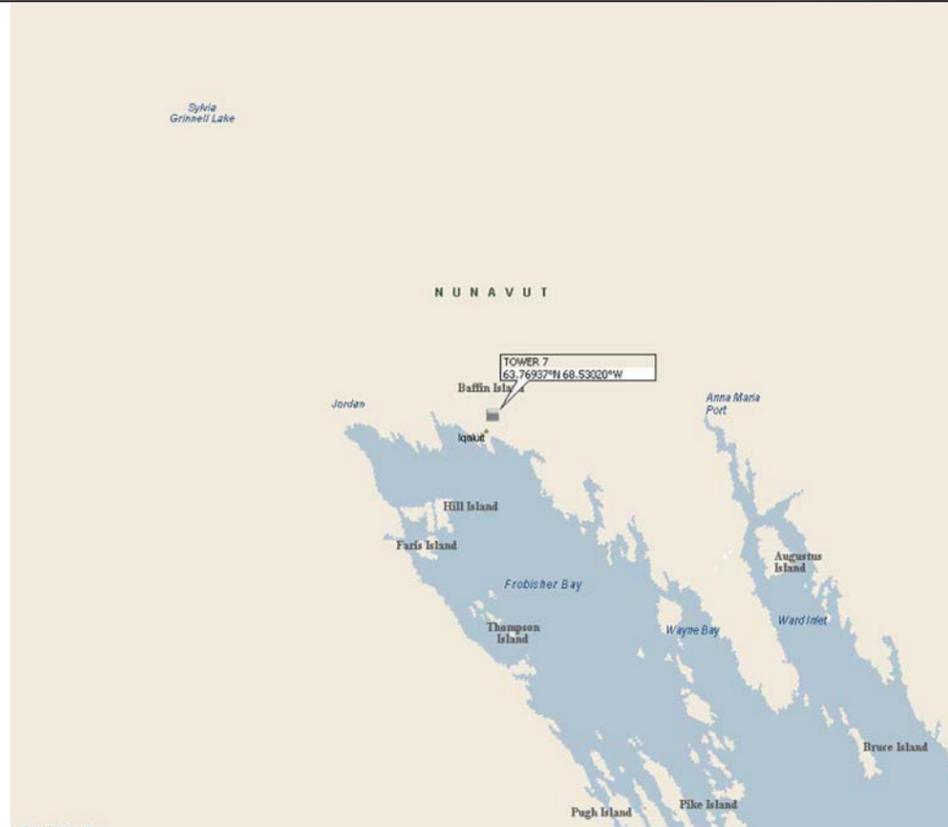
APPENDIX E: DRAWINGS



MOUNT INSTALLATION/RETROFIT

SITE NAME: TOWER 7
SITE NUMBER: N/A
PROJECT: N/A

VICINITY MAP



CODE COMPLIANCE

SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE CANADIAN, PROVINCIAL AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE:
 PROVINCE BUILDING CODE

ELECTRICAL CODE:
 CANADIAN ELECTRICAL CODE (LATEST EDITION)
 NATIONAL FIRE CODE (NFC) (LATEST EDITION)

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:
 CSA S37-13 ANTENNAS, TOWER, AND ANTENNA-SUPPORTING STRUCTURES. CONCRETE MATERIALS AND METHODS OF CONSTRUCTION SHALL CONFORM TO REQUIREMENTS OF CSA A23.1. TESTING METHODS SHALL CONFORM TO CSA A23.2.
 ALL STEEL FABRICATION AND INSTALLATION SHALL BE IN ACCORDANCE WITH CSA STANDARDS S37-13, AND S16.1 (LATEST EDITION).
 LAPS, ANCHORAGES AND SPLICES SHALL COMPLY WITH THE REQUIREMENTS OF CSA A23.3.
 ALL STEEL SHALL CONFORM TO CSA G40.21 UNLESS NOTED OTHERWISE.

TOWER INFORMATION

PROPERTY INFORMATION:
 SITE TYPE: 42.67m GUYED TOWER

APPROXIMATE LOCATION:
 LATITUDE: 63° 46' 9.73"
 LONGITUDE: -68° 31' 48.73"

RELEVANT SA:
 P-SEC #16403 R01 DATED JULY 21, 2017

RELEVANT AUDIT:
 MAINTENANCE INSPECTION REPORT
 OCTOBER 11, 2016 (15732)

RELEVANT WORK ORDER:
 STRUCTURAL ANALYSIS SCOPE OF WORK
 DATED JULY 06, 2017
 EWT 8055-253/526 RX SITE (TOWER 7)

SHEET INDEX

SHEET	REV	DESCRIPTION
T-1	0	TITLE PAGE
G-1	0	GENERAL NOTES
A-1	0	TOWER PROFILE
A-2	0	Tx LAYOUT
A-3	0	ANTENNA MOUNT RETROFIT
A-4	0	ANTENNA MOUNT REPLACEMENT
A-5	0	ANTENNA MOUNT REPLACEMENT
A-6	0	ANTENNA INSTALLATION
F-1	0	PARTS
F-2	0	PARTS

CLIENTS



ENGINEERING FIRM
P-SEC
 PIER STRUCTURAL ENGINEERING CORP.
 ph: 519-885-3806
 fx: 519-884-3806
 www.p-sec.ca
 55 NORTHFIELD DR. E.
 SUITE 198
 WATERLOO, ON
 N2K 3T6

PROJECT NUMBER
 16403



IAIN M. HARRISON P.ENG No.: 100011993
 P-SEC CoA No.: 100099550

No.	Description	Date
0	ISSUED FOR CONSTRUCTION	08.04.17

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT NAMED IS STRICTLY PROHIBITED.

CLIENT NUMBER
 TOWER 7

SITE ADDRESS
 IQALUIT, NUNAVUT

SITE DESIGN
 MOUNT
 INSTALLATION/RETROFIT

SHEET TITLE
 TITLE PAGE

DRAWN BY JWG	SHEET T-1
CHECKED BY DDS	
APPROVED BY IMH	

GENERAL

1. THE GENERAL STRUCTURAL NOTES ARE INTENDED TO AUGMENT THE DRAWINGS AND SPECIFICATIONS. SHOULD CONFLICTS EXIST BETWEEN THE DRAWINGS, SPECIFICATIONS AND/OR THE GENERAL STRUCTURAL NOTES, THE STRICTEST PROVISION SHALL GOVERN.
2. THE STRUCTURE IS DESIGNED TO BE STABLE AFTER THE CONSTRUCTION IS FULLY COMPLETED. THE CREW MUST FOLLOW APPROVED ERECTION PROCEDURES IN ORDER TO ENSURE THE SAFETY OF THE CONSTRUCTION AND ITS PARTS DURING ERECTION.
3. ALL CONSTRUCTION SHALL COMPLY FULLY WITH THE APPLICABLE PROVISIONS OF THE CANADA LABOUR CODE, AND ALL LOCAL GOVERNING CODES. ALL REQUIREMENTS SPECIFIED IN THE CODES SHALL BE ADHERED TO AS IF THEY WERE CALLED FOR OR SHOWN ON THE DRAWINGS.
4. ALL WORK CONSTRUCTED ACCORDING TO THESE DRAWINGS SHALL BE CHECKED AND VERIFIED BY QUALITY ASSURANCE AS DETERMINED BY THE ENGINEER.
5. WHERE STANDARDS ARE IDENTIFIED WITHOUT A RELEASE DATE IN THESE GENERAL NOTES, THE MOST RECENT VERSION SHALL APPLY.

DESIGN LOADS

1. WIND AND ICE LOADS AS PER CSA S37-13. REFERENCE WIND PRESSURE: 633Pa (50 YEAR RECURRENCE - SITE SPECIFIC WIND). 489Pa (10 YEAR RECURRENCE - SITE SPECIFIC WIND).
2. RADIAL ICE: 10mm (CSA S37-13 TABLE E.1)

FOUNDATIONS

1. THE FOUNDATION DESIGN IS BASED ON LOADS SHOWN ON THE DESIGN PROFILE.
2. A SOIL REPORT IS TO BE COMMISSIONED WHEN THE TOWER LOCATION IS DETERMINED. THE PRELIMINARY FOUNDATION DESIGNS ARE TO BE REVISED ACCORDING TO THE PARAMETERS GIVEN IN THE SOIL REPORT.
3. WHERE SITE CONDITIONS DIFFER FROM THESE DRAWINGS, CONSULT THE ENGINEER ON RECORD.
4. A QUALIFIED FOREMAN OR SUPERVISOR SHALL PERFORM A SITE INSPECTION OF THE FOUNDATION INSTALLATION TO INSURE COMPLIANCE WITH THE PLANS.
5. CHECK AREA FOR LOCATION OF UNDERGROUND PIPES, CABLES, CONDUITS, ETC., PRIOR TO EXCAVATION.
6. ALL WORK SHALL BE DONE IN ACCORDANCE WITH LOCAL CODES AND SAFETY REGULATIONS. PROCEDURES FOR PROTECTION OF EXISTING EXCAVATIONS, CONSTRUCTION AND UTILITIES SHALL BE ESTABLISHED PRIOR TO COMMENCEMENT OF FOUNDATION WORK.
7. BRACING, SHORING, AND SLOPING OF EXCAVATIONS SHALL BE DONE IN ACCORDANCE WITH ALL LOCAL AND FEDERAL CODES AND SAFETY REGULATIONS.
8. WELDING OF REINFORCING STEEL AND EMBEDMENTS IS PROHIBITED UNLESS NOTED OTHERWISE ON DRAWINGS.
9. CONCRETE COVERAGE OVER ALL STEEL SHALL CONFORM TO CSA A23.1, APPLICABLE BUILDING CODE MINIMUM REQUIREMENTS, AND AS SHOWN IN STRUCTURAL DETAILS. THE MINIMUM CONCRETE COVER OVER REBAR SHALL BE 75mm (3").
10. INSPECT BOTTOM OF EXCAVATING PRIOR TO PLACING STEEL CAGE AND CONCRETE TO ENSURE NO SIGNIFICANT AMOUNT OF LOOSE SOIL OR FOREIGN MATERIALS REMAINS. BEARING SURFACES TO BE PLACED ON UNDISTURBED SOIL OR ROCK.
11. SPACING DEVICES SHALL BE USED AS REQUIRED TO MAINTAIN SIDE CLEARANCE BETWEEN THE STEEL REINFORCEMENT AND EXCAVATION WALL.
12. CONCRETE SHALL BE PLACED IN THE EXCAVATION WITHOUT UNDUE DELAY, WITH THE USE OF A CHUTE OR HOPPER DEVICE TO DIRECT THE CONCRETE TO FALL WITHIN THE CENTER OF THE STEEL CAGE. CONCRETE SLUMP SHALL NOT BE LESS THAN 20mm (3/4") NOR MORE THAN 80mm (3-1/4"). CONCRETE SHALL NOT BE ALLOWED TO HIT THE STEEL CAGE, WHICH COULD CAUSE SEGREGATION OF THE MATERIAL.
13. BACK FILL SHALL BE PLACED IN 225-300mm (9-12") HORIZONTAL LIFTS AND COMPACTED TO A MINIMUM 95% OF STANDARD PROCTOR DRY DENSITY. THE FILL MATERIAL SHALL BE FREE FROM LARGE ROCKS, WASTE, AND DEBRIS AND SHALL BE PLACED AT OR NEAR THE OPTIMUM MOISTURE CONTENT. ALSO REFER TO THE SOIL REPORT FOR RECOMMENDED BACKFILL/COMPACTED FILL PROCEDURES.
14. CONCRETE MIXED ON SITE IS NOT PERMITTED UNLESS APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.

ROCK ANCHORS

1. ROCK ANCHORS SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. ALL LOOSE AND WEATHERED ROCK IS TO BE REMOVED BEFORE INSTALLATION.
2. THE ANCHORS SHALL BE SECURELY FASTENED IN PLACE TO PREVENT MOVEMENT DURING GROUTING. GROUTING OPERATIONS SHALL BE IN ACCORDANCE WITH PCA RECOMMENDED PRACTICE, AND ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER.
3. ALL EXPOSED STEEL ITEMS FOR ANCHORAGES, INCLUDING ANCHOR BOLTS, SHALL BE ZINC-COATED IN ACCORDANCE WITH CLAUSE 7.2 OF CSA S37-13, OR OTHERWISE SUITABLY PROTECTED. WHERE ANCHORAGE STEEL IS PARTIALLY EMBEDDED IN CONCRETE THE ZINC COATING SHALL EXTEND A MINIMUM OF 50mm (2") INTO THE CONCRETE.
4. ANCHORAGE STEEL BELOW GRADE THAT IS NOT ENCASED IN CONCRETE SHALL BE GALVANIZED, AND FURTHER CORROSION PROTECTION SHALL BE PROVIDED.

CAST-IN-PLACE CONCRETE

1. CONCRETE MATERIALS AND METHODS OF CONSTRUCTION SHALL CONFORM TO REQUIREMENTS OF CSA A23.1. TESTING METHODS SHALL CONFORM TO CSA A23.2.
2. ALL CONCRETE SHALL HAVE A MINIMUM SPECIFIED 28-DAY COMPRESSIVE STRENGTH OF 30MPa, UNLESS NOTED OTHERWISE.
3. ALL REINFORCING STEEL BARS SHALL CONFORM TO CSA G30.18, AND HAVE A YIELD STRENGTH OF 400MPa, UNLESS NOTED OTHERWISE.
4. LAPS, ANCHORAGES AND SPLICES SHALL COMPLY WITH THE REQUIREMENTS OF CSA A23.3.
5. CONCRETE SHALL BE PLACED WITHIN 3 HOURS OF MIXING.

STRUCTURAL STEEL

1. ALL STEEL FABRICATION AND INSTALLATION SHALL BE IN ACCORDANCE WITH CSA S37-13, AND S16.1 (LATEST EDITION).
2. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH CSA STANDARD W59. ALL WELDING TO BE COMPLETED IN A CWB REGISTERED SHOP. FIELD WELDING IS NOT PERMITTED UNLESS APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION. ALL WELDING TO BE COMPLETED BY CERTIFIED AWS/CWB WELDER AND THEN INSPECTED BY CERTIFIED AWS/CWB WELDING INSPECTOR.
3. BASE MATERIAL SHALL BE CORRECTLY PREHEATED BEFORE WELDING AND POST HEATED AFTER WELDING IN ACCORDANCE WITH THE ENGINEERED WELDING PROCEDURE, WHICH MUST BE APPROVED BY THE CWB.
4. ALL STEEL SOLID ROUND LEGS SHALL CONFORM TO CSA G40.21 GRADE 350W STEEL SPECIFICATION.
5. ALL STEEL ANGLE, PLATE AND MISCELLANEOUS MEMBERS SHALL CONFORM TO CSA G40.21 GRADE 300W STEEL SPECIFICATION.
6. ALL STEEL CHANNEL MEMBERS SHALL CONFORM CSA G40.21 GRADE 300 STEEL SPECIFICATION
7. THE FINISHED DIAMETER OF BOLT HOLES SHALL NOT BE MORE THAN 2mm (1/16") LARGER THAN THE NOMINAL BOLT DIAMETER UNLESS OTHERWISE NOTED.
8. MATERIAL MAY BE CUT BY SHEARING, SAWING, OR CUTTING WITH A ROUTER OR GAS CUT. MATERIAL GREATER THAN 51mm (2") THICKNESS SHALL NOT BE SHEARED.
9. CUT EDGES SHALL BE TRUE AND SMOOTH, AND FREE FROM EXCESSIVE BURRS AND RAGGED BREAKS. SHEARED EDGES OF THICK PLATES SHALL BE PLANED TO A DEPTH OF 6mm (1/4") RE-ENTRANT CUTS SHALL BE AVOIDED. IF USED, THEY SHALL BE FILLETED BY DRILLING PRIOR TO CUTTING.
10. TOLERANCES AS INDICATED IN CSA STANDARD S16.1 SHALL BE CAREFULLY FOLLOWED DURING FABRICATION.
11. PRIOR TO GALVANIZING ALL FABRICATED STEEL SHALL BE THOROUGHLY SHOP INSPECTED AND QUANTITIES COUNTED.
12. ALL BOLTS, WASHERS AND NUTS SHALL CONFORM TO ASTM A325 TYPE N, 5/8"Ø UNLESS NOTED OTHERWISE.
13. BOLTS SHALL BE TIGHTENED USING THE TURN-OF-THE-NUT METHOD AS DESCRIBED IN CSA STANDARD S16.1, UNLESS NOTED OTHERWISE.
14. ALL EXPOSED STEEL AND HARDWARE SHALL BE HOT DIPPED GALVANIZED PER CSA STANDARD G164, AFTER FABRICATION, UNLESS NOTED OTHERWISE.
15. WHEN TOWER REINFORCEMENT IS REQUIRED ON A PAINTED TOWER THE REINFORCEMENT MATERIAL SHALL BE PAINTED IN ACCORDANCE WITH THE REQUIREMENTS OF TRANSPORT CANADA STANDARD 621 OBSTRUCTION MARKING AND LIGHTING. WHITE PAINT SHALL CONFORM WITH UNITED STATES FEDERAL STANDARD FED-STD-595B, PAINT NUMBER 17875. ORANGE PAINT SHALL CONFORM WITH UNITED STATES FEDERAL STANDARD FED-STD-595B, PAINT NUMBER 12197.

GUY WIRES

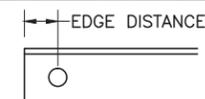
1. ALL GUY WIRES SHALL BE GRADE 180, AND IN ACCORDANCE WITH CSA STANDARD G12, USING HOT ZINC COATED WIRE. GUY HARDWARE ASSEMBLIES SHALL BE RATED TO 100% OF THE GUY BREAKING STRENGTH OR HIGHER, UNLESS OTHERWISE NOTED.
2. GROUNDING OF THE GUYS AT ANCHORS SHALL MEET THE MINIMUM REQUIREMENTS OF CSA STANDARD S37-13.

FIELD ERECTION

1. THE CREW SHOULD COMPLY WITH ALL INSTALLATION PROCEDURES. SAFEGUARDS AND MEANS AND METHODS OF CONSTRUCTION. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF OHSA AND THE CANADIAN LABOUR CODE, (LATEST EDITION)
2. ERECTION METHODS AND TOLERANCES SHALL COMPLY WITH CSA STANDARD S37-13. MINIMUM RECOMMENDED WEATHER CONDITIONS THAT SHOULD BE OBSERVED TO ENSURE A SAFE WORKING CONDITION SHALL BE: WIND SPEED NOT TO EXCEED 30 KM/H, AND NO THUNDERSTORMS FORECASTED.
3. ALL PRECAUTIONS AND EFFORTS SHALL BE TAKEN TO ENSURE TOWER STABILITY DURING ERECTION.
4. TEMPORARY GUYS, IF REQUIRED BY INSTALLATION PROCEDURE, SHALL BE REMOVED AFTER THE NEXT PERMANENT GUY WIRE HAS BEEN INSTALLED BEFORE CONTINUING TOWER ERECTION. ALL BOLTS SHALL BE INSTALLED AND TIGHTENED AS ERECTION PROGRESSES ABOVE PERMANENT GUYS.
5. TOWER SHALL BE PLUMBED AND RE-TENSIONED IN CALM WEATHER. INITIAL TENSION VALUES SHOWN ON PLANS ARE FOR NORMAL TEMPERATURES FOR THE SITE.
6. INSTALLATION OF THE TRANSMISSION LINES SHALL BE AS SHOWN ON THE LAYOUT DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS AND INSTALLATION INSTRUCTIONS.
7. ANY STRUCTURAL MEMBERS THAT HAVE DAMAGED GALVANIZED SURFACES SHALL BE CLEANED AND TOUCHED UP WITH THREE COATS OF ZINC-RICH PAINT, ACCORDING TO CSA STANDARD G189.
8. UPON COMPLETION OF ALL WORK, THE SITE SHALL BE CLEANED OF ALL DEBRIS AS REQUIRED. ANY SURPLUS MATERIALS NOT REMOVED FROM THE SITE SHALL BE NEATLY STORED IN AN AREA DESIGNATED BY THE OWNER'S REPRESENTATIVE.

MAINTAIN MINIMUM EDGE DISTANCES UNLESS NOTED OTHERWISE:

- 22mm FOR 1/2" HARDWARE
- 28mm FOR 5/8" HARDWARE
- 32mm FOR 3/4" HARDWARE
- 38mm FOR 7/8" HARDWARE
- 44mm FOR 1" HARDWARE



CLIENTS



ENGINEERING FIRM
P-SEC
 PIER STRUCTURAL ENGINEERING CORP. N2K 3T6
 ph: 519-885-3806
 fx: 519-884-3806
 www.p-sec.ca
 55 NORTHFIELD DR. E.
 SUITE 198
 WATERLOO, ON

PROJECT NUMBER
16403

PROFESSIONAL STAMP

 IAIN M. HARRISON P.ENG No.: 100011993
 P-SEC CoA No.: 100099550

REVISIONS		
No.	Description	Date
0	ISSUED FOR CONSTRUCTION	08.04.17

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT NAMED IS STRICTLY PROHIBITED

CLIENT NUMBER
TOWER 7

SITE ADDRESS
IQALUIT, NUNAVUT

SITE DESIGN
MOUNT INSTALLATION/RETROFIT

SHEET TITLE
GENERAL NOTES

DRAWN BY JWG	SHEET G-1
CHECKED BY DDS	
APPROVED BY IMH	

DESIGN SPECIFICATION: CSA-S37-13
WIND PRESSURE: 633 Pa (50 YEAR), 489 Pa (10 YEAR)
RADIAL ICE: 10mm
IMPORTANCE FACTOR: 1.00
SERVICEABILITY FACTOR: 1.00

Single	0.305		
X	0.610		
Single	0.305	SR 51	SR 19
PANEL TYPE	PANEL HEIGHT (m)	LEGS (44W)	HORIZONTALS

- EL. = 42.67m
- EL. = 39.62m
- EL. = 36.58m
- EL. = 33.53m
- EL. = 30.48m
- EL. = 27.43m
- EL. = 24.38m
- EL. = 21.34m
- EL. = 18.29m
- EL. = 15.24m
- EL. = 12.19m
- EL. = 9.14m
- EL. = 6.10m
- EL. = 3.05m
- EL. = 0.00m

TOWER PROFILE

MAXIMUM BASE REACTIONS (FACTORED AS PER CSA-S37-13)
DOWNLOAD (KN): 192.5
SHEAR (KN): 10.1
TORSION (KNm): -3.0

SCOPE OF WORK (SOW):

- A. MODIFY EXISTING MOUNT FOR EL. 43.0m EMO ANTENNA AT TOP OF TOWER. SEE DWG A-3.
- B. REPLACE EXISTING MOUNT FOR SRL 210-C4 ANTENNA AT 37.8m. SEE DWG A-4.
- C. REPLACE EXISTING MOUNT FOR SRL 210-C4 ANTENNA AT 27.7m. SEE DWG A-5.
- D. INSTALL NEW MOUNT AND PROPOSED YAGI 425-70 ANTENNA AT 12.2m. SEE DWG A-6.

MEMBER LEGEND

- A SR 19 (44W)
- B TR-PL3x0.25+SR3/4 (44W)
- C L76x76x6 (44W)

LONG WIRE ANTENNA SPANNING BETWEEN TOWERS 7 AND 11

3-B5 11/16 IT = 25.80 kN

3-B5 11/16 IT = 25.80 kN

ANCHOR REACTIONS

ANCHOR #	AZIMUTH (deg)	RADIUS (m)	ELEVATION (m)	HORIZ LOAD (kN)	VERT LOAD (kN)	AXIAL LOAD (kN)	ANGLE (deg)
A1	90	28.96	0.00	28.60	21.03	35.50	36.33
B1	210	28.96	0.00	27.42	20.16	34.04	36.33
C1	330	28.96	0.00	28.46	20.92	35.32	36.33
A2	90	32.00	0.00	27.29	36.52	45.59	53.24
B2	210	32.00	0.00	27.08	36.25	45.25	53.24
C2	330	32.00	0.00	27.31	36.55	45.63	53.24

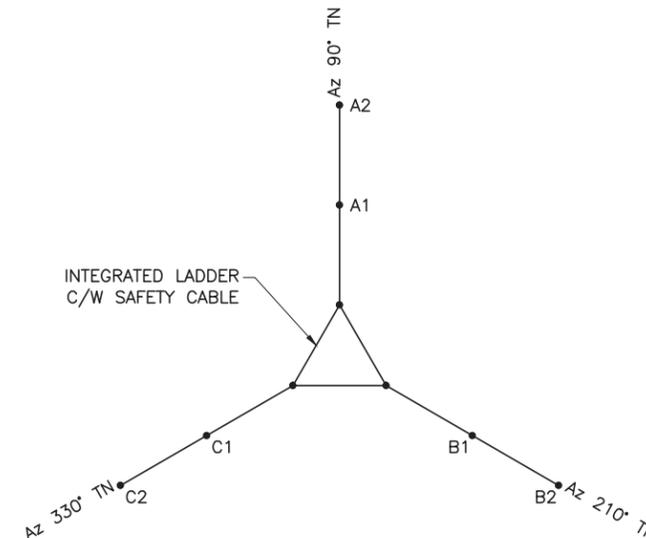
APPURTENANCE INFORMATION:

Height		Appurtenance *						TX Line		Status ***	Owner
ft	m	Qty	Description / Type	Equipment	Location	Mount	Azimuth ° **	Qty	Type		
141.0	43.0	1	EMO Antenna	—	Centre	Pipe Mt.	120, 120, 80, 240	1	LDF4-50A	EX	Nu. Gov.
141.0	43.0	1	DOL	—	B	Leg Mt.	None OMNI	1	Teck	EX	CCG
124.0	37.8	1	<<Sindair>> SRL 210-C4	—	B	—	120	1	LDF5-50A	EX	CCG
90.9	27.7	1	<<Sindair>> SRL 210-C4	—	B	—	120	1	LDF5-50A	EX	CCG
40.0	12.2	1	Yagi 425-70	—	B	—	175	1	LDF4-50A	PR	CCG
9.0	2.7	1	<<Sindair>> SRL 110.2	—	C	—	190	1	3/8" Cable	EX	CCG

* Leg A is denoted as the leg closest to True North in a clockwise direction (which was 90° TN)
** The azimuths are ±10° and have been adjusted based on True North and the magnetic declination
*** Existing (EX), Future (FU), Imminent Future (IMF), or Proposed (PR)

NOTES:

- CONTRACTOR IS RESPONSIBLE TO MAKE PROVISIONS TO SUPPORT OR WORK AROUND EXISTING ANTENNAS, TRANSMISSION LINES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL MEASUREMENTS AT THE SITE BEFORE PROCEEDING WITH FABRICATION AND INSTALLATION OF ANY MATERIALS. ANY DISCREPANCIES SHOULD IMMEDIATELY BE FORWARDED TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
- THESE DRAWINGS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, TECHNIQUES, SEQUENCES AND PROCEDURES.
- REQUIRED MODIFICATIONS TO BE COMPLETED IN CALM WEATHER WITH WIND VELOCITY LESS THAN 30 KM/HR.
- ALL STEEL FABRICATION AND CONSTRUCTION SHALL CONFORM TO THE LATEST EDITION OF CSA S37-13 STANDARDS.
- ALL NEW STEEL SHALL BE HOT DIP GALVANIZED AS PER CSA STANDARD G164.
- ALL STRUCTURAL STEEL SHALL CONFORM TO G40.21 300W MATERIAL & STANDARDS UNLESS OTHERWISE NOTED.
- ANY DAMAGE TO GALVANIZING SHALL BE COATED WITH ZINC RICH PAINT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- SEE GENERAL NOTES FOR FURTHER GENERAL & INSTALLATION NOTES.
- ALL WORK TO BE DONE IN ACCORDANCE WITH CLIENT SPECIFICATIONS AND ALL RELEVANT CODES.
- POSITION NEW TX LINES ALONGSIDE EXISTING PER TERMS OF LATEST STRUCTURAL ANALYSIS (P-SEC 16403 R01). SEE DRAWING A-2.



