



## Inspection and Maintenance Report 18.2m Doppler Tower

Location Code: XYY

Site Name: Villeroy



# Site Details

## Site Information

Location Code: XVY  
Site Name: Villeroy  
Site Address: 1213E Rang E  
City: Villeroy  
Province: QC  
Tower Owner: Environment Canada  
Carrier 1:  
Carrier 2:

## Inspection Details

Inspection Date: 20-Aug-13  
Temperature: 25°C  
Weather Conditions: Sunny  
Wind Speed: 15km/hr  
Wind Direction: SW  
Inspector: Hugues Bibeau  
Maintenance Crew: Mathieu Savard  
Maintenance Crew:

## Tower Paint

Painted (Y/N): No

## Lighting Details

Light Model: Not Inspected  
Light Serial Num:  
Light Cable:  
Light Manufacturer:  
Controller Model:  
Photocell Model:  
Emergency Light Make:  
Emergency Light Model:

Elev.	Light Type	# Bulbs
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## Technical Information

Latitude: 46 27 00  
Longitude: 71 54 55  
Site Access: Escort  
Standard: CSA S37-01

## Structure Information

Structure Height: 18.2m  
Structure Type: Doppler  
Construction Type: Knockdown  
Manufacturer: Unknown  
Face Width: Varies  
Panel Height: Varies  
Cross Section: Square  
Fall Arrest Type: N/A  
Anchor Protection: N/A

## Shelter Information

Shelter Manufacturer: Not Inspected  
Shelter Size:  
Shelter Serial:  
Shelter Generator:  
Shelter A/C:  
Hydro Meter:

## Compound Information

Compound Size:

## Drawing Information

Drawing Number: N/A  
Drawing Date:  
Revision:

## Tower Loading

#	Elev.	Antenna or Attachment (in order from top to bottom)	Location	TxLine	Orientation
1	18.2 m	Doppler 98R	Inside Shroud	(1)WR1150	Omni

