Attachment 2 to Annex A

COMMUNICATION TOWER - STATEMENT OF WORK (SOW)

Build One (1) Communication Tower,

Desmarais, AB	Latitude: 55 57 52.2N	Longitude: 113 49 37.8W

Table of Contents

1.0 Title

Build of one (1) Communication Tower.

2.0 Background

The Royal Canadian Mounted Police (RCMP) has legal obligations to ensure the safety of its members and general public under the Canadian Labor Code and the Canadian Occupational Health and Safety Regulations. As a result, the RCMP has initiated a national program to ensure that all its radio communication towers are compliant with applicable standards under Canadian Standards Association (CSA) S37-13.

These standards define the design, construction and maintenance of communication towers and their accessories. In the case where it is not possible to make an existing tower compliant, or if a tower is beyond repair, it will be replaced. As well, should it be determined that an existing RCMP tower is no longer required it will be removed.

3.0 Objectives

The RCMP strives to meet the Canadian Labor Code (CLC) directive and to ensure the safe, serviceable condition of all RCMP communication towers.

4.0 Scope

The Royal Canadian Mounted Police has a requirement to build one (1) 80 ft. (24.3 m) communication tower in Desmarais, AB.

The RCMP Standards and Guidelines for Communications Sites (Appendix B) and the CSA S37-13 must be referred to when detailing the specific requirements of this Statement of Work.

5.0 Tasks/Technical Specifications

5.1 Prior to the commencement of construction, the contractor is responsible for all underground utility locate services which must be performed in order to determine any utility lines are in the area and at risk due to the construction. The contractor is also responsible for obtaining and/or procuring all permits, authorizations or approvals needed to expedite this contract. This includes, but is not limited to permits, authorizations or approvals for building, digging, construction, electrical, road closures, demolitions, etc.

5.2 The Contractor is responsible for the supply and installation of all new hot-dipped galvanized lattice type self support tower and auxiliary components in accordance with CSA S37-13 Standard, built of solid rounds, and, as a minimum support wind pressure of 600 pa with radial ice of 41mm (or to the wind report values (Appendix C), whichever is higher). Tower section connections must be bolted flange type splices with a minimum 4 bolts per splice. The antennas and transmission lines are to be as defined in the CSLL (Communication Structure Load List) and the Contractor must ensure the tower will be built to support the required wind pressure and ice loading in their designated locations (Refer to Site Specific Details, Section 12.0).

5.3 Prior to tower fabrication, the contractor must provide the RCMP Project Authority with the complete set of stamped and sealed manufacturers drawings. It must include the proposed tower profile and foundation specification and is required 60 calendar days prior to construction for final review and approval by the RCMP Project Authority or designated representative.

5.4 The contractor is responsible for the supply and installation of a new tower foundation that must be manufactured to incorporate all antennas and lines shown in the Communication Structures Loading List (CSLL) detailed in the individual Site Specific Requirements (Section 12). The foundation must be

specified and installed based on a geotechnical report. The foundation installation documentation must be stamped and sealed by a Professional Engineer. The contractor must supply a detailed documentation to be approved by the RCMP Project Authority or designated representative prior to installation.

5.5 The tower foundation must be specified and installed based on the supplied geotechnical reports (Appendix E) and the site specific requirements detailed in this document. Concrete testing must be performed as per RCMP Tower Standards and Guidelines (Appendix B).

5.6 The Contractor must provide detailed drawings of a proposed anti-climb system (as per Appendix B - RCMP Standards and Guidelines for Communication Sites). Once approved by the Project Authority, the Contractor must supply and install the proposed anti-climb and fall arrest rail. Must be CSA certified to the most current version of CSA Z 259 Standard, A CSA compliant/compatible fall arrest rail will not be accepted.

One CSA certified trolley (designed and certified for the supplied fall arrest rail) must be supplied with the new fall arrest rail. The trolley must be CSA certified. A CSA compliant/compatible trolley will not be accepted.

5.7 The Contractor must supply and install a new tower ground system including external buss bar connections, in accordance with the RCMP Standards and Guidelines for Communication Sites (Appendix B). The new ground system must consist of but not be limited to, individual leg grounding, continuous ground riser, bottom and top tinned coated copper buss bars and a lightning rod. The lighting rod must be installed in accordance to CSA S37-13 Standards. The contractor must supply an internal grounding buss bar and surge protectors for each antenna. The internal buss bar and surge protectors must be provided to the RCMP. A tower ground ring must be terminated to the RCMP building ground.

5.8 The Contractor is responsible for supplying and installing all proposed transmission lines, antennas and mounts as indicated on the CSLL (Refer to Site Specific Details Section 12.0). All transmission line hangers must be heavy duty and constructed of material compatible with hot dip galvanized steel. Lines and feeders installed on antenna mounts are to be attached with line hangers. The transmission lines must be grounded to the waveguide port and to the top and bottom of the buss bars. The Contractor must supply and install an External Ground Bus bar (EGB) below the waveguide port(s) on the RCMP building. A 2/0 vinyl coated copper ground lead, and ground kits must be added to all the TX-lines and terminated on the new ground bar.