TOWER SECTION

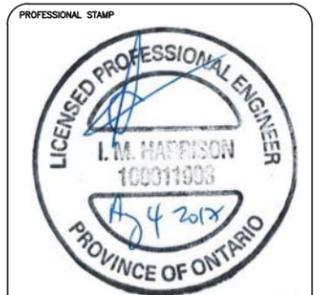
SEE DWG A-2 FOR Tx-LINE LAYOUT

CLIENTS



ENGINEERING FIRM
P-SEC
PIER STRUCTURAL ENGINEERING CORP.
ph: 519-885-3806
fx: 519-884-3806
www.p-sec.ca
55 NORTHFIELD DR. E.
SUITE 198
WATERLOO, ON
N2K 3T6

PROJECT NUMBER
16403



IAN M. HARRISON P.ENG No.: 100011993
P-SEC CoA No.: 100099550

No.	Description	Date
0	ISSUED FOR CONSTRUCTION	08.04.17

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT NAMED IS STRICTLY PROHIBITED

CLIENT NUMBER
TOWER 7

SITE ADDRESS
IQUALUIT, NUNAVUT

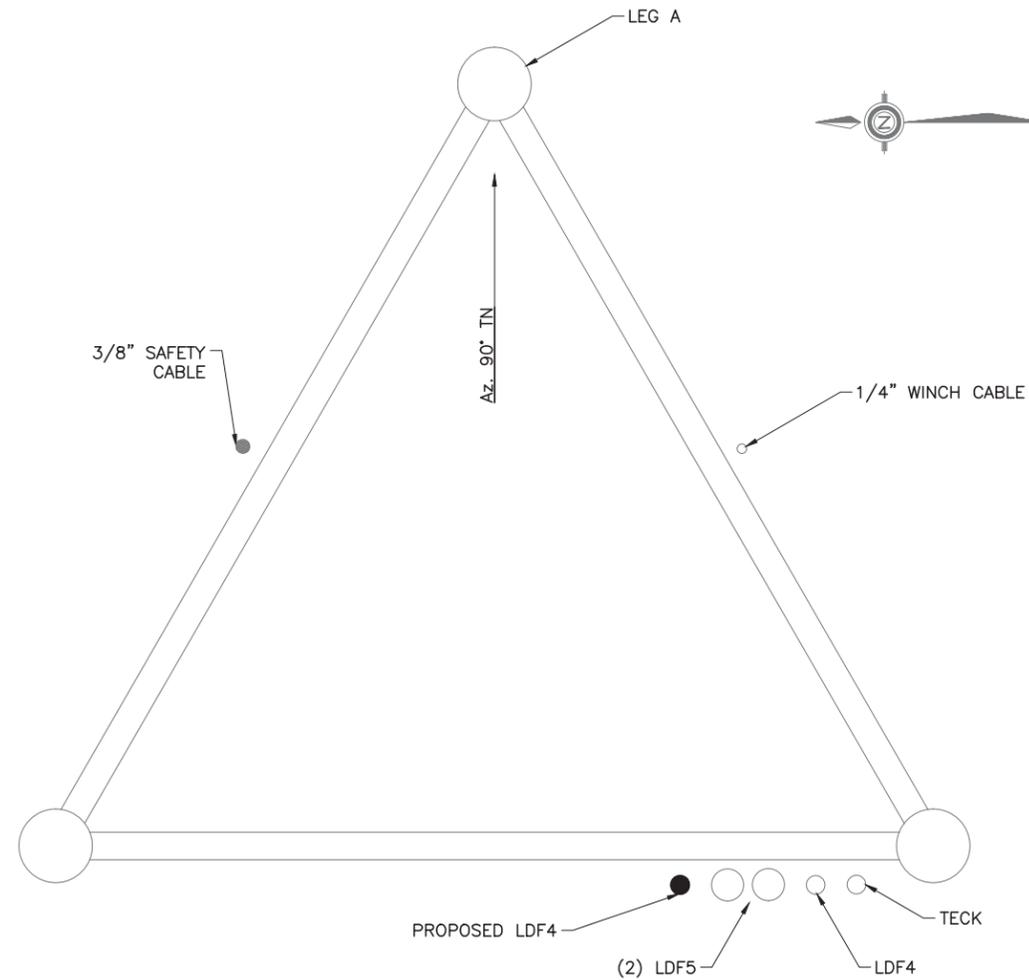
SITE DESIGN
MOUNT INSTALLATION/RETROFIT

SHEET TITLE
TOWER PROFILE

DRAWN BY JWG	SHEET A-1
CHECKED BY DDS	
APPROVED BY IMH	

NOTES:

1. ROUTE TX LINES IN THE MANNER SHOWN ALONG EXISTING TX LADDER. FOLLOW CLIENT AND MANUFACTURER INSTALLATION RECOMMENDATIONS.
2. REFERENCE P-SEC MAINTENANCE INSPECTION REPORT #15732 DATED OCT 11, 2016.
3. THE CREW SHALL COMPLY WITH ALL INSTALLATION PROCEDURES, SAFEGUARDS AND MEANS AND METHODS OF CONSTRUCTION.



Tx LAYOUT

CLIENTS



ENGINEERING FIRM



ph: 519-885-3806
 fx: 519-884-3806
 www.p-sec.ca

55 NORTHFIELD DR. E.
 SUITE 198
 WATERLOO, ON
 N2K 3T6

PROJECT NUMBER

16403

PROFESSIONAL STAMP



IAN M. HARRISON P.ENG No.: 100011993
 P-SEC CoA No.: 100099550

REVISIONS

No.	Description	Date
0	ISSUED FOR CONSTRUCTION	08.04.17

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT NAMED IS STRICTLY PROHIBITED

CLIENT NUMBER

TOWER 7

SITE ADDRESS

IQUALUIT, NUNAVUT

SITE DESIGN

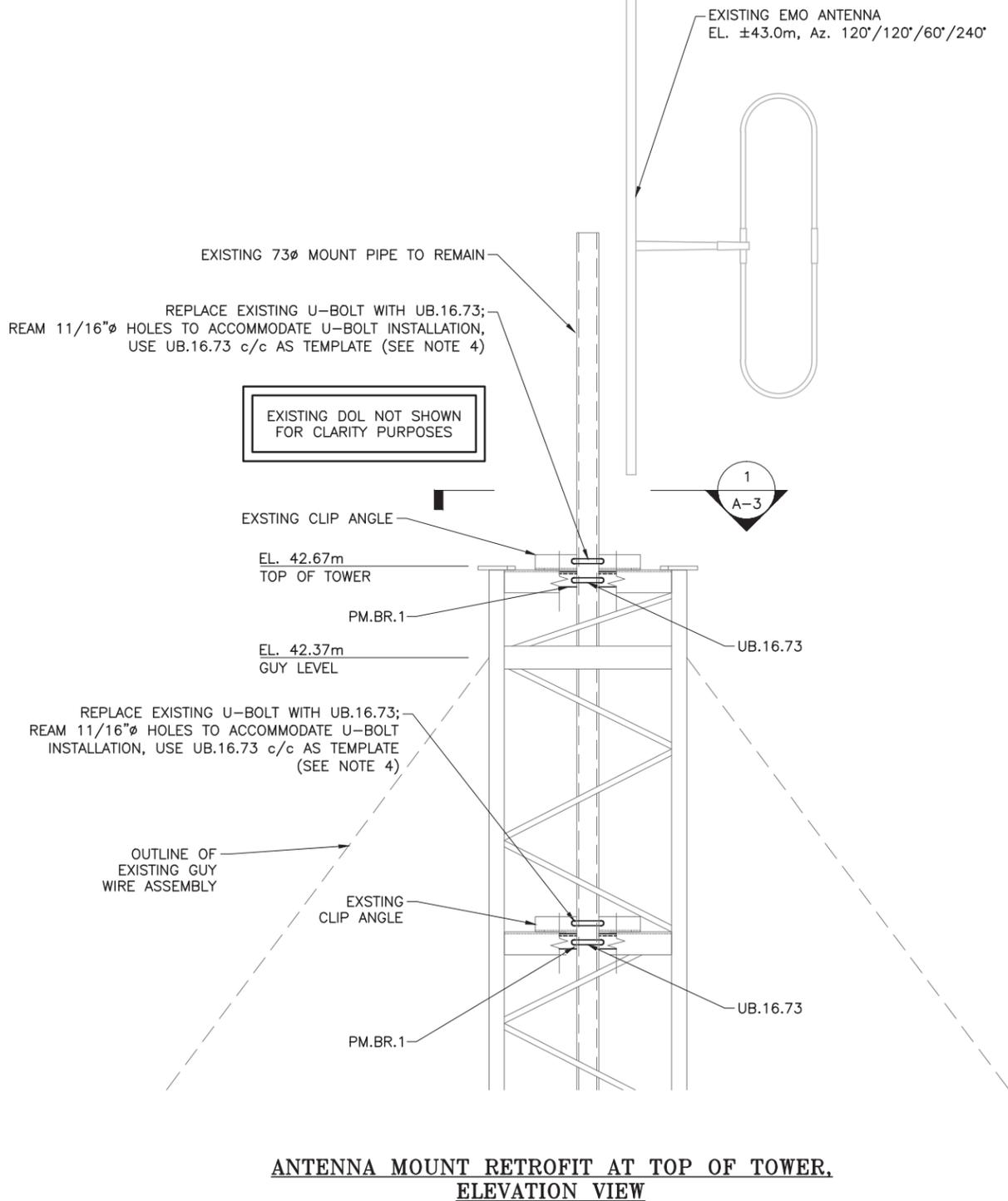
MOUNT
 INSTALLATION/RETROFIT

SHEET TITLE

Tx LAYOUT

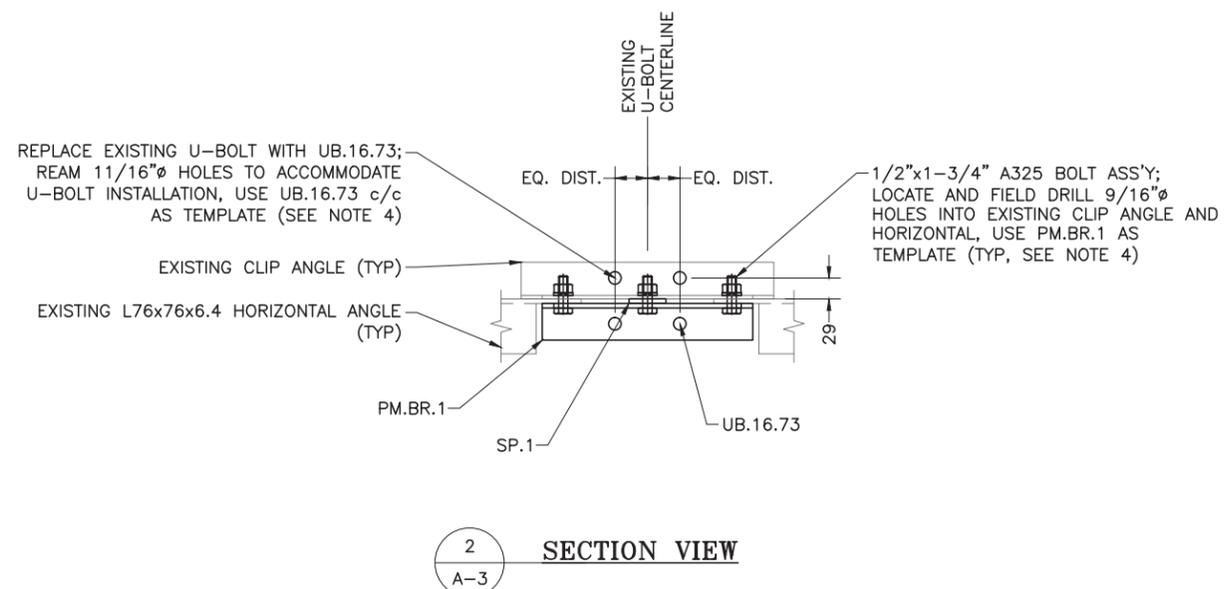
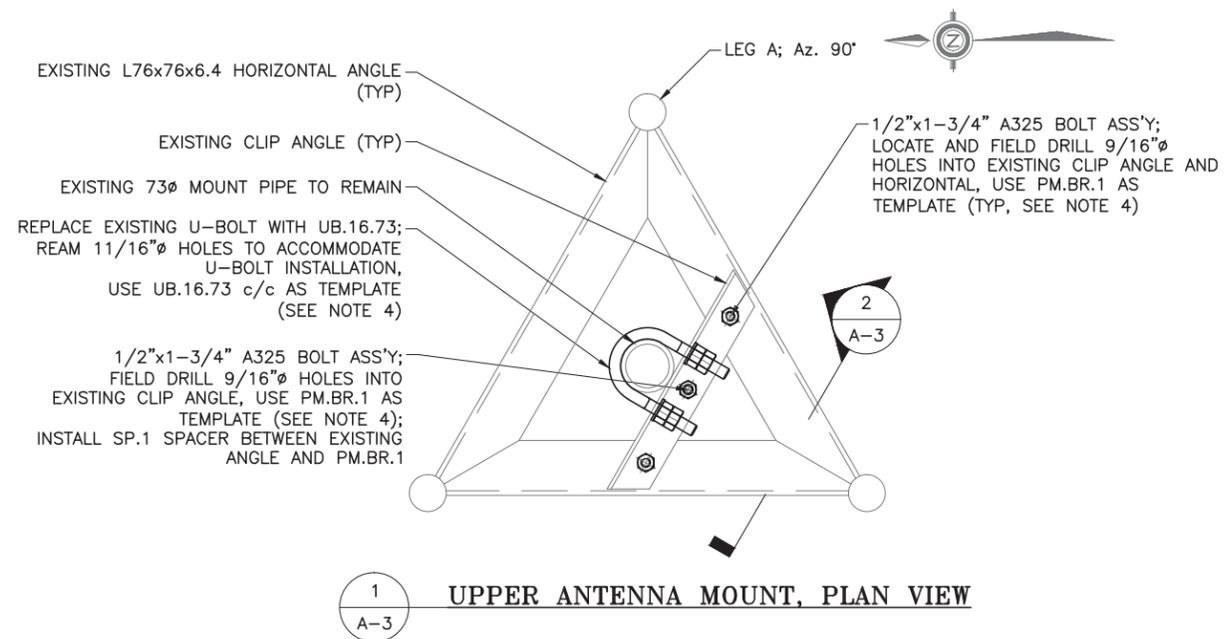
DRAWN BY	JWG	SHEET	A-2
CHECKED BY	DDS		
APPROVED BY	IMH		

BILL OF MATERIALS		
PART No.	DESCRIPTION	QTY
PM.BR.1	PIPE MOUNT BRACKET (FITS 73Ø)	2
SP.1	SPACER	2
UB.16.73	5/8" U-BOLT ASS'Y (FITS 73Ø)	4
-	1/2"x1-3/4" A325 BOLT ASS'Y HDG	6



NOTES ON INSTALLATION

1. INSTALL MOUNT MODIFICATION IN ACCORDANCE WITH ALL MANUFACTURER'S/CLIENT INSTALLATION SPECIFICATIONS.
2. CONTRACTOR IS RESPONSIBLE TO MAKE PROVISIONS TO SUPPORT OR WORK AROUND EXISTING ANTENNAS, MOUNT AND TRANSMISSION LINES.
3. MAY REQUIRE DETACHING AND RE-ATTACHING EXISTING TX LINES TO ACCOMMODATE MOUNT INSTALLATION; NEW TX LINE HARDWARE MAY BE REQUIRED. CONTRACTOR TO FIELD VERIFY.
4. APPLY TWO LAYERS OF COLD GALVANIZING TO ALL FIELD CUTS, FIELD DRILLED HOLES AND FIELD WELDING USING ZRC GALVALITE OR ZINGA COMPOUND.
5. THE REQUIRED MODIFICATIONS TO BE COMPLETED IN CALM WEATHER WITH WIND VELOCITY LESS THAN 30 KM/H AT GROUND ELEVATION.



CLIENTS

ENGINEERING FIRM

P-SEC

ph: 519-885-3806
fx: 519-884-3806
www.p-sec.ca

55 NORTHFIELD DR. E.
SUITE 198
WATERLOO, ON
N2K 3T6

PROJECT NUMBER

16403

PROFESSIONAL STAMP

IAN M. HARRISON P.ENG No.: 100011993
P-SEC CoA No.: 100099550

REVISIONS

No.	Description	Date
0	ISSUED FOR CONSTRUCTION	08.04.17

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT NAMED IS STRICTLY PROHIBITED.

CLIENT NUMBER

TOWER 7

SITE ADDRESS

IQALUIT, NUNAVUT

SITE DESIGN

MOUNT INSTALLATION/RETROFIT

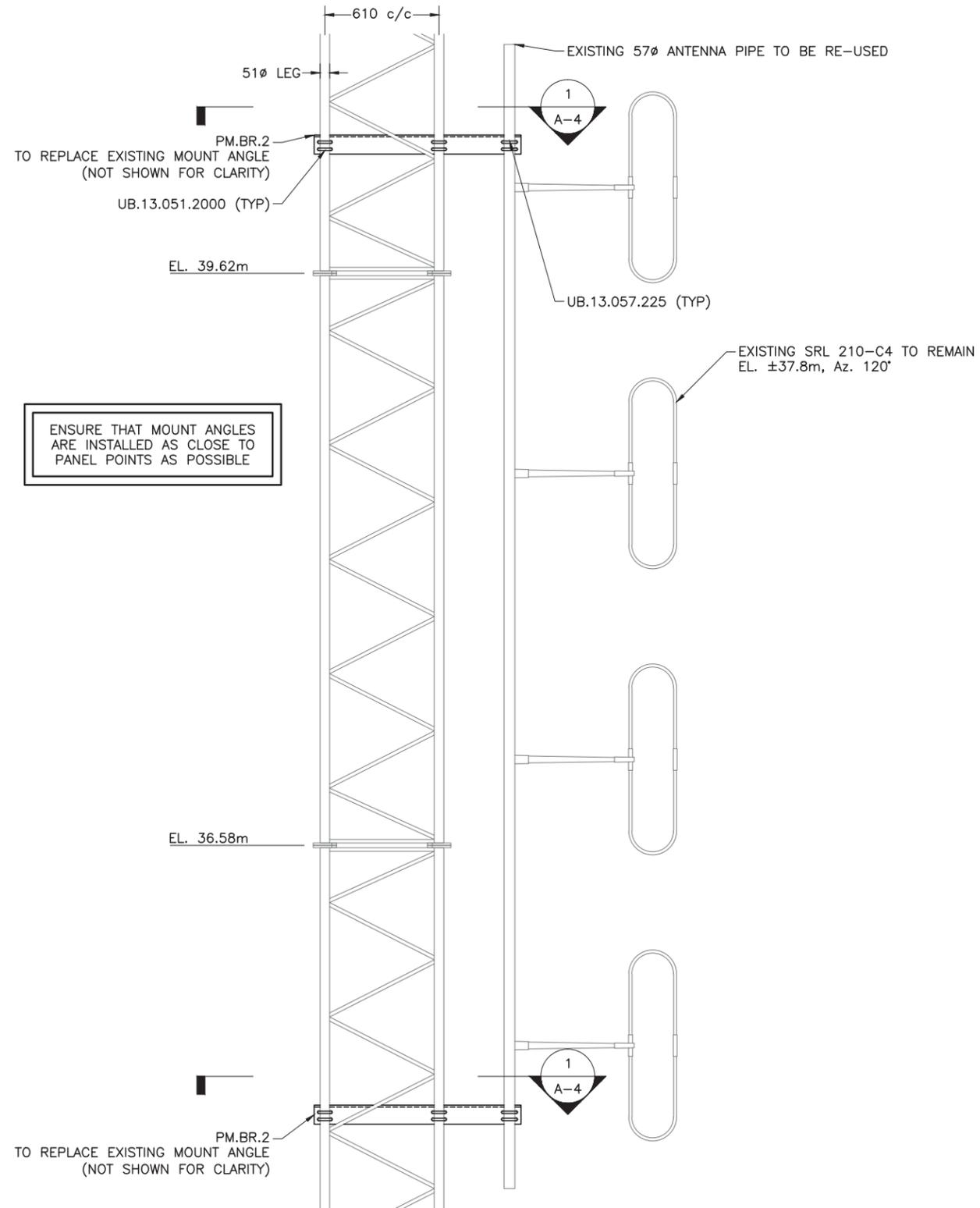
SHEET TITLE

ANTENNA MOUNT RETROFIT

DRAWN BY: JWG
CHECKED BY: DDS
APPROVED BY: IMH

SHEET

A-3

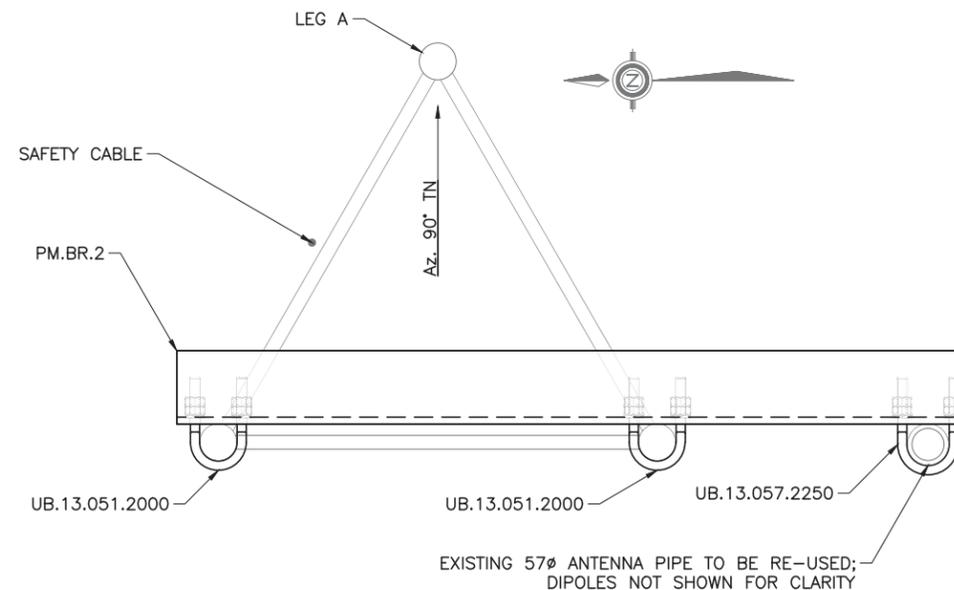


**ANTENNA MOUNT REPLACEMENT DETAILS @ ±37.8m.
FACE BC ELEVATION VIEW**

BILL OF MATERIALS		
PART No.	DESCRIPTION	QTY
PM.BR.2	PIPE MOUNT BRACKET	2
UB.13.051.2000	1/2" U-BOLT ASS'Y (FITS 51Ø LEG)	8
UB.13.057.2250	1/2" U-BOLT ASS'Y (FITS 57Ø PIPE)	4

NOTES ON INSTALLATION

1. POSITION MOUNT ON TOWER SUCH THAT PROPER ELEVATION AND ORIENTATION CAN BE PROVIDED.
2. INSTALL REPLACEMENT MOUNT PARTS AND HARDWARE IN ACCORDANCE WITH ALL MANUFACTURER'S/CLIENT INSTALLATION SPECIFICATIONS.
3. CONTRACTOR IS RESPONSIBLE TO MAKE PROVISIONS TO SUPPORT OR WORK AROUND EXISTING ANTENNAS, MOUNT AND TRANSMISSION LINES.
4. MAY REQUIRE DETACHING AND RE-ATTACHING EXISTING TX LINES TO ACCOMMODATE MOUNT INSTALLATION; NEW TX LINE HARDWARE MAY BE REQUIRED. CONTRACTOR TO FIELD VERIFY.
5. APPLY TWO LAYERS OF COLD GALVANIZING TO ALL FIELD CUTS, FIELD DRILLED HOLES AND FIELD WELDING USING ZRC GALVALITE OR ZINGA COMPOUND.
6. THE REQUIRED MODIFICATIONS TO BE COMPLETED IN CALM WEATHER WITH WIND VELOCITY LESS THAN 30 KM/H AT GROUND ELEVATION.



**1
A-4 TYPICAL SECTION VIEW**

CLIENTS



ENGINEERING FIRM
P-SEC
PIER STRUCTURAL ENGINEERING CORP.

ph: 519-885-3806
fx: 519-884-3806
www.p-sec.ca

55 NORTHFIELD DR. E.
SUITE 198
WATERLOO, ON
N2K 3T6

PROJECT NUMBER
16403

PROFESSIONAL STAMP
LICENSED PROFESSIONAL ENGINEER
I. M. HARRISON
100011993
H 4 2017
PROVINCE OF ONTARIO

IAIN M. HARRISON P.ENG No.: 100011993
P-SEC CoA No.: 100099550

REVISIONS

No.	Description	Date
0	ISSUED FOR CONSTRUCTION	08.04.17

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT NAMED IS STRICTLY PROHIBITED.