# Site Overview - Pictures

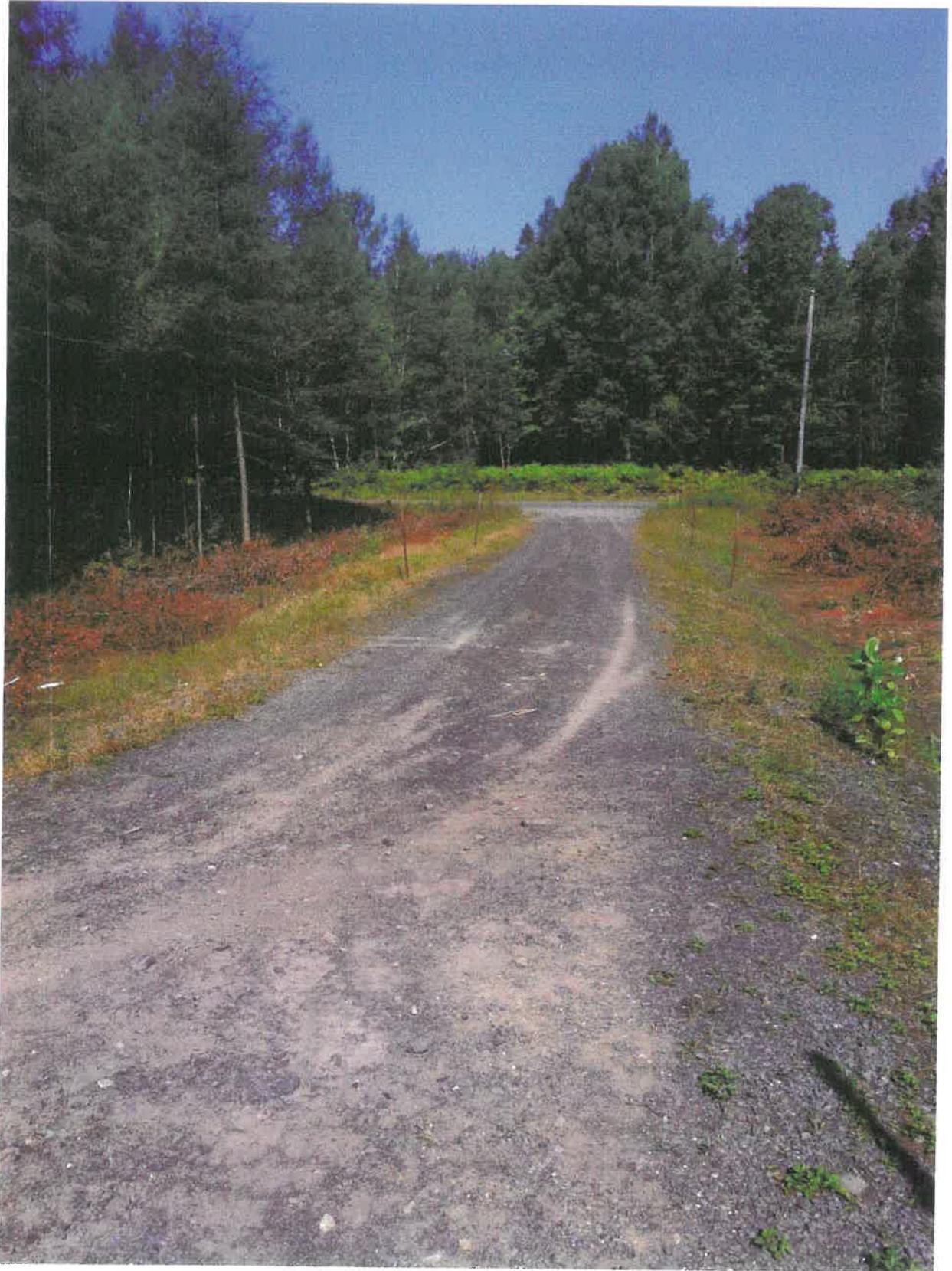
## Tower Profile



# Antenna Installation Profile



## Access Roadway to Site



## View of Site



# Tower Compound



# Tower Base



## Transmission Line Bridge or Cable Tray



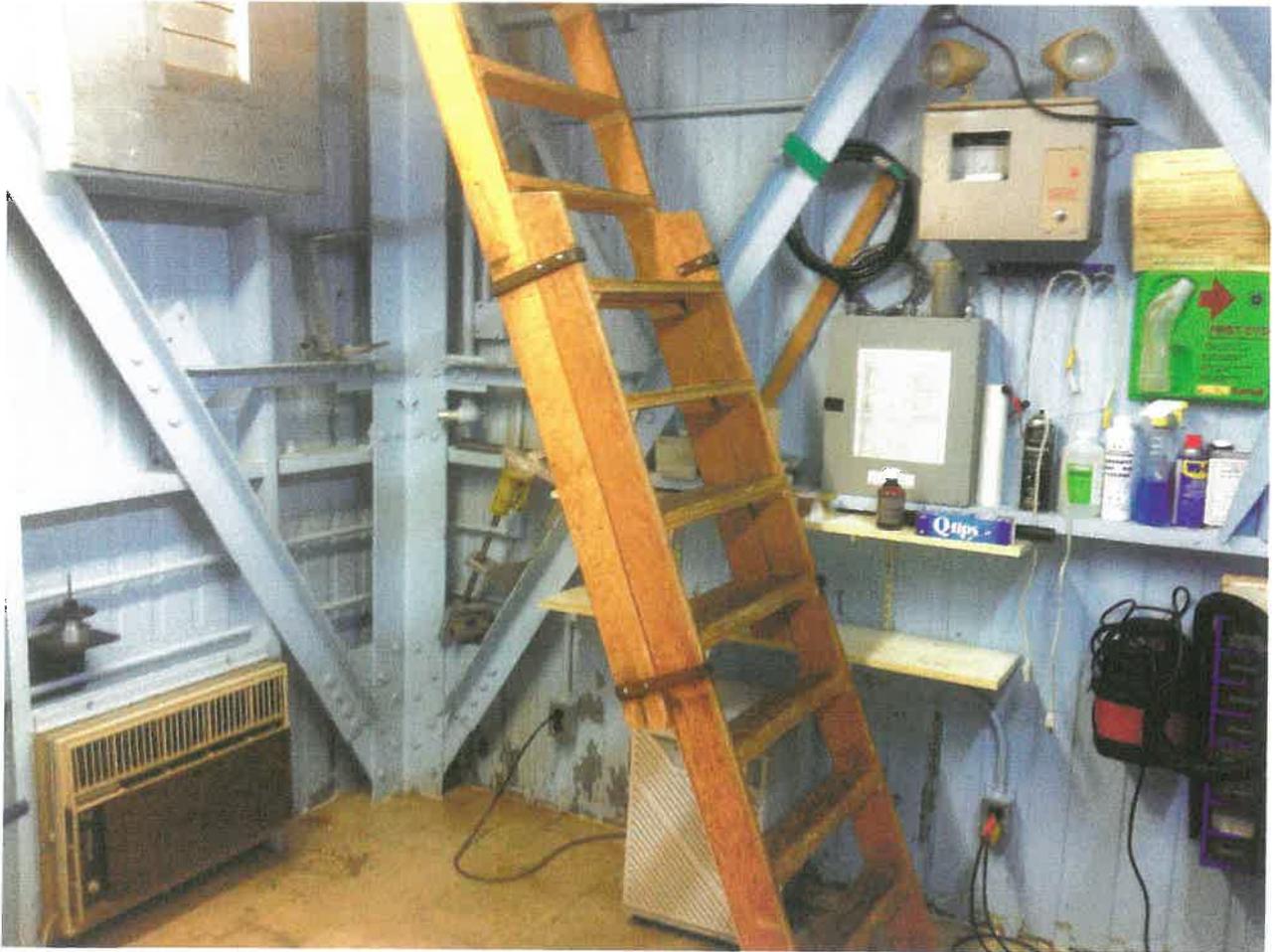
## Equipment Shelter or Cabinet (Outside)