5.9 The Contractor must supply sufficient length of cable for feeding the lines through the entry port inside of the RCMP building and sealing the tower base end with expandable foam. The RCMP technician is responsible for any connections made inside the building.

5.10 The Contractor must supply all mounting hardware necessary to install the specified antennas.

5.11 The Contractor is responsible for supplying all N-type connectors for the transmission lines. The Contractor is responsible for the termination at the antenna only. The RCMP technician will complete any connections made inside the building.

5.12 The tower structure and all auxiliary components must be hot-dipped galvanized to conform with CSA S37-13 prior to installation.

5.13 The Contractor must complete antenna orientations, optimization, testing and commissioning, Including a transmit sweep test. Copies of the transmission sweeps must be supplied to the RCMP.

5.14 The RCMP will identify the required obstruction lighting/markings are required for the tower on a per site basis. If markings are required the Contractor must identify how these requirements will be addressed.

5.15 Upon completion of the work, the Contractor must leave the site in a clean and tidy condition subject to the satisfaction of the RCMP Project Authority or his designated representative.

5.16 The Contractor must supply and install caution signs as identified in the RCMP Standards and Guidelines for Communication Sites (Appendix B). These signs must be provided in French and English.

6.0 Deliverables

Summary of Required Reports/Documents

Number	Title	Date Required	Comments	Format
1	Proposed tower profile and site specific foundation specification and manufacturers stamped drawings.	At least 60 calendar days prior to tower erection	Must include foundation specifications and complete set of stamped drawings for tower and foundation specific to the requirement as detailed in the statement of work. Proposed drawings must be approved by the RCMP technical authority prior to manufacture.	Microsoft Word or Adobe pdf format acceptable
2	Detailed drawings of a proposed anti-climb system	At least 60 calendar days prior to tower erection.	To be followed by the supply and installation of the anti-climb and fall arrest rail as per RCMP Tower Standards and Guidelines (Appendix B). Proposed drawings must be approved by the RCMP technical authority prior to manufacture.	Microsoft Word or Adobe pdf format acceptable
3	Antenna orientations, optimization, testing and commissioning, including transmit sweep test results.	Required upon completion of tower erection, prior to final RCMP Inspection	One copy of the results is to be left at site and one copy is to be provided to the RCMP Project Authority	Microsoft Word or Adobe pdf format acceptable
4	“As Built” Drawings for the completed towers and foundations	Required upon completion of tower erection, prior to final inspection	To be created as per RCMP Tower Standards and Guidelines - Section 1.5 Detailed Drawings (Appendix B).	Microsoft Word or Adobe pdf format acceptable
5	A copy of the contractor’s Safety Program	If and when requested by RCMP project manager	Must be pre-reviewed by the provincial and federal authorities with jurisdiction	Microsoft Word or Adobe pdf format acceptable
6	An overall summary report.	Required upon completion of tower erection, prior to final RCMP inspection	Soft copy of report including all pertinent details. When the task is a tower removal, digital photos of the site after removal must be included. The digital photos must be of sufficient resolution to provide the Project Authority with a clear understanding of all details pertaining to the tower build.	Microsoft Word or Adobe pdf format acceptable

7.0 Location of Work

Install One (1) Communication Tower,

Desmarais, AB Latitude: 55 57 52.2N Longitude: 113 49 37.8W

8.0 Constraints

8.1 All on site Contractor personnel must be trained with regard to safe climbing and working techniques and must be trained with regard to tower rescue techniques. CSA approved safety equipment must be utilized at all times.

8.2 The Contractor must safeguard existing antennas, transmission lines, and other tower attachments, as well as the tower members and connections and not alter or otherwise impair the performance of any of these items during the course of work without the written approval of the RCMP.

8.3 The Contractor must use all new CSA Grade steel, hot dipped and galvanized, and must comply with CSA S37-13. The tower must be an all weld knock-down, built of solid rounds for their legs and diagonal and, as a minimum support wind pressure of 600 pa with radial ice of 41mm.

8.4 Contractor to confirm all field dimensions, existing conditions and measurements on site, prior to fabrication.

8.5 The Contractor is responsible for the review and implementation of all safety regulations under the Canada Labor Code, all RCMP safety regulations, those safety requirements of the Workers Compensation Commission, Canada Labor Code, CSA Standards, and other applicable Provincial and Federal Regulations.

9.0 Travel Arrangement

9.1 Arrangement for the transportation of all personnel, materials and equipment to and from the sites is the responsibility of the Contractor.

10.0 Additional Work

10.1 In the event of additional work within the scope of the Statement of Work, the procedure given below must be adhered to.

a. The Contractor must submit in writing to the contracting authority and the technical authority the requirement giving sufficient details.

b. The Contractor must submit an estimate of cost and materials to the contract authority and technical authority.

c. The Contractor must not proceed with any additional work without written authorization of the contract authority. Any work taken in hand without the contracting authority must be considered to be work carried outside the scope of work and no extra payment will be made for any such work.