CLIENT NUMBER
TOWER 7

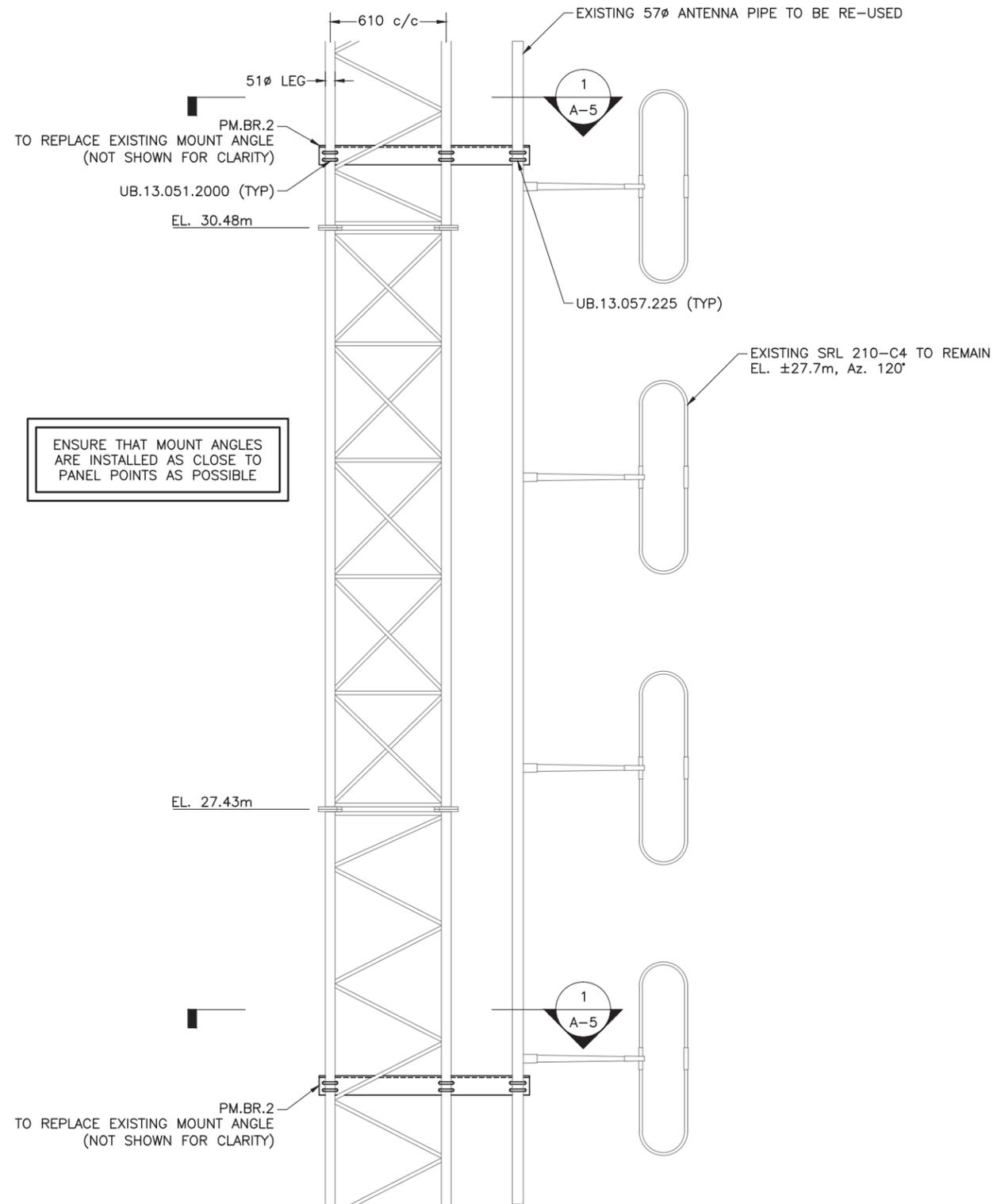
SITE ADDRESS
IQUALUIT, NUNAVUT

SITE DESIGN
**MOUNT
INSTALLATION/RETROFIT**

SHEET TITLE
**ANTENNA
MOUNT REPLACEMENT**

DRAWN BY: JWG
CHECKED BY: DDS
APPROVED BY: IMH

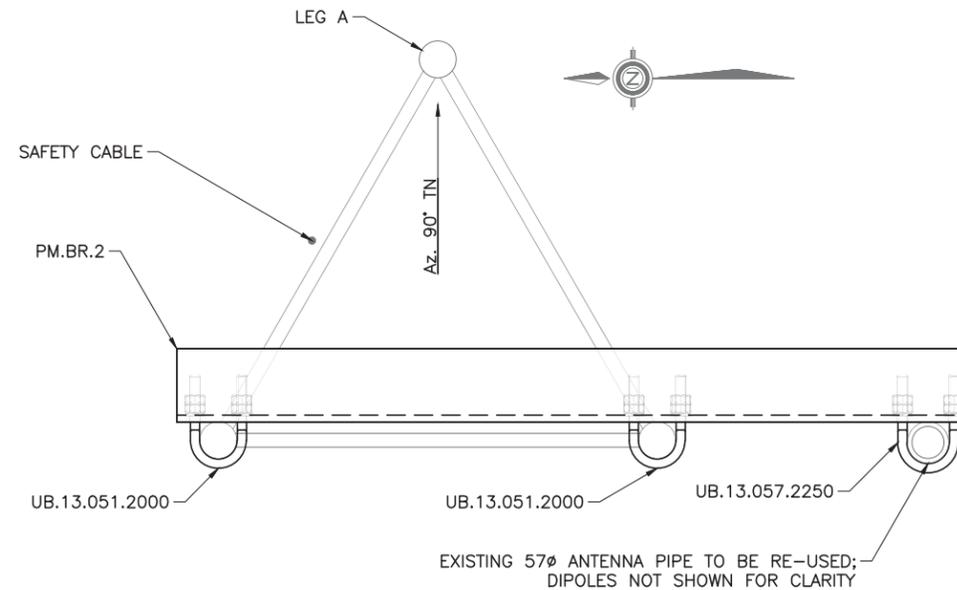
SHEET
A-4



BILL OF MATERIALS		
PART No.	DESCRIPTION	QTY
PM.BR.2	PIPE MOUNT BRACKET	2
UB.13.051.2000	1/2" U-BOLT ASS'Y (FITS 51φ LEG)	8
UB.13.057.2250	1/2" U-BOLT ASS'Y (FITS 57φ PIPE)	4

NOTES ON INSTALLATION

1. POSITION MOUNT ON TOWER SUCH THAT PROPER ELEVATION AND ORIENTATION CAN BE PROVIDED.
2. INSTALL REPLACEMENT MOUNT PARTS AND HARDWARE IN ACCORDANCE WITH ALL MANUFACTURER'S/CLIENT INSTALLATION SPECIFICATIONS.
3. CONTRACTOR IS RESPONSIBLE TO MAKE PROVISIONS TO SUPPORT OR WORK AROUND EXISTING ANTENNAS, MOUNT AND TRANSMISSION LINES.
4. MAY REQUIRE DETACHING AND RE-ATTACHING EXISTING TX LINES TO ACCOMMODATE MOUNT INSTALLATION; NEW TX LINE HARDWARE MAY BE REQUIRED. CONTRACTOR TO FIELD VERIFY.
5. APPLY TWO LAYERS OF COLD GALVANIZING TO ALL FIELD CUTS, FIELD DRILLED HOLES AND FIELD WELDING USING ZRC GALVALITE OR ZINGA COMPOUND.
6. THE REQUIRED MODIFICATIONS TO BE COMPLETED IN CALM WEATHER WITH WIND VELOCITY LESS THAN 30 KM/H AT GROUND ELEVATION.



1
A-5 TYPICAL SECTION VIEW

**ANTENNA MOUNT REPLACEMENT DETAILS @ ±27.7m.
FACE BC ELEVATION VIEW**

CLIENTS



ENGINEERING FIRM
P-SEC
 PIER STRUCTURAL ENGINEERING CORP.
 ph: 519-885-3806
 fx: 519-884-3806
 www.p-sec.ca
 55 NORTHFIELD DR. E.
 SUITE 198
 WATERLOO, ON
 N2K 3T6

PROJECT NUMBER
16403



IAIN M. HARRISON P.ENG No.: 100011993
 P-SEC CoA No.: 100099550

REVISIONS		
No.	Description	Date
0	ISSUED FOR CONSTRUCTION	08.04.17

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT NAMED IS STRICTLY PROHIBITED

CLIENT NUMBER
TOWER 7

SITE ADDRESS
IQALUIT, NUNAVUT

SITE DESIGN
**MOUNT
 INSTALLATION/RETROFIT**

SHEET TITLE
**ANTENNA
 MOUNT REPLACEMENT**

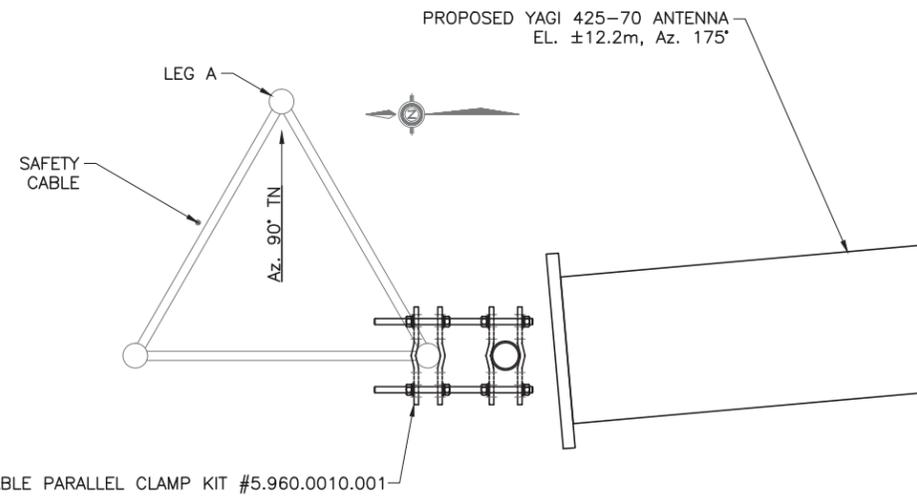
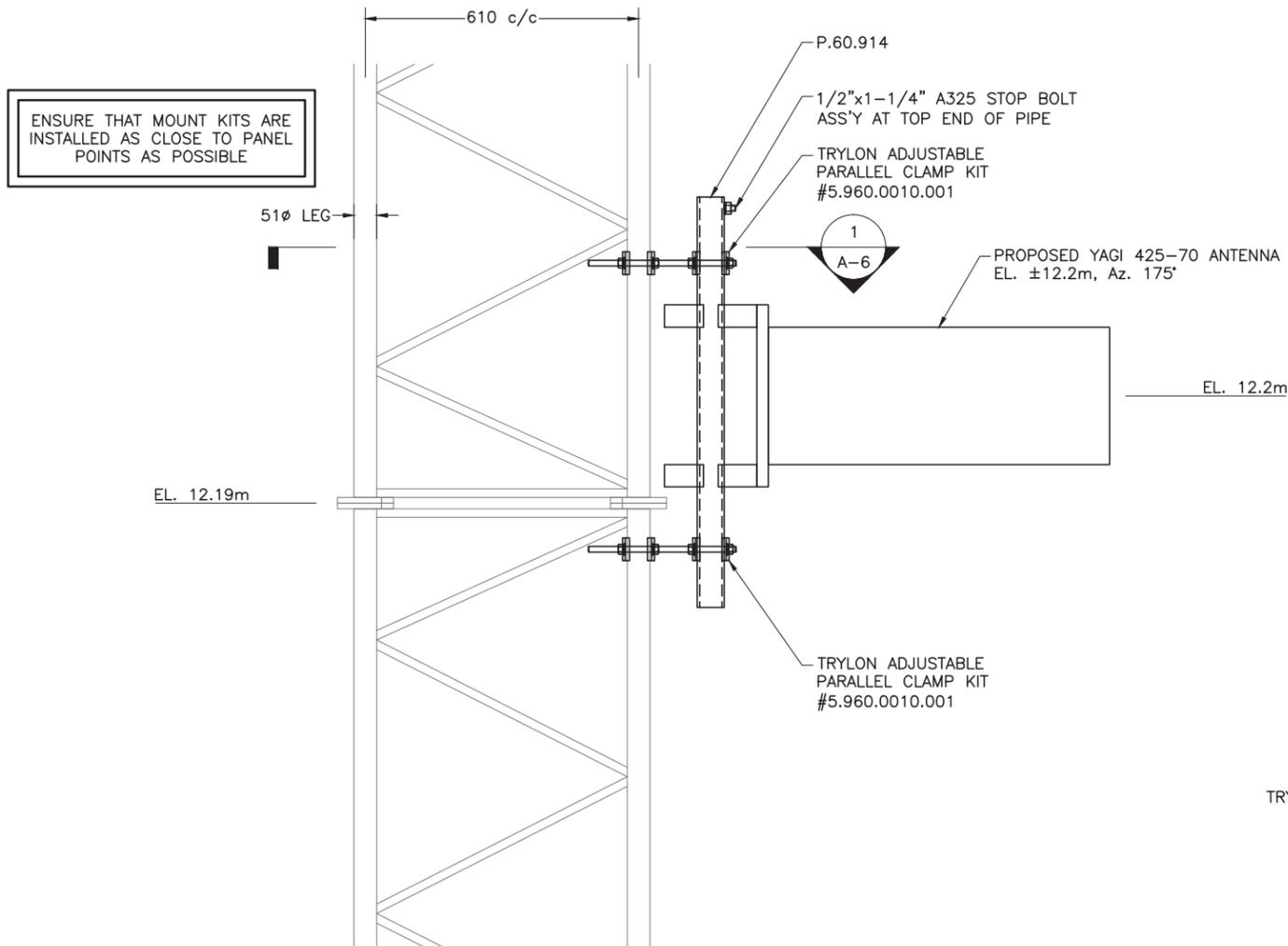
DRAWN BY JWG	SHEET A-5
CHECKED BY DDS	
APPROVED BY IMH	

NOTES ON INSTALLATION

1. POSITION MOUNT ON TOWER SUCH THAT PROPER ELEVATION AND ORIENTATION CAN BE PROVIDED.
2. INSTALL ANTENNA IN ACCORDANCE WITH ALL MANUFACTURER'S/CLIENT INSTALLATION SPECIFICATIONS.
3. CONTRACTOR IS RESPONSIBLE TO MAKE PROVISIONS TO SUPPORT OR WORK AROUND EXISTING ANTENNAS, MOUNT AND TRANSMISSION LINES.
4. MAY REQUIRE DETACHING AND RE-ATTACHING EXISTING TX LINES TO ACCOMMODATE MOUNT INSTALLATION; NEW TX LINE HARDWARE MAY BE REQUIRED. CONTRACTOR TO FIELD VERIFY.
5. APPLY TWO LAYERS OF COLD GALVANIZING TO ALL FIELD CUTS, FIELD DRILLED HOLES AND FIELD WELDING USING ZRC GALVALITE OR ZINGA COMPOUND.
6. THE REQUIRED MODIFICATIONS TO BE COMPLETED IN CALM WEATHER WITH WIND VELOCITY LESS THAN 30 KM/H AT GROUND ELEVATION.

BILL OF MATERIALS - MOUNT PIPE		
PART No.	DESCRIPTION	QTY
P.60.914	60Ø PIPE	1
-	1/2"x1-1/4" A325 BOLT ASS'Y HDG	1

BILL OF MATERIALS - TRYLON KITS		
TRYLON KIT No.	DESCRIPTION	QTY
5.960.0010.001	ADJUSTABLE PARALLEL CLAMP KIT	2



1
A-6
PLAN VIEW @ 19.2m

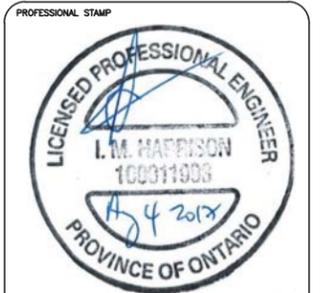
**ANTENNA INSTALLATION DETAILS,
ELEVATION VIEW @ FACE BC**

CLIENTS



ENGINEERING FIRM
P-SEC
PIER STRUCTURAL ENGINEERING CORP.
ph: 519-885-3806
fx: 519-884-3806
www.p-sec.ca
55 NORTHFIELD DR. E.
SUITE 198
WATERLOO, ON
N2K 3T6

PROJECT NUMBER
16403



IAIN M. HARRISON P.ENG No.: 100011993
P-SEC CoA No.: 100099550

No.	Description	Date
0	ISSUED FOR CONSTRUCTION	08.04.17

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT NAMED IS STRICTLY PROHIBITED.

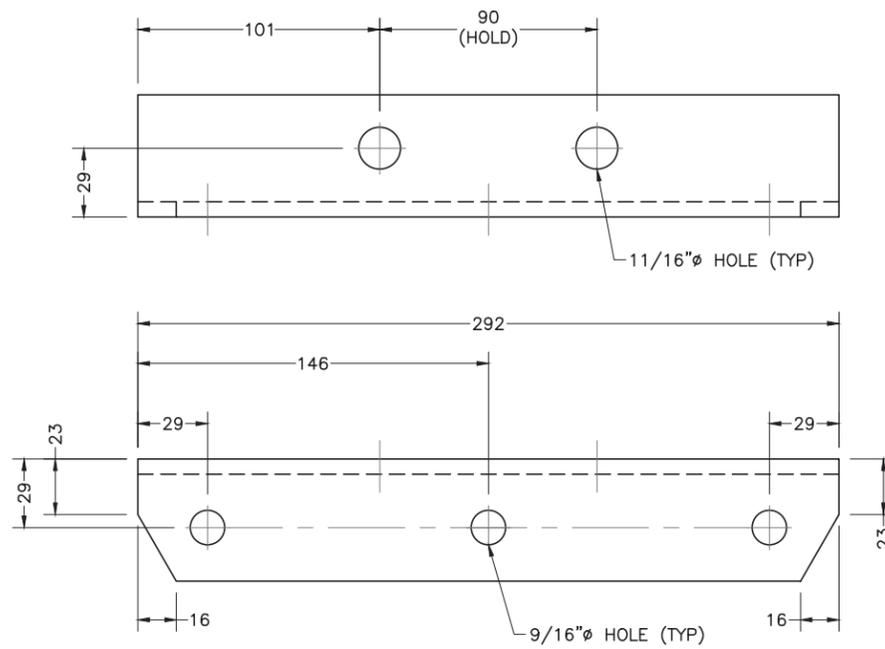
CLIENT NUMBER
TOWER 7

SITE ADDRESS
IQUALUIT, NUNAVUT

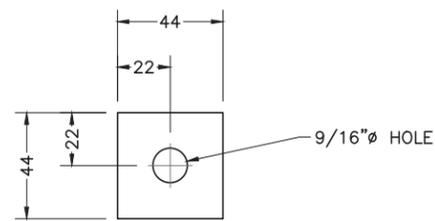
SITE DESIGN
**MOUNT
INSTALLATION/RETROFIT**

SHEET TITLE
**ANTENNA
INSTALLATION**

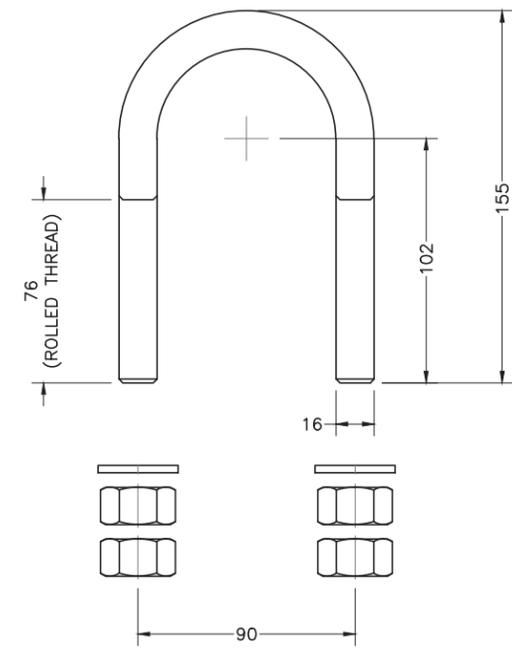
DRAWN BY JWG	SHEET A-6
CHECKED BY DDS	
APPROVED BY IMH	



PM.BR.1
 NAME: PIPE MOUNT BRACKET
 MATERIAL: L 51x51x6.4
 GRADE: G40.21-300W
 FINISH: HDG
 QTY: 2



SP.1
 NAME: SPACER
 MATERIAL: 6.4mm THICK PLATE
 GRADE: G40.21-300W
 FINISH: HDG
 QTY: 2



UB.16.73
 NAME: 5/8" U-BOLT ASSY
 MATERIAL: 5/8" SOLID ROUND BAR
 GRADE: ASTM A307 / Gr.5 NUTS & F.W.
 FINISH: HDG
 QTY: 4

CLIENTS



ENGINEERING FIRM



ph: 519-885-3806
 fx: 519-884-3806
 www.p-sec.ca
 55 NORTHFIELD DR. E.
 SUITE 198
 WATERLOO, ON
 N2K 3T6

PROJECT NUMBER

16403

PROFESSIONAL STAMP



IAN M. HARRISON P.ENG No.: 100011993
 P-SEC CoA No.: 100099550

REVISIONS

No.	Description	Date
0	ISSUED FOR CONSTRUCTION	08.04.17

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT NAMED IS STRICTLY PROHIBITED

CLIENT NUMBER

TOWER 7

SITE ADDRESS

IQALUIT, NUNAVUT

SITE DESIGN

MOUNT
 INSTALLATION/RETROFIT

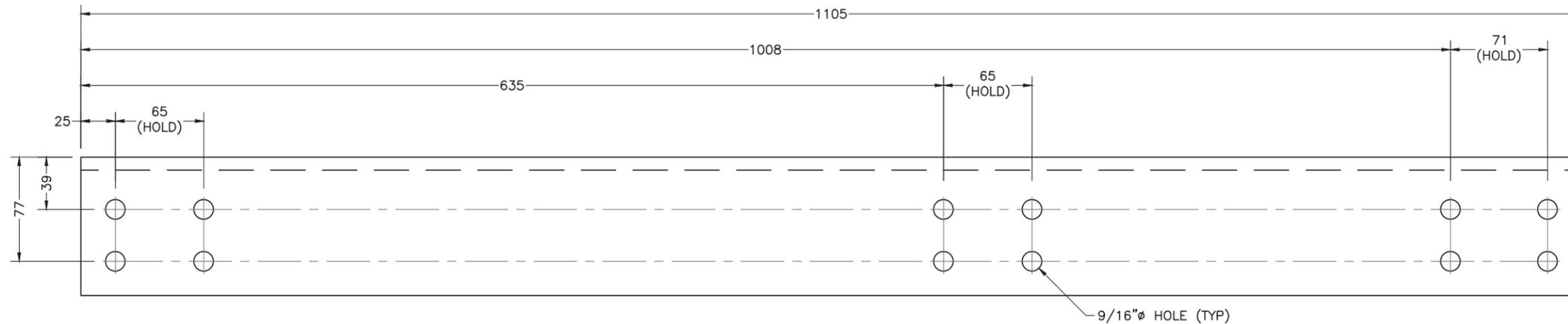
SHEET TITLE

PARTS

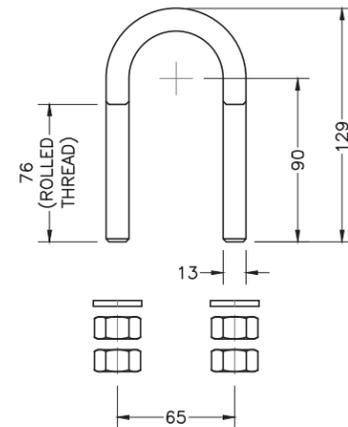
DRAWN BY: JWG
 CHECKED BY: DDS
 APPROVED BY: IMH

SHEET

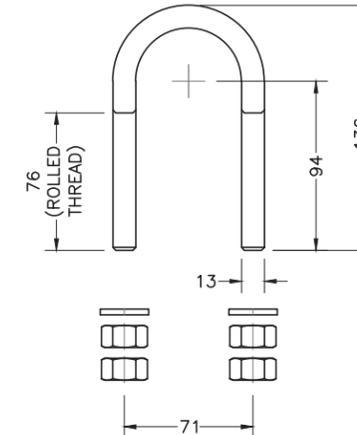
F-1



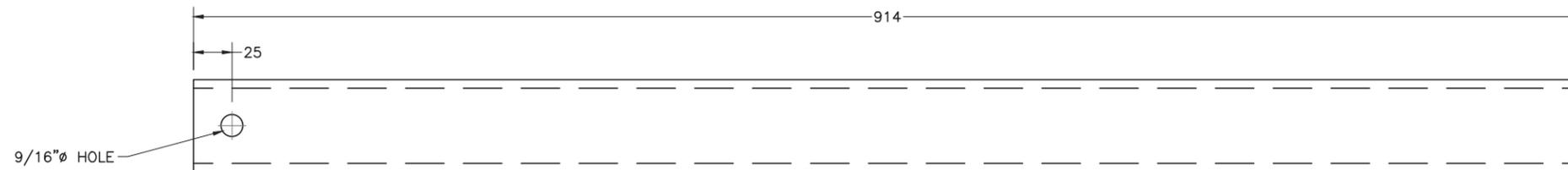
PM.BR.2
 NAME: PIPE MOUNT BRACKET
 MATERIAL: L 102x102x10
 GRADE: G40.21-300W
 FINISH: HDG
 QTY: 4



UB.13.051.2000
 NAME: 1/2" U-BOLT ASSY
 MATERIAL: 1/2" SOLID ROUND BAR
 GRADE: ASTM A307 / Gr.5 NUTS & F.W.
 FINISH: HDG
 QTY: 16



UB.13.057.2250
 NAME: 1/2" U-BOLT ASSY
 MATERIAL: 1/2" SOLID ROUND BAR
 GRADE: ASTM A307 / Gr.5 NUTS & F.W.
 FINISH: HDG
 QTY: 8



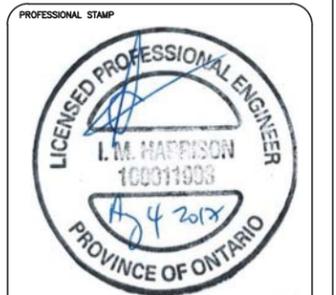
P.60.914
 NAME: PIPE
 MATERIAL: 2" SCH 80 (60mm ϕ x 5.573mm THICK) PIPE
 GRADE: ASTM A53 Gr. A
 FINISH: HDG
 QTY: 1

CLIENTS



ENGINEERING FIRM
P-SEC
 PIER STRUCTURAL ENGINEERING CORP.
 ph: 519-885-3806
 fx: 519-884-3806
 www.p-sec.ca
 55 NORTHFIELD DR. E.
 SUITE 198
 WATERLOO, ON
 N2K 3T6

PROJECT NUMBER
16403



IAN M. HARRISON P.ENG No.: 100011903
 P-SEC CoA No.: 100099550

REVISIONS		
No.	Description	Date
0	ISSUED FOR CONSTRUCTION	08.04.17

THE INFORMATION CONTAINED IN THIS SET OF DOCUMENTS IS PROPRIETARY BY NATURE. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO THE CLIENT NAMED IS STRICTLY PROHIBITED

