



**VARCON Inc.**  
*consulting engineers*

**Tower Engineering, Inspection and Project Management**



CLIENT:..... RCMP  
 STRUCTURE OWNER:..... RCMP  
 PROJECT TITLE:..... TOWER REMEDIATION AND INSTALLATION  
 LOCATION:..... PTARMIGAN, NT  
 SITE NAME:..... PTARMIGAN, NT  
 PROJECT NO:..... 50273

DATE OF CURRENT ISSUE:..... 2016-01-29  
 REVISION NUMBER:..... 0  
 ISSUED FOR:..... CONSTRUCTION

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**NOTES**

GENERAL

1. THESE DRAWINGS ARE PREPARED FOR THE SOLE USE OF THE CLIENT FOR THE SUBJECT TOWER. THE USE OF ANY PART OF THE INFORMATION CONTAINED HEREIN SHALL BE CONSIDERED TO BE AT THE SOLE RISK OF THE USER.
2. ALL DIMENSIONS ARE GIVEN IN MILLIMETERS, ALL ELEVATIONS ARE GIVEN IN METERS AND ALL AZIMUTHS ARE REFERENCED TO TRUE NORTH UNLESS NOTED OTHERWISE.
3. DO NOT SCALE DIMENSIONS FROM THE DRAWINGS.
4. DESIGN IS IN ACCORDANCE WITH CSA S37 AND S16. ALL STANDARDS REFERENCED ARE THE LATEST RELEASE.
5. TOLERANCES FOR ERECTION OF STRUCTURES SHALL CONFORM TO THOSE SPECIFIED IN CSA S37 AND S16.
6. ANY WORK INVOLVING THE TEMPORARY REMOVAL OF EXISTING MEMBERS SHALL BE CARRIED OUT WHEN THE WIND IS LESS THAN 25km/h AND WITH NO ICE ON THE TOWER. THE CONTRACTOR SHALL TAKE ALL THE NECESSARY PRECAUTIONS SO AS NOT TO CAUSE DISTORTION IN THE TOWER LEGS. IT IS NOT PERMITTED TO LOOSEN MORE THAN ONE MEMBER AT A TIME UNLESS TEMPORARY REINFORCING MEMBER(S) IS(ARE) INSTALLED WHICH HAVE BEEN APPROVED BY THE ENGINEER.
7. EXCEPT WHEN NOTED OTHERWISE, THE CONTRACTOR IS RESPONSIBLE FOR THE MANUFACTURING, SUPPLY AND INSTALLATION OF THE NEW ELEMENTS SHOWN ON THE DRAWINGS.
8. THE CONTRACTOR SHALL SUBMIT THE SHOP DRAWINGS OF ALL NEW ELEMENTS PRIOR TO FABRICATION, FOR APPROVAL BY THE ENGINEER OF RECORD.
9. AT THE COMPLETION OF THE WORK, THE SITE SHALL BE CLEANED OF ALL DEBRIS TO THE SATISFACTION OF THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE CAUSED BY HIS WORK TO EXISTING INSTALLATIONS AND EQUIPMENT.

STRUCTURAL STEEL AND BOLTS

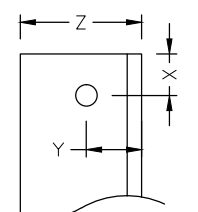
1. ALL BOLT QUANTITIES HAVE BEEN INCREASED BY 5%.
2. BOLTS IN ALL CONNECTIONS SHALL BE HIGH STRENGTH BOLTS CONFORMING TO ASTM A325 OR A325M. BOLTS SHALL BE IN FULL BEARING AND THREADS EXCLUDED FROM THE SHEAR PLANES. USE ONLY NEW BOLTS AND DO NOT REUSE BOLTS.
3. BOLTS ARE TO BE PRE-TENSIONED AS PER CSA S16 USING THE "TURN-OF-NUT" METHOD.
4. ALL TYPICAL STEEL MEMBERS, BOLTS AND HARDWARE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH CSA G164 WITH THE EXCEPTION OF CERTAIN TYPES (E.G. ASTM A193 B7 AND A490) U.N.O.
5. ANY DAMAGE TO GALVANIZED AND/OR PAINTED SURFACES AND AROUND FIELD DRILLED HOLES IS TO BE REPAIRED WITH TWO COATS OF ZINC RICH PAINT. BRUSH APPLY ONLY.
6. ALL WELDING (USING E49XX ELECTRODES) SHALL CONFORM TO CSA W59 AND W47.1. ALL WELDING SHALL BE COMPLETED BY CWB CERTIFIED WELDERS IN A CWB CERTIFIED SHOP. ALL WELDS SHALL BE SEALED WELDS AND THOROUGHLY CLEANED TO PERMIT PROPER AND COMPLETE GALVANIZING.
7. THE USE OF A TORCH TO CORRECT ERRORS ON SITE OR TO CREATE NEW HOLES IS NOT PERMITTED. ALL FIELD HOLES SHALL BE DRILLED.
8. ALL HOLES ARE TO MEET EDGE AND GAUGE DISTANCE PER TABLE 1 UNLESS NOTED OTHERWISE.
9. FIELD WELDING IS NOT PERMITTED UNLESS NOTED OTHERWISE.

CONCRETE

1. THE CONTRACTOR IS FULLY RESPONSIBLE FOR REINFORCED CONCRETE WORKS.
2. CONCRETE MATERIAL AND METHOD OF CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS OF CSA A23.1.
3. ALL CONCRETE SHALL HAVE MINIMUM SPECIFIED 28 DAY COMPRESSIVE STRENGTH OF 32 MPa, SLUMP OF 75mm TO 150mm, WITH ENTRAINED AIR OF 4% TO 7% UNLESS NOTED OTHERWISE. CEMENT SHALL BE TYPE HS.
4. ALL REINFORCING STEEL BARS SHALL CONFORM TO CSA G30.18 AND HAVE A YIELD STRENGTH OF 400MPa UNLESS NOTED OTHERWISE.
5. LAPS, ANCHORS AND SPLICES SHALL COMPLY WITH THE REQUIREMENTS OF CSA A23.3.
6. CONCRETE TESTS FOR SLUMP, PLACEMENT AND AIR SHALL BE COMPLETED BY A THIRD PARTY FIRM. TESTING METHOD SHALL CONFORM TO CSA A23.2.

**TABLE 1 – EDGE AND GAUGE DISTANCES**

SIZE [Z] (mm)	GAUGE [Y] (mm)	BOLT SIZE (mm)	END DIST.* [X] (mm)
51	28	13	25
64	35	16	30
76	40	19	35
89	45	22	40
102	50		
127	65		



\* FOR A 5/8" (16mm) BOLT CONNECTED TO 5mm THICK MEMBERS, THE END DISTANCE IS 35mm.