11.0 RCMP Inspection

11.1 Workmanship will be subject to inspections at any time by the RCMP Project Authority or designated representative. The contractor must work with the RCMP Project Authority or designated representative to establish an estimated time for inspections.

11.2 A final Acceptance Inspection will be conducted by an RCMP designated representative. The purpose of the acceptance inspection is to confirm compliance of the installation with the site specific specifications and all related documents as detailed in the Statement of Work. All efforts will be made to have the inspection in conjunction with the completion of work at the site. All required tasks as detailed in the statement of work must be completed at the time of the final Acceptance Inspection.

11.3 Any deficiencies or remedial work identified in the inspections must be completed by the contractor at the contractor's own expense and to the satisfaction of the RCMP Project Authority

12.0 Specific Details

Desmarais Detachment Tower Build

Introduction

The 80 foot self-support communication tower to be built is located at the new RCMP Detachment in Wabasca-Desmarais, AB.

The land is located at Lot 8 Block 15 Plan 9723974.

General Site Details

Name: Desmarais Detachment Site

Location:

Lot8 Block15 Plan9723974

Wabasca-Desmarais, AB

Latitude: 55 57 52.2N

Longitude: 113 49 37.8W

Base Elevation: 1814ft. (553m)

Site Access: two wheel drive

Existing Structure:

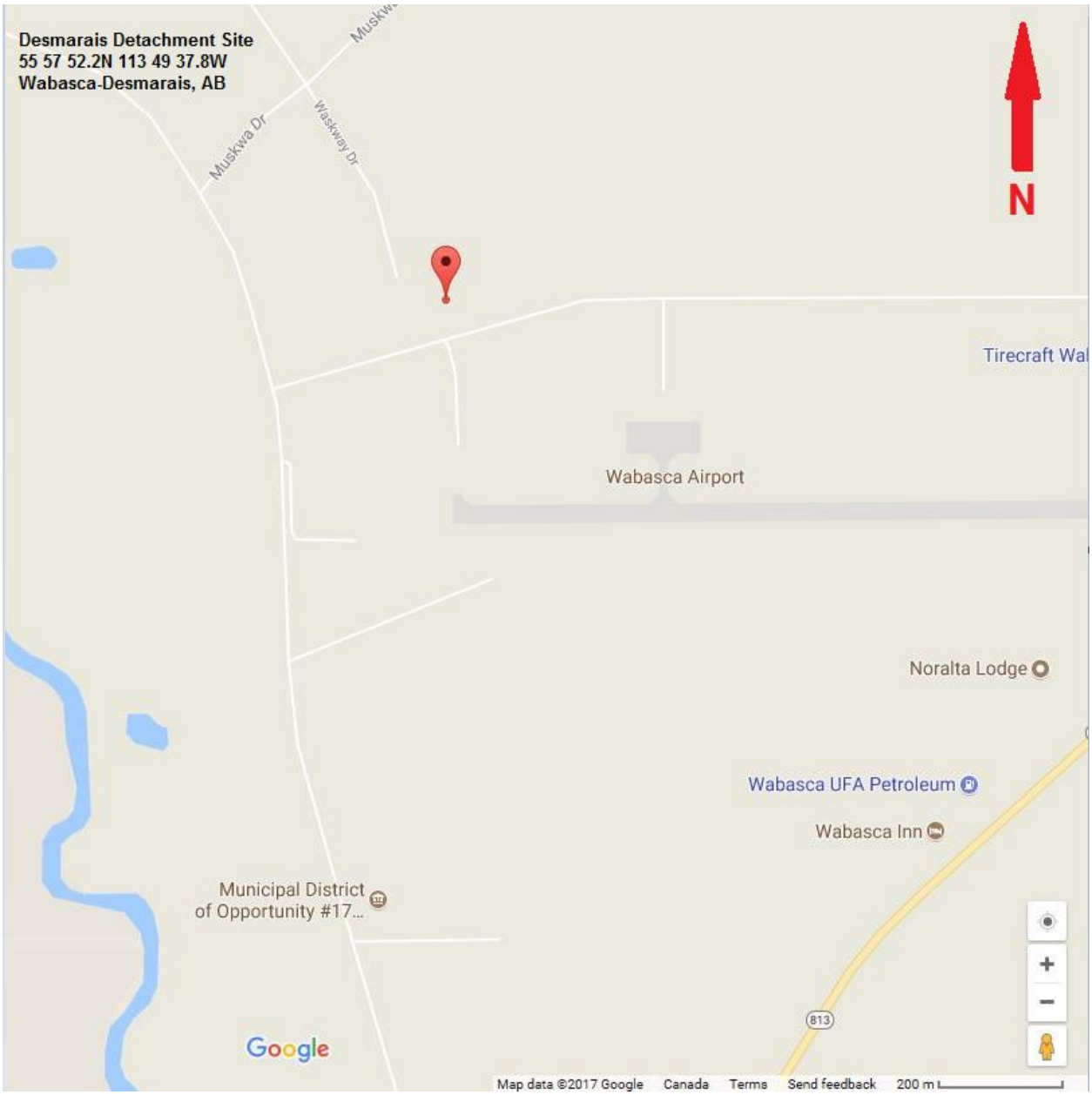
Type: Triangular Self-support

Height: 80ft. (24.30m)