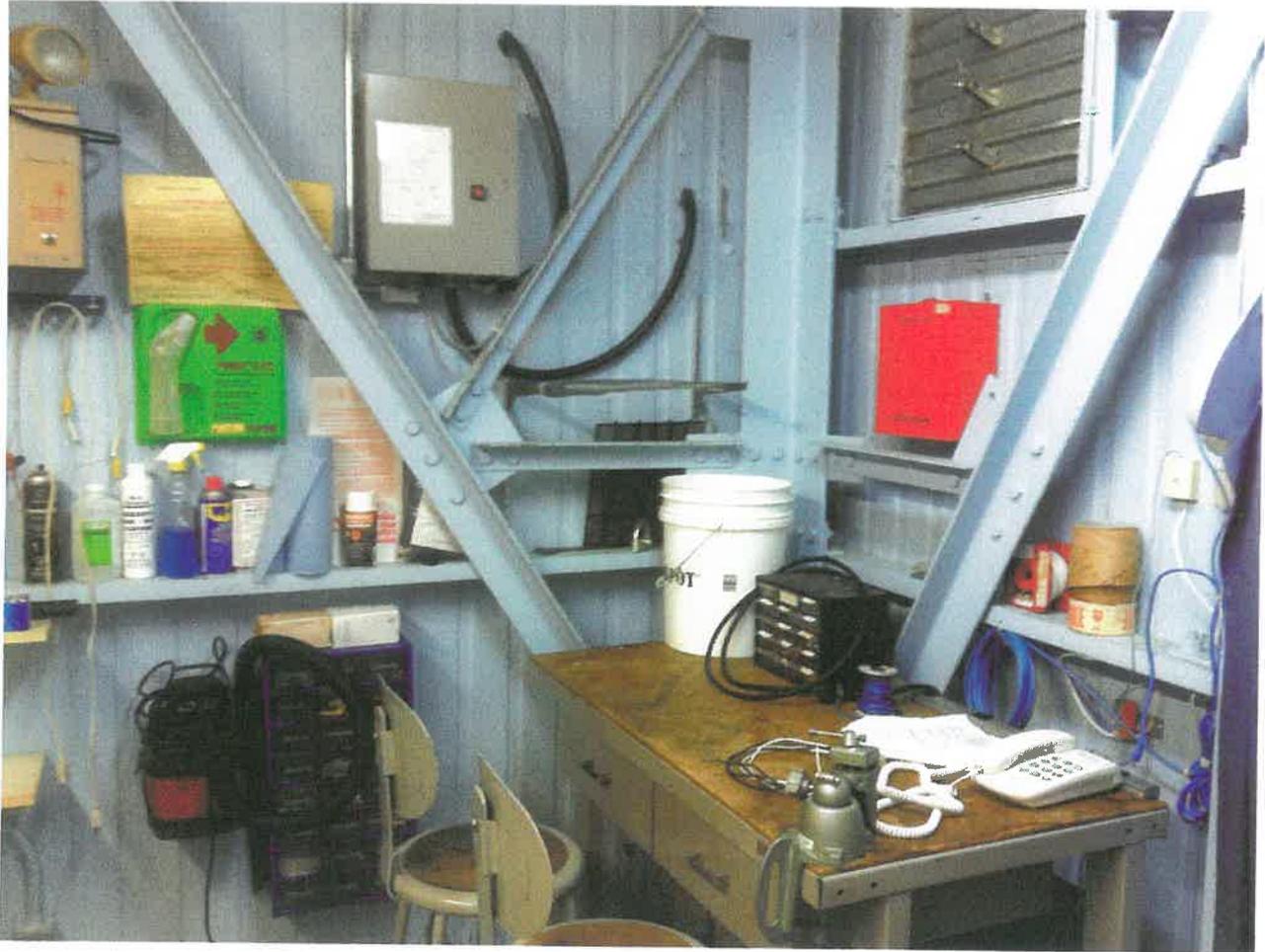
## Equipment Shelter or Cabinet (Inside)