**THE CONTRACTOR SHALL TAKE NOTE OF THE FOLLOWING**

- A SITE VISIT SHALL BE CARRIED OUT BY THE BIDDER (UNLESS CONTRADICTED BY THE CLIENT) BEFORE PREPARING THEIR BID IN ORDER TO CONSIDER AND ACCOUNT FOR EXISTING SITE CONDITIONS AND VERIFY THE DIMENSIONS CONTAINED WITHIN THIS DRAWING PACKAGE. THE CONTRACTOR SHALL ADVISE THE VARCON DESIGNER OF ANY CONFLICTS OR OMISSIONS NOTED ON SITE. THE CONTRACTOR SHALL CARRY OUT THIS VERIFICATION BEFORE FABRICATION OF THE NEW ELEMENTS AS INDICATED IN THIS DRAWING PACKAGE.
- FOR THE INSTALLATION OF NEW TRANSMISSION LINES THE CONTRACTOR SHALL DESIGN, FURNISH AND INSTALL STEEL ELEMENTS IN ORDER TO PROTECT THE NON-VERTICAL PORTION OF THE TRANSMISSION LINES BETWEEN THE ANTENNA AND THE TX-LINE SUPPORTS AND THE TOWER, BETWEEN THE TX-LINES SUPPORT AND THE WAVEGUIDE BRIDGE AND BETWEEN THE WAVEGUIDE BRIDGE AND THE FEED THRU PLATE ON THE SHELTER AGAINST FALLING ICE. NEW TRANSMISSION LINES MUST BE INSTALLED AS SHOWN ON THE DRAWINGS OVER THE ENTIRE HEIGHT OF THE TOWER.
- THE CONTRACTOR SHALL EXECUTE ALL WORK AS DESCRIBED IN THIS DOCUMENT IN ENTIRE CONFORMITY WITH THE DRAWINGS. THIS INCLUDES ALL ELEMENTS WITHIN THE SCOPE OF WORK AND SHEET SPECIFIC NOTES WITHIN THE DRAWINGS. ANY PROPOSED CHANGES RELATIVE TO THE DRAWINGS SHALL BE SUBMITTED TO THE EQUIPMENT OWNER AND VARCON FOR APPROVAL PRIOR TO THEIR FABRICATION AND/OR INSTALLATION. FOR ANY CHANGES CARRIED OUT WITHOUT PRIOR APPROVAL THE CONTRACTOR SHALL BE RESPONSIBLE TO PAY THE FEES AND EXPENSES OF VARCON TO MEASURE-UP THE CHANGES ON SITE, TO EVALUATE THE CHANGES AND TO PREPARE THE AS-BUILT DRAWINGS EVEN IF IT IS CONCLUDED THAT THE CHANGES ARE CONSIDERED ACCEPTABLE.



CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

GENERAL NOTES

PROJECT NUMBER

50273

SHEET

01

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

## SCOPE OF WORK FOR THIS PROJECT

THIS PROJECT INVOLVES THE INSTALLATION OF A TOWER THAT WAS PREVIOUSLY DE-COMMISSIONED BY CBC. INCONSISTENCIES OR ISSUES BETWEEN THE DRAWINGS AND THE SITE CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE CONSULTANT PRIOR TO MOBILIZATION FOR CONSTRUCTION. ADDITIONAL STEEL MEMBERS HAVE BEEN INCLUDED WITHIN THIS DESIGN PACKAGE WITH RESPECT TO THE DIAGONAL REPLACEMENTS. ANY ISSUES OR QUESTIONS THAT MAY PREVENT SUCCESSFUL COMPLETION OF THE PROJECT MUST BE ADDRESSED BY THE CONTRACTOR DURING BID PREPARATION AND SITE VISIT TO ENSURE THAT ALL ISSUES ARE RESOLVED PRIOR TO BID SUBMISSION. ANY CONTINGENCIES MISSING BY THE BIDDER AFTER THE AWARD SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FOLLOWING ITEMS, GROUPED BY WORK TYPE:

### CIVIL WORK:

CONTRACTOR TO MARK PROPOSED FOUNDATION LOCATIONS BY MEANS OF SURVEYING EQUIPMENT TO ENSURE ANCHOR PLACEMENT IS AS PER SHEET 05. IF DEVIATION FROM FLAT TERRAIN EXISTS ON SITE, THE SURVEYOR IS TO DETERMINE REVISED ANCHOR RADII THAT ENSURE THE SHAFT ANGLE IS CONSISTENT BETWEEN ALL THREE ANCHORS. THE SURVEYOR SHOULD PROVIDE THE CONTRACTOR WITH THE FINAL RADII AND ELEVATIONS AS TO PERMIT THE CREATION OF PULSE CHARTS.

1. CLEAR AND GRUB SITE TO SPECIFIED EXTENTS FOR GUY ANCHORS. SEE SHEET 05 FOR DETAILS.
2. RELOCATE EXISTING SHELTER FROM DECOMMISSIONED TOWER TO NEW SHELTER COMPOUND. THE SHELTER IS TO BE SUPPORTED BY A CRUSHED ROCK PAD. SEE SHEETS 05 AND 06 FOR DETAILS.
3. PREPARE PROPOSED SHELTER COMPOUND AS PER PROPOSED SITE LAYOUT. THIS INCLUDES THE SUPPLY AND INSTALL OF FILL, GROUND FINISHING, FENCING, WAVEGUIDE BRIDGE, GATES AND THEIR ASSOCIATED FOUNDATIONS FOR THE SHELTER AREA. SEE SHEETS 05, 06, 10 AND 11 FOR DETAILS.
4. SUPPLY AND INSTALL ASSOCIATED MATERIALS FOR (3) GUY ANCHOR LOCATIONS. THIS INCLUDES SUPPLY AND INSTALLATION OF FENCING (AND THEIR ASSOCIATED FOUNDATIONS), GUY MARKERS, GROUND FINISHING (GRAVEL TO PREVENT VEGETATION GROWTH) AND ALL OTHER ASSOCIATED ELEMENTS TO BRING EXISTING SITE UP TO RCMP CSS REQUIREMENTS. SEE SHEETS 07, 09, 11 AND 12 FOR DETAILS.
5. SUPPLY AND INSTALL TOWER BASE FOUNDATION AND (3) GUY ANCHOR FOUNDATIONS. SEE SHEET 08 AND 09 FOR DETAILS.
6. SUPPLY AND INSTALL COMPLETE TOWER GROUNDING SYSTEM. THIS INCLUDES THE SUPPLY AND INSTALL OF A CONTINUOUS GROUND RISER. SEE SHEETS 12 TO 14 FOR DETAILS.

### TOWER ERECTION:

7. SUPPLY AND INSTALL ALL SPECIFIED GUY ASSEMBLIES. SEE SHEET 15 FOR DETAILS.
8. IDENTIFY EACH TOWER SECTION AS PER THE PROVIDED TABLE. CARE MUST BE TAKEN TO ENSURE THE SECTIONS ARE ORIENTED CORRECTLY. CORRECT ORIENTATION SHALL BE DETERMINED BY STARTING AT THE BOTTOM AND ENSURING THE TOWER BRACING CONTINUES IN A REPEATABLE PATTERN FOR THE ENTIRE HEIGHT OF THE STRUCTURE. CONTRACTOR IS TO ENSURE THE LADDER ATTACHMENTS ALL REMAIN ON THE SAME FACE. SEE SHEET 16 FOR DETAILS.
9. SUPPLY AND INSTALL NEW SPLICE PLATES AND REQUISITE SHIMS FOR THE TOWER ASSEMBLY. INSTALLATION OF NEW SPLICES REQUIRES CONTRACTOR TO REMOVE (1) THREADED ROD SUB-HORIZONTAL ASSEMBLY ON SECTION 13. SEE SHEET 17 FOR DETAILS.
10. SUPPLY AND INSTALL NEW DIAGONAL BRACING MEMBERS TO REPAIR THE EXISTING DAMAGED MEMBERS. DUE TO UNCERTAINTY OF THE DIAGONALS THE STRUCTURE IS RESTING ON, ADDITIONAL DIAGONAL REPLACEMENTS HAVE BEEN SPECIFIED. CONTRACTOR IS TO ASSESS AND REPLACE BENT DIAGONALS. SEE SHEET 18 FOR DETAILS.