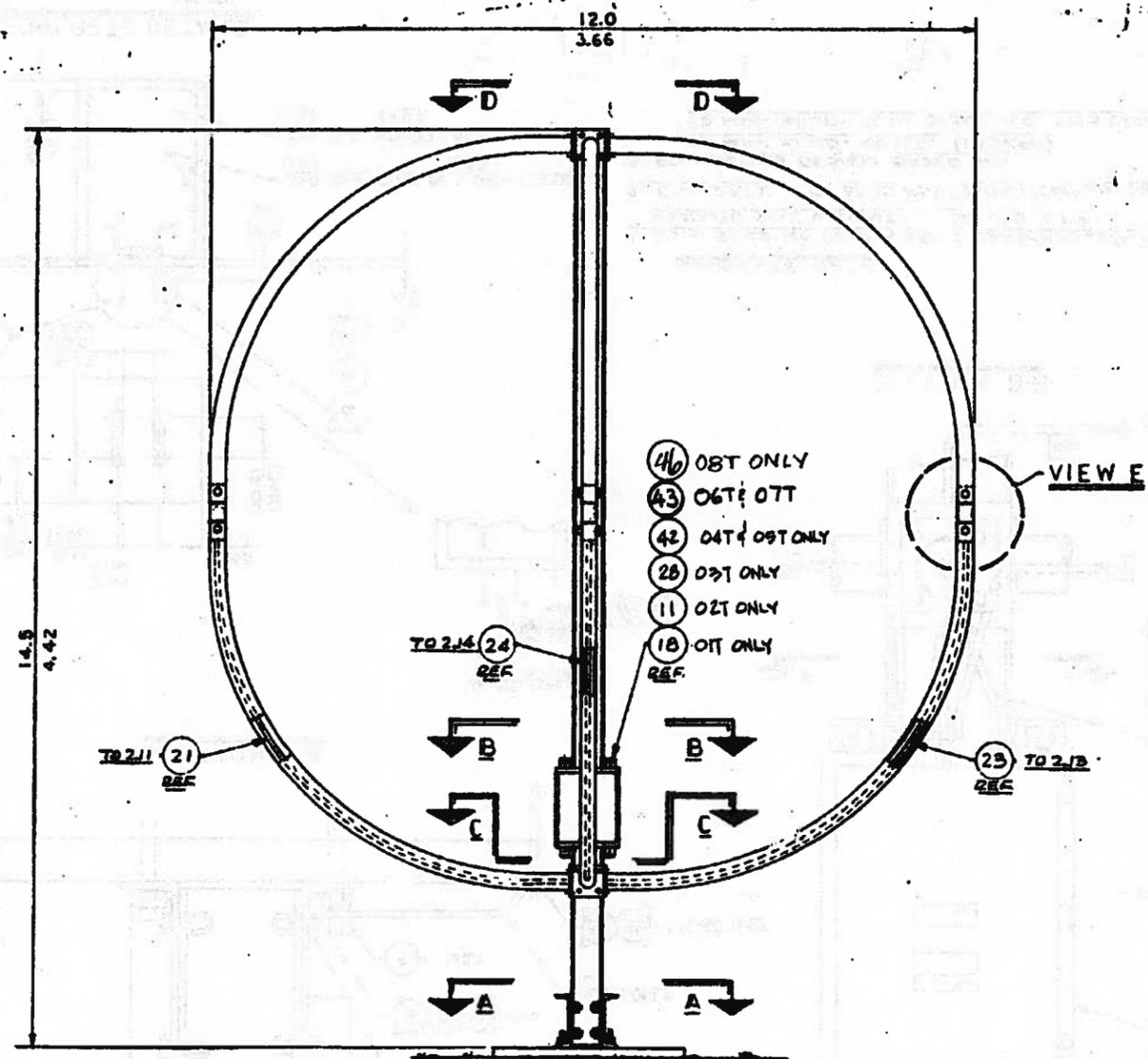
CLIENT NUMBER
TOWER 7

SITE ADDRESS
IQALUIT, NUNAVUT

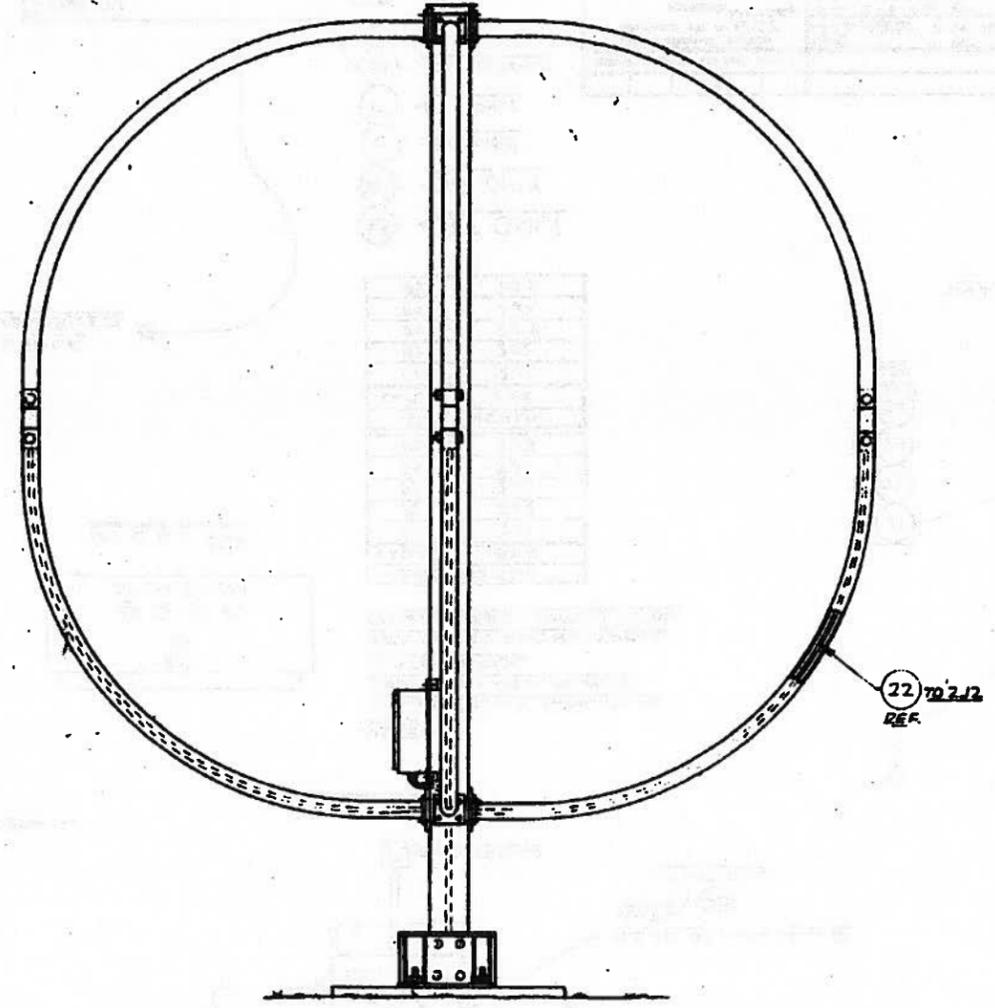
SITE DESIGN
MOUNT INSTALLATION/RETROFIT

SHEET TITLE
PARTS

DRAWN BY JWG	SHEET
CHECKED BY DDS	F-2
APPROVED BY IMH	



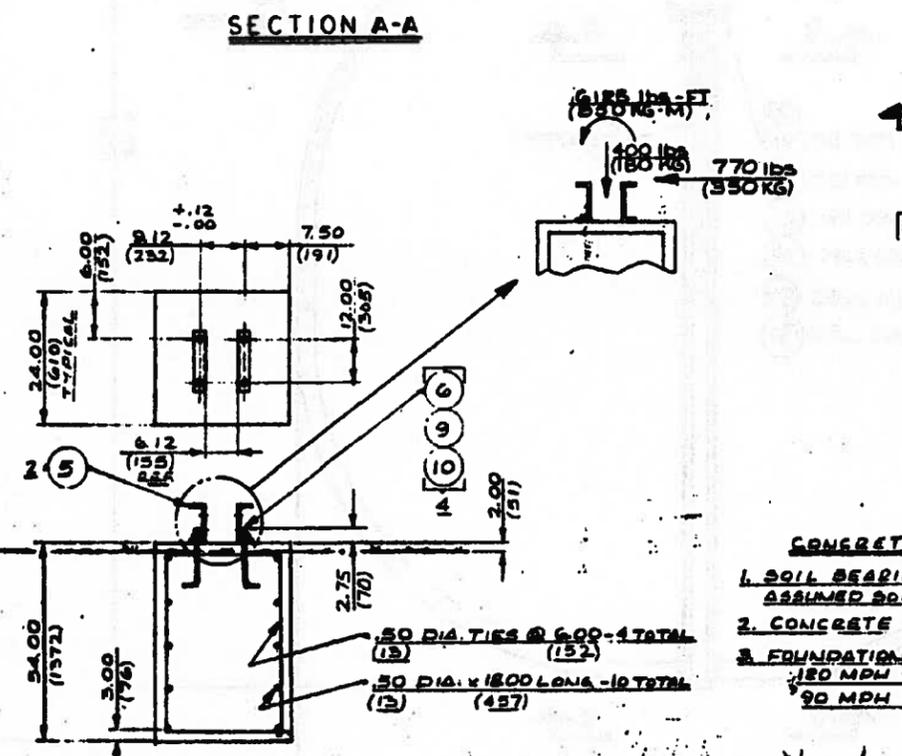
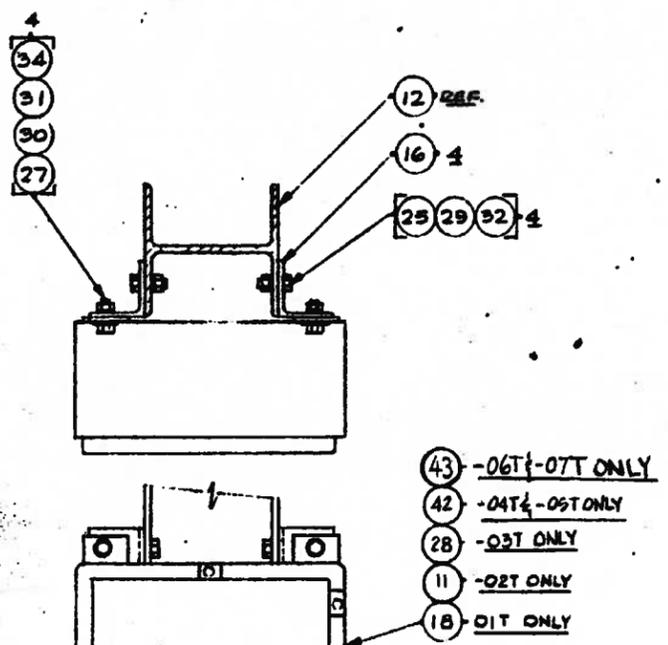
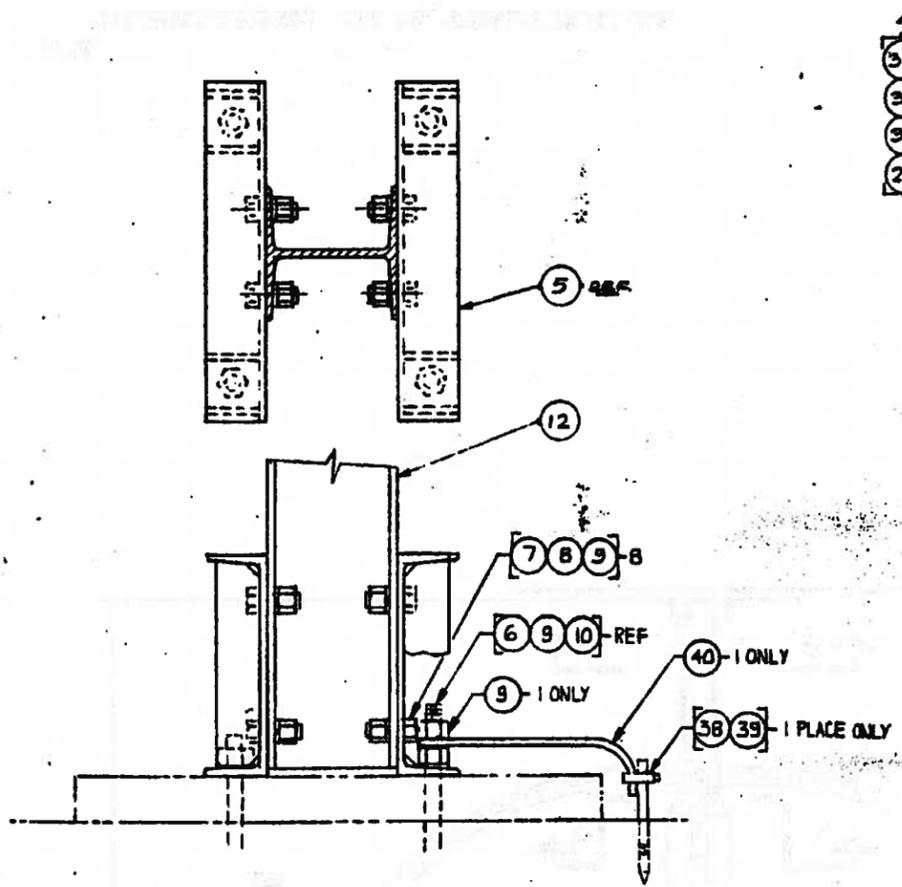
- (46) OBT ONLY
- (43) O6T; OTT
- (42) O4T; O9T ONLY
- (28) O3T ONLY
- (11) O2T ONLY
- (18) OTT ONLY REF.



NOTE
SEE SHEET 2 FOR CONCRETE AND INSTALLATION DETAILS.

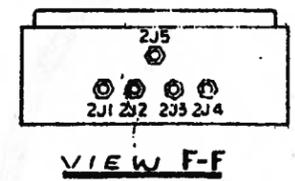
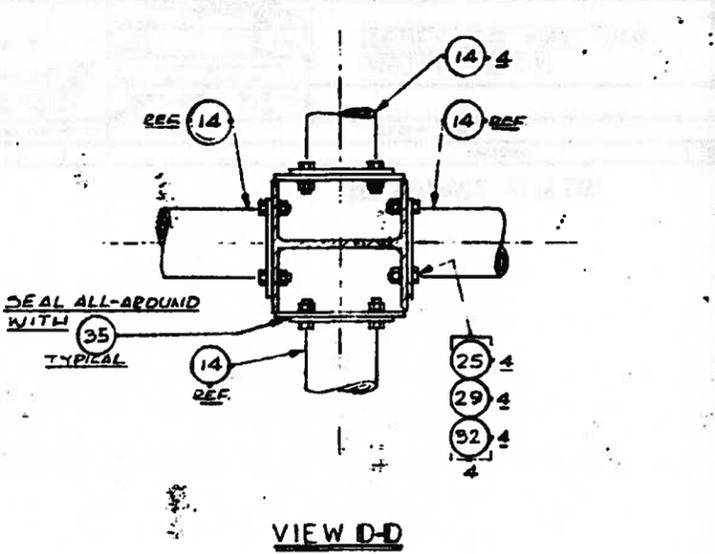
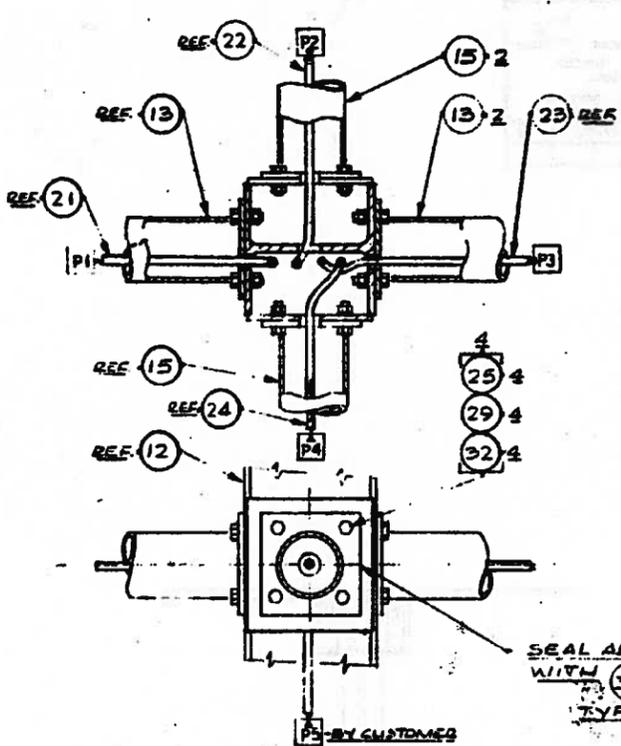
SEE SEPARATE PARTS LIST

QUANTITY REQUIRED FOR EACH NUMBER	DESCRIPTION	LIST OF MATERIALS
<small>UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES</small> <small>TERMINALS & CONNECTORS</small> <small>REVISIONS</small>	<small>DATE</small> <small>BY</small> <small>APPROVED</small> <small>DATE</small>	INSTALLATION MODEL 625L ANTENNA
<small>REVISED BY</small> <small>DATE</small>	<small>DATE</small> <small>BY</small>	329-ANT-00T



CONCRETE DATA

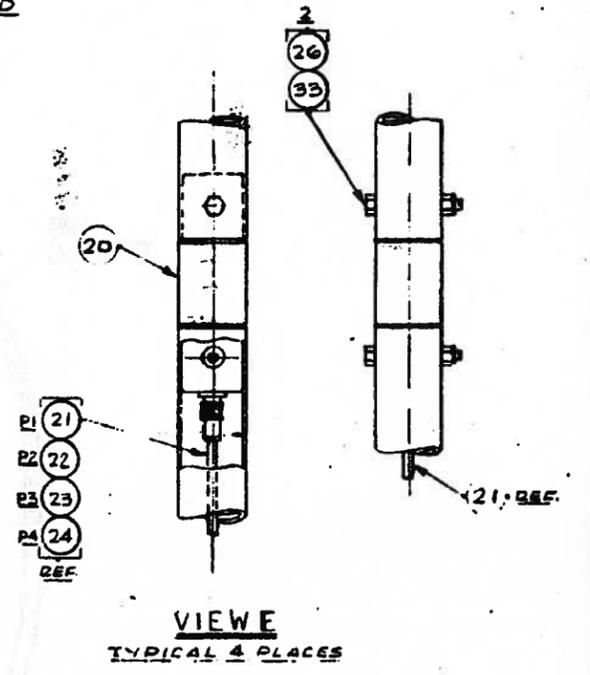
- SOIL BEARING PRESSURE: 3 KSE (1450 KG/M²)
ASSUMED SOIL WEIGHT: 100 LBS/FT³
- CONCRETE F'C: 3000 PSI (210 KG/CM²) IN 28 DAYS
- FOUNDATION DESIGN BASED ON:
150 MPH WIND - NO ICE (133 KPH)
90 MPH WIND - 1/2 IN. RADIAL ICE (145 KPH)



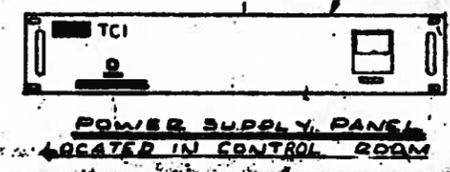
NOTE:
CONNECTIONS SHOWN FOR
SOUTHERN HEMISPHERE
INSTALLATION.
SEE CHART FOR NORTHERN
HEMISPHERE INSTALLATION.

-SOUTHERN-	
CABLE	BOX
P1	2J1
P2	2J2
P3	2J3
P4	2J4
P5	2J5

-NORTHERN-	
CABLE	BOX
P1	2J3
P2	2J2
P3	2J1
P4	2J4
P5	2J5



- 45 -07T ONLY
- 44 -06T ONLY
- 41 -05T ONLY
- 17 -02T ONLY
- 19 -01T/04T ONLY



REVISION	DESCRIPTION	DATE	APPROVED

CHECKED BY: [Signature] DRAWN BY: [Signature]	DATE: 2-24-75 SCALE: 1:1 SHEET: 2 OF 2	INSTALLATION MODEL 62L ANTENNA
PART NO. 329-ANT-00T	QTY. 1	MFG. M



Fremont, California USA

PARTS LIST

DRAWING SIZE

DRAWING NUMBER

REV

D

329-ANT-00T

M

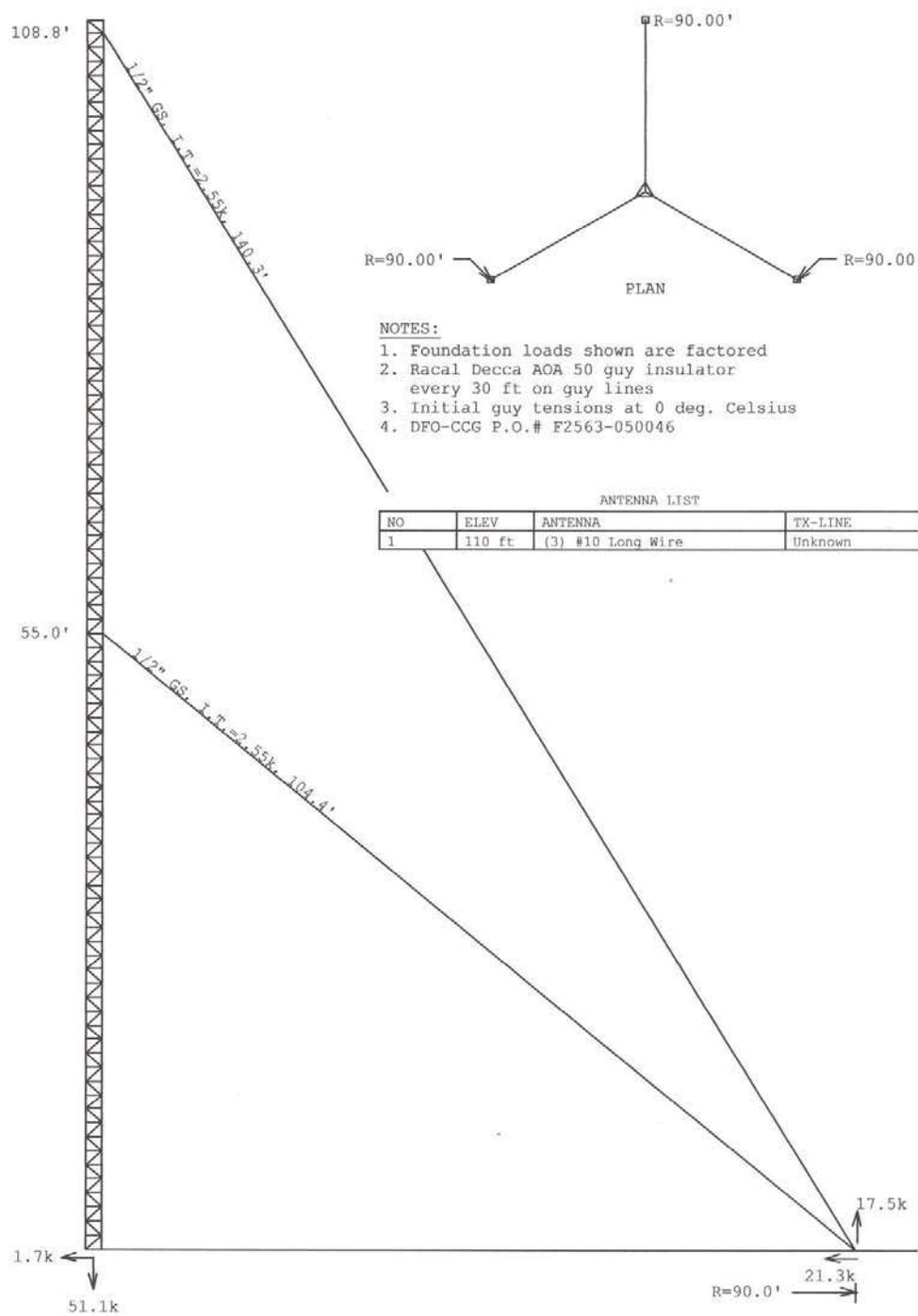
PREPARED BY:	USED ON:	NEXT ASSEMBLY:	TITLE
	3/2/78		INSTALLATION MODEL 625L ANTENNA
CHECKED BY:			
CA WATERMAN	4/7/78		
APPROVED BY:			
EMJT	4/12/78		
APPROVED BY:			
G MEYERS	4/11/78		

REV	DESCRIPTION OF CHANGE	DATE	PREP BY	CHECK BY	APPROVED	REV	DESCRIPTION OF CHANGE	DATE	PREP BY	CHECK BY	APPROVED
A	INSTALLATION RELEASE	6/6/1978	JB	CAW	GM						
B	P/N 20 WAS 235 ASY-03A	11/30/78	CP		EMJT						
C	ADDED -02T	4/1/1981	MF	RDT	RDT						
D	REVISED PER ECN 00488	10/28/81	PL	CP							
E	REVISED PER ECN 00916	1/27/1982		RJOY							
F	REVISED PER ECN 02559	1/3/1983	KH	GGG	PW						
G	REVISED PER ECN 06027	8/21/1985	CH	RJOY	CAW						
H	REVISED PER ECN 06233	10/6/1989	MBJ								
J	REVISED PER ECO 23627	9/16/1998	DW	RJOY	ALIU						
K	REVISED PER ECO 28756	7/10/2003			MWF/GGG						
L	REVISED PER ECO 30136	11/12/04	KO		GGG						
M	REVISED PER ECO 30654	9/28/05	GB		<i>GGG</i>						

 Fremont, California USA														TITLE			DRAWING NUMBER		REV
														MODEL 625L, ANTENNA INSTALLATION			329-ANT-00T		M
-99T	-98T					-10T	-08T	-07T	-06T	-05T	-04T	-03T	-02T	-01T	DASH	TC/BR/DIELECTRIC PART NUMBER	NOMENCLATURE OR DESCRIPTION	ITEM NO.	COMMENTS
^	^					^	^	^	^	^	^	^	^	^	STATUS CODE				
M	M					M	M	M	M	M	M	M	M	M	REVISION				
QUANTITY REQUIRED PER DASH NUMBER																			
						1	1	1	1	1	1	1	1	1		021-CBL-10A	CABLE ASSEMBLY-COAXIAL	22	
						1	1	1	1	1	1	1	1	1		021-CBL-11A	CABLE ASSEMBLY-COAXIAL	23	
						1	1	1	1	1	1	1	1	1		021-CBL-12A	CABLE ASSEMBLY-COAXIAL	24	
4						36	36	36	36	36	36	36	36	36		003-BLT-01P	BOLT, HEX, 1/2-13 X 1-1/4" ALUM	25	
1						8	8	8	8	8	8	8	8	8		003-BLT-10P	BOLT, HEX, 1/2-13 X 3.5" ALUM	26	
1						4	4	4	4	4	4	4	4	4		007-BLT-09P	BOLT, HEX, 3/8-16 X 1" FULL THREAD ALUM	27	
												1				404-ASY-03A	ASSEMBLY OUTLINE, POWER DIVIDER W/O AMP	28	SUPPLY DWG(ITEM #50)
4						36	36	36	36	36	36	36	36	36		004-WSH-01P	WASHER, SPLITLOCK, 1/2" ALUM	29	
1						4	4	4	4	4	4	4	4	4		004-WSH-02P	WASHER, SPLITLOCK, 3/8" ALUM	30	
1						4	4	4	4	4	4	4	4	4		005-WSH-03P	WASHER, FLAT 3/8" ALUM	31	
4						36	36	36	36	36	36	36	36	36		003-NUT-01P	NUT, HEX 1/2-13 ALUM	32	
1						8	8	8	8	8	8	8	8	8		016-NUT-09P	NUT, HEX, NYLOCK, 1/2-13 ALUM	33	
1						4	4	4	4	4	4	4	4	4		006-NUT-01P	NUT, HEX, 3/8-16 ALUM	34	
						1	1	1	1	1	1	1	1	1		001-RTV-01P	RTV, 732 SEALANT - WHITE - 10 OZ.TUBE	35	AS REQUIRED-SUPPLY 1 TUBE
																		36	
																		37	
						1	1	1	1	1	1	1	1	1		012-ROD-01A	ROD, GROUND 8FT X 5/8" DIA GALV	38	
						1	1	1	1	1	1	1	1	1		005-CLA-03P	CLAMP, PARALLEL, 37-6/16M WIRES ALUM	39	
						1	1	1	1	1	1	1	1	1		058-WIR-03A	WIRE, GROUND, LOOP TOWER, .69	40	
										1						994-ASY-04A	ASSEMBLY, POWER SUPPLY MULTICOUPLER 20V, 1 CH	41	1 OUTPUT
										1	1					404-ASY-04A	ASSEMBLY OUTLINE, AMPLIFIER-POWER DIVIDER	42	23dB AMPLIFIER-SUPPLY DWG(ITEM #50)
								1	1							404-ASY-05A	ASSEMBLY OUTLINE, AMPLIFIER-POWER DIVIDER	43	17 dB AMP
									1							899-ASY-09A	ASSEMBLY, POWER SUPPLY MULTICOUPLER, 12V, 1 CH.	44	
								1								994-ASY-05A	ASSEMBLY, POWER SUPPLY MULTICOUPLER 12V, 1 CH	45	
						1										404-ASY-06A	ASSEMBLY OUTLINE, AMPLIFIER-POWER DIVIDER,17DB W/MF FILTER	46	
						1										899-ASY-08A	ASSEMBLY, POWER SUPPLY MULTICOUPLER, 12V, 2 CH.	47	
																		48	
																		49	
									2	2	2	2	2	2		404-ASY-00A	DWG.,ASSEMBLY OUTLINE, AMPLIFIER-POWER DIVIDER	50	