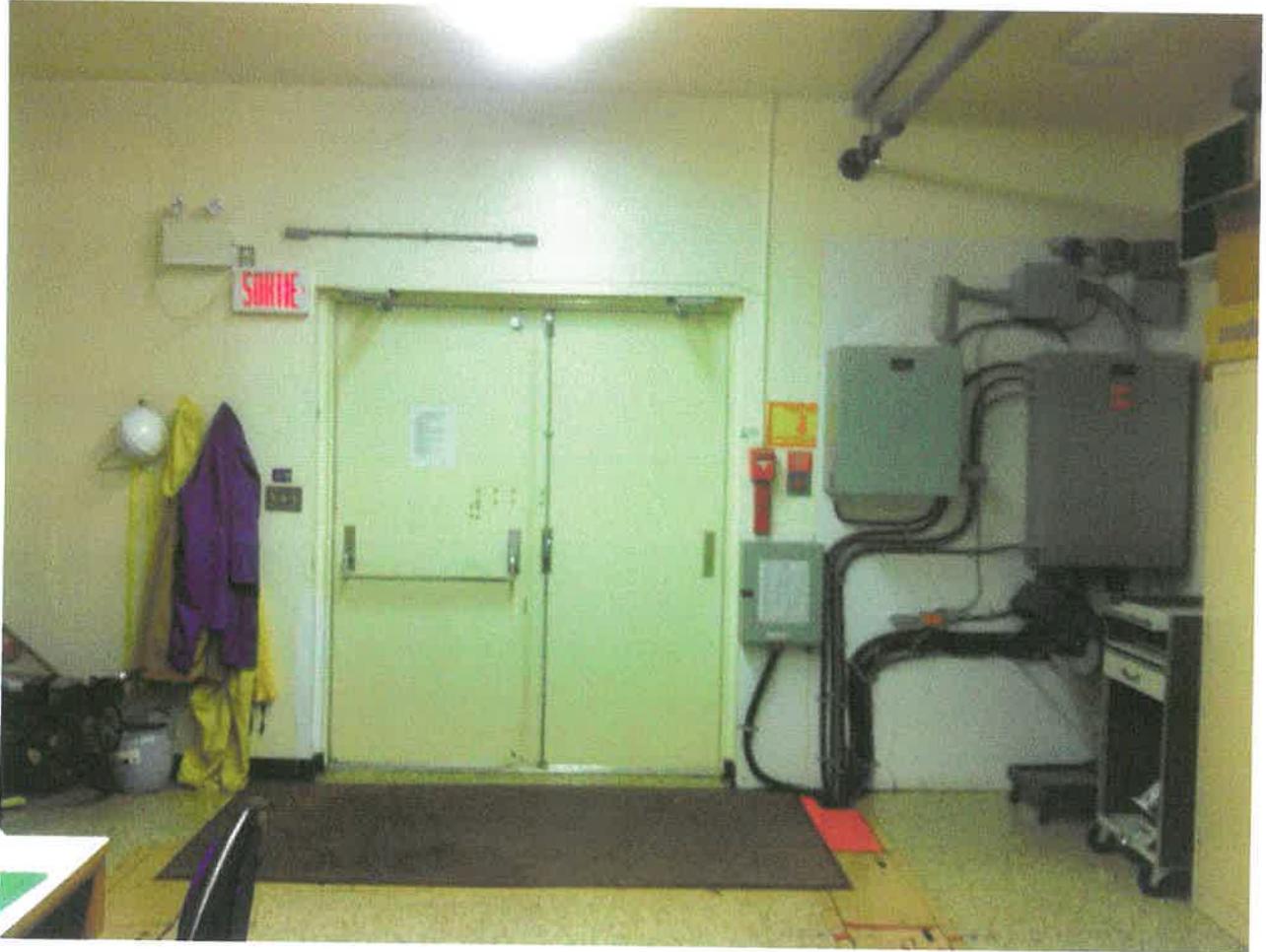
## Equipment Shelter or Cabinet (Inside)



## Equipment Shelter or Cabinet (Inside)



## Equipment Shelter or Cabinet (Inside)



## Transmission Line Entry Ports (Inside)



## Inspection Checklist

Item	1.0: Tower Alignment and Guy Tensions	Sat	UnSat	N/A	Obs
1.1	Alignment - to meet CSA S37-01	NI			
1.2	Guy Tension - to meet CSA S37-01			X	
1.3	Twist - to meet CSA S37-01	NI			