11. CONTRACTOR IS TO REMOVE THE PARTIALLY INSTALLED SUB-HORIZONTAL MEMBERS AT THE BOTTOM OF SECTION 13. THIS INCLUDES THE REMOVAL OF THE SUB-HORIZONTAL MEMBERS, THE SPACER AND REINSTALLATION OF A NEW BOLT AND SPACER.
12. SUPPLY AND INSTALL TORSION RESISTOR MEMBERS, NOSE PLATE WELDMENTS AND GUY LEVEL 3 BOTTOM WELDMENT. FIELD ADJUSTMENT MAY BE REQUIRED TO SUIT CONDITIONS. CONTRACTOR TO SUPPLY AND INSTALL OBSTRUCTION SIGNAGE ABOVE AND BELOW GUY LEVEL 3 TORSION RESISTOR. SEE SHEETS 20 AND 21 FOR DETAILS.
13. ERECTION SHALL BE COMPLETED IN A SAFE MANNER WITH LOW WINDS IN ORDER TO ENSURE PERSONNEL SAFETY AT ALL TIMES. CONTRACTOR IS TO SUPPLY A WRITTEN PROCEDURE TO THE OWNER AND CONSULTANT FOR REVIEW PRIOR TO MOBILIZATION.
14. EXISTING LADDER SHALL BE REINSTALLED IN A CONTINUOUS MANNER. CONTRACTOR TO SUPPLY AND INSTALL NEW 91.4m TRYLON FALL ARREST RAIL AND ONE (1) 6.1m LADDER SECTION TO REPLACE BENT LADDER SECTION. SEE SHEET 19 AND 22 FOR DETAILS.
15. SUPPLY AND INSTALL HINGE TYPE PLATE ANTI-CLMB. SEE SHEET 22 FOR DETAILS.
16. CONTRACTOR TO SUPPLY AND INSTALL NEW STROBE SYSTEM (OR APPROVED EQUAL) FOR 91.4m TOWER INSTALLATION. NEW INSTALLATION TO MEET THE REQUIREMENTS OF CARS 621.19 TRANSPORT CANADA, NAV CANADA AND THE RCMP CSS. SEE SHEET 26 FOR DETAILS.
17. CONTRACTOR TO SUPPLY AND INSTALL INITIAL TENSION TAGS. UPON INSTALLATION OF THE ANCHORS, CONTRACTOR IS TO CONTACT VARCON INC. AND PROVIDE THE FINAL RADII AND ELEVATIONS OF ALL ANCHORS. WITH THIS INFORMATION VARCON WILL PREPARE AND TRANSMIT PULSE CHARTS TO THE CONTRACTOR. FINAL TENSIONS ARE TO BE COMPLETED ON THE TOWER IN ITS COMPLETED AND FINAL CONFIGURATION.

### ANTENNA INSTALLATION:

18. CONTRACTOR TO SUPPLY AND INSTALL ALL TRANSMISSION LINES FOR THE PROPOSED ANTENNAS WITHIN THESE DRAWINGS. CONTRACTOR TO SUPPLY EXTRA LENGTH TO SUIT WAVEGUIDE BRIDGE AND EQUIPMENT INSTALLATION IN RCMP SHELTER. AN ADDITIONAL CONTINGENCY OF 9m PER LINE SHOULD BE MADE BY THE BIDDER. CONFIRMATION OF LINE LENGTH CAN BE MADE BY COORDINATING WITH THE RCMP. THE HARDWARE TO BE CONSIDERED INCLUDES ALL ASSOCIATED ATTACHMENT HARDWARE, GROUNDING ACCESSORIES AND ANY OTHER HARDWARE REQUIRED TO MEET MANUFACTURER'S AND RCMP REQUIREMENTS. SEE SHEET 03 FOR DETAILS.
19. CONTRACTOR TO REMOVE EXISTING SEALANT AND LINES PRIOR TO INSTALLATION OF NEW ANTENNAS. CONTRACTOR TO SUPPLY AND INSTALL WEATHERPROOF SEALANT ON EXISTING WAVEGUIDE PORT.
20. CONTRACTOR TO SUPPLY AND INSTALL PROPOSED MOUNT AT EL. 91.4m AND REQUISITE MANUFACTURER FABRICATED MOUNTING BRACKETS AS TO ALLOW INSTALLATION OF PROPOSED ANTENNAS. SEE SHEETS 24 AND 25 FOR DETAILS.
21. SWEEP/PIM TESTS TO BE COMPLETED IN CONJUNCTION WITH THE RCMP.



### CLIENT INFORMATION



**CLIENT PROJECT MANAGER:**  
ERIC GLYNN  
PROJECT MANAGER

### PROJECT INFORMATION

**PROJECT TITLE:**  
TOWER REMEDIATION AND  
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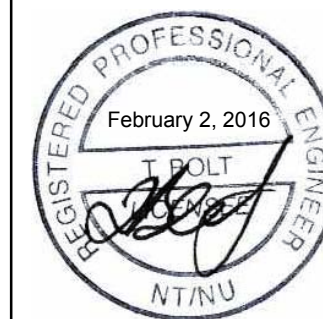
**SITE NAME:**  
PTARMIGAN, NT