Leg	44	SR 1-1/4" ϕ
Diagonal	44	SR 5/8" ϕ
Horizontal	44	SR 5/8" ϕ
Brace Bolts	A325	0.525
Face Width	0	2.0'
Panel Height#Panels	0	1.2' #88

110.0'
108.8'
55.0'
0.0'



- NOTES:
1. Foundation loads shown are factored
 2. Racal Decca AOA 50 guy insulator every 30 ft on guy lines
 3. Initial guy tensions at 0 deg. Celsius
 4. DFO-CCG P.O.# F2563-050046

ANTENNA LIST

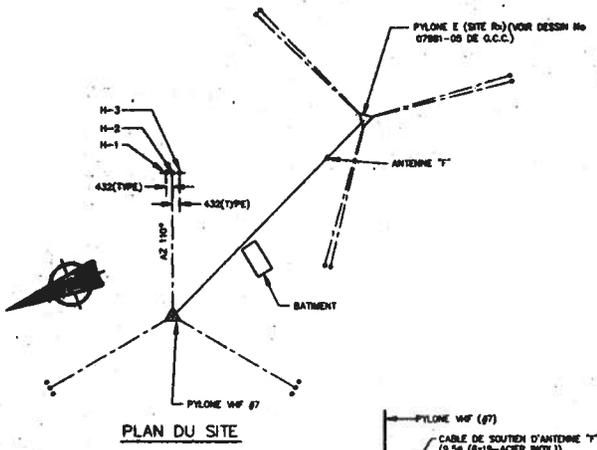
NO	ELEV	ANTENNA	TX-LINE
1	110 ft	(3) #10 Long Wire	Unknown

Elevation on azimuth 0.00 deg

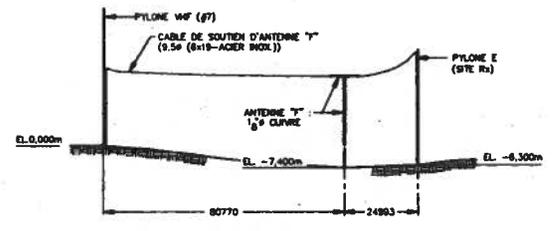
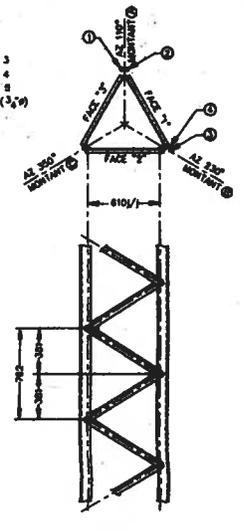


Advantage Tower Ltd.
 Box 1 Site 21 RR9, Calgary, Alta. T2J 5G5
 Phone: (403) 201-7983 Fax: (403) 201-7963

Client: DFO-Canadian Coast Guard Job No: 1028 Date: 2 mar 2006
 Location: 110 ft guyed - Iqaluit, NU Tower Height: 110.00'
 Standard: CSA/S37-01 Design Wind & Ice: 1000 Pa, 40 mm ice



- ① LIÈGE 20mm Ø DE L'ANTENNE 3
- ② LIÈGE 20mm Ø DE L'ANTENNE 4
- ③ LIÈGE 8,5mm Ø DE L'ANTENNE 5
- ④ LIÈGE ÉLECTRIQUE "TECK 90" (3,5)



LISTE DES ANTENNES					
ANTENNE	TYPE	ELEVATION	AZMUT	LIGNES DE TRANSMISSION	REMARQUES
1	SRL 320	47840	-	-	EXISTANTE SUR MONTANT (1) NON UTILISÉE
2	(2)SRL 230	37105	-	-	EXISTANTE SUR FACE (1) NON UTILISÉE
3	SRL 210A-1	31638	130a	28mm Ø	EXISTANTE SUR MONTANT (2)
4	SRL 210A-1	22125	130a	28mm Ø	EXISTANTE SUR MONTANT (2)
5	SRL 210A-2	3810	130a	8,5mm Ø	EXISTANTE SUR MONTANT (2)

NOTE: TOUTES LES INFORMATIONS CONCERNANT LES ÉLÉMENTS EXISTANTS DU PYLON, PROVIENT DU RELEVÉ EFFECTUÉ LE 15 NOVEMBRE 1984, PAR MARTON, CYR ET ASSOCIÉS.

RAYONS ET ELEVATIONS APPROXIMATIFS DES POINTS DE TRAVAIL DES ANCRAGES		
ANCRAGE	RAYON (mm)	ELEVATION (mm)
AZMUT 110°	37740	-4330
AZMUT 230°	38580	-5810
AZMUT 350°	44440	-8490

NOTE: UN RAIL DE SÉCURITÉ AINSI QUE DES ÉCHELONS DEVRAIENT ÊTRE INSTALLÉS SI UNE ANALYSE DU PYLON LE PERMET. MODÈLES DE RAIL MANUFACTURÉS PAR "MILLER SAFETY LTD." (TRENTON, ONTARIO) OU PAR "WYLDON MANUFACTURING CO. LTD."

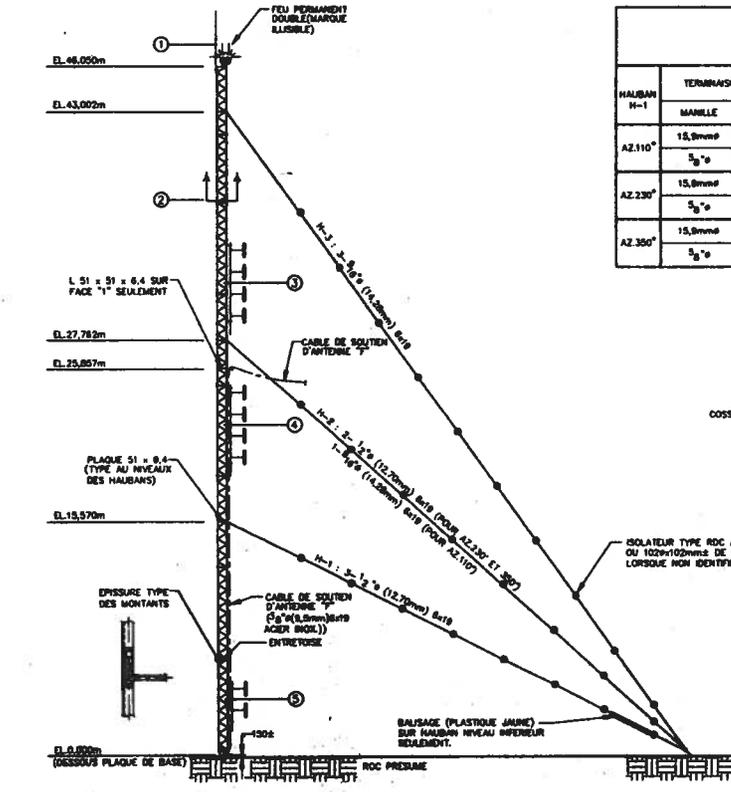
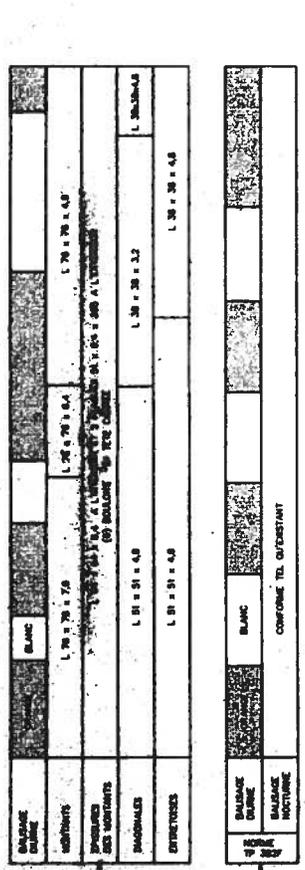
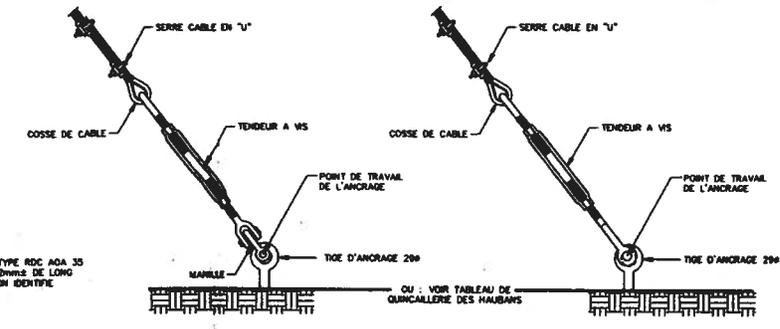
OSCILLATIONS DES HAUBANS											
AZMUT : 110°											
		TEMPÉRATURE									
		-40°C	-30°C	-20°C	-10°C	0°C	10°C	20°C			
HAUBAN	HAUTEUR	DIAMÈTRE	TENSION INITIALE	(mm)	12,53	11,79	11,02	10,27	9,52	8,77	8,00
H 1	15,57	12,70	3 Oscillations	(sec.)	0,80	0,71	0,70	0,70	0,70	0,81	0,89
				(sec.)	2,07	2,13	1,98	2,08	2,27	2,47	2,59
HAUBAN	HAUTEUR	DIAMÈTRE	TENSION INITIALE	(mm)	13,85	13,24	12,53	11,83	11,12	10,41	9,71
H 2	27,78	14,29	3 Oscillations	(sec.)	0,83	0,80	0,80	0,80	0,83	0,88	1,00
				(sec.)	2,49	2,88	2,83	2,71	2,79	2,89	2,89
HAUBAN	HAUTEUR	DIAMÈTRE	TENSION INITIALE	(mm)	13,01	12,54	12,07	11,59	11,12	10,65	10,17
H 3	43,00	14,29	3 Oscillations	(sec.)	1,05	1,07	1,08	1,11	1,14	1,18	1,19
				(sec.)	3,15	3,21	3,27	3,34	3,41	3,48	3,57

OSCILLATIONS DES HAUBANS											
AZMUT : 230°											
		TEMPÉRATURE									
		-40°C	-30°C	-20°C	-10°C	0°C	10°C	20°C			
HAUBAN	HAUTEUR	DIAMÈTRE	TENSION INITIALE	(mm)	12,40	11,89	10,99	10,24	9,52	8,80	8,08
H 1	15,57	12,70	3 Oscillations	(sec.)	0,80	0,79	0,79	0,76	0,78	0,81	0,88
				(sec.)	2,58	2,12	2,19	2,27	2,35	2,44	2,59
HAUBAN	HAUTEUR	DIAMÈTRE	TENSION INITIALE	(mm)	11,82	11,09	10,57	10,04	9,52	9,00	8,47
H 2	27,78	12,70	3 Oscillations	(sec.)	0,82	0,84	0,85	0,88	0,91	0,94	0,98
				(sec.)	2,47	2,53	2,59	2,65	2,73	2,81	2,89
HAUBAN	HAUTEUR	DIAMÈTRE	TENSION INITIALE	(mm)	12,88	12,44	12,00	11,58	11,12	10,68	10,24
H 3	43,00	14,29	3 Oscillations	(sec.)	1,08	1,08	1,10	1,12	1,14	1,17	1,18
				(sec.)	3,18	3,24	3,30	3,36	3,43	3,50	3,57

OSCILLATIONS DES HAUBANS											
AZMUT : 350°											
		TEMPÉRATURE									
		-40°C	-30°C	-20°C	-10°C	0°C	10°C	20°C			
HAUBAN	HAUTEUR	DIAMÈTRE	TENSION INITIALE	(mm)	12,60	11,83	11,08	10,29	9,52	8,75	7,98
H 1	15,57	12,70	3 Oscillations	(sec.)	0,80	0,82	0,80	0,80	0,82	0,88	1,00
				(sec.)	2,39	2,49	2,55	2,64	2,78	2,87	3,04
HAUBAN	HAUTEUR	DIAMÈTRE	TENSION INITIALE	(mm)	11,82	11,32	10,72	10,15	9,59	9,02	8,48
H 2	27,78	12,70	3 Oscillations	(sec.)	0,88	0,84	0,87	1,00	1,03	1,08	1,18
				(sec.)	2,79	2,82	2,89	2,89	3,08	3,18	3,30
HAUBAN	HAUTEUR	DIAMÈTRE	TENSION INITIALE	(mm)	13,28	12,74	12,30	11,88	11,12	10,58	10,04
H 3	43,00	14,29	3 Oscillations	(sec.)	1,14	1,15	1,19	1,22	1,28	1,38	1,39
				(sec.)	3,42	3,49	3,57	3,65	3,74	3,83	3,89

NOTES:
 - CES TABLEAUX D'OSCILLATIONS TIENNENT COMPTE DES POINTS DE TRAVAIL ACTUELS DES ANCRAGES DES HAUBANS.
 - POUR LES HAUBANS AYANT DES TEMPS D'OSCILLATIONS DE 2,00 SECONDES ET PLUS (POUR TROIS OSCILLATIONS), LA MÉTHODE D'OSCILLATION ("PULSE METHOD") DOIT ÊTRE UTILISÉE POUR EFFECTUER LES MESURES.
 - POUR LES HAUBANS AYANT DES TEMPS D'OSCILLATIONS DE MOINS DE 2,00 SECONDES (POUR TROIS OSCILLATIONS), LA MÉTHODE DU BALANCIER ("SHING METHOD") DOIT ÊTRE UTILISÉE POUR EFFECTUER LES MESURES.
 VEUILLEZ PRENDRE NOTE QUE:
 1 - UNE DIMINUTION DU TEMPS D'OSCILLATION DE 4,88% CORRESPOND À UNE AUGMENTATION DE LA VALEUR DE TENSION DANS LE HAUBAN DE 10%.
 2 - UNE AUGMENTATION DU TEMPS D'OSCILLATION DE 5,41% CORRESPOND À UNE DIMINUTION DE LA VALEUR DE TENSION DANS LE HAUBAN DE 10%.

QUINCAILLERIE DES HAUBANS																	
HAUBAN	TERMINAISON AU PYLON				TERMINAISON À L'ANCRAGE				HAUBAN	TERMINAISON AU PYLON				TERMINAISON À L'ANCRAGE			
	MANILLE	ATTACHE	SERRE-CÂBLE EN "U"	TENDEUR À VIS	MANILLE	MANILLE	ATTACHE	SERRE-CÂBLE EN "U"		TENDEUR À VIS	MANILLE	MANILLE	ATTACHE	SERRE-CÂBLE EN "U"	TENDEUR À VIS	MANILLE	
AZ110°	15,8mm 5/8"	JOINT MECAHIQUE	(2) 12,7mm 1/2"	22,2mm 7/8" x 12"	15,8mm 5/8"	AZ110°	15,8mm 5/8"	JOINT MECAHIQUE	(1) 15,8mm (2) 14,3mm 1/2"	22,2mm 7/8" x 12"	15,8mm 5/8"	AZ110°	15,8mm 5/8"	JOINT MECAHIQUE	(2) 14,3mm 1/2"	22,2mm 7/8" x 12"	15,8mm 5/8"
AZ230°	15,8mm 5/8"	JOINT MECAHIQUE	(2) 12,7mm 1/2"	23,8mm 1 1/16" x 12"	15,8mm 5/8"	AZ230°	15,8mm 5/8"	JOINT MECAHIQUE	(2) 14,3mm 1/2"	22,2mm 7/8" x 12"	-	AZ230°	15,8mm 5/8"	JOINT MECAHIQUE	(2) 14,3mm 1/2"	23,8mm 1 1/16" x 10"	15,8mm 5/8"
AZ350°	15,8mm 5/8"	JOINT MECAHIQUE	(2) 12,7mm 1/2"	22,2mm 7/8" x 12"	-	AZ350°	15,8mm 5/8"	JOINT MECAHIQUE	(2) 12,7mm 1/2"	22,2mm 7/8" x 12"	-	AZ350°	15,8mm 5/8"	JOINT MECAHIQUE	(2) 14,3mm 1/2"	22,2mm 7/8" x 12"	-



PROFIL DU PYLON EXISTANT
1 : 200

NOTE:
 - POUR LES RECOMMANDATIONS DU BALSAJE, NOUS AVONS CONSULTÉ CHAQUE PYLON SUR LE SITE ET COMME UNE STRUCTURE DÉPENDANTE, CEPENDANT NOUS RECOMMANDONS QUE LA COMPAGNIE CANADIENNE EFFECTUE UNE RECHERCHE À TITRE PRÉLIMINAIRE POUR CONFIRMER LE SITE ET SUIVRE LES RECOMMANDATIONS RECOMMANDÉES. CE NE PERMETTRAIT PAS DE SEVEN SANS ÊTRE CHARGÉ PYLON, MAIS RECOMMANDONS DÉLÉGUER LE RELEVÉMENT DE PYLON ET LES PLUS ÉLEVÉS.

DETAIL DE L'ANCRAGE
N.A.E.

Dwg. No. 07981-04



CONSULTANTS
MCI MARTON, CYR & ASSOCIÉS INC.
 1000 Avenue de l'Industrie
 Québec, Québec G1M 1C8
 Téléphone: (514) 885-1000
 Télécopieur: (514) 885-1003

DESSIN: P. GIRARD
 VÉRIFIÉ: S. JAR
 PROJETÉ: M. BISSON
 VÉRIFIÉ: P. TARDIF
 NO DU CONTRAT: 84-5025311
 NO DU DESSIN: S-1
 MODIFICATION: 0
 DATE: 94-12-08

0 84-12-08 TEL. QUE RELEVÉ

No	Date	Modifications	Échelle

Carte d'attestation
 Québec
 Région de la Capitale
 Ingénieur

Carte d'attestation
 Québec
 Région de la Capitale
 Ingénieur

QUALITÉ(SITE Rx)
 PYLON W#(07)
 RELEVÉ DU PYLON EXISTANT

Signé: [Signature]
 Date: [Date]

CONSTRUCTION PACKAGE			
DRAWING No.	DESCRIPTION	REVISION	DATE (yy/mmm/dd)
3424.924.100-1	TITLE PAGE	A	08 MAR 17
3424.924.102-1	TOWER PROFILE	B	08 JUNE 16
3424.924.112-1	STAR BASE DETAILS	A	08 MAR 17
3424.924.113-1	GUY ASSEMBLY DETAILS	A	08 MAR 17
3424.924.150-1	FALL PROTECTION DETAILS	B	08 JUNE 16
3424	BILL OF MATERIALS	A	08 MAR 17



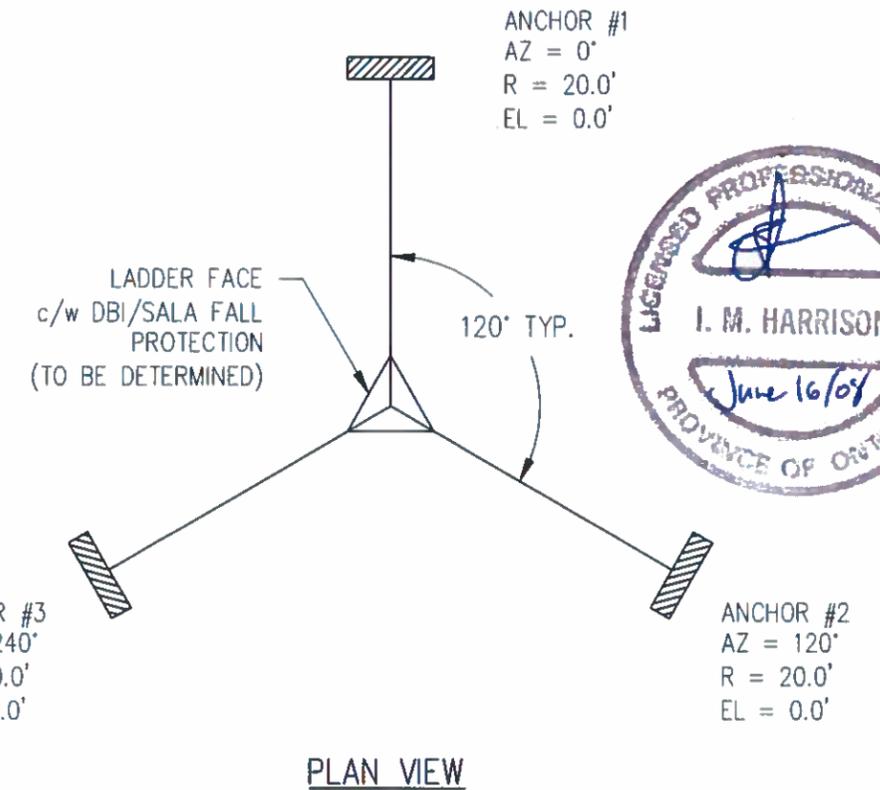
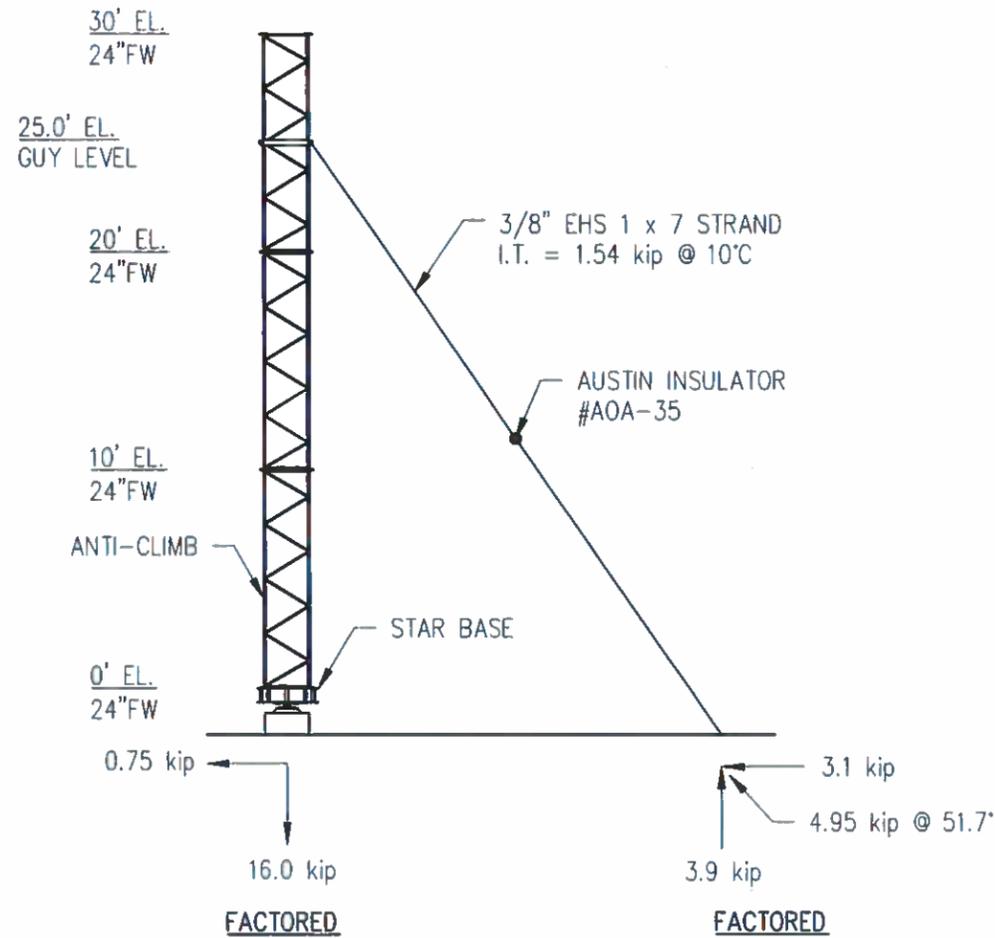
OWNER:	CANADIAN COAST GUARD
SITE NAME / CODE:	IQUALUIT
TOWER HEIGHT / TYPE:	30'24" ALL WELD GUYED TOWER
LOCATION:	NUNAVUT, CANADA

Rev.	Rev'd By:	App'd By:	Rev. Description	Date:	Notes:
A	MO		ISSUE FOR CONSTRUCTION	08 MAR 17	

Project No:		F2563-07-0041	
Project Description:		30' 24" ALL WELD GUYED TOWER	
 ALLAN PIPE FAB INC. 395 DOBBIE DRIVE CAMBRIDGE, ON. CANADA P: (519) 622-6013 F: (519) 622-7062			
Drawn By:	Checked By:	Date:	Scale:
MO		08 MAR 17	1:1
Customer:	Site Name/Code:	Job No:	
CANADIAN COAST GUARD	IQAULUIT, NU	3424	
Drawing Title:		Drawing No.	
TITLE PAGE		3424.924.100-1	

ITEM No.	ANTENNA LOADING						Tx. LINE	
	QTY.	MAKE AND MODEL OF ANTENNA	ELEVATION (ft.)	AZIMUTH ('TN)	DOWN TILT (°)	STATUS	QTY.	DESCRIPTION
1	4	LONG WIRE ANTENNA	30.0	N/A	N/A	INITIAL	2	LDF2-50A
2	1	WIND ANINOMETRE	23.0	N/A	N/A	INITIAL	1	LDF2-50A
3	1	WIND ANINOMETRE	20.0	N/A	N/A	INITIAL	1	LDF2-50A

PAINT	PAINT WHITE (ONLY)						
LEG (50W)	1-1/4" S.R.						924.3.0090.001
HORIZONTAL	3/8" x 3" FLAT BAR						924.3.0001.001
DIAGONAL	3/4" S.R.						924.3.0001.001
SPLICE PAD	PL 4" x 4" x 1/2"						
SPLICE BOLTS	5/8" x 2-1/4" A325 BOLT ASS'Y (3 PER LEG)						
							SECTION No.