Manufacturer: TBD

Fall Arrest Facility: Yes – TDB

Map


Desmarais Detachment Site
55 57 52.2N 113 49 37.8W
Wabasca-Desmarais, AB
Muskwa Dr
Waskway Dr
N
Tirecraft Wal
Wabasca Airport
Noralta Lodge
Wabasca UFA Petroleum
Wabasca Inn
Municipal District of Opportunity #17...
813
Google
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Canada
Terms
Send feedback
200 m

Satellite


Desmarais Detachment Site
55 57 52.2N 113 49 37.8W
Wabasca-Desmarais, AB
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Canada
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Send feedback
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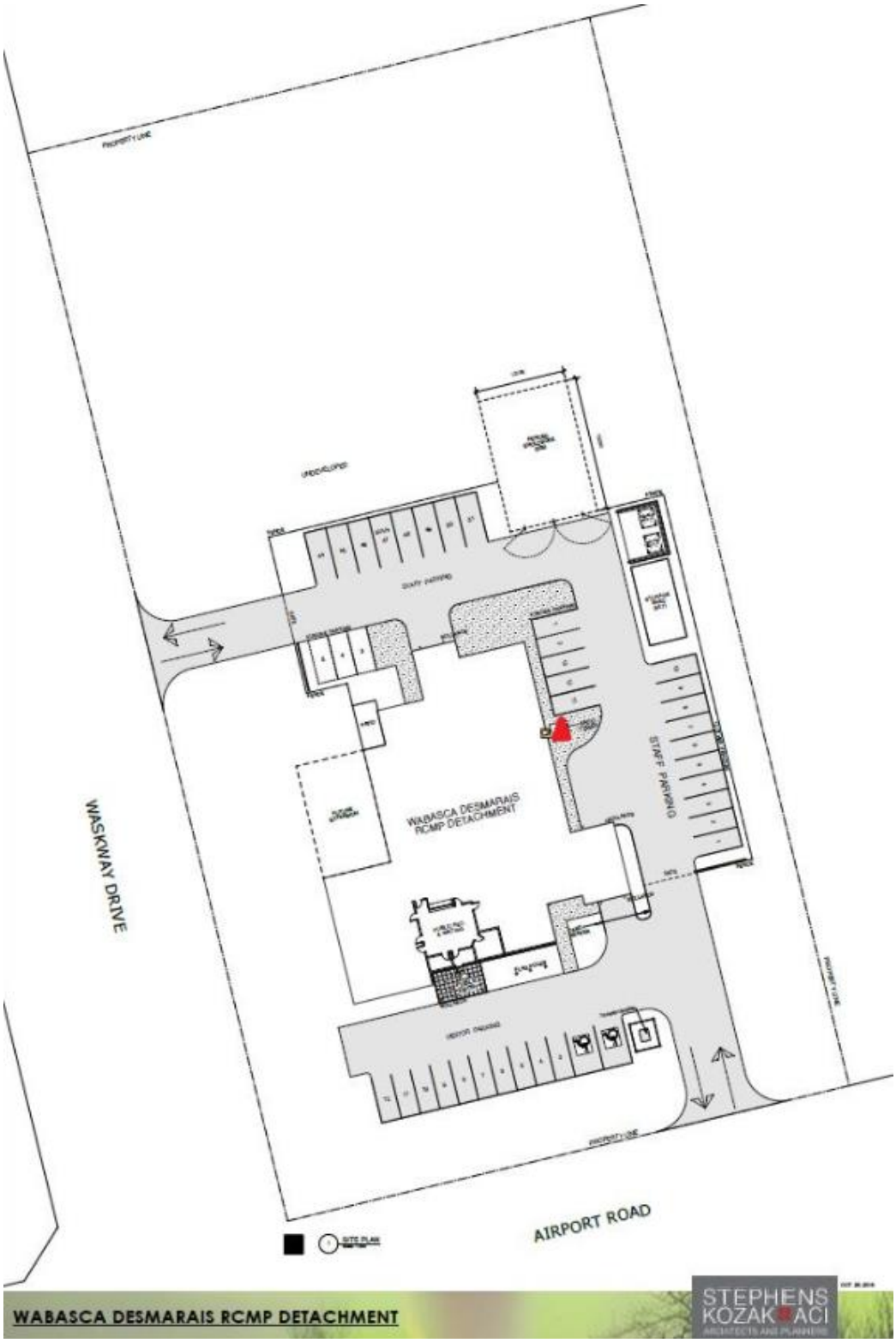
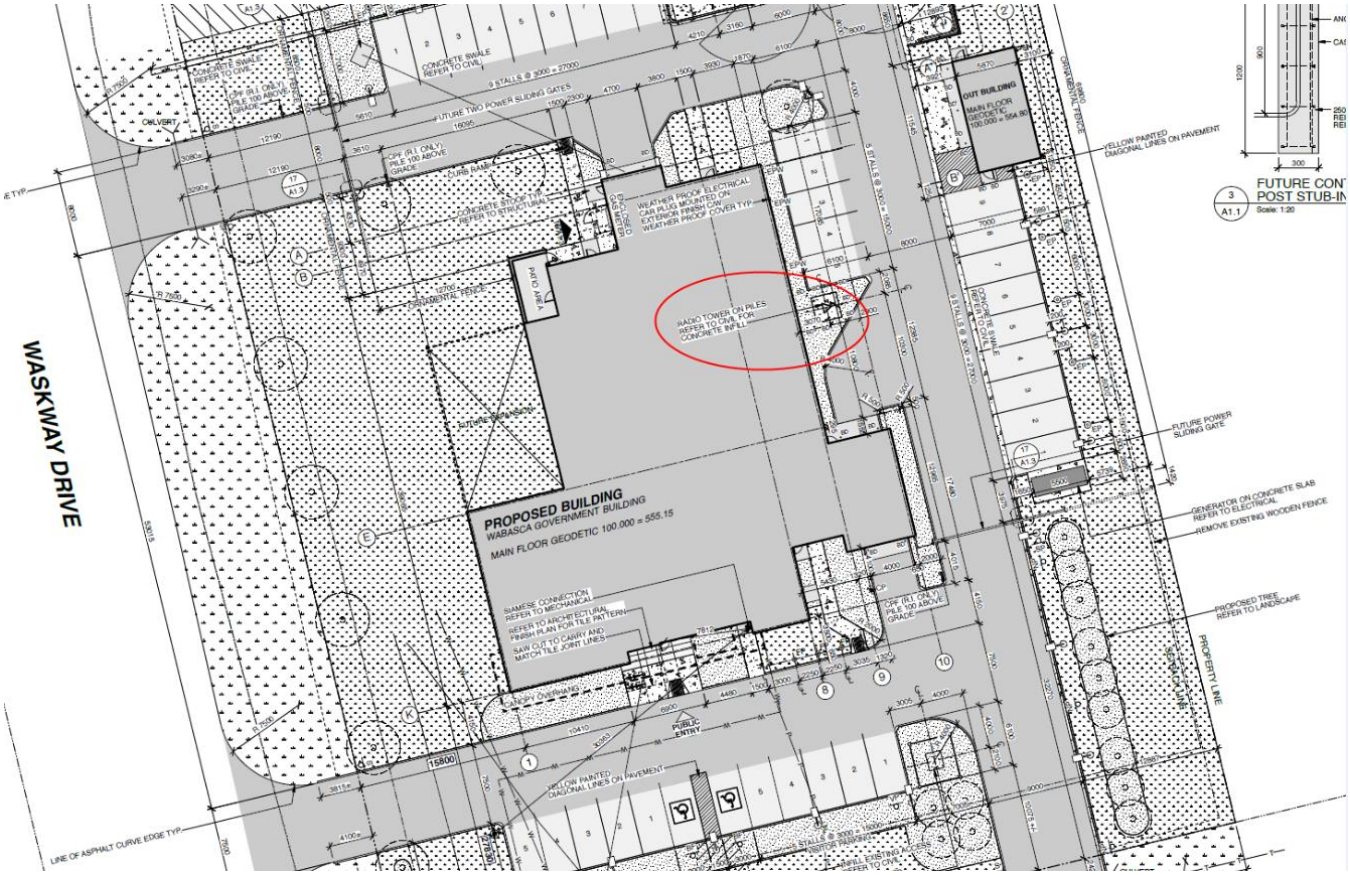
Site Plan