**DRAWN BY:**  
PTN

**DESIGNED BY:**  
ROBERT MOSS, P.ENG.

**APPROVED BY:**  
JORDAN CHASE, BScE.

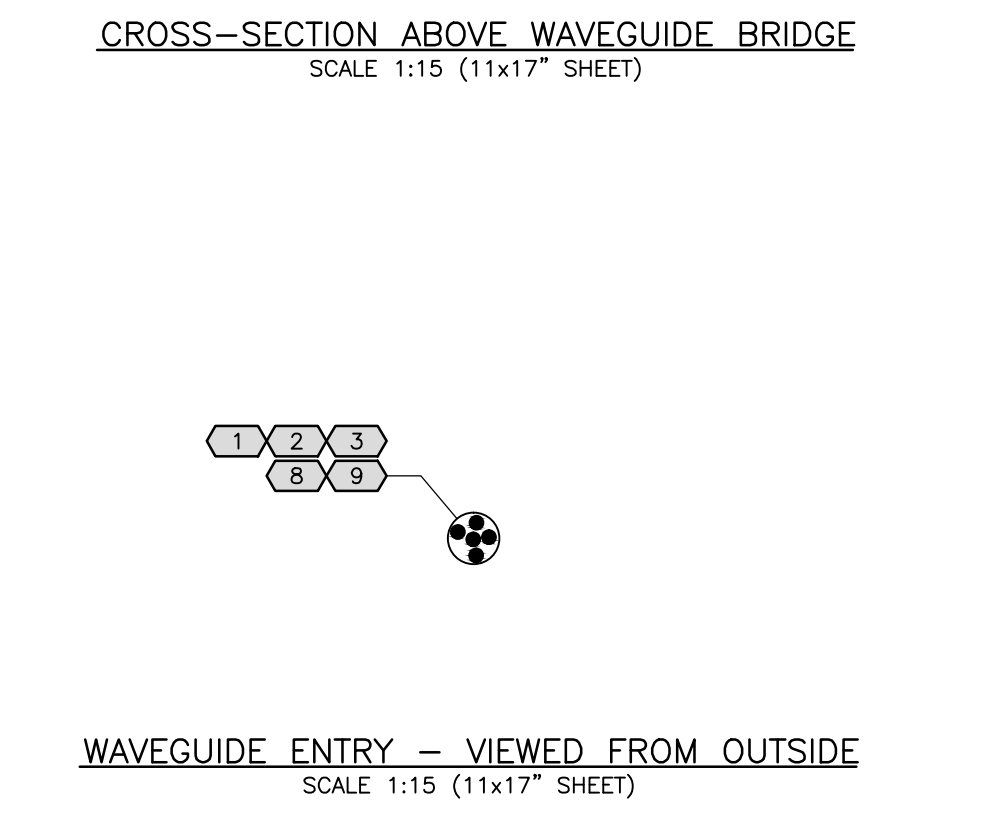
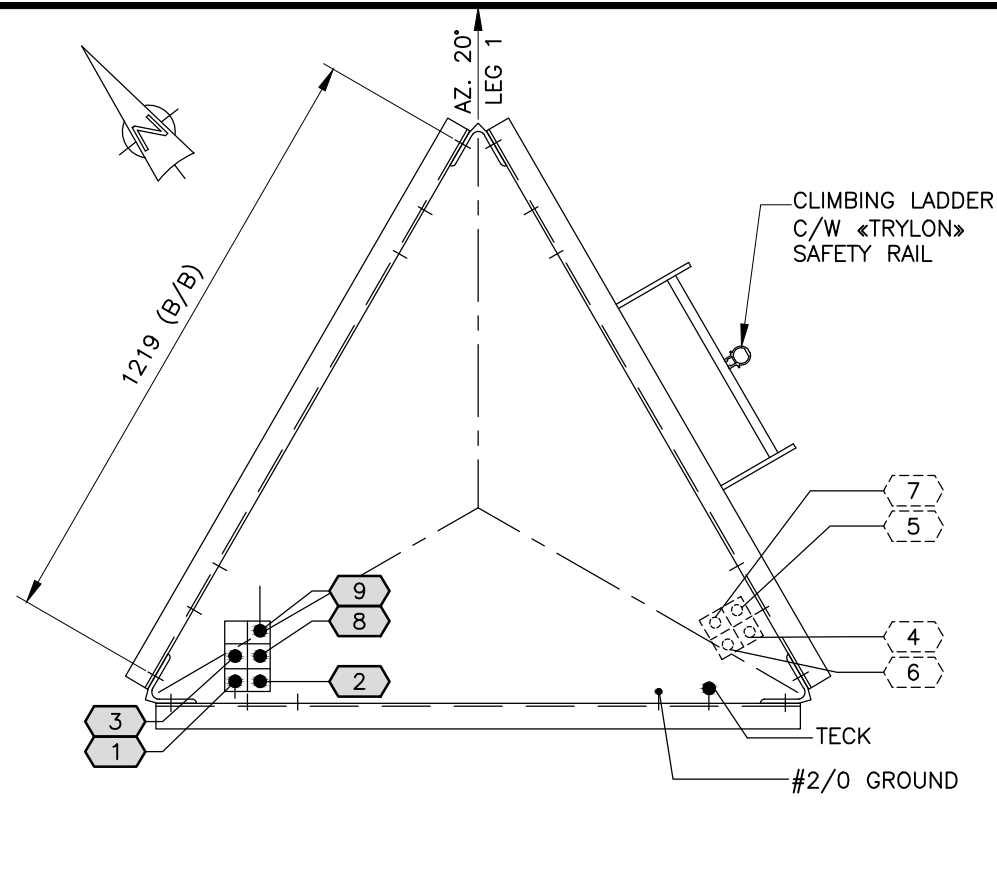
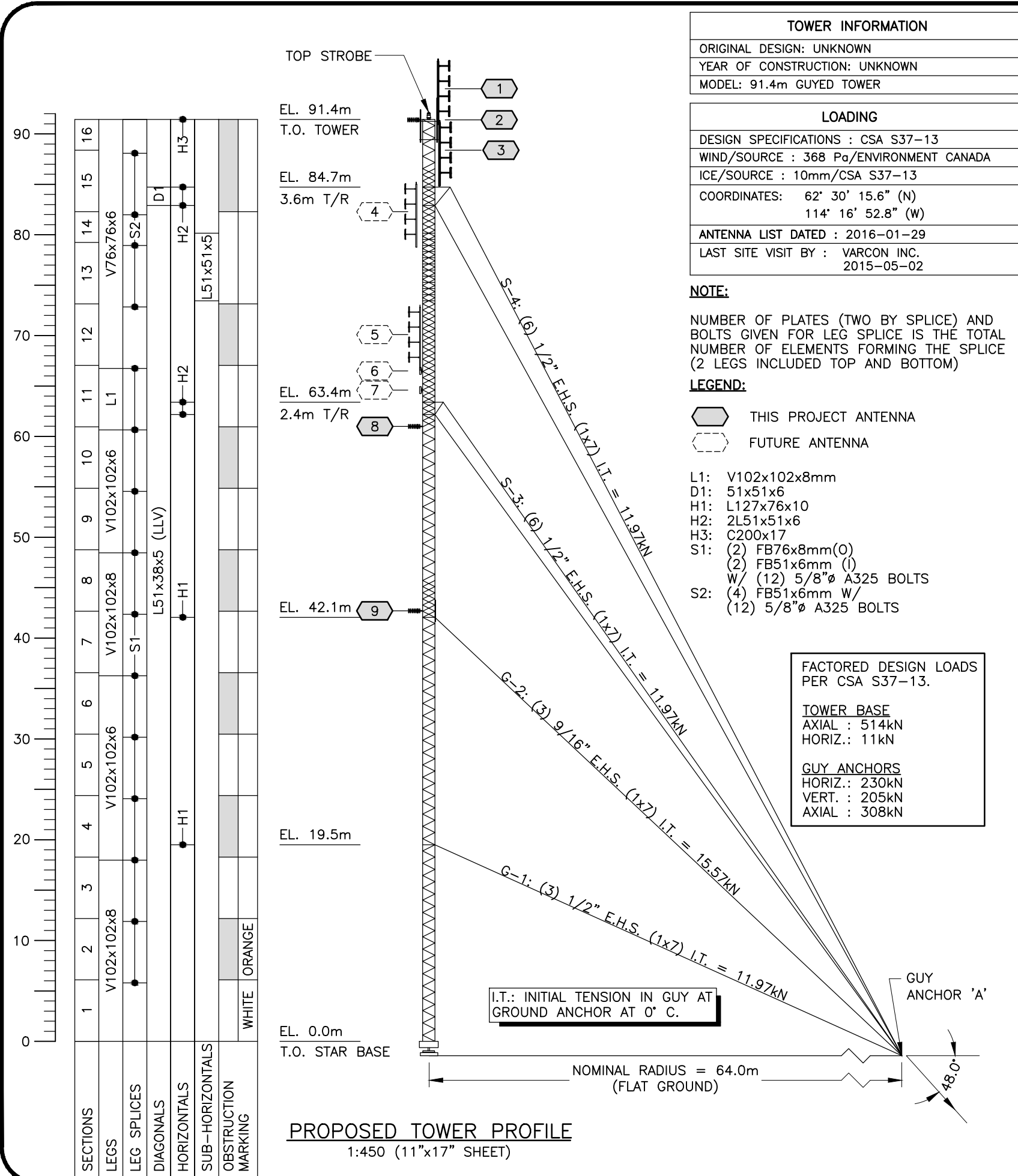
ENGINEERING SEAL