Item	2.0: Site Grounding	Sat	UnSat	N/A	Obs
2.1	Check tower base attachments for loose, missing or deteriorating connections.	X			
2.2	Check guy anchor attachments for loose, missing or deteriorating connections. Grounding conductors are to be installed with a smooth path to ground, allowing guy movement.			X	
2.3	Check shelter, waveguide bridge, cable tray and fence attachments.	X			
2.4	Check ground bar attachments for loose, missing or deteriorating connections.	X			
2.5	Check installation of visible ground conductors for electrical continuity (visual), broken or frayed strands or conductors.	X			
2.6	Confirm lightning rod installation, (If applicable to structure: if Omni antenna present, lightning rod not required) electrical conductivity (visual) and structure integrity.			X	
2.7	Check ground mating surfaces for Penetrox or equal applied. Ensure that paint has been removed before installation of ground connector.	X			
2.8	Check grounding conductors and connector attachments to confirm that non-compatible metals are not in contact causing potential deterioration of the structure.	X			
2.9	Ground resistance confirmation at tower base, shelter and anchors. Average reading is to be less than 25 Ohms to be satisfactory. Note what the reading was in field notes and summary.	X			
2.10	Is there TMA grounding present?			X	
2.11	Are all radios grounded?			X	
2.12	Are all ground kits 2-hole lugs?			X	
2.13	Has any site grounding been stolen?	X			
2.14	If visually possible, check that equipment ground is connected to building ground.	X			

Item	3.0: Site Foundations	Sat	UnSat	N/A	Obs
3.1	Check visible concrete piers, grout and slabs (if applicable to structure design) for movement, cracking, spalling, deterioration etc. Include tower base, building piers and bridge foundations.		X		
3.2	Check all visible steel of anchor shafts, guy anchor plates, base plate, foundation bolts and associated structural bolts for fatigue, cracks, bending and fractures.			X	
3.3	Check foundation and anchor installation for movement, settlement and confirm suitable water drainage around foundation area.			X	
3.4	Check visible steel of anchor shafts to ensure corrosion protection has been applied or cathodic protection installed (anode lead connected to shaft).			X	

Item	4.0: Cell Site Civil Elements	Sat	UnSat	N/A	Obs
4.1	Complete a general site review and site clean up. Has debris been left or blown into site. Note any concerns.	X			
4.2	Check vegetation growth as it impacts the tower, access road and compound area.	X			
4.3	Visually check condition of hydro / telco pole line, meter installation, conduits, joints and associated fixtures.	X			
4.4	Check and note all low spots and potholes found over the anchor blocks, compound and along the access road.	X			

Item	5.0: Compound and Anchor Fencing	Sat	UnSat	N/A	Obs
5.1	Check, tighten and repair barbed wire and barbed wire overhangs.	X			
5.2	Align sagging gates and adjust latches as feasible while on site.	X			
5.3	Check compound and anchor fence for any damage to fabric or potential signs of vandalism. Any damage should be patched temporarily.		X		
5.4	Lubricate hinges and tighten hardware as required to ensure site security.	X			
5.5	Check fence foundations for cracking, deterioration and frost heaving.	X			
5.6	Are there any locks missing on the compound gate or at the access road?	X			

Item	6.0: Shelter or Equipment Canopy	Sat	UnSat	N/A	Obs
6.1	Check and note condition of shelter roof membrane.				X
6.2	Check and note condition of transmission entry port(s). Seal with butyl rubber or caulking.	X			
6.3	Check cladding for damage, vandalism and potential water.	X			
6.4	Check and note any water damage inside shelter.	X			
6.5	Door fit: adjust and lubricate shelter door and deadbolt alignment (if possible).	X			
6.6	Visually check shelter caulking for deterioration and cracks. Also check caulking on roof area if applicable.	X			
6.7	Check if shelter or site steps are installed in a safe and secure manner.	X			
6.8	Check operation of outdoor shelter and cabinet lighting.				X
6.9	Check shelter mounted antennas and transmission lines. Ensure installation is sound and not detrimental to shelter performance.		X		
6.10	Check if emergency and site lighting is installed and operational.	X			

Item	7.0: Structural Members, Attachments and Hardware	Sat	UnSat	N/A	Obs
7.1	Check for any damage to structural members (bent, fractured or missing).	X			
7.2	Check welds for fatigue or cracks.	X			
7.3	Check splice, bracing and attachment member bolted connections by completing a random sampling.	X			
7.4	Complete a random check to ensure bolts installed are of correct length, size and are not missing in the structure.	X			
7.5	Check antenna mount installation, ensure they are visually plumb and appear adequate for current load. Visually check antenna mounts and ice guards for fatigue, cracks, dents and fractures, ensure hardware is tight and structurally sound.	X			
7.6	Check base weldment, tapered base, torsion resistor and guy plate attachments for overall condition.	X			
7.7	Check waveguide bridge and attachments for structural integrity and providing adequate cover for transmission lines between the structure and the building or equipment cabinets.	X			
7.8	Complete a visual check and proper torquing at all rotatable pinwheel U-bolts.			X	