WASKWAY DRIVE
WABASCA DESMARAIS RCMP DETACHMENT
STAFF PARKING
AIRPORT ROAD
WABASCA DESMARAIS RCMP DETACHMENT
STEPHENS KOZAK ACI

Detailed Site View



Requirements

1. A new 80 foot (24.3 m) self-support tower must be installed at the identified location.

2. The tower and foundation must be designed to incorporate all antennas and lines shown in the Communications Structure Load List (CSLL) and the Site/Tower/Antenna Requirements data sheet and in accordance with the site specific wind data. A copy of the tower profile and foundation drawings must be submitted to the RCMP Project Authority for verification before commencement of procurement of materials, manufacturing, site preparation and installation.

3. The geotechnical report must be used for the design of the tower foundation.

4. The Contractor must supply and install the tower foundation detailed in the CSLL and the Site/Tower/Antenna Requirements data sheet provided below. Site specific drawings of the foundation must be included on the final Engineering Stamped As-Built Drawings.

5. The specified transmission lines must be routed through a subterranean schedule 80 rigid PVC conduit. A new conduit will have to be used. Refer to the site plan and photos provided below for the positioning of the entry ports relative to the tower placement. The contractor must plan for the use of this conduit and must supply and install a waterproof conduit coupler compatible with the specified transmission lines.