DRAWING TITLE

SCOPE OF WORK

				PROJECT NUMBER
				50273
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	SHEET 02
REV.	BY	DATE	DESCRIPTION	



CLIENT INFORMATION



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ERIC GLYNN  
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ENGINEERING SEAL



DRAWING TITLE

TOWER PROFILE &  
TX-LINE SECTION

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

PROJECT NUMBER	50273
SHEET	03

ANTENNA LIST

ANT No.	ANTENNA IDENTIFIER	OWNER	STATUS	ANTENNA DESCRIPTION	ELEV. (m)	TX-LINE	EQUIPMENT	AZ. (TN°)	LOCATION
1	-	RCMP	THIS PROJECT	«SINCLAIR» SD214 HD	94.5	7/8" COAXIAL	-	225	FACEMOUNT
2	-	RCMP	THIS PROJECT	«SINCLAIR» SY206EB	91.4	7/8" COAXIAL	-	81	FACEMOUNT
3	-	RCMP	THIS PROJECT	«SINCLAIR» SD214 HD	88.4	7/8" COAXIAL	-	225	LEG 3
4	-	RCMP	FUTURE	«SINCLAIR» SD314 HD	82.3	7/8" COAXIAL	-	180	LEG 2
5	-	RCMP	FUTURE	«SINCLAIR» SD214 HD	70.1	7/8" COAXIAL	-	225	LEG 3
6	-	RCMP	FUTURE	«CAMBIAN» PTP650	66.5	7/8" COAXIAL	-	225	LEG 3
7	-	RCMP	FUTURE	«CAMBIAN» PTP650	64.6	7/8" COAXIAL	-	225	LEG 3
8	-	RCMP	THIS PROJECT	«SINCLAIR» SY307R	61.0	7/8" COAXIAL	-	225	LEG 3
9	-	RCMP	THIS PROJECT	«SINCLAIR» SY206EB	42.7	7/8" COAXIAL	-	225	LEG 3

**NOTES:**

1. THE ELEVATIONS OF THE ANTENNAS ARE GIVEN WITH RESPECT TO ELEVATION 0.0m ON THE TOWER (TOP OF THE STAR BASE).

**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.



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**APPROVED BY:**  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

ANTENNA LIST

				PROJECT NUMBER
				50273
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REV.	BY	DATE	DESCRIPTION	

**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.

**NOTE:**

- CLEARING AND GRUBBING IS REQUIRED FOR PROPOSED ANCHOR SETS IS LIMITED TO A MINIMUM OF 6.0m CENTERED ALONG THE GUY LENGTH.
- ADDITIONAL CLEARING MAY BE REQUIRED AT THE ANCHOR LOCATION TO FACILITATE EXCAVATION AND PLACEMENT OF THE DEADMAN ANCHOR

ANCHOR	RADIUS	AZ. (NEW)	ELEVATION
1A	64.0m (TBD)	20°±	0 (TBD)
2A	64.0m (TBD)	140°±	0 (TBD)
3A	64.0m (TBD)	260°±	0 (TBD)



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www.varcon.ca

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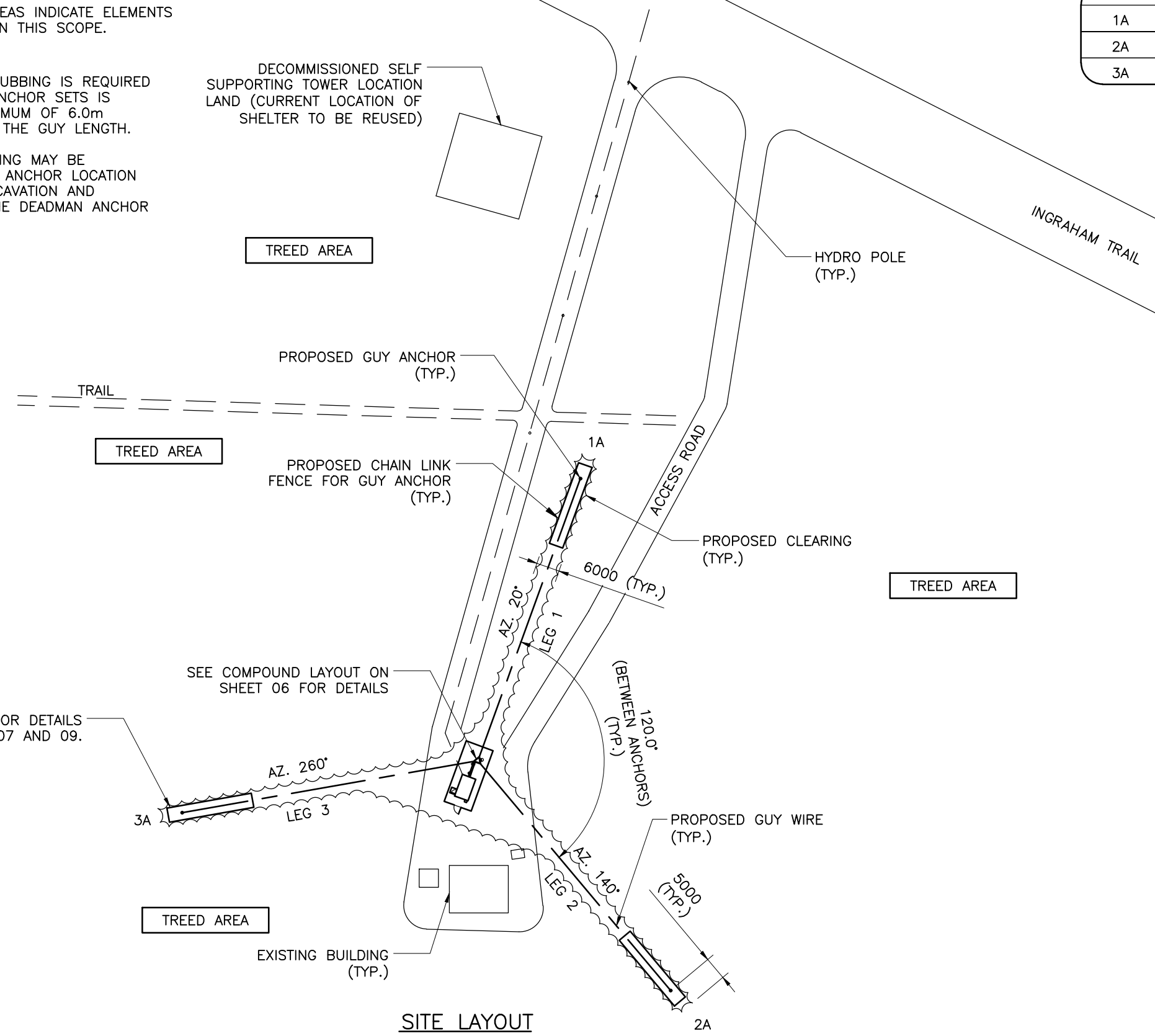
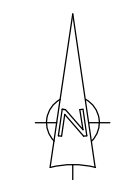
ENGINEERING SEAL