Item	8.0: Galvanizing and Corrosion	Sat	UnSat	N/A	Obs
8.1	Check structural members, anchors, mounts, ladder, attachment, etc.			X	
8.2	Check shelter and/or equipment frame and steps.	X			
8.3	Check waveguide bridge channel, posts, shield, supports, cable tray, flashing and accessories.	X			
8.4	Check compound, anchor fence and hardware.		X		
8.5	Check antenna systems for signs of corrosion.	X			
8.6	Check tower guys, hardware and accessories.			X	
8.7	Check tower lighting system components for signs of corrosion.			X	
8.8	Check misc. non-galvanized surfaces for signs of corrosion.				X

Item	9.0: Guy Assemblies	Sat	UnSat	N/A	Obs
9.1	Check for broken guy strands.			X	
9.2	Check for slippage of guy grips, clips, compression sleeves and field-potted termination.			X	
9.3	Check for loose, worn, cracked, bent or missing hardware components.			X	
9.4	Check turnbuckle take-up remaining for future adjustment. Note critical gaps in 'Field Notes' that will require future re-termination.			X	
9.5	Check turnbuckle articulation for compliance with current code.			X	
9.6	Check for the installation of ice break-up clip(s) above guy grounding attachment.			X	
9.7	Check guy tails, note fraying or lack of a proper clamp installation.			X	
9.8	Check for installation of yellow guy guards at each anchor at 14ft. above ground level.			X	
9.9	Check that turnbuckles, shackles and thimbles are of the correct size, suitable manufacturer and properly installed.			X	
9.10	Check lay of guy / bridge strand and guy grip installed to ensure they are compatible.			X	
9.11	Check installation of guy clips or fist clips at guy wire termination. Ensure spacing and orientation meet manufacturers installation requirements.			X	

Item	10.0: Antenna and Transmission Line System	Sat	UnSat	N/A	Obs
10.1	Check overall installation of antenna system with regard to meeting manufacturers' guidelines. Includes: cable routing, drip loops, support spacing and installation, bend radius, strut quantity, etc.	X			
10.2	Check for proper jumpers and jumper attachments.	X			
10.3	Check to ensure that mounting clamps are tight.	X			
10.4	Check antennas and transmission lines for physical damage due to falling ice. Confirm that ice protection has been installed and is functional.	X			
10.5	Check antennas for dents, bullet holes, rubbing against structural members, damaged feed horns, broken, kinked or missing components, ripped radomes and other damage.	X			
10.6	Check installation of grounding kits for proper electrical conductivity (visual), weatherproofing and attachment to ground bars as available. Ensure that the grounding straps are in serviceable condition.	X			
10.7	Confirm transmission line markings with carrier specifications.				X
10.8	Check transmission line bridge, support ladder and cable to ensure assembly provides adequate support for the line loading and that elements are properly attached.	X			

Item	11.0: Climbing Facilities, Ladders & Platforms	Sat	UnSat	N/A	Obs
11.1	Check to ensure that a ladder is present and that it extends from the base to the top of the structure and is in compliance with CSA S37-01.			X	
11.2	Check ladder for fractured members, fractured welds, loose or missing supports.			X	
11.3	Check ladder-rung spacing and diameter for compliance with CSA S37-01.			X	
11.4	Check ladder spacing between rails for compliance with CSA S37-01.			X	
11.5	Check ladder toe and foot clearance for compliance with CSA S37-01.			X	
11.6	Check ladder-climbing radius for compliance with CSA S37-01.			X	
11.7	Check for platforms and hand railing at all transfers in ladder locations.	X			
11.8	Check if the spacing between platforms is in compliance with CSA S37-01 if no fall arresting device is present.			X	
11.9	Is there an anti-climb present? (Fencing is not an anti-climb)				X
11.10	Check pinwheel for safety rail.			X	

