



Inspection and Maintenance Report 24m Doppler Tower

Location Code: XSS

Site Name: Silver Star



Site Details

Site Information

Location Code: XSS
Site Name: Silver Star
Site Address:
City: Silver Star
Province: BC
Tower Owner: Environment Canada
Carrier 1:
Carrier 2:

Technical Information

Latitude: 50 22 10
Longitude: 119 03 54
Gnd Elev.: 1885m
Site Access: Escort
Standard: CSA S37-01

Inspection Details

Inspection Date: 16-Jul-09
Temperature: 25°
Weather Conditions: Sunny
Wind Speed: 5km\hr
Wind Direction: N
Inspector: Will Gaskarth
Maintenance Crew: Duane Lee

Structure Information

Structure Height: 24m
Structure Type: Doppler
Construction Type: Knockdown
Manufacturer: Unknown
Face Width: Varies
Panel Height: Varies
Cross Section: Square
Fall Arrest Type: Not Required

Lighting Details

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

Shelter Information

Shelter Manufacturer:
Shelter Size:
Shelter Generator:
Shelter A/C:

Drawing Information

Drawing Number: N/A
Drawing Date:
Revision:

Elev.	Light Type	# Bulbs
-------	------------	---------

Tower Loading

#	Elev.	Antenna or Attachment (in order from top to bottom)	Location	TxLine	Orientation
1	24 m	Inside Shroud Doppler	Radar	Hardline	OMNI

Site Overview - Pictures

Tower Profile



Antenna Installation Profile



Access Roadway to Site



Tower Compound



Tower Base



Transmission Line Layout - Ladder/Safety Rail



Transmission Line Layout - Ladder/Safety Rail



Equipment Shelter or Cabinet (Outside)



Transmission Line Entry Port (Outside)



Inspection Checklist

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

Item	2.0: Site Grounding	Sat	Un-Sat	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 structural 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			

Item	3.0: Site Foundations	Sat	Un-Sat	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	Un-Sat	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 poleline, 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	Un-Sat	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			

Item	6.0: Shelter or Equipment Canopy	Sat	Un-Sat	N/A	Obs
6.1	Check and note condition of shelter roof membrane.	NI			
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.	NI			
6.5	Door fit: adjust and lubricate shelter door and deadbolt alignment (if possible).	NI			
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.	NI			
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	Un-Sat	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			

Item	8.0: Galvanizing and Corrosion	Sat	Un-Sat	N/A	Obs
8.1	Check structural members, anchors, mounts, ladder, attachment, etc.		R		
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.		R		
8.4	Check compound, anchor fence and hardware.		R		
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	Un-Sat	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 the 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 proper clamp installation.			X	
9.8	Check for the installation of yellow guy guards at each anchor.			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	
9.12	Check to ensure that tension tags have been installed on guys.			X	

Item	10.0: Antenna and Transmission Line System	Sat	Un-Sat	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 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 specification.			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	Un-Sat	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 & rusting, 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	Should an anti-climb be installed? IE: If site is in an area that may be prone or at risk of trespassers.				X

Item	12.0: Safety and Fall Arresting Devices	Sat	Un-Sat	N/A	Obs
12.1	Check if 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 cantilevered rail above the last support point. It should not exceed 0.3m. If so, cut off at .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 signs are posted above and below each climbing hazard or obstruction.			X	
12.9	Check at entry gate to see if there is a sign regarding potential falling ice.			X	

Item	13.0: Tower Obstruction Markings – Lighting System and Painting	Sat	Un-Sat	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 and 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.			X	
13.6	Change incandescent light bulbs.			X	

Item	14.0: Rooftop Installation Inspection	Sat	Un-Sat	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 in are 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 in good condition.			X	
14.6	Check pitch pocket installation. Ensure that they are filled with tar and in good condition.			X	
14.7	Check that shelter and equipment cabinets have been installed, are secure and meet industry standards.			X	