DRAWING TITLE

SITE LAYOUT

REV.	BY	DATE	DESCRIPTION	PROJECT NUMBER
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	50273
				SHEET 05



**SITE LAYOUT**  
1:1000 (11x17 SHEET)

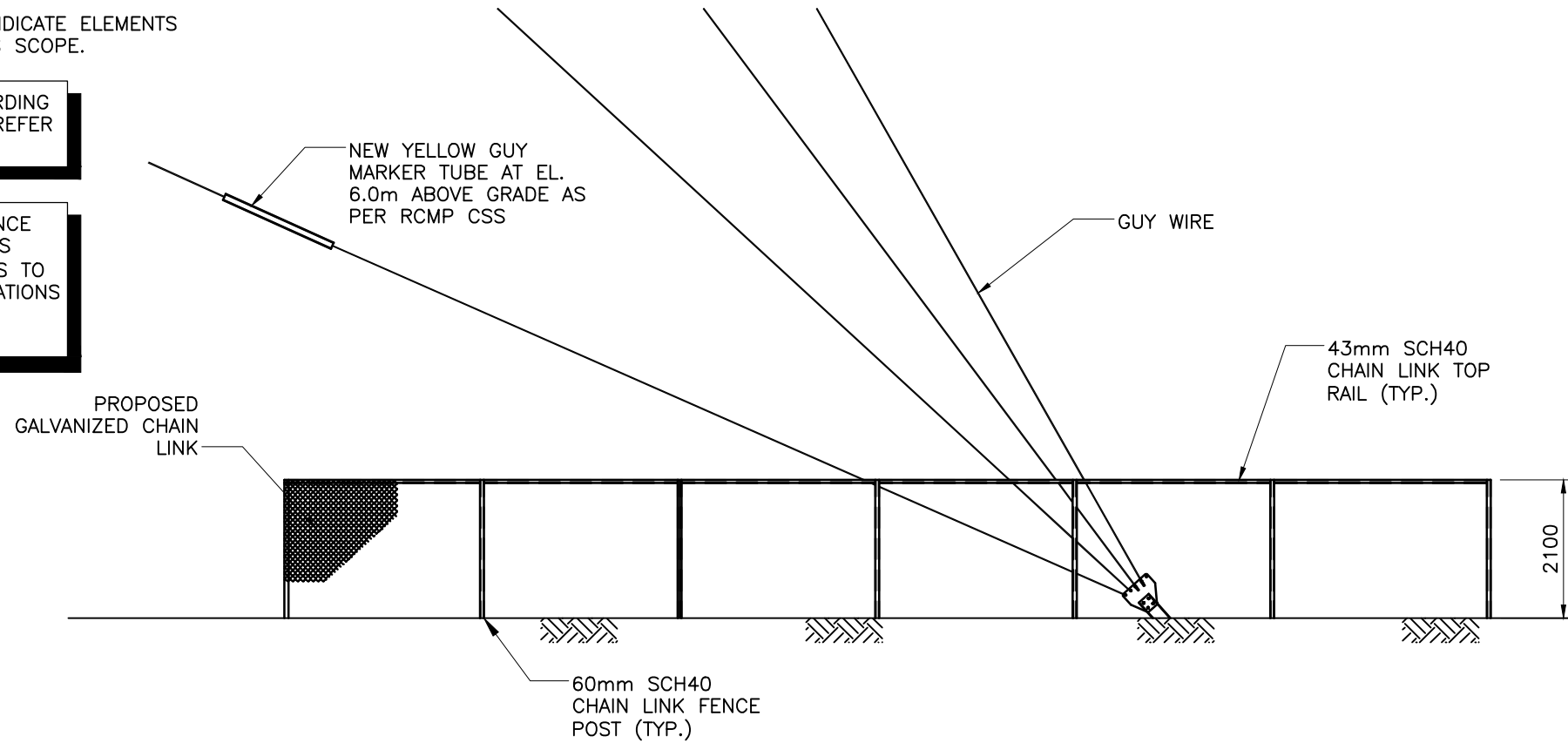


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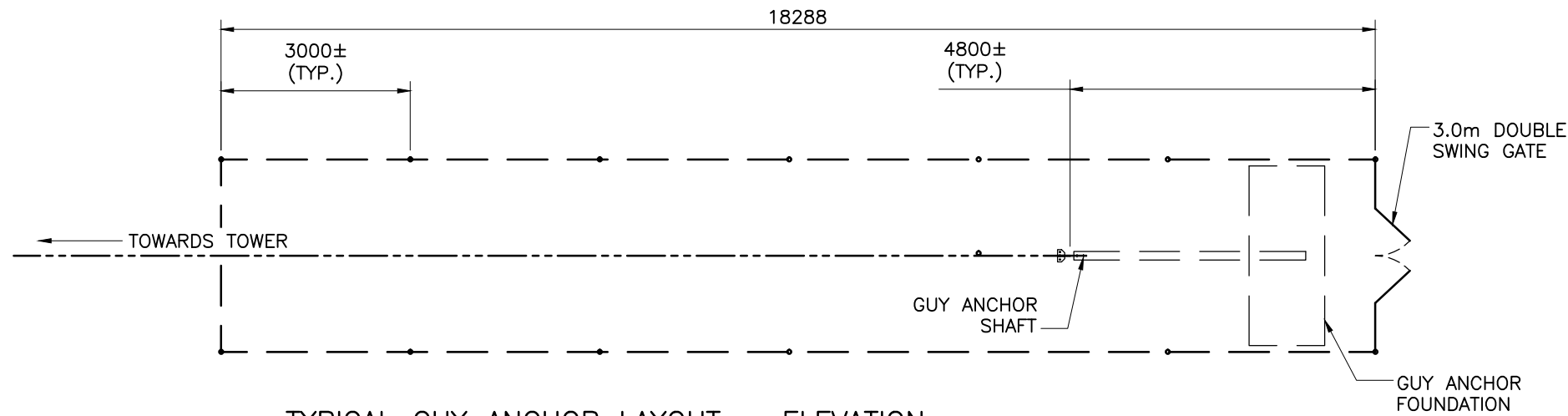
SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.

FOR FULL DETAILS REGARDING FENCING INSTALLATIONS REFER TO RCMP CSS

CONTRACTOR TO REFERENCE SOIL REPORT BY JACQUES WHITFORD (#1004979) AS TO ENSURE FENCING FOUNDATIONS ARE ADEQUATE FOR SITE CONDITIONS



**TYPICAL GUY ANCHOR LAYOUT – PLAN**  
SCALE 1:100 (11x17" SHEET)



**TYPICAL GUY ANCHOR LAYOUT – ELEVATION**  
SCALE 1:100 (11x17" SHEET)



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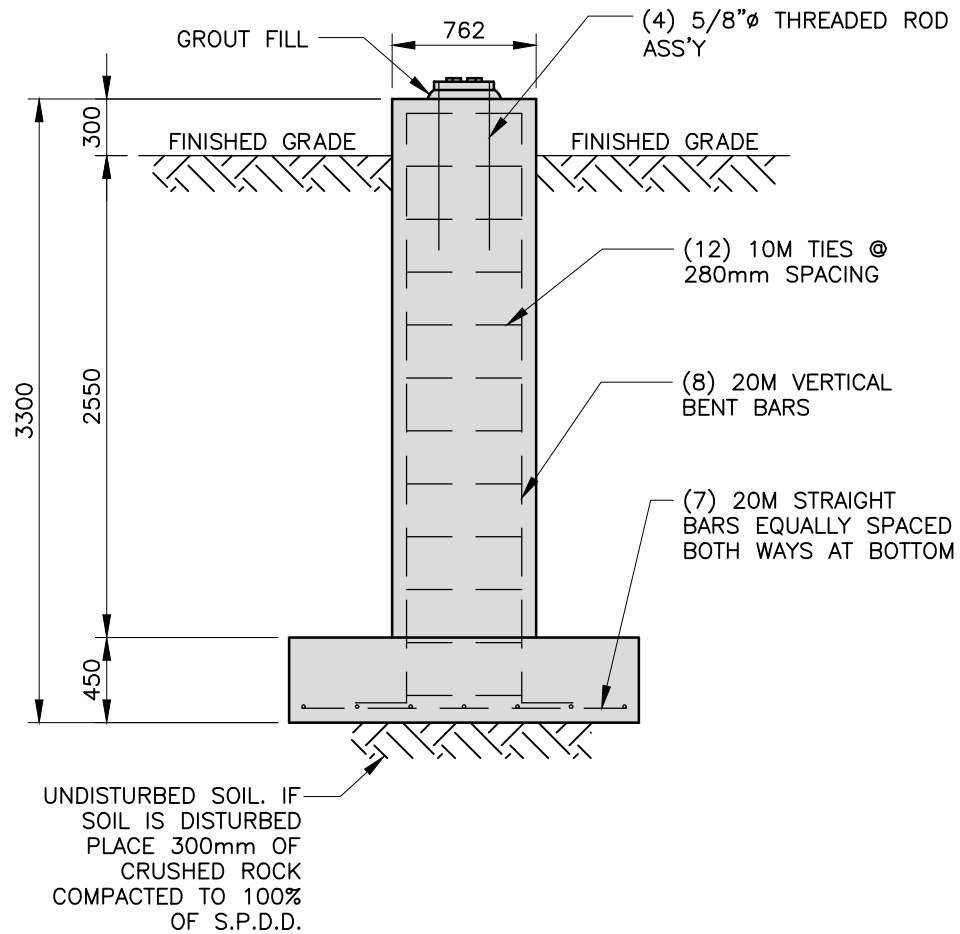
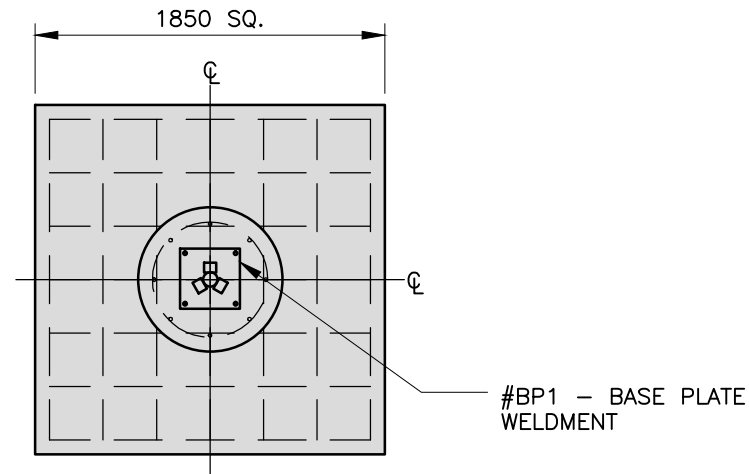
TYPICAL GUY ANCHOR LAYOUT

				PROJECT NUMBER
				50273
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	SHEET 07
REV.	BY	DATE	DESCRIPTION	



**LEGEND:**

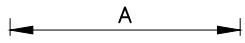
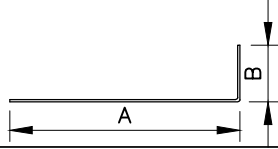
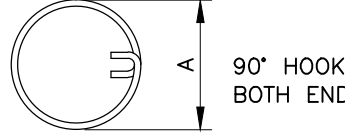
SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.



**TOWER BASE FOUNDATION**

SCALE 1:40 (11x17" SHEET)

BILL OF MATERIAL - TOWER BASE FOUNDATION			
MARK	QTY	DESCRIPTION	DWG NO.
#BP1	1	BASEPLATE WELDMENT	F01
-	4	5/8"Ø THREADED ROD ASS'Y - GR60 600mm lg. W/ (3) NUTS & (2) WASHERS	-

BAR LIST FOR REINFORCING STEEL (TOWER BASE)							
BAR LOCATION	BAR SIZE	BAR TYPE	TOTAL LENGTH OF BAR	BENDING DIAGRAM		QTY. REQ'D	
				DIM. A	DIM. B		
PAD	20M	STRAIGHT	1698	1698	-		14
PIER	20M	BENT	3375	3108	267		8
PIER	10M	TIE	2117	610	-		12

**FOUNDATIONS NOTES:**

- THIS FOUNDATION DESIGN IS BASED ON SOIL REPORT BY JACQUES WHITFORD FILE NO. 1004979 DATED NOVEMBER 24, 2005.
- CONCRETE TESTING SHALL BE ORGANIZED AND COORDINATED WITH THE RCMP.
- BACKFILL SHOULD CONSIST OF GRANULAR MATERIAL. BACK FILL SHALL BE PLACED IN 300mm VERTICAL LIFTS AND COMPACTED TO A MINIMUM 100% OF STANDARD PROCTOR DENSITY. THE FILL MATERIAL SHALL BE PLACED AT OR NEAR THE OPTIMUM MOISTURE CONTENT.
- WHERE SITE CONDITIONS DIFFER FROM THESE DRAWINGS, CONSULT THE ENGINEER OF RECORD.
- CONTRACTOR SHALL BE RESPONSIBLE FOR CO-ORDINATING THE FOUNDATION INSPECTION WITH VARCON INC. TO ENSURE COMPLIANCE WITH THE PLANS.
- CHECK AREA FOR UNDERGROUND PIPES, CABLES, CONDUIT AND ETC. PRIOR TO EXCAVATION.
- ALL CONCRETE SHALL HAVE MINIMUM SPECIFIED 28 DAY COMPRESSIVE STRENGTH OF 32 MPa, SLUMP OF 75mm TO 150mm, WITH ENTRAINED AIR OF 4% TO 7% UNLESS NOTED OTHERWISE. CEMENT SHALL BE TYPE HS.
- ALL WORK SHALL BE DONE IN ACCORDANCE WITH LOCAL CODES AND SAFETY REGULATIONS REQUIREMENTS. PROCEDURES FOR PROTECTION OF EXCAVATIONS, EXISTING CONSTRUCTION AND UTILITIES SHALL BE ESTABLISHED PRIOR TO START OF FOUNDATION WORK.
- BRACING SHORING AND SLOPING EXCAVATION SHALL BE DONE IN ACCORDANCE WITH ALL LOCAL AND FEDERAL CODES AND SAFETY REGULATIONS. REFER TO SOIL REPORT FOR EXCAVATION/DRILLING CONDITIONS.
- WELDING OF REINFORCING STEEL AND EMBEDMENT IS PROHIBITED UNLESS NOTED OTHERWISE ON DRAWINGS.
- MINIMUM CONCRETE COVER OVER MAIN REINFORCEMENT STEEL SHALL BE 76mm OR IN CONFORMITY TO CSA A23.1 AND/OR MINIMUM APPLICABLE BUILDING CODE REQUIREMENTS.
- REBAR SPACERS SHALL BE USED AS REQUIRED TO MAINTAIN THE SIDE CLEARANCE BETWEEN THE STEEL REINFORCEMENT AND EXCAVATION WALL.
- CONCRETE SHALL BE PLACED INTO EXCAVATION WITHOUT UNDUE DELAY AND WITH THE USE OF A CHUTE DEVICE TO DIRECT THE CONCRETE TO FALL WITHIN THE CENTER OF THE STEEL CAGE. CONCRETE SHALL NOT BE ALLOWED TO HIT THE STEEL CAGE WHICH WOULD CAUSE SEGREGATION OF THE MATERIAL. THE MAXIMUM FREE-FALL DROP HEIGHT OF THE CONCRETE SHALL NOT EXCEED 1.5m.
- DESIGN LOADS ARE AS PER THE VARCON INC. STRUCTURAL ANALYSIS. FACTORED LOADS HAVE A 30% RESERVE CAPACITY DESIGNED. FACTORED DESIGN LOADS ARE:
  - AXIAL: 514kN
  - SHEAR: 11kN
- ESTIMATED VOLUME OF CONCRETE = 2.9 CUBIC METERS.



CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

TOWER BASE FOUNDATION

PROJECT NUMBER

50273

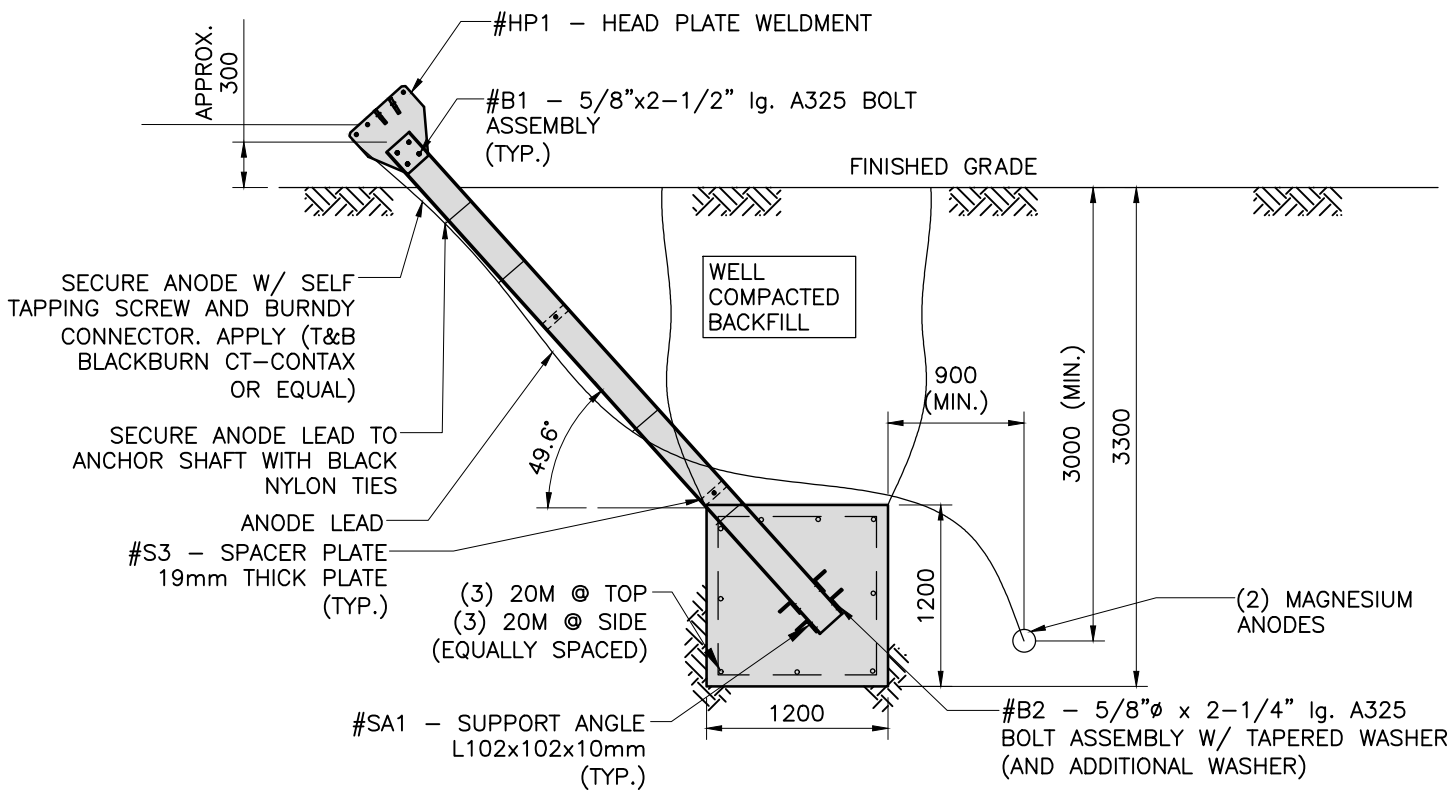
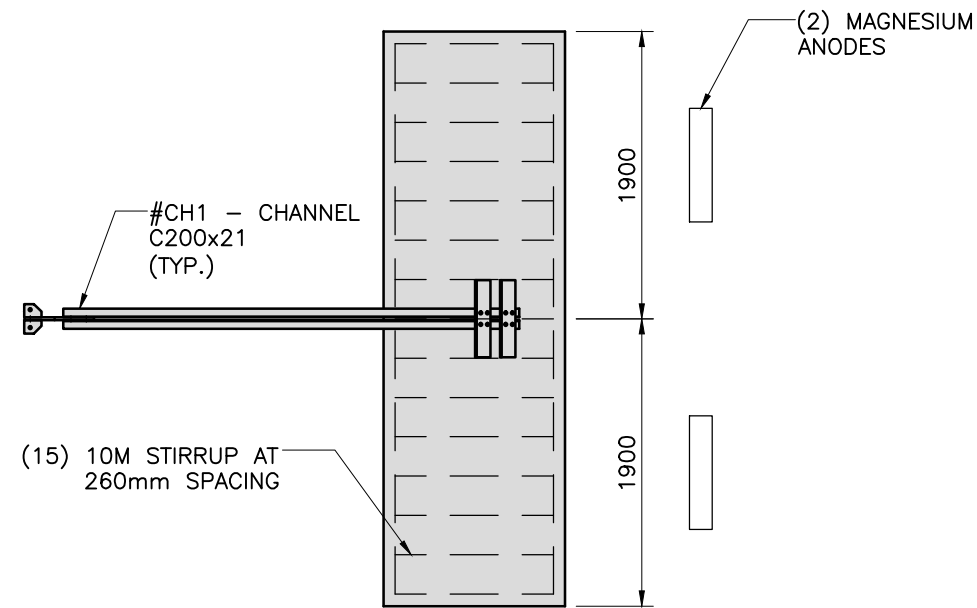
SHEET

08

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.



**TOWER GUY ANCHOR FOUNDATION**

SCALE 1:50 (11x17" SHEET)

**BILL OF MATERIAL - TOWER GUY ANCHOR FOUNDATIONS**

MARK	QTY	DESCRIPTION	DWG NO.
#