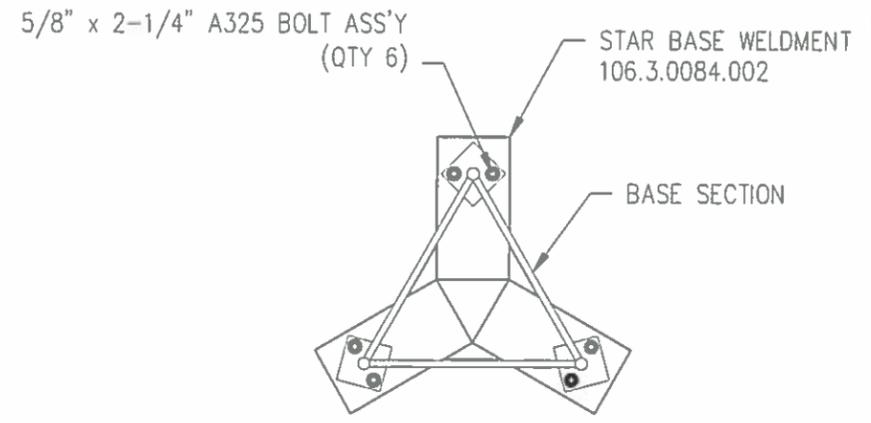
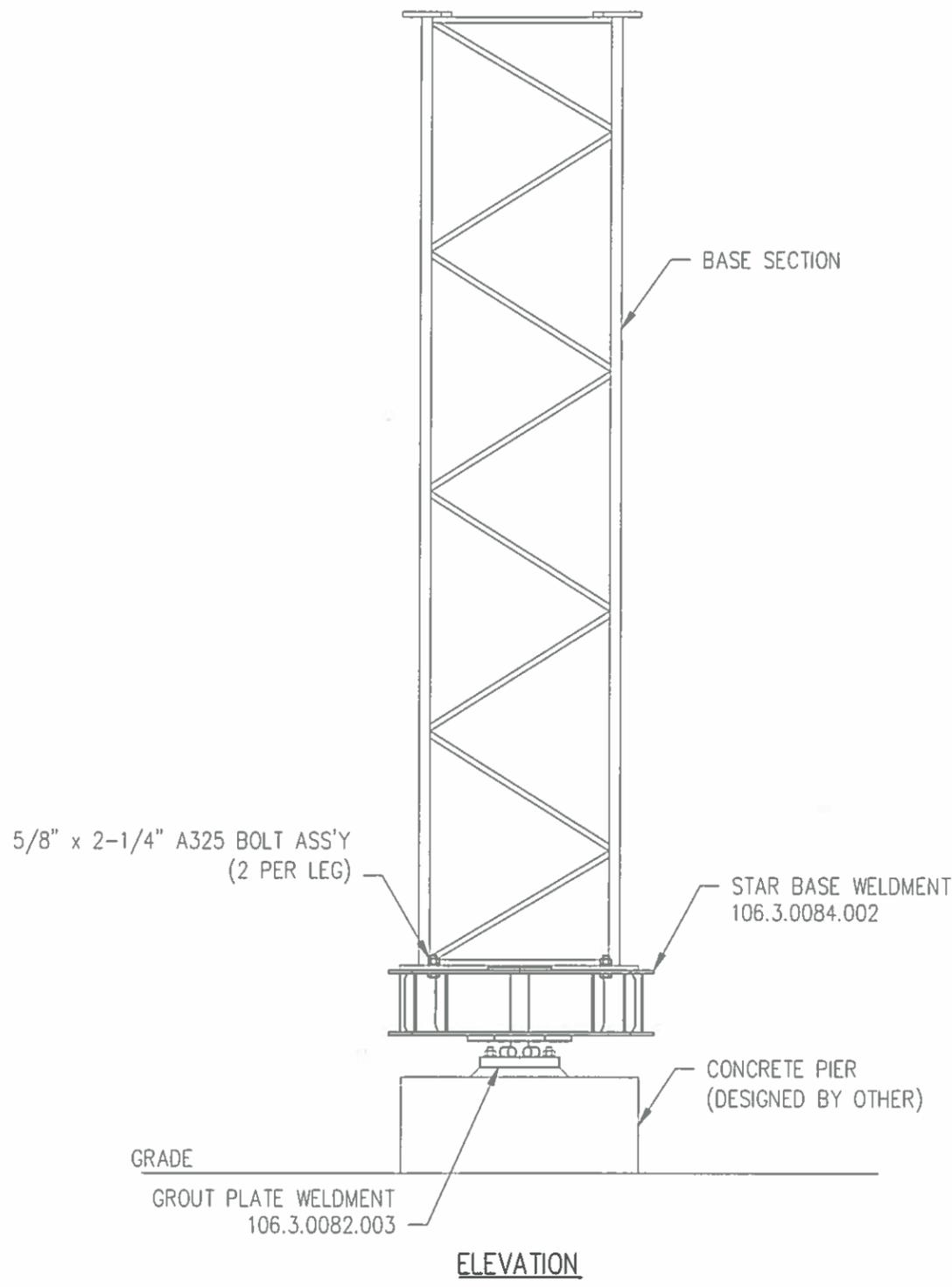


TOWER DESIGNED TO:
 CAN/CSA S37-01
 WIND: 850 Pa
 ICE: 40 mm

Rev.	Rev'd By:	App'd By:	Rev. Description	Date:
A	MO		ISSUE FOR CONSTRUCTION	08 MAR 17
B	MO		REVISED AS PER COMMENTS	08 JUNE 16

- Notes:
- ALL DIMENSIONS ARE IN INCHES
 - ALL STRUCTURAL STEEL SHALL BE G40.21 - 300W (44W) OR 350W (50W) AS REQ'D
 - LIMIT STATES DESIGN, FACTORED LOADING
 - ALL MATERIAL TO BE HOT DIPPED GALVANIZED
 - TOWER FOUNDATION DESIGNED AND SUPPLIED BY OTHER

Project No:		F2563-07-0041	
Project Description:		30' 24" ALL WELD GUYED TOWER	
 ALLAN PIPE FAB INC. 395 DOBBIE DRIVE CAMBRIDGE, ON. CANADA P: (519) 622-6013 F: (519) 622-7062			
Drawn By:	Checked By:	Date:	Scale:
MO		08 MAR 17	1:100
Customer:	Site Name/Code:	Job No:	
CANADIAN COAST GUARD	IQUALUIT, NU	3424	
Drawing Title:		Drawing No.	
TOWER PROFILE		3424.924.102-1	



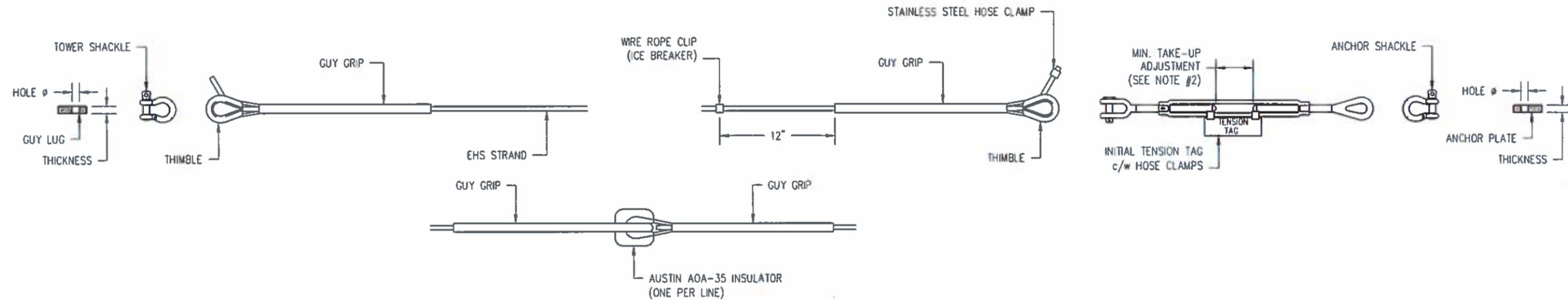
PLAN VIEW



Rev.	Rev'd By:	App'd By:	Rev. Description	Date:
A	MO		ISSUE FOR CONSTRUCTION	08 MAR 17

Notes:
1. ALL DIMENSIONS ARE IN INCHES

Project No:		F2563-07-0041	
Project Description:		30' 24" ALL WELD GUYED TOWER	
 ALLAN PIPE FAB INC. 395 DOBBIE DRIVE CAMBRIDGE, ON. CANADA P: (519) 622-6013 F: (519) 622-7062			
Drawn By:	Checked By:	Date:	Scale:
MO		08 MAR 17	1:20
Customer:	Site Name/Code:	Job No:	
CANADIAN COAST GUARD	IQUALUIT, NU	3424	
Drawing Title:		Drawing No.	
STAR BASE DETAILS		3424.924.112-1	



GUY ASSEMBLY CHART 1 x 7 EHS STRAND																					
ELEV (ft)	GUY LUG		TOWER SHACKLE (S.P.)			THIMBLE (HEAVY)	STRAND (LEFT HAND LAY)		GUY GRIPS (BOTH ENDS)				WIRE ROPE CLIP	THIMBLE (HEAVY)	JAW & EYE TURNBUCKLE		ANCHOR SHACKLE			ANCHOR PLATE	
	PLT THK	HOLE Ø	SIZE	PIN Ø	T. ULT (kips)		DESCRIPTION	T. ULT (kips)	SIZE	PART #	STRENGTH	T. ULT (kips)			SIZE	T. ULT (kips)	SIZE	PIN Ø	T. ULT (kips)	PLT THK	HOLE Ø
25.0	5/8"	5/8"	7/16"	1/2"	18.00	7/16"	3/8" EHS 1 x 7 LL GALV STRAND	15.40	3/8"	GDE-1107	100%	15.40	3/8"	7/16"	5/8" x 12"	26.00	7/16"	1/2"	18.00	5/8"	5/8"



Rev.	Rev'd By	App'd By	Rev. Description	Date
A	MD		ISSUE FOR CONSTRUCTION	DB MAR 17

Notes:

- ALL DIMENSIONS ARE IN INCHES
- AS PER CAN/CSA S37-01, CLAUSE 11.5 "FOR INITIAL INSTALLATIONS, THE MINIMUM TAKE-UP ADJUSTMENT AVAILABLE AFTER THE STRUCTURE IS PLUMB AND THE GUY TENSIONS ARE SET SHOULD BE:"
 - 6" (150mm) FOR GUYS WITH NOMINAL DIAMETRE OF 1/2" (13mm) AND SMALLER; AND
 - 10" (250mm) FOR GUYS WITH NOMINAL DIAMETRE GREATER THAN 13mm.

Project No:		F2963-07-0041	
Project Description:		30' 24" ALL WELD GUYED TOWER	
 ALLAN PIPE FAB INC. 395 DOBBIE DRIVE CAMBRIDGE, ON CANADA P (519) 622-6013 F (519) 622-7062			
Drawn By:	MO	Checked By:	DB MAR 17
Customer:	CANADIAN COAST GUARD	Site Name/Code:	IOAULUIT, NU
Job No:	3424	Scale:	1:1
Drawing Title:	GUY ASSEMBLY DETAILS		Drawing No. 3424.924.113-1

CABLE CONNECTION ANGLE
150.3.0002.001

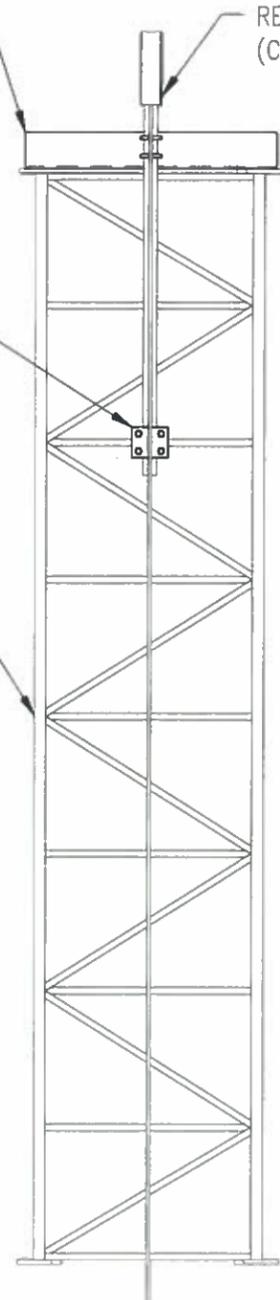
REFER TO DBI/SALA INSTALLATION INSTRUCTIONS
(CONNECT TOP BRACKET TO ANGLE)

EL: 30.0'

REFER TO DBI/SALA INSTALLATION INSTRUCTIONS

TOWER SECTION

EL: 20.0'



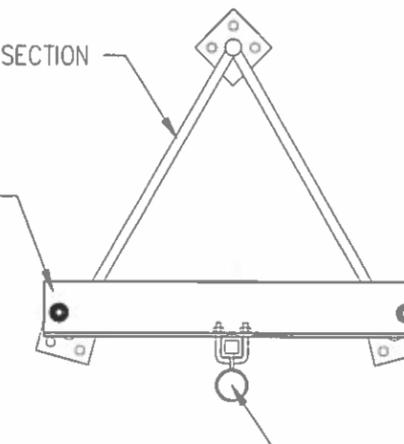
ELEVATION

TOWER SECTION

CABLE CONNECTION ANGLE
150.3.0002.001

(2) 5/8" x 2" A325 BOLT ASS'Y

REFER TO DBI/SALA INSTALLATION INSTRUCTIONS
(CONNECT TOP BRACKET TO ANGLE)



PLAN VIEW



Rev.	Rev'd By:	App'd By:	Rev. Description	Date:
A	MO		ISSUE FOR CONSTRUCTION	08 MAR 17
B	MO		REVISED AS PER COMMENTS	08 JUNE 16

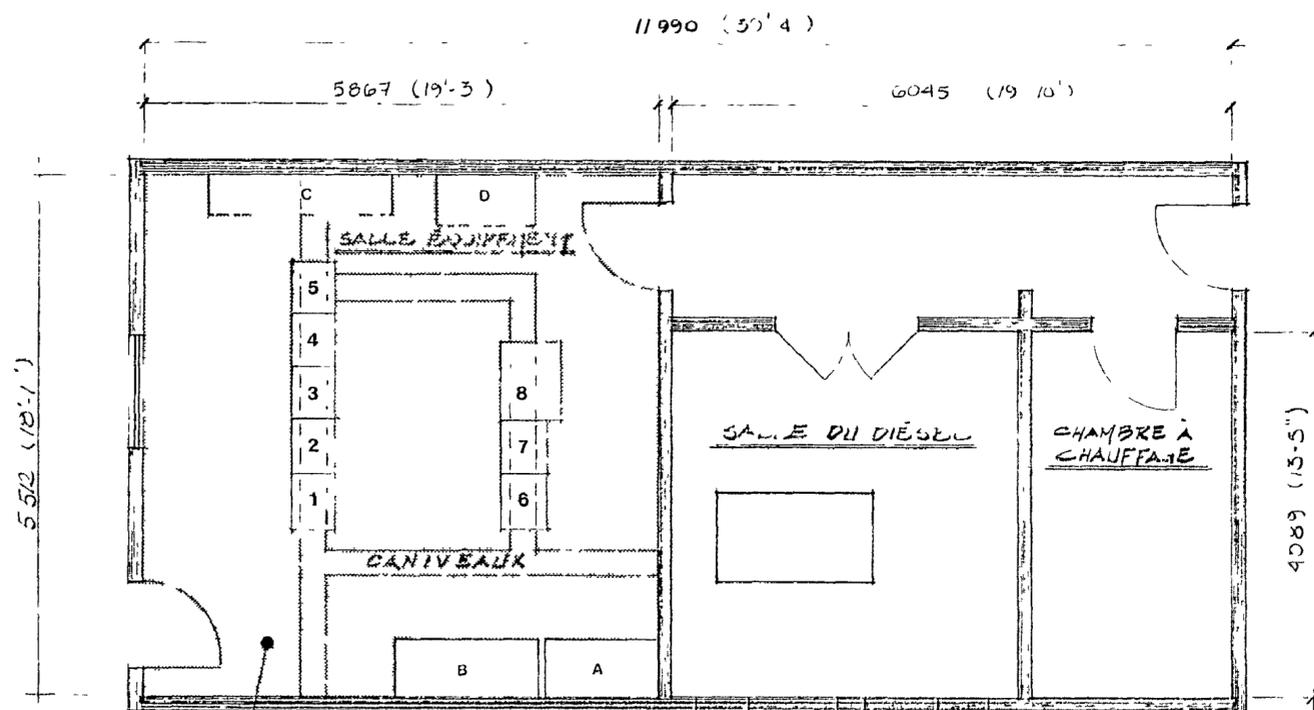
Notes:
1. ALL DIMENSIONS ARE IN INCHES

Project No:	F256J-07-0041
Project Description:	30' 24" ALL WELD GUYED TOWER

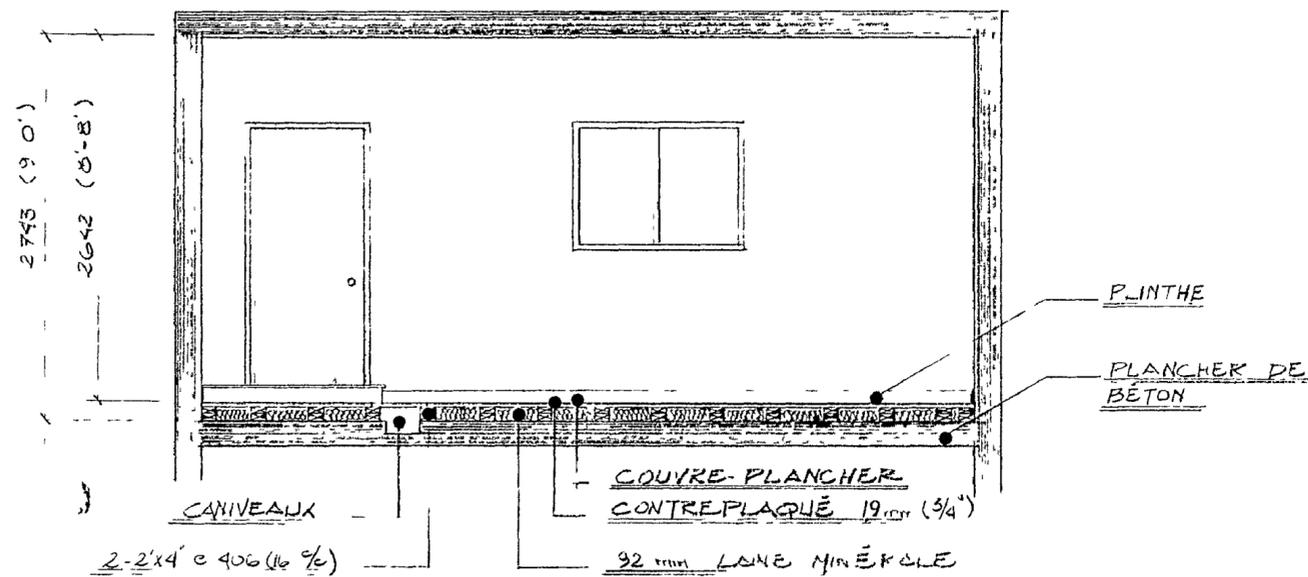


ALLAN PIPE FAB INC.
395 DOBBIE DRIVE
CAMBRIDGE, ON, CANADA
P: (519) 622-6013 F: (519) 622-7062

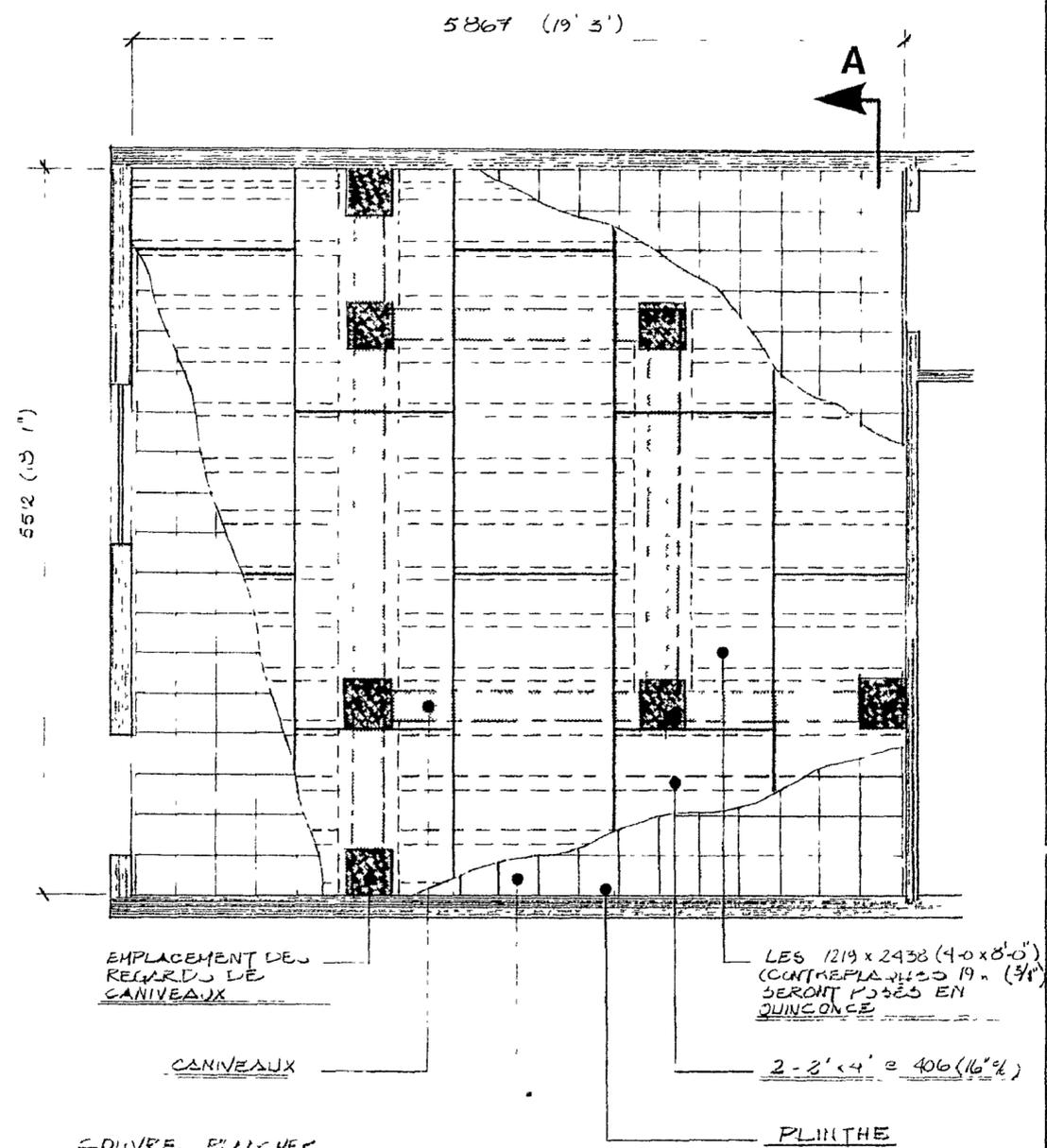
Drawn By:	MO	Checked By:		Date:	08 MAR 17	Scale:	1:20
Customer:	ADVANTAGE TOWER	Site Name/Code:	IQUALUIT, NU	Job No:	3424		
Drawing Title:	FALL PROTECTION DETAILS					Drawing No.:	3424.924.150-1



VUE EN PLAN
ECHELLE 1/4" = 1'-0"

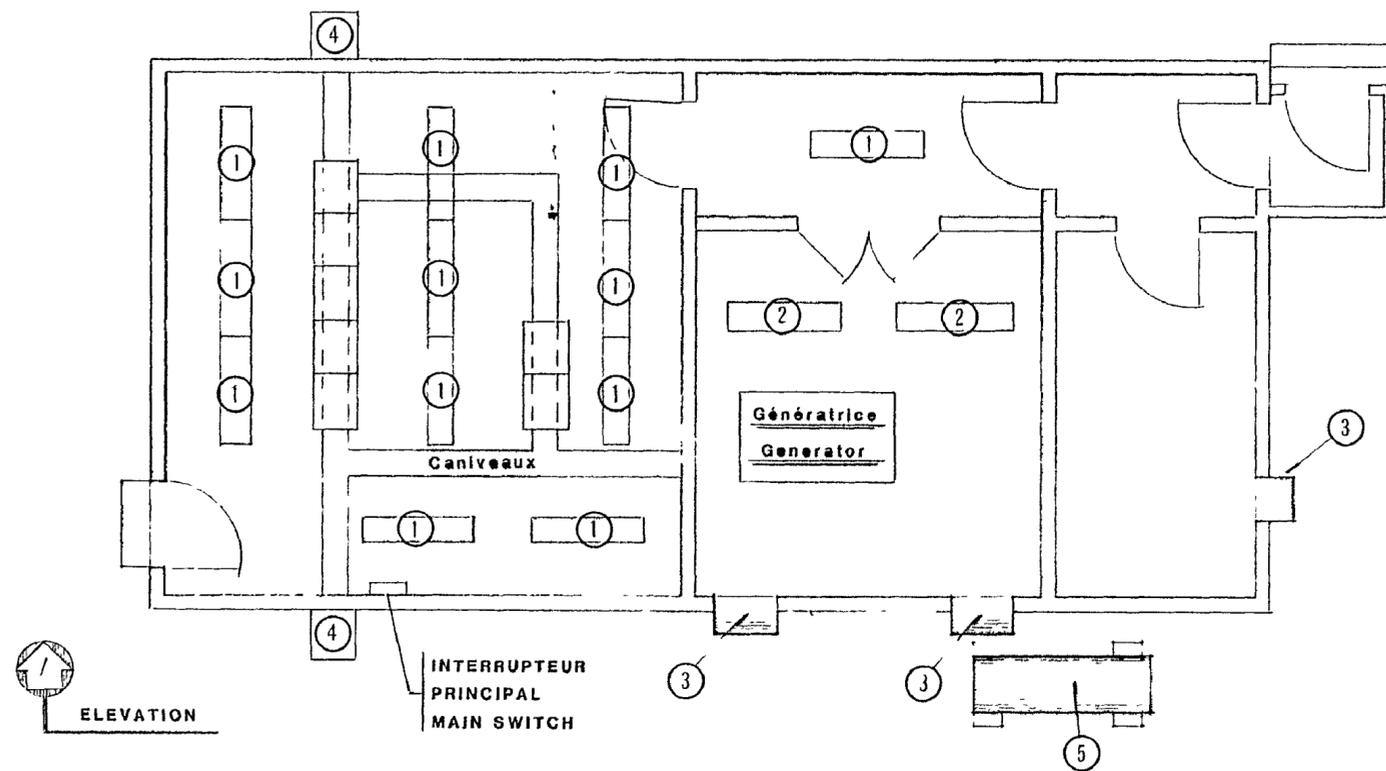


COUPE A
ECHELLE 3/8" = 1'-0"



PLAN DÉTAILLÉ
ECHELLE 3/8" = 1'-0"