6. The contractor is responsible for providing sufficient length of transmission lines to accommodate the estimated additional 105 feet (32 m) for the cable runs inside of the RCMP Detachment building. The contractor will not be required to enter the building as RCMP technicians will be present on site to assist with the fishing of the lines through the entry ports, however, they will supply the compatible N type connector for each line at the equipment end and the RCMP will assume responsibility for their installation. The contractor will install the N type female connector at the antenna end.

7. The Contractor must provide detailed drawings to supply and install a new panel anti-climb and fall arrest rail. The panel anti-climb must be 10 feet (3 m) with the fall arrest rail beginning at the top of the new panel anti-climb and extend to the top of the tower.

8. Transport Canada's Aeronautical Assessment stipulates that lighting and marking is required. Supply and install red lighting as per TC Standard 621-2016. Light must be low voltage long life LED. The tower is also to be painted (daytime marking). The tower lighting system must include a remote alarm monitoring functionality and photo electric sensor for night time operation.

9. The Contractor must provide, supply and install caution signs in accordance with the RCMP Standards and Guidelines for Communication Sites (Appendix B). The signs must be in French and English.

New Tower
Communications Structure Load List (CSLL)

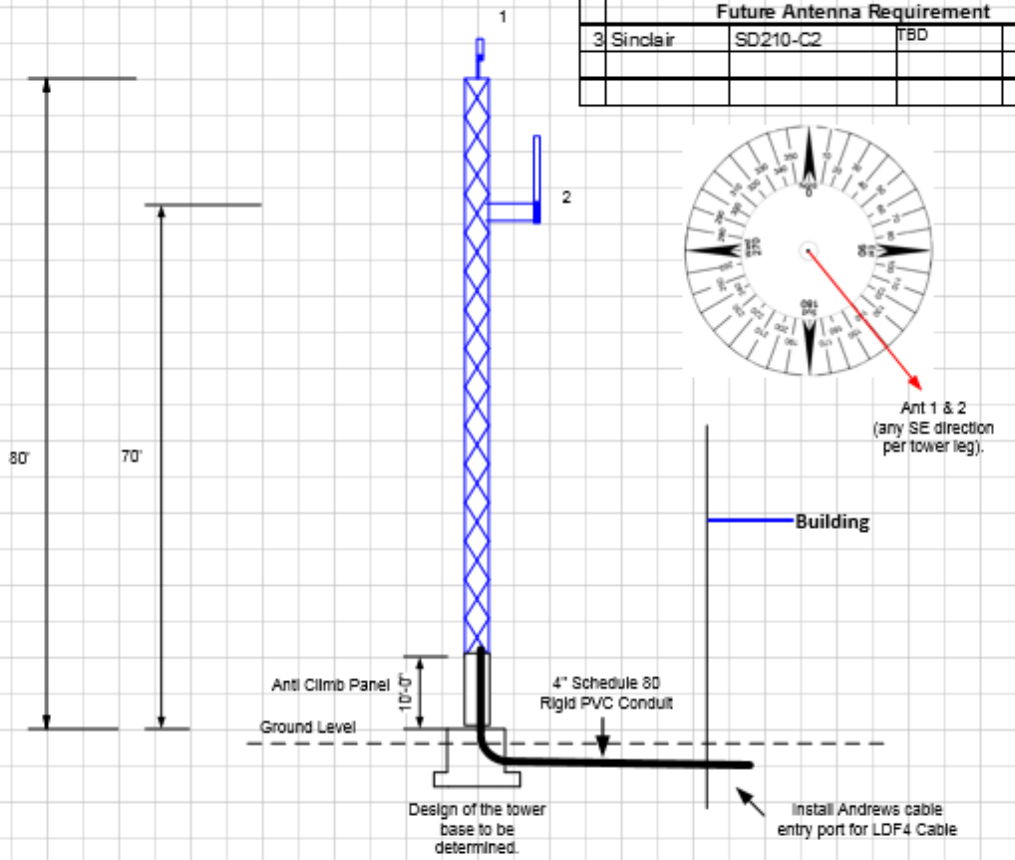
RCMP-GRC

WABASCA / DESMARAIS DETACHMENT

Version #	
Date:	2017-12-11
Author:	Darren Kozey / Mike Riester
Civic Address:	
Misc:	
Buried conduit	

Wabasca-Desmarais				
	Lat:	55.964539	Long:	-113.828
	Wind:	TBD	Ice:	TBD
	Fall Arrest	Yes	Paint:	Yes
	Security	Anticlimb	Lighting:	Yes
	Grounding	CSA S37	Cable:	LDF4-50
	TOWER	80'	MODEL	TBD

Antenna System Required				
#	Make	Model	Location	Bearing
1	PCTEL	MFBW7463	Top	140 deg.
2	Sinclair	SC233	70 ft.	140 deg.
	Future Antenna Requirement			
3	Sinclair	SD210-C2	TBD	



CSS-CIO Sector Ottawa
Friday, November 02, 2012

13.0 Appendix A - Antenna Specifications

PCTEL MFBW7463:

746-869 MHz, 3 dB Gain MAXRAD Fiberglass Base Station (MFB) Omnidirectional Antennas

This is an omnidirectional base station antenna that provides 3 dB gain within the specified frequency. It is designed for mast mounting.