Item	12.0: Safety and Fall Arresting Devices	Sat	UnSat	N/A	Obs
12.1	Check if the fall arrest system is installed on ladder exceeding 1.8m in height above the base of the structure.			X	
12.2	Check condition of fall arresting device, ensuring that the rail profile has not been damaged and that it meets manufacturer's specifications.			X	
12.3	Check if fall arresting device is continuous & extends from the base to the highest point of the structure. Measure the distance of the cantilvered rail above the last point. It should not exceed 0.3m. If so, cut off at 0.15m.			X	
12.4	Check if the fall arrest rail has been installed with a 'stop' bolt to prevent a trolley from running off the top.			X	
12.5	Check if the fall arrest cable is properly tensioned and has no kinks. Check for any rubbing on members, missing standoff brackets or broken strands.			X	
12.6	Check if the fall arrest cable or rail have any loose / missing or short bolts and hardware.			X	
12.7	Check if a warning sign is present at the base of the structure noting the potential climbing hazards and that qualified personnel must only climb the tower.		X		
12.8	Check if obstruction warning signs are posted above and below each climbing hazard or obstruction.			X	
12.9	Ensure the rail is anchored to the ladder rungs at a maximum of 1.5m (5ft) intervals.			X	
12.10	Verify that each piece of rail is anchored to the ladder independent of other rail sections.			X	
12.11	Check internal splice bars to confirm they are fully mated and straight.			X	
12.12	For cable systems, ensure the anchor point does not utilize hardware other than what is supplied by the manufacturer.			X	
12.13	For cable systems, ensure the cable is adequately taught.			X	
12.14	For cable systems, ensure cable guides are installed every 7.6m (25ft).			X	
12.15	Is the safety climb system a Trylon Cougar rail or 3/8in. cable system?			X	

Item	13.0: Tower Obstruction Markings - Lighting System and Painting	Sat	UnSat	N/A	Obs
13.1	Check tower lighting system for conformance to current code.	X			
13.2	Check lighting system fixtures, cables, cable attachments, housing, connections, photo-control and gaskets for bullet holes or damage.				X
13.3	Check operation of obstruction lighting system.	X			
13.4	Check tower paint to see that banding meets CAR 621.19 requirements and that paint isn't fading, flaking, oxidizing or peeling.			X	
13.5	Check GFI outlet installation at obstruction light level, if applicable.	NI			
13.6	Change incandescent DOL or SOL bulbs.			X	
13.7	Change incandescent beacon bulbs.			X	

Item	14.0: Rooftop Installation Inspection	Sat	UnSat	N/A	Obs
14.1	Check access to site. Ensure that entry to site / building as well as rooftop access is safe without hazard due to structural or surrounding environment.	X			
14.2	Check waveguide bridge, cable tray and flashing installation to ensure that cable tray has been properly supported, spliced and that the lid has been attached in a secure fashion.	X			
14.3	Check building walkways, stairs, platforms and handrails have been installed, secure and are in good condition.	X			
14.4	Check the ballast weight to ensure that it has not been damaged, removed or is deteriorating.			X	
14.5	Check rooftop penetration related to cell site installation. Check that they have been sealed, flashed and are in good condition.			X	
14.6	Check pitch pocket installation. Ensure that they are filled with tar and are in good condition.			X	
14.7	Check that shelter and equipment cabinets have been installed, are secure and meet industry standards.			X	
14.8	Ensure equipment ground is connected to building ground as per Client spec's.	X			
14.9	Is there a lightning protection system on the rooftop site?	X			

Item	Description	Sat	UnSat	N/A	Obs
S.1	Is the eye wash solution full, solution visually clear or labelled with a refill date?	X			
S.2	Does the fire extinguisher service date tag have a current stamp? To service the extinguisher, turn it over and back slowly a number of times to ensure settlement at the bottom has not occurred.	X			
S.3	Is the first aid kit full, labelled and accessible and are there any expired items?	X			
S.4	Were rodents found on site? If so, note in 'Field Notes'.	X			
S.5	Does the site lock operate easily?			X	
S.6	Are there any visual signs of vandalism?				X
S.7	Proper tie-off point (loop, eye bolt or member) to permit safe access by climber using fixed fall restraint climbing hook to access pinwheels, torsions or other attachments.	X			
S.8	Is there a dog or other threat on or near the site that may represent a hazard to the safe entry into the site?	X			

## Deficiency, Repaired and Observation Summary

Item	Description	Priority	Picture
3.1	The above grade portion of all four tower base concrete foundations have cracking throughout.	C	6-7
5.3	Repaired the compound fence support rail.	R	1-2
5.3	One of the compound fence rail clips is broken.	C	8
6.1	There is no ice protection over the shelter roof.	Obs	10
6.8	The outdoor light does not work.	Obs	11
8.4	The compound fence rails are corroded.	C	9
8.8	Wire brushed and cold galvanized the tower base.	R	3-4
10.7	There are no transmission line marking with carrier specification.	Obs	12
11.9	There is no anti-climb installed on the tower.	Obs	13
12.7	There is no warning sign at the base of the tower.	A	5

**Conclusion:**

The tower overall is in good condition and meets or exceeds current CSA S37-01 erection tolerances & standards. Note the structure has not been structurally analyzed for strength requirements.