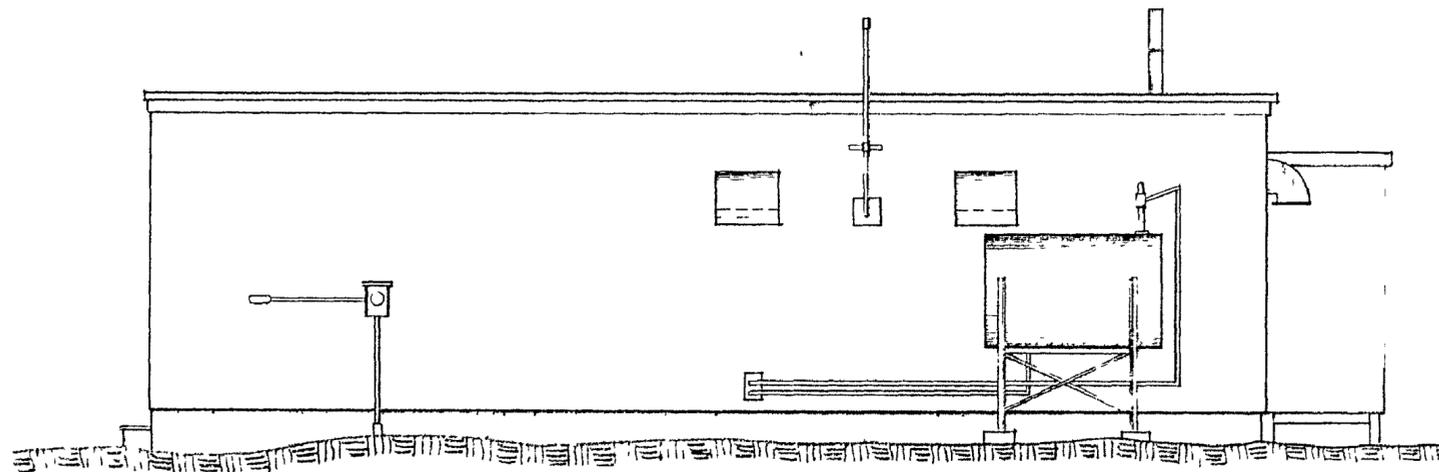
No	Date	Revisé	Par
Gardie côtière canadienne Region des Laurentides		Canadian Coast Guard Laurentian Region	
FROBISHER BAY ISOLATION DU PLANCHER DU BÂTIMENT DES « ÉQUIPEMENT »		Conçu par Date Dessiné par B. P. L. L. L. Date de rev. 3 Vérifié par Date Approuvé par Date Feuille 1 de 1	
Echelle INDICUÉE		Dessin # A V-86-5114	



VUE EN PLAN - PLAN VIEW

ECHELLE-SCALE 1/4"=1'-0"

- ① Luminaire a lampes fluorescentes monte au plafond, 2-40W a fournir et installer
Fluorescent luminaire ceiling mounting 2-40W lamps, to be supplied and installed
- ② Luminaire a lampes fluorescentes, 2-40W suspendu a fournir et installer.
Fluorescent luminaire suspended mounting 2-40W lamps, to be supplied and installed
- ③ Capuchon de mur pour entree ou sortie d'air
Wall-type hood for intake or exhaust ventilation
- ④ Entree des câbles
Cable entrance
- ⑤ Reservoir a l'huile
Oil tank



ELEVATION

ECHELLE-SCALE 1/4"=1'-0"

NS	Date	Revisiens	Par
	Transports Canada	Transport Canada	Region des Laurentides
	Garde cõtiere	Coast Guard	
Frobisher			Conçu par
Bâtisse de réception			Date
receiving station			Dessiné par R. Pravoat
			Date 24/05/84
			Vérifié par
			Date
			Approuvé par
			Date
			Feuille 1 de 1
Echelle 1/4"=1'-0"		Dessin #Q SIC-84-4903	



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canadian
Coast Guard

Garde côtière
canadienne



APPENDIX F: DESIGNATED SUBSTANCE SURVEY



CONCENTRIC

CLIENT-CENTRIC. CHALLENGE DRIVEN.

concentriceng.com



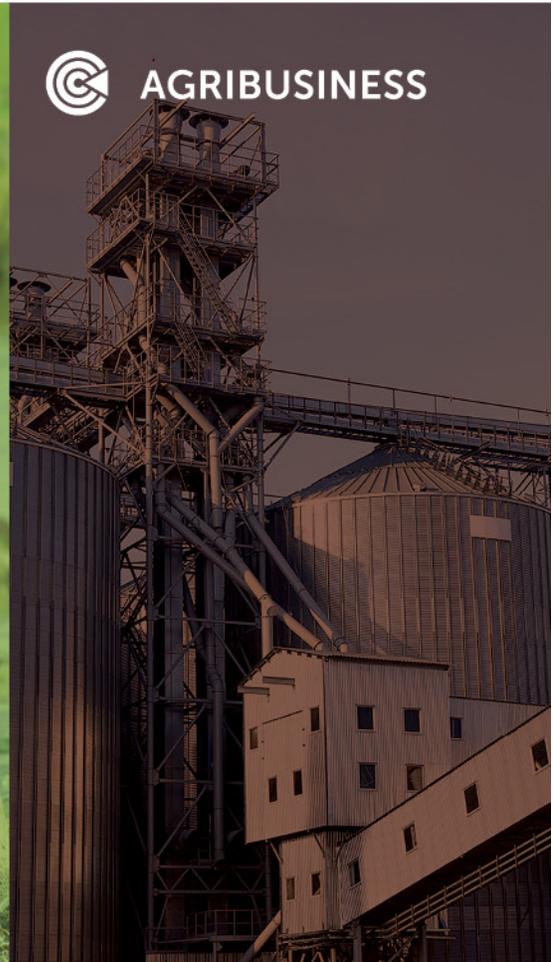
**BUILDINGS &
INFRASTRUCTURE**



ENVIRONMENTAL



AGRIBUSINESS



**IQALUIT RECEIVER SITE – EQUIPMENT BUILDING
MOULD AND BUILDING ENVELOPE ASSESSMENT &
DESIGNATED SUBSTANCE SURVEY**

Iqaluit, Nunavut

PRODUCED FOR: CANADIAN COAST GUARD

PRODUCED BY: CONCENTRIC ASSOCIATES INTERNATIONAL INCORPORATED

CONCENTRIC REFERENCE NUMBER: 16-6912

DATE: SEPTEMBER 7, 2016



EXECUTIVE SUMMARY

Concentric Associates International Incorporated (Concentric) was retained by the Canadian Coast Guard (CCG) to conduct a mould assessment, building envelope assessment, and hazardous substance survey (HSS) for CCG's equipment building at the Iqaluit receiver site.

It was reported to Concentric that the equipment building was impacted with mould believed to be caused by a roof leak. Various building materials within the attic space were known to be water damaged and impacted with mould. In addition, laboratory results from an air quality report dated June 14, 2016 (provided by CCG) indicated the presence of elevated levels of airborne mould spores within the building.

According to CCG this building, which consists of a furnace room, generator room and radio room (see Photograph 1) is scheduled to be demolished in the fall of 2017.

A representative of Concentric attended the site on July 26th and 27th, 2016 to ascertain the extent of mould and water impacted building materials, and to determine the possible cause(s) of moisture intrusion into the building. A detailed visual inspection of the site was conducted and building materials samples were collected for laboratory analysis of hazardous substances.

Summarized below are the results of the site investigation and recommendations for:

- Preventing further moisture intrusion into the ceiling assembly of the building.
- Handling hazardous substances prior to onset of the demolition.

Building Envelope Assessment

Numerous penetrations and other possible entryways for moisture were observed on the exterior of the building. These included holes or cavities around exterior components, deteriorated sealants and insulating foam, and missing roof flashing. To reduce moisture intrusion into the building, the following actions are recommended:

1. Seal flute openings with an appropriate sealant (e.g. silicone or polyurethane).
2. Install metal flashing on the north (where previously removed) and south sides of the roof.
3. Repair any penetrations in the metal cladding and ensure an adequate seal around the exterior components (e.g. flue and air vents, pipes, cables, etc.).
4. Install more efficient (i.e. longer) vent covers that will prevent entry of wind-driven snow during the winter months.

Mould Assessment

Visible mould and water-damaged building materials were observed within the attic space of the radio room. Laboratory analysis of three tape lift samples collected from inside the test opening confirmed the presence of mould.



Numerous layers of building materials were present throughout the attic space. A thorough examination of mould-impacted areas, therefore, was not practical without an extensive destructive investigation. Based on the severity of water damage in the area observed, however, the extent of mould contamination and water damage is presumed to extend throughout the attic space.

It is recommended that the all porous mould impacted or water damaged building materials within the attic space be removed. Non-porous materials (eg. wood, metal sheeting etc.) may need to be removed and replaced if they cannot be adequately cleaned or the mould has effected its soundness. Alternately encapsulation of this area may be an option if the area can be adequately sealed and ventilation within the building is not compromised.

Designated Substance Survey

Asbestos

Analytical results confirmed the presence of asbestos in cement board on the south and east walls of the furnace room.

Cement board is considered a non-friable material and can therefore be removed by a qualified contractor using the low or moderate risk abatement procedures (depending on removal methods) specified in section 5.2 of the *Northwest Territories and Nunavut Codes of Practice for Asbestos Abatement*.

Lead

Based on total lead analysis, lead was confirmed to be present in paint samples collected from the site; however, based on TCLP analysis it was determined that the lead content was below the regulatory limit for hazardous waste classification. Other lead-containing materials identified on site include lead acid batteries used for the generator and in emergency lights.

Nunavut's *Environmental Guideline for Waste Batteries* should be followed should the lead acid batteries be disposed of prior to demolition activities.

In addition, demolition activities may have the potential to create airborne lead. As such, necessary measures must be taken (e.g. by means of engineering controls, work practices and hygiene practices) to ensure that the exposure of a worker to airborne lead shall not exceed the occupational exposure limit (OEL), averaged over an 8-hour day, of 0.05 mg/m³ as per the Nunavut Occupational Health and Safety Regulations (2016).

Mercury

Fluorescent lights were identified in the building. Fluorescent light tubes contain mercury vapour.

Recommendations: Prior to demolition activities, fluorescent lights should be carefully removed and re-used, recycled, or disposed of in accordance with Nunavut's *Environmental Guideline for Mercury-Containing Products and Waste Mercury* (2010).

Silica



Gypsum board, which may contain crystalline silica, was identified on the south and north walls of the generator room and hallway, respectively.

Demolition wastes containing silica must be handled, transported and disposed of according to applicable federal and territorial waste handling regulations.

Demolition activities have the potential to create airborne silica. As such, necessary measures must be taken (e.g. by means of engineering controls, work practices and hygiene practices) to ensure that the exposure of a worker to airborne silica shall not exceed the occupational exposure limit (OEL), averaged over an 8-hour day, of 0.05 mg/m³ for quartz and cristobalite and 0.1 mg/m³ for quartz/tripoli as per the Nunavut Occupational Health and Safety Regulations (2016).

Polychlorinated Biphenyls (PCBs)

Fluorescent light ballasts and electrical transformers may contain PCBs.

Prior to demolition activities, ballasts and transformer labels should be checked to confirm the presence of PCBs, otherwise they should be assumed to contain PCBs. All PCB-containing equipment should be packed and shipped for destruction or recycling according to Transport Canada's Transportation of Dangerous Goods Act.

Other Hazardous Substances

Numerous other potentially hazardous substances (or equipment containing hazardous substances) were noted during the survey, including three fuel tanks, oil canisters, paints and adhesives, and electrical and communication equipment. It is presumed that these substances or equipment be disposed of prior to demolition of the building. Any hazardous waste disposal should be completed according to applicable federal and territorial regulations and/or guidelines.



TABLE OF CONTENTS

1. INTRODUCTION	1
2. SCOPE OF WORK	1
3. REGULATORY GUIDELINES AND FRAMEWORK	2
4. METHODS	2
4.1 MOULD AND BUILDING ENVELOPE ASSESSMENT	2
4.2 DESIGNATED SUBSTANCE SURVEY	3
4.2.1 <i>Asbestos</i>	3
4.2.2 <i>Lead</i>	3
4.2.3 <i>Other Hazardous Substances</i>	3
5. RESULTS	4
5.1 MOULD ASSESSMENT & BUILDING ENVELOPE ASSESSMENTS	4
5.1.1 <i>Surface Mould</i>	4
5.2 HAZARDOUS SUBSTANCE SURVEY	5
5.2.1 <i>Asbestos</i>	5
5.2.2 <i>Lead</i>	6
5.2.3 <i>Mercury</i>	7
5.2.4 <i>Silica</i>	7
5.2.5 <i>Polychlorinated Biphenyls (PBCs)</i>	7
5.2.6 <i>Ozone Depleting Substances</i>	7
5.2.7 <i>Other Hazardous Substances</i>	7
6. RECOMMENDATIONS	7
6.1 BUILDING ENVELOPE ASSESSMENT	7
6.3 DESIGNATED SUBSTANCE SURVEY	8
6.3.1 <i>Asbestos</i>	8
6.3.2 <i>Lead</i>	9
6.3.3 <i>Mercury</i>	9
6.3.4 <i>Silica</i>	9
6.3.5 <i>Polychlorinated Biphenyls</i>	9
7. GENERAL LIMITATIONS	10

LIST OF APPENDICES

- Appendix A: Regulatory and Guideline Framework
- Appendix B: Sample Location Maps
- Appendix C: Photographs
- Appendix D: Laboratory Certificates of Analysis



1. INTRODUCTION

Concentric Associates International Incorporated (Concentric) was retained by the Canadian Coast Guard (CCG) to conduct a mould assessment, building envelope assessment, and hazardous substance survey (HSS) for CCG's equipment building at the Iqaluit receiver site.

It was reported to Concentric that the equipment building was impacted with mould believed to be caused by a roof leak. Various building materials within the attic space were known to be water damaged and impacted with mould. In addition, laboratory results from an air quality report dated June 14, 2016 (provided by CCG) indicated the presence of elevated levels of airborne mould spores within the building.

According to CCG this building, which consists of a furnace room, generator room and radio room (see Photograph 1) is scheduled to be demolished in the fall of 2017.

2. SCOPE OF WORK

The following scope of work was completed at the site:

Mould and Building Envelope Assessments

- Visual assessment to identify the extent of water damaged and mould impacted building materials within the building that require remediation.
- Visual assessment of the building envelope to determine the source of the moisture intrusion into the building.

Designated Substance Survey

In the absence of territorial guidelines or regulations outlining hazardous substances of concern to be assessed, Ontario Regulation 490/09 "Designated Substances", published by the Ontario Ministry of Labour provided a general framework for the HSS. This regulation defines the following eleven designated substances:

- Acrylonitrile
- Benzene
- Isocyanates
- Silica
- Arsenic
- Coke Oven Emissions
- Lead
- Vinyl Chloride
- Asbestos
- Ethylene Oxide
- Mercury

Polychlorinated Biphenyls (PCB's) and ozone depleting substances (ODS) are not currently listed as a designated substance under Ontario Regulation 490/09 "Designated Substances" however, PCBs and ODS containing materials were included in this HSS because they must be handled and disposed of in accordance with the Canadian Environmental Protection Act's "PCB's Regulations" and the Government of Nunavut's Environmental Guideline for ozone depleting substances (2011).

Given the use of the site, the HSS was limited to identifying asbestos, lead, mercury, silica, ODS, and PCBs in building materials and equipment. Coke oven emissions, acrylonitrile, arsenic, benzene, ethylene oxide, isocyanates, and vinyl chloride are not found in a typical building and were, therefore, not addressed during the HSS.



Building material sampling was conducted with the intent of identifying asbestos and lead. Other hazardous substances were identified visually.

The proposed HSS did include the following due to health hazard or inaccessibility to the surveyor:

- Components or wiring within motor control centers, breakers, motors, lights, etc.;
- Concrete leveling compound for floors;
- Insulation on or in high voltage wiring;
- Mechanical packing, ropes, gaskets, etc., and;
- Materials within confined spaces.

3. REGULATORY GUIDELINES AND FRAMEWORK

The following regulations apply to this project:

- *The Occupational Health and Safety Regulations* (2016, as amended), Government of Nunavut
- *Consolidation of Safety Act* (2016, as amended), Government of Nunavut
- *Northwest Territories & Nunavut Asbestos Abatement Codes of Practice* (2012, as amended), Workers' Safety & Compensation Commission
- *Environmental Guideline for Waste Asbestos* (2011, as amended), Government of Nunavut
- *Environmental Guideline for Waste Lead and Lead Paint* (2014, as amended), Government of Nunavut
- *Environmental Guideline for Mercury-Containing Products and Waste Mercury* (2010, as amended), Government of Nunavut
- *Environmental Guideline for Waste Batteries* (2011, as amended), Government of Nunavut
- *PCB Regulations SOR/2008-273* (2015, as amended), Government of Canada

See **Appendix A** for further information on the aforementioned regulations and guidelines.

4. METHODS

Site work was completed on July 26 and 27, 2015 by Mr. Randy Scott of Concentric.

4.1 Mould and Building Envelope Assessment

The mould and building envelope assessment included a visual examination of the building interior and exterior including (to the extent possible) the roof and ceiling assembly and attic space. Approximately eight feet of metal flashing was removed on the northeast corner of the building to allow for a visual inspection of the roof (Photograph 2).



The interior ceiling of the radio room was also examined. A test opening completed by others allowed for a limited visual inspection of the attic space (see Photograph 3).

In addition, to confirm the presence of mould, three tape-lift samples were collected for analysis for non-viable mould. A tape lift is a sticky sample medium—handled only by its ends—that is firmly pressed onto a surface to collect microbial propagules. The medium is then slowly and steadily lifted upwards and placed into a dedicated, labeled container. All three surface samples were collected from within the attic space and submitted to Paracel Laboratories Limited (Paracel) for analysis.

4.2 Designated Substance Survey

The DSS included a systematic, room-by-room inspection of accessible areas of the site. Samples of materials suspected to contain asbestos or lead were collected and placed in sealed polyethylene bags with appropriate sample identifier labels. Each sample identifier was plotted on sketched floor plans, and detailed notes were recorded with respect to general building construction, condition of building materials, and other types of hazardous substances or equipment witnessed during the survey.

Where possible, Concentric assessed all wall and ceiling layers. However, no significant openings were made in drywall, plaster, or concrete. Other hazardous substances may therefore exist between walls, above ceilings or in other enclosures or barriers that would not have been visible during the survey. Additionally, Concentric did not dismantle any mechanical or electrical equipment as part of this survey due to potential hazard to the surveyor.

4.2.1 Asbestos

According to the Government of Nunavut's Occupational Health and Safety Regulations, an employer shall identify and keep a written record of all friable exposed and non-exposed (accessible) asbestos-containing materials.

For the collection of potential asbestos-containing materials, sampling guidelines outlined in the *Northwest Territories and Nunavut Codes of Practice for Asbestos Abatement* were followed.

Nine (9) bulk material samples were collected and analyzed by Paracel for asbestos content via Polarized Light Microscopy (PLM) in accordance with EPA Method 600/R-93/116.

4.2.2 Lead

For the collection of potential lead-containing materials, sampling guidelines outlined in the American Society of Testing and Materials (ASTM) Method E1729-05 (*Standard Practice for Field Collection of Dried Paint Samples for Subsequent Lead Determination*) were followed.

Six (6) paint samples were collected and analyzed by Paracel for total lead content by inductively coupled plasma optical emission spectrometry (ICP-OES).

4.2.3 Other Hazardous Substances

All other hazardous substances were assessed for visually or by reviewing labelling.



5. RESULTS

The building consisted of three main rooms including a furnace room, generator room, and radio room. The building was wood framed with metal cladding. Interior finishes consisted of a mix of plywood and gypsum board walls and vinyl tile flooring.

The roof was a batten seam system edged with metal flashing. The roof assembly consisted of numerous layers including, from top to bottom, a metal roof deck; plywood roof sheathing; wood strapping; plywood; 2x4 joists and batt insulation; metal sheeting, plywood; wood joists and blocking; 1/4" painted plywood; and 1/8" panel board.

Results of the assessment are provide in sections 5.1 through 5.7. Sample locations are illustrated in Figure 1, **Appendix B**. Photographs taken during the site visit are presented in **Appendix C**. Laboratory Certificates of Analysis are provided in **Appendix D**.

5.1 Mould and Building Envelope Assessments

A visual inspection of the attic space above the radio room confirmed the presence of mould impacted and water-damaged (i.e. rotted) building materials (see Photograph 9). Specifically, the plywood appeared to be in an advanced stage of rot and the insulation was deteriorated. Due to accessibility issues, only the area immediately adjacent to the test opening in the radio room was inspected. Complete delineation of the attic space was not possible without creating additional destructive openings. However, due to the age of the building and severity of the water damage observed, it is presumed that the majority of the attic space above the wood joists and blocking are water damaged and/or contaminated with mould.

Various potential entryways for moisture into the ceiling assembly were observed. Most notably, insulation and sealant in the flute openings of the roofing system were deteriorated (see Photograph 4) and may be an entryway for moisture into the building. Various other penetrations or cavities in the building exterior were witnessed during the inspection, including the following:

- A cavity under the base of flue chimney on the roof (see Photograph 5)
- Ventilation openings in the metal cladding (see Photograph 6)
- Ventilation hoods on the north and west sides of building (see Photograph 7)
- Penetration in the metal cladding on the north side of building (see Photograph 8)

5.1.1 Surface Mould

Mould was observed within the attic space of the building. In addition, analytical results (provided below) from the surface samples collected within the attic space confirmed the presence of mould.



Table 1. Analytical Results for Surface Sampling

<i>Sample ID</i>	<i>Microscopic Identification</i>	<i>Relative Amount¹</i>
M1	Hyaline mycelial fragments	High
	<i>Aspergillus/Penicillium</i> -like spore:	Low
	<i>Cladosporium</i> spores	Low
	Pigmented mycelia fragments	Low
	Unidentified spore	Low
M2	<i>Cladosporium</i> spores	Moderate
	Bacteria	Low
	Hyaline mycelia fragments	Low
	Unidentified spore	Low
M3	Bacteria	High
	Pigmented mycelia fragments	Moderate
	Ascospores	Low

¹Relative Amount: Moderate = 11-100 propagules per mm²; High = > 101 propagules per mm²; Low = 2-10 propagules per mm²

The following website may be referenced for additional information on the above-noted propagules: http://www.paracellabs.com/files/Species_Ecology_List.pdf.

5.2 Hazardous Substance Survey

5.2.1 Asbestos

The Government of Nunavut's Occupational Health and Safety Regulations state that an asbestos-containing material is that which contains 1% or more asbestos (by weight) as determined using microscopy, stereo and polarized light, with dispersion staining, in accordance with the National Institute for Occupational Safety and Health, *Manual of Analytical Methods, Method 9002, Issue 2 (as amended)*.

Materials sampled and their associated analytical results are presented below.

Table 2. Analytical Results for Asbestos Content in Bulk Material Samples

<i>Sample Material & Location</i>	<i>Sample ID</i>	<i>Asbestos-Containing</i>
Vinyl floor tile throughout the building	A1, A2, A3	No
Gypsum board in the hallway and Generator Room	A4, A6, A9	No
Cement board in the Furnace Room (south and east walls)	A5, A7, A8	Yes

Cement board in the furnace room (Photograph 10) was confirmed to contain 20% chrysotile asbestos and 10% crocidolite asbestos.



5.2.2 Lead

According to the Government of Nunavut's *Environmental Guideline for Waste Lead and Lead Paint* (2014), the total lead concentration for waste disposal purposes must not exceed 100 mg/kg, otherwise the material is considered to be hazardous waste.

However, the guideline states that samples may be further analyzed using an accepted Toxicity Characteristic Leaching Procedure (TCLP). If the resulting leachate lead concentration is below 5.0 mg/L, the material is not deemed to be hazardous waste.

Based on the analytical results received on August 4, 2016, five of the six collected paint samples were confirmed to contain total lead above the regulatory guideline of 100 mg/kg. A summary of the results are presented below.

Table 3. Lab Results for Total Lead Content in Paint Samples

<i>Room</i>	<i>Paint Description</i>	<i>Sample ID</i>	<i>Total Lead Concentration</i>
<i>Generator</i>	White paint on south wall	L1	1210 µg/g
	White paint on plywood wall	L5	2580 µg/g
<i>Furnace</i>	White paint on south wall	L2	968 µg/g
	Green paint on south wall	L3	1250 µg/g
	Green paint on north wall	L4	1200 µg/g
<i>Radio</i>	Green paint on plywood ceiling (below paneling)	L6	42 µg/g

Note: µg/g and mg/kg are equivalent units

Samples which exceeded the regulatory limit of 100 mg/kg (Samples L1 – L5) were further analyzed via TCLP analysis to determine their lead leachate concentration. Results from the TCLP analysis are presented below.

Table 4. Lab Results for Leachate Lead Content in Paint Samples

<i>Sample ID</i>	<i>Leachate Lead Concentration</i>
L1	0.75 mg/L
L2	< 0.05 mg/L
L3	0.53 mg/L
L4	0.85 mg/L
L5	1.39 mg/L

In addition to the lead-containing paint samples, a large lead-acid battery was identified on the floor of the generator room. Emergency lighting, which also contains lead-acid batteries, was identified in the generator and radio rooms (see Photograph 12).



5.2.3 Mercury

Fluorescent lights, which contain mercury vapor, were identified within the building (see Photograph 12).

5.2.4 Silica

Gypsum board, which may contain crystalline silica, was identified on the south and north walls of the generator room and hallway, respectively.

5.2.5 Polychlorinated Biphenyls (PBCs)

PCBs may be present in the ballasts of fluorescent lights (see Photograph 11). Concentric did not disassemble these light tubes to review ballast labels due to potential hazards to the surveyor.

PCBs may also be present in transformers and control units in the generator and radio rooms.

5.2.6 Ozone Depleting Substances

No ozone depleting substances were identified at the site.

5.2.7 Other Hazardous Substances

Although outside the scope of this HSS, numerous other potentially hazardous substances (or equipment containing hazardous substances) were noted during the survey, including three fuel tanks, oil canisters, paints and adhesives, and electrical and communication equipment. It is presumed that these substances or equipment be disposed of prior to demolition of the building. Any hazardous waste disposal should be completed according to applicable federal and territorial regulations and/or guidelines.

6. RECOMMENDATIONS

6.1 Building Envelope Assessment

Numerous potential entryways for moisture into the building were observed. To reduce infiltration into the ceiling assembly of the building, the following actions are recommended:

1. Seal flute openings with sealant (e.g. silicone or polyurethane).
2. Install metal flashing on the north (where previously removed) and south sides of the roof.
3. Repair any penetrations in metal cladding and ensure an adequate seal around exterior components (e.g. flue and air vents, pipes, cables and electrical, etc.).
4. Install more efficient (i.e. longer) vent covers that will prevent entry of wind-driven snow during the winter season

Note: The above recommendations are provided presuming the building is to be replaced within the following 12 – 18 months, as scheduled. Should the building not be replaced within this time frame, more extensive measures would be required.



6.2 Mould Assessment

Generally speaking, moulds can be found virtually everywhere and can grow on virtually any organic substance as long as moisture and oxygen are present. All persons are repeatedly exposed day after day to a wide variety of bioaerosols (airborne particles that are living or originate from living organisms) and most do not experience adverse health effects. However, some moulds can produce allergens that can trigger allergic reactions or asthma attacks; others are known to produce toxins and/or irritants.

Mould related guidelines have been formulated by the Federal Government and the American Industrial Hygiene Association. These guidelines indicate that microbial growth within a building is not acceptable. Moisture intrusion, visible mouldy, wet, or soiled surfaces must be remediated following an established protocol.

Mould at the site should be remediated following an established protocol such as the following:

- Institute of Inspection Cleaning and Restoration Certification (IICRC) S520, Standard Reference Guide for Professional Mold Remediation (2008).
- Mould Guidelines for the Canadian Construction Industry” published by the Canadian Construction Association (2004).