Features

- N female connector
- Thick walled aluminum mounting base
- White fiberglass radome

MAXRAD

Antenna Electrical Specifications

Model	Frequency Range	Nominal Gain	Vertical Beamwidth at Half Power	Horizontal Beamwidth at Half Power
MFBW7463	746-869 MHz	3 dB	40°	360°

Mechanical Specifications

Model	Antenna Length	Weight (Mass)	Temperature Range
MFBW7463	27"	1.5 lbs	-40°C to +70°C

Model	Lateral Thrust at Rated Wind with 1/2" of Ice	Equivalent Flat Plate Area with 1/2" of Ice	Wind Survival with 1/2" of Ice
MFBW7463	20 lbf	.22 ft²	125 mph

Technical Data

General Specifications: 746-869 MHz omnidirectional antenna
Maximum Power: 50 watts
Normal Impedance: 50 ohms
Polarization: Vertical
VSWR: < 1.8:1
Termination: N female
Mounting Method: MMK12 heavy duty cast mast mount (sold separately)

For detailed specifications, visit http://antenna.pctel.com.

Sinclair SC233:

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Superior then, Superior now.
A Norsat Company | Norsat International Inc.

Antennas
Low Band, Aviation, and VHF Antennas
SC233 Series

SC233-SFXSNM(FXXXX) Collinear omni, 3 dBd, 2 MHz B.W., N-Male connector, 138-174 MHz

Also referred as: SRL233-XXXX

- Low cost antenna
- 2 MHz Bandwidth. Frequency must be specified at time of order
- Designed to withstand the severe demands of marine service
- Excellent horizon coverage

The SC233 is a lightweight, 3 dB collinear antenna constructed of high strength fiberglass with an aluminum coaxial skirt and base pipe. The combined features of light weight, medium gain, and low cost make this antenna a natural choice for moderate base station antenna requirements. Mounting clamps are provided for parallel mounting to a minimum 1.9 inch diameter support pipe.

www.sinctech.com

Region	United States	Europe, Middle East and Africa	Caribbean and Latin America	Canada and rest of the world
Telephone	USA: 1 800 263 3275	International: +44 (0) 1487 84 28 19	International: +1 905 726 7676	Canada: 1 800 263 3275 International: +1 905 727 0165
E-mail	salesusa@sinctech.com	salesuk@sinctech.com	salesla@sinctech.com	salescan@sinctech.com

Sinclair SC223 Cont'd:

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Antennas
Low Band, Aviation, and VHF Antennas
SC233 Series

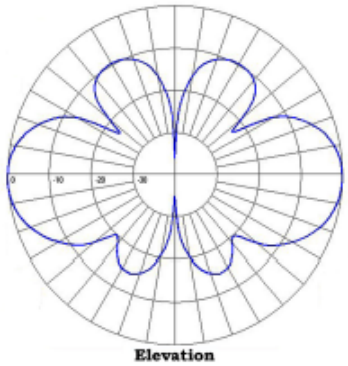
Electrical Specifications			
Frequency Range	MHz	138 to 174	*1
Bandwidth	MHz	2	
Connector		N-Male	
Gain (nominal)	dBd (dBi)	3 (5.1)	
Input VSWR (max)		1.5:1	
Polarization		vertical	
Impedance	Ω	50	
Pattern		Omni-directional	
Vertical beamwidth (typ)	degrees	35	
Average Power Input (max)	W	100	
Lightning protection		DC ground	

Notes
*1 : Specify operating frequency
*2 : Based on 100mph and 0 inches of ice.
*3 : Based on 100mph and 0 inches of ice.
*4 : Based on 100mph and 0 inches of ice.

Mechanical Specifications			
Depth	in (mm)	1.5 (38)	
Length	in (mm)	145 (3683)	
Width	in (mm)	1.5 (38)	
Base pipe diameter	in (mm)	0.88 (22)	
Base pipe mounting length	in (mm)	14 (356)	
Radome material		fiberglass (UV protected)	
Weight	lbs (kg)	3.5 (1.59)	
Weight iced	lbs (kg)	15 (6.81)	
Mounting Hardware (Standard)		Clamp135	
Actual Shipping weight	lbs (kg)	25 (11.35)	
Shipping dimensions	in (mm)	157x4x4 (3988x102x102)	

Ordering Information
Specify operating frequency.