The following recommendations have been outlined for this site:

Monitor the cracks in the tower base foundations during future site visits. If cracking worsens further action may be required.

Repair the compound fence rail clip.

Wire brush and cold galvanize all corroded items.

Install a warning sign at the base of the tower.

The tower was inspected by Hugues Bibeau and reviewed by Jean Labrosse P. Eng.

  
H. Bibeau  
Inspector

  
  
Jean Labrosse P. Eng  
Regional VP, Quebec

Repaired Deficiencies During Inspection  
5.3 - Repaired the compound fence support rail.

Picture 1-2  
Before



After



8.8 - Wire brushed and cold galvanized the tower base.

Picture 3-4  
Before



After



**Deficient Items - Priority A**

**12.7 - There is no warning sign at the base of the tower.**

**Picture 5**



Deficient Items - Priority C

3.1 - The above grade portion of all four tower base concrete foundations have cracking throughout.

Picture 6-7



5.3 - One of the compound fence rail clips is broken.

Picture 8



8.4 - The compound fence rails are corroded.

Picture 9



Observed Items

6.1 - There is no ice protection over the shelter roof.

Picture 10



6.8 - The outdoor light does not work.

Picture 11



10.7 - There are no transmission line marking with carrier specification.

Picture 12



11.9 - There is no anti-climb installed on the tower.

Picture 13



## Terms and Definitions

Westtower's Inspection and Maintenance Program provides our client with the necessary site inspection and preventative maintenance that promotes employee and contractor safety, network integrity and long-term asset value. This program is not a structural review of the site installation, but rather a comprehensive visual review of the condition of the existing site. It is expected that the original installation meets or exceeds the original construction drawing requirements. If requested by our client, or deemed necessary by the inspection, a complete structural analysis can be completed under a separate contract.

CSA S37-01 is the code used for the design, fabrication, installation and maintenance of communication structures in Canada. This code recommends that periodic inspection and maintenance of all structures be undertaken.

### Priority

Rating	Description	Criteria
<b>A</b>	<b>Immediate</b>	Safety issues are deemed Priority A. Equipment / installation condition does not meet current code requirements. Due to the nature of the equipment / installation immediate repair work is required.
<b>B</b>	<b>Near-Term</b>	Equipment / installation condition does not meet current code requirements. The condition of the equipment / installation warrants a near-term review and repair of the condition identified at the time of inspection. It is recommended that the condition be addressed, reviewed or repaired within 6 months to minimize the risk of further deterioration to the site.
<b>C</b>	<b>Monitor, Regular Maintenance</b>	Equipment / installation condition does not meet current code requirements. The condition of the equipment / installation warrants monitoring and/or repair as part of a regular maintenance program. It is recommended that the condition be addressed, reviewed or repaired before the next inspection.

### Checklist Rating

The columns opposite each item in the checklist represent "Sat" (Satisfactory), "Un-Sat" (Un-Satisfactory) "N/A" (Not Applicable) and "Obs" (Observation). "Un-Sat" (Un-Satisfactory) will carry a rating mark of "X", "R" (repaired), "T" (temporary) or "N/I" (not inspected).

An Observation is something noted by our inspector for our client information and action, as they deem necessary.

It is to be noted that the mark in the rating column represents the condition of the checklist item at the completion of the Site Inspection by Westtower's Inspection and Maintenance crew.

Rating Mark	Criteria
<b>X</b>	<p>If an "X" has been placed in the "Un-Sat" column then work or adjustments are required to ensure the structure meets current code.</p> <p>If an "X" has been placed in the "Sat" column then the item did meet the current code.</p> <p>If an "X" has been placed in the "N/A" column then the item was not applicable to that site.</p> <p>If an "X" has been placed in the "Obs" column then this item is noted for our client information and their action, as they deem necessary.</p>
<b>R</b>	<p>If an "R" (repaired) has been placed in the "Un-Sat" column on the checklist, work or adjustments have been completed by the Westtower Inspection and Maintenance crew while on site.</p> <p>Before and after pictures are included as deemed necessary in the checklist portion of this report.</p>
<b>T</b>	<p>If a "T" (temporary) has been placed in the "Un-Sat" column on the checklist, emergency repairs, temporary fixes or adjustments were completed by Westtower's Inspection and Maintenance crew while on site.</p> <p><u>The item still does not meet code in this case.</u></p>
<b>N/I</b>	<p>If an "N/I" (not inspected) has been placed in the "Un-Sat" column on the checklist, this item has not been inspected as part of the review of the site.</p>