It is recommended that the all porous mould impacted or water damaged building materials within the attic space be removed. Non-porous materials (eg. wood, metal sheeting etc.) may need to be removed and replaced if it cannot be adequately cleaned or the mould has effected its soundness. Alternately encapsulation of this area may be an option if the area can be adequately sealed and ventilation within the building is not compromised.

6.3 Designated Substance Survey

6.3.1 Asbestos

Prior to demolition activities, all cement board within the furnace room should be removed and handled by a qualified contractor in accordance with the *Northwest Territories and Nunavut Codes of Practice for Asbestos Abatement*. Cement board is considered a non-friable material and can therefore be removed using the low risk abatement procedures specified in section 5.2 of the Code, provided the following criteria are met:

- The material is not cut, broken, sanded, or vibrated; or
- Non-powered hand tools designed to cut, drill, or abrade the material are used with water to control fiber release; and,
- The asbestos-containing materials are handled and transported in sealed containers.

If the material has to be cut, broken or otherwise damaged during removal without the use of water to control the release of asbestos fibers, moderate risk abatement procedures specified in section 5.3 of the Code should be followed.

Additionally, if the amount of cement board exceeds 10 kg, the employer should establish a safe work practice governing the storage, handling, use, and disposal of the asbestos.



Transportation and disposal of asbestos waste should be conducted in accordance with the Government of Nunavut's *Environmental Guideline for Waste Asbestos*.

6.3.2 Lead

Demolition activities may have the potential to create airborne lead. As such, necessary measures must be taken (e.g. by means of engineering controls, work practices and hygiene practices) to ensure that the exposure of a worker to airborne lead shall not exceed the occupational exposure limit (OEL), averaged over an 8-hour day, of 0.05 mg/m³ as per the Nunavut Occupational Health and Safety Regulations (2016).

Because all of the collected paint samples contained leachate lead concentrations below the regulatory limit of 5.0 mg/L, any paint waste from the site may be treated as non-hazardous waste and disposed of in a regular landfill.

Before demolition activities, the lead-acid batteries in the emergency lights and the large lead-acid battery on the floor of the Generator Room should be removed and either reused or handled, transported, and disposed of by a qualified contractor in accordance with the Government of Nunavut's *Environmental Guideline for Waste Batteries* (2011).

6.3.3 Mercury

Prior to demolition activities, fluorescent lights should be carefully removed and re-used, recycled, or disposed of in accordance with Nunavut's *Environmental Guideline for Mercury-Containing Products and Waste Mercury* (2010).

6.3.4 Silica

Demolition activities have the potential to create airborne silica. As such, necessary measures must be taken (e.g. by means of engineering controls, work practices and hygiene practices) to ensure that the exposure of a worker to airborne silica shall not exceed the occupational exposure limit (OEL), averaged over an 8-hour day, of 0.05 mg/m³ for quartz and cristobalite and 0.1 mg/m³ for quartz/tripoli as per the Nunavut Occupational Health and Safety Regulations (2016).

Demolition wastes containing silica must be handled, transported and disposed of according to applicable federal and territorial waste handling regulations.

6.3.5 Polychlorinated Biphenyls

It is recommended that fluorescent light ballast labels be checked to confirm the presence of PCB containing components prior to removal and disposal. If ballasts are not clearly labeled as "non-PCB", they must be considered PCB-containing. Alternatively, the Environment Canada Publication titled *Identification of Lamp Ballasts Containing PCBs* (1991) may be referenced to (potentially) determine if unlabeled ballasts contain PCBs.

If the ballasts are labeled or identified as PCB-containing, they should be packed and shipped for destruction or recycling according to Transport Canada's Transportation of Dangerous Goods Act—this should include packing with an absorbent material and shipment to a licensed facility under proper chain of custody procedures.



Electrical transformers on site should be assumed to contain PCBs (unless identified otherwise) and handled, transported, and disposed of according to the above recommendations.

7. GENERAL LIMITATIONS

This report was prepared exclusively for the purposes, project and site location outlined in the report. The report is based on information provided to, or collected and/or obtained by Concentric as indicated in the report, and applies solely to site conditions existing at the time of the site assessment. Concentric's report represents a reasonable analysis and interpretation of available information within an agreed work scope, schedule and budget.

Concentric prepared this report for the sole benefit of the Canadian Coast Guard. The material in it reflects Concentric's best judgment in light of the information available to us at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions based upon it, are the responsibilities of such third parties. Concentric accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

The services performed and outlined herein were based, in part, upon visual observations of the site. Our opinion cannot be extended to portions of the site that were unavailable for direct observation by objects or coverings at the time of our onsite review. It should be noted that no destructive investigations were performed in areas with concrete, or where there was no absolute access point. As such, it is possible that asbestos and other hazardous substances may exist between walls or other enclosures/barriers, which would not have been visible during the survey. Furthermore, inconsistencies in construction as well as later renovations, repairs and additions to the building may result in a deviation in the pattern of designated substance use within the building. As such, without viewing and sampling every building material, it is not possible to individually characterize every material present.

Observations at the site relating to asbestos and hazardous materials are described in this report. Where testing was performed, it was executed in accordance with our contract for these services. Other compounds or materials not tested for may be present.

The objective of this report was to survey the environmental conditions at the site, within the context of our contract, with respect to the existing regulations, and within the applicable jurisdiction. Compliance of past and current owners with applicable local, provincial and federal government laws and regulations was not included in our contract for services.

The conclusions of this report are based, in part, on the information provided by others, including any testing and analyses described in the report. The possibility remains that unexpected environmental conditions may be encountered at the site locations not explored. Should such an event occur, Concentric should be notified so that modifications to our conclusions can be made, as necessary.

This report has been prepared in accordance with generally accepted environmental study and/or engineering practices. No other warranties, expressed or implied, are made as to the professional services provided under the terms of our contract and inclusions in this report.



If you have any questions regarding the above, please do not hesitate to contact the undersigned.

Yours sincerely,

CONCENTRIC ASSOCIATES INTERNATIONAL INCORPORATED

A handwritten signature in blue ink that reads "Jesse Francisco".

Jesse Francisco
Environmental Technologist

A handwritten signature in black ink that reads "Nancy Caldwell".

Nancy Caldwell B.A. (Hons.)
Project Manager



Appendix A
Regulatory and Guideline Framework



The Occupational Health and Safety Regulations (2016, as amended), Government of Nunavut

The Government of Nunavut's Occupational Health and Safety Regulations made under the Safety Act (2016, as amended) provides requirements to all industries regarding occupational health and safety in Nunavut. Part 24 and 25 of the regulation outlines the processes and appropriate measures for handling and/or working around asbestos and silica, respectively.

Consolidation of Safety Act (2016, as amended), Government of Nunavut

The Nunavut Safety Act is a consolidation of both Nunavut and Northwest Territories' statutes. The act, in part, specifies the duties required by employers to protect the health and safety of their employees in the workplace. Specifically, Section 4 of the act dictates the need for employers to "take all reasonable precautions and adopt and carry out all reasonable techniques and procedures to ensure the health and safety of every person in his or her establishment".

Northwest Territories and Nunavut Asbestos Abatement Codes of Practice (2012, as amended), Workers' Safety & Compensation Commission

The Asbestos Abatement Codes of Practice outlines the most appropriate techniques for the safe abatement of asbestos-containing materials. The code also provides general information about health hazards associated with asbestos exposure, as well as important criteria for contractors such as safe work procedures, inspection criteria, sampling guidance, applicable legislation, and competency profiles for those involved in the abatement process.

Environmental Guideline for Waste Asbestos (2011, as amended), Government of Nunavut

This guideline provides the generator and contractors with information regarding asbestos waste management including appropriate procedures for handling, storage, transporting, and disposing of asbestos waste. For example, the guideline specifies the protocol for packaging/labeling asbestos waste in accordance with the Transportation of Dangerous Goods Act and Regulations.

Environmental Guideline for Waste Lead and Lead Paint (2014, as amended), Government of Nunavut

This guideline provides information on the characteristics and possible effects of waste lead and lead paint on human health and the environment, and provides guidance on its proper containment, removal, storage, transportation and disposal.

Environmental Guideline for Mercury-Containing Products and Waste Mercury (2010, as amended), Government of Nunavut

This guideline provides information on the risks, hazards and best management practices associated with various mercury containing products commonly used in Nunavut. It examines the characteristics and effects of mercury on the environment and human health, identifies non mercury alternatives for common products, and



provides guidance on the proper cleanup, storage, transportation and disposal of mercury waste.

Environmental Guideline for Waste Batteries (2011, as amended), Government of Nunavut

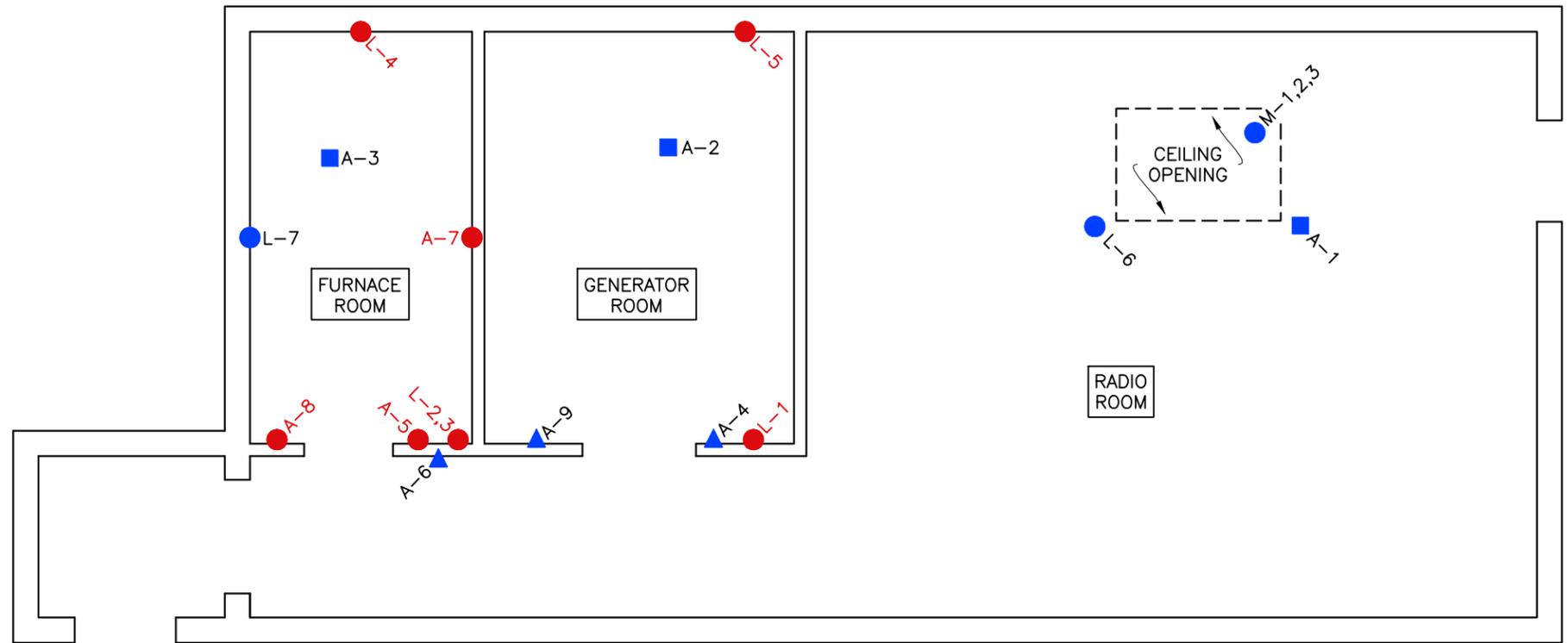
This guideline provides information on the types, uses and potential environmental and human health effects of waste batteries, as well as guidance on their proper storage, transportation and disposal.

PCB Regulations SOR/2008-273 (2015, as amended), Government of Canada

This regulation outlines related prohibitions, storage, labeling, etc. of PCBs in Canada. Section 5 states that no person shall release PCBs into the environment in excess of 2 mg/kg of liquid containing PCBs.



Appendix B
Sample Location Maps



- LEGEND:**
- A-# - VINYL FLOOR TILE SAMPLE LOCATION
 - ▲ A-# - GYPSUM BOARD SAMPLE LOCATION
 - A-# - ASBESTOS CONTAINING CEMENT BOARD SAMPLE LOCATION
 - M-# - MOULD SAMPLE LOCATION
 - L-# - LEAD CONTAINING PAINT SAMPLE LOCATION
 - L-# - PAINT SAMPLE LOCATION

 **SAMPLE LOCATION PLAN**
SCALE: 1:50



Appendix C
Photographs



Photograph 1. View of CCG's equipment building at the Iqaluit receiver site.



Photograph 2. View of the northeast corner of metal batten roof with flashing removed.



Photograph 3. View of test cut opening in the ceiling of the Radio room.



Photograph 4. View of deteriorating sealant and insulation in flute opening of roof.



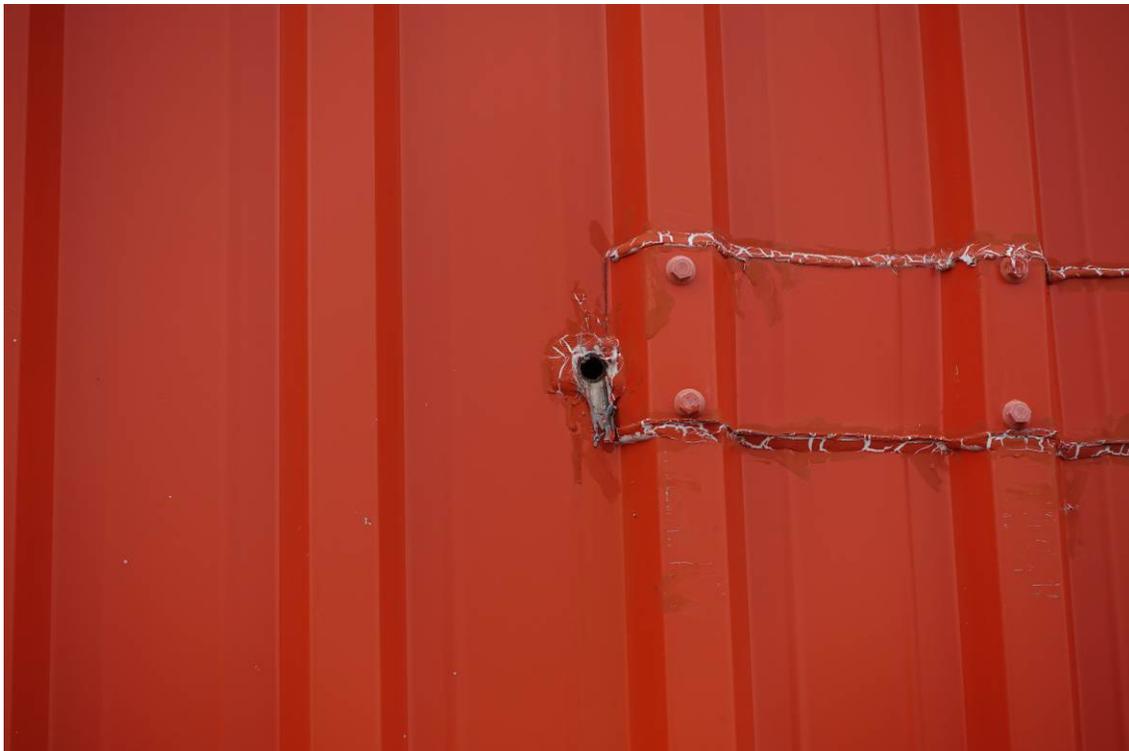
Photograph 5. View of the base of flue vent showing underlying cavity.



Photograph 6. View of ventilation opening in the metal cladding.



Photograph 7. Small vent hoods on the north and west sides of the building.



Photograph 8. Small penetration in the metal cladding of the building.



Photograph 9. View of rotted wood and mould-contamination in the attic space.



Photograph 10. Asbestos-containing cement board walls in the furnace room.



Photograph 11. View of the generator room showing emergency lighting and fluorescent light tubes with potentially PCB containing ballasts.



Appendix D
Laboratory Certificates of Analysis

Certificate of Analysis

Concentric Associates International Inc. (Ottawa)

2327 St. Laurent Blvd., Unit 100
Ottawa, ON K1G 4J8
Attn: Randy Scott

Client PO:
Project: 16-6912E
Custody: 17530

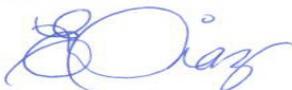
Report Date: 8-Aug-2016
Order Date: 2-Aug-2016

Order #: 1632112

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Parcel ID	Client ID
1632112-01	A1 Radio Rm Floor
1632112-02	A2 Generator Rm Floor
1632112-03	A3 Furnace Rm Floor
1632112-04	A4 Southwall, Generator Rm Floor (Gypsum)
1632112-05	A6 Northwall, Main Hallway (Gypsum)
1632112-06	A9 Southwall, Generator Room (Gypsum)
1632112-07	A5 Southwall, Furnace Room
1632112-08	A7 Eastwall, Furnace Room
1632112-09	A8 Southwall, Furnace Rm
1632112-10	A4 Southwall, Generator Rm Floor (Paper)
1632112-11	A6 Northwall, Main Hallway (Paper)
1632112-12	A9 Southwall, Generator Room (Paper)

Approved By:



Emma Diaz
Senior Analyst

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Certificate of Analysis

Report Date: 08-Aug-2016

Client: **Concentric Associates International Inc. (Ottawa)**

Order Date: 2-Aug-2016

Client PO:

Project Description: **16-6912E**

Asbestos, PLM Visual Estimation **MDL - 1.0%**

<i>Parcel I.D.</i>	<i>Sample Date</i>	<i>Layers Analyzed</i>	<i>Colour</i>	<i>Description</i>	<i>Asbestos Detected:</i>	<i>Material Identification</i>	<i>% Content</i>
1632112-01	26-Jul-16	sample homogenized	Brown	Floor Tile	No	Client ID: A1 Radio Rm Floor [AS-PRE] Non-Fibers	100
1632112-02	26-Jul-16	sample homogenized	Brown	Floor Tile	No	Client ID: A2 Generator Rm Floor [AS-PRE] Non-Fibers	100
1632112-03	26-Jul-16	sample homogenized	Brown	Floor Tile	No	Client ID: A3 Furnace Rm Floor [AS-PRE] Non-Fibers	100
1632112-04	26-Jul-16	sample homogenized	Brown	Gypsum	No	Client ID: A4 Southwall, Generator Rm Floor (Gypsum) Cellulose MMVF Non-Fibers	1 5 94
1632112-05	26-Jul-16	sample homogenized	Brown	Gypsum	No	Client ID: A6 Northwall, Main Hallway (Gypsum) Cellulose MMVF Non-Fibers	1 5 94
1632112-06	26-Jul-16	sample homogenized	Brown	Gypsum	No	Client ID: A9 Southwall, Generator Room (Gypsum) Cellulose MMVF Non-Fibers	1 5 94
1632112-07	26-Jul-16	sample homogenized	Grey	Cement Board	Yes	Client ID: A5 Southwall, Furnace Room Chrysotile Crocidolite Non-Fibers	20 10 70
1632112-08	26-Jul-16					Client ID: A7 Eastwall, Furnace Room not analyzed	
1632112-09	26-Jul-16					Client ID: A8 Southwall, Furnace Rm not analyzed	
1632112-10	26-Jul-16	sample homogenized	Brown	Paper	No	Client ID: A4 Southwall, Generator Rm Floor (Paper) [AS-PRE] Cellulose MMVF Non-Fibers	90 1 9
1632112-11	26-Jul-16	sample homogenized	Brown	Paper	No	Client ID: A6 Northwall, Main Hallway (Paper) [AS-PRE] Cellulose Non-Fibers	90 10

Certificate of Analysis

Report Date: 08-Aug-2016

Client: **Concentric Associates International Inc. (Ottawa)**

Order Date: 2-Aug-2016

Client PO:

Project Description: 16-6912E

Asbestos, PLM Visual Estimation **MDL - 1.0%******

Parcel I.D.	Sample Date	Layers Analyzed	Colour	Description	Asbestos Detected:	Material Identification	% Content
1632112-12	26-Jul-16	sample homogenized	Brown	Paper	No	Client ID: A9 Southwall, Generator Room (Paper) <small>[AS-PRE]</small>	
						Cellulose	90
						Non-Fibers	10

* MMVF: Man Made Vitreous Fibers: Fiberglass, Mineral Wool, Rockwool, Glasswool

**** Analytes in bold indicate asbestos mineral content.**

Analysis Summary Table

Analysis	Method Reference/Description	Lab Location	NVLAP Lab Code *	Analysis Date
Asbestos, PLM Visual Estimation	by EPA 600/R-93/116	Ottawa West Lab	200812-0	3-Aug-16

* Reference to the NVLAP term does not permit the user of this report to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Qualifier Notes

Sample Qualifiers :

AS-PRE: Due to the difficult nature of the bulk sample (interfering fibers/binders), additional NOB preparation was required prior to analysis

Work Order Revisions / Comments

None

Certificate of Analysis

Concentric Associates International Inc. (Ottawa)

2327 St. Laurent Blvd., Unit 100

Ottawa, ON K1G 4J8

Attn: Randy Scott

Client PO: 16-6912E

Project: 16-6912E

Custody: 28238

Report Date: 4-Aug-2016

Order Date: 2-Aug-2016

Order #: 1632017

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Parcel ID	Client ID
1632017-01	L1-South Wall, Generator Room
1632017-02	L2-South (Inner) Wall, Furnace Room
1632017-03	L3-South (Outer) Wall, Furnace Room
1632017-04	L4-North Wall, Furnace Room
1632017-05	L5-North Wall, Generator Room
1632017-06	L6-Ceiling, Radio Room

Approved By:



Mark Foto, M.Sc.

Lab Supervisor

Any use of these results implies your agreement that our total liability in connection with this work, however arising shall be limited to the amount paid by you for this work, and that our employees or agents shall not under circumstances be liable to you in connection with this work

Certificate of Analysis
Client: **Concentric Associates International Inc. (Ottawa)**
Client PO: 16-6912E

Report Date: 04-Aug-2016
Order Date: 2-Aug-2016
Project Description: 16-6912E

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals, ICP-OES	based on MOE E3470, ICP-OES	3-Aug-16	3-Aug-16

Sample and QC Qualifiers Notes

1- QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Certificate of Analysis
 Client: **Concentric Associates International Inc. (Ottawa)**
 Client PO: 16-6912E

Report Date: 04-Aug-2016
 Order Date: 2-Aug-2016
 Project Description: 16-6912E

Sample Results

Lead				Matrix: Paint	
				Sample Date: 26-Jul-16	
Paracel ID	Client ID	Units	MDL	Result	
1632017-01	L1-South Wall, Generator Room	ug/g	20	1210	
1632017-02	L2-South (Inner) Wall, Furnace Room	ug/g	20	968	
1632017-03	L3-South (Outer) Wall, Furnace Room	ug/g	20	1250	
1632017-04	L4-North Wall, Furnace Room	ug/g	20	1200	
1632017-05	L5-North Wall, Generator Room	ug/g	20	2580	
1632017-06	L6-Ceiling, Radio Room	ug/g	20	42	

Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Matrix Blank									
Lead	ND	20	ug/g						
Matrix Duplicate									
Lead	2350	20	ug/g	2550			8.2	30	
Matrix Spike									
Lead	1430		ug/L	1280	61.1	70-130			QM-07

Certificate of Analysis

Concentric Associates International Inc. (Ottawa)

2327 St. Laurent Blvd., Unit 100
Ottawa, ON K1G 4J8
Attn: Jesse Francisco

Client PO: 16-6912E
Project: 16-6912E
Custody: 28238

Report Date: 11-Aug-2016
Order Date: 9-Aug-2016

Order #: 1633147

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Parcel ID	Client ID
1633147-01	L1-South Wall, Generator Room
1633147-02	L2-South (Inner) Wall, Furnace Room
1633147-03	L3-South (Outer) Wall, Furnace Room
1633147-04	L4-North Wall, Furnace Room
1633147-05	L5-North Wall, Generator Room

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: Concentric Associates International Inc. (Ottawa)
Client PO: 16-6912E

Report Date: 11-Aug-2016
Order Date: 9-Aug-2016
Project Description: 16-6912E

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals, ICP-MS	EPA 6020 - Digestion - ICP-MS	11-Aug-16	11-Aug-16
Solids, %	Gravimetric, calculation	10-Aug-16	10-Aug-16

Certificate of Analysis
 Client: **Concentric Associates International Inc. (Ottawa)**
 Client PO: 16-6912E

Report Date: 11-Aug-2016
 Order Date: 9-Aug-2016
 Project Description: 16-6912E

Client ID:	L1-South Wall, Generator Room	L2-South (Inner) Wall, Furnace Room	L3-South (Outer) Wall, Furnace Room	L4-North Wall, Furnace Room
Sample Date:	26-Jul-16	26-Jul-16	26-Jul-16	26-Jul-16
Sample ID:	1633147-01	1633147-02	1633147-03	1633147-04
MDL/Units	Paint	Paint	Paint	Paint

Physical Characteristics

% Solids	0.1 % by Wt.	100	100	100	100
----------	--------------	-----	-----	-----	-----

EPA 1311 - TCLP Leachate Inorganics

Lead	0.05 mg/L	0.75	<0.05	0.53	0.85
------	-----------	------	-------	------	------

Client ID:	L5-North Wall, Generator Room	-	-	-
Sample Date:	26-Jul-16	-	-	-
Sample ID:	1633147-05	-	-	-
MDL/Units	Paint	-	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	100	-	-	-
----------	--------------	-----	---	---	---

EPA 1311 - TCLP Leachate Inorganics

Lead	0.05 mg/L	1.39	-	-	-
------	-----------	------	---	---	---

Certificate of Analysis
 Client: **Concentric Associates International Inc. (Ottawa)**
 Client PO: 16-6912E

Report Date: 11-Aug-2016
 Order Date: 9-Aug-2016
Project Description: 16-6912E

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
EPA 1311 - TCLP Leachate Inorganics									
Lead	ND	0.05	mg/L						

Certificate of Analysis
 Client: **Concentric Associates International Inc. (Ottawa)**
 Client PO: 16-6912E

Report Date: 11-Aug-2016
 Order Date: 9-Aug-2016
 Project Description: **16-6912E**

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
EPA 1311 - TCLP Leachate Inorganics									
Lead	0.610	0.05	mg/L	0.657			7.4	32	
Physical Characteristics									
% Solids	91.0	0.1	% by Wt.	91.0			0.0	25	

Certificate of Analysis
 Client: **Concentric Associates International Inc. (Ottawa)**
 Client PO: 16-6912E

Report Date: 11-Aug-2016
 Order Date: 9-Aug-2016
Project Description: 16-6912E

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
EPA 1311 - TCLP Leachate Inorganics									
Lead	49.2		ug/L	ND	98.4	77-126			

Certificate of Analysis
Client: Concentric Associates International Inc. (Ottawa)
Client PO: 16-6912E

Report Date: 11-Aug-2016
Order Date: 9-Aug-2016
Project Description: 16-6912E

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.