Environmental Specifications			
Temperature range	°F (°C)	-40 to +140 (-40 to +60)	
Wind Loading Area (Flat Plate Equivalent)	ft² (m²)	0.61 (0.06)	
Wind Loading Area (1/2" ice)	ft² (m²)	1.33 (0.12)	
Rated wind velocity (no ice)	mph (km/h)	115 (185)	
Rated wind velocity (1/2" radial ice)	mph (km/h)	85 (137)	
Lateral thrust (100 mph No Ice)	lbs (N)	21 (93.4)	*2
Bending moment (100 mph No Ice)	ft-lbs (Nm)	66 (89.1)	*3
Tip deflection (100 mph No Ice)	degrees	2	*4



Elevation

Region	United States	Europe, Middle East and Africa	Caribbean and Latin America	Canada and rest of the world
Telephone	USA: 1 800 263 3275	International: +44 (0) 1487 84 28 19	International: +1 905 726 7676	Canada: 1 800 263 3275 International: +1 905 727 0165
E-mail	salesusa@sinctech.com	salesuk@sinctech.com	salesla@sinctech.com	salescan@sinctech.com

Sinclair SD210-C2:

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Antennas
Low Band, Aviation, and VHF Antennas
SD210D Series

SD210D-SF2P4SNM — 1 dipole, dual array 2 feed cables, 2.5 dBd, offset, 138-174 MHz

Also referred as: SRL210C/210CNM*4-2

- Dual single dipole antennas on same mast covering 138-174 MHz
- 2.5 dBd gain with offset pattern
- 200W power handling
- Can be top or side mounted (Universal mount)

Recommend SMK-125-A3 or SMK-125-A7 for Offset Side Mount.
Available from Sinclair separately.

The SD210D series of antennas is highly efficient and offers exceptionally wide bandwidth. It covers the frequency ranges of 118-137 or 138-174 MHz at a VSWR of 1.5:1 or better. Because of its bandwidth, the SD210 series is perfectly suited for multicoupled systems.

Region	United States	Europe, Middle East and Africa	Caribbean and Latin America	Canada and rest of the world
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E-mail	salesusa@sinctech.com	salesuk@sinctech.com	salesla@sinctech.com	salescan@sinctech.com

Sinclair SD210-C2 Cont'd:

Superior then, Superior now.
A Norsat Company

Antennas
Low Band, Aviation, and VHF Antennas
SD210D Series

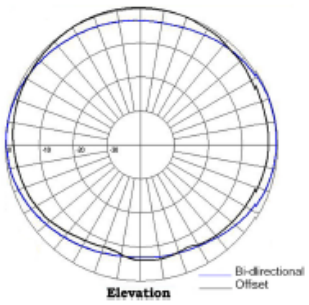
Electrical Specifications		
Frequency Range	MHz	138 to 174
Bandwidth	MHz	36
Connector		N-Male
Gain (nominal)	dBd (dBi)	2.5 (4.6)
Input VSWR (max)		1.5:1
Polarization		vertical
Impedance	Ω	50
Pattern		Offset
Isolation (typ)	dB	30
Horizontal beamwidth (typ)	degrees	210
Vertical beamwidth (typ)	degrees	68
Average Power Input (max)	W	200
Lightning protection		DC ground

Mechanical Specifications			
Width	in (mm)	24 (610)	
Depth	in (mm)	4 (102)	
Length/ Height	in (mm)	192 (4877)	
Base pipe diameter	in (mm)	2.38 (60)	
Radiating element material		aluminum	
Base pipe material		aluminum	
Weight	lbs (kg)	38 (17.25)	
Weight iced (1/2" ice)	lbs (kg)	88 (39.95)	
Mounting Hardware (Optional)		Clamp005, Clamp015, or Clamp130	*1
Mounting configurations		Universal Mount	
Recommended For Offset Side Mount:		SMK-125-A3 or SMK-125-A7	

Environmental Specifications		
Temperature range	°F (°C)	-40 to +140 (-40 to +60)
Wind Loading Area (Flat Plate Equivalent)	ft² (m²)	1.83 (0.17)
Wind Loading Area (1/2" ice)	ft² (m²)	3.25 (0.3)
Rated wind velocity (no ice)	mph (km/h)	145 (233)
Rated wind velocity (1/2" radial ice)	mph (km/h)	110 (177)
Lateral thrust (100 mph No Ice)	lbs (N)	114 (507.1)
Torsional moment (100 mph No Ice)	ft-lbs (Nm)	34 (45.9)
Bending moment (100 mph No Ice)	ft-lbs (Nm)	218 (294.3)
Tip deflection (100 mph No Ice)	degrees	0.3

Notes
*1 : Qty 2

Ordering Information
Clamps must be ordered separately.



Elevation

Region	United States	Europe, Middle East and Africa	Caribbean and Latin America	Canada and rest of the world
Telephone	USA: 1 800 263 3275	International: +44 (0) 1487 84 28 19	International: +1 905 726 7676	Canada: 1 800 263 3275 International: +1 905 727 0165
E-mail	salesusa@sinctech.com	salesuk@sinctech.com	salesla@sinctech.com	salescan@sinctech.com

14.0 Appendix B - RCMP Standards and Guidelines For Communication Sites

Note: attached as a separate pdf document.

15.0 Appendix C – Environment Canada Wind Data

Note: attached as a separate pdf documents.

16.0 Appendix D – Transport Canada Documentation

Note: attached as a separate pdf documents.

17.0 Appendix E – Geotechnical Survey

Note: attached as a separate pdf documents.