Item	Description	Sat	Un-Sat	N/A	Obs
S.1	Is the eye wash solution full, solution visually clear or labelled with a refill date?	NI			
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.	NI			
S.3	Is the first aid kit full, labelled and accessible?	NI			
S.4	Were rodents found on site? If so, note in "Field Notes" below.	NI			
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
8.1	Wire brushed and cold galvanized the tower base grounding.	R	1-2
8.3	Wire brushed and cold galvanized various tower members.	R	3-4
8.3	Wire brushed and cold galvanized the tower base hardware.	R	5-6
8.4	Wire brushed and cold galvanized the compound fence grounding hardware.	R	7-8
8.4	Wire brushed and cold galvanized the compound fence welds.	R	9-10
10.6	No grounding attached to hard line.	Obs	
11.9	No anti climb installed on tower or stairwell.	Obs	11
11.10	Site is located on popular ski mountain and biking hill.	Obs	12
S.5	Site was unlocked on arrival of inspection crew, crew locked when they left site.	Obs	13

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.

There were no outstanding deficiencies identified during the time of the inspection.

The tower was inspected by Will Gaskarth and reviewed by Ron Harrington.

RP Urban for W. Gaskarth

W. Gaskarth
Inspector

Ron Harrington

R. Harrington P. Eng
SVP



Repaired Deficiencies During Inspection

8.1 - Wire brushed and cold galvanized the tower base grounding.

Picture 1-2

Before



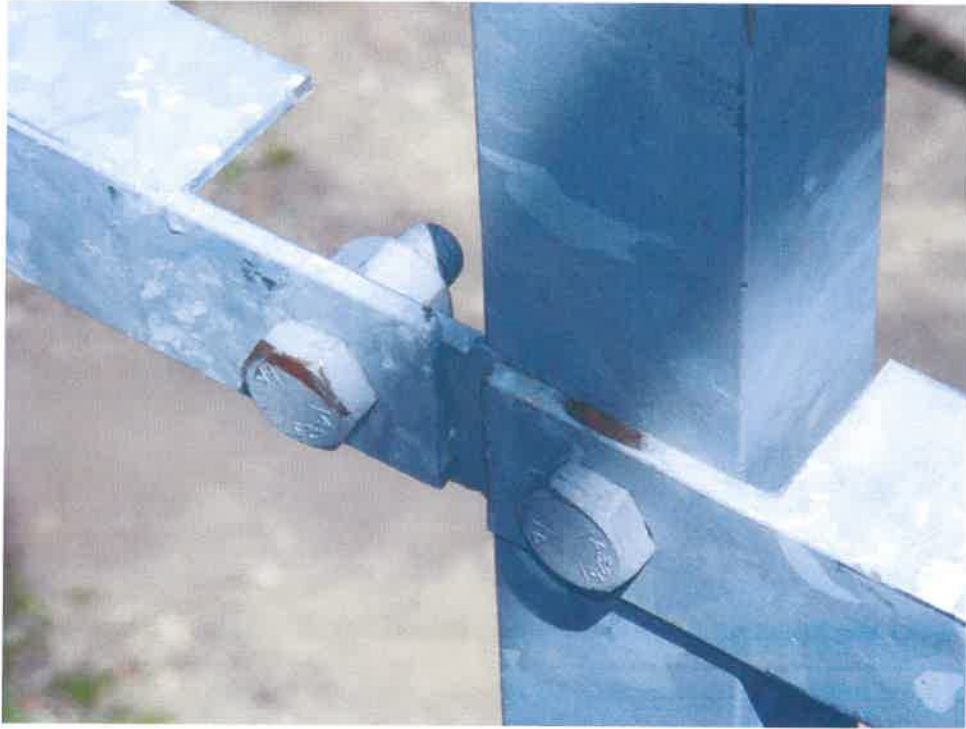
After



8.3 - Wire brushed and cold galvanized various tower members.

Picture 3-4

Before



After



8.3 - Wire brushed and cold galvanized the tower base hardware.

Picture 5-6

Before



After



8.4 - Wire brushed and cold galvanized the compound fence grounding hardware.

Picture 7-8

Before



After



8.4 - Wire brushed and cold galvanized the compound fence welds.

Picture 9-10

Before



After



Observed Items

11.9 - No anti climb installed on tower or stairwell.

Picture 11



11.10 - Site is located on popular ski mountain and biking hill.

Picture 12



S.5 - Site was unlocked on arrival of inspection crew, crew locked when they left site.

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
A	Immediate	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	Near-Term	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.
C	Monitor, Regular Maintenance	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
X	<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>
R	<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>
T	<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>
N/I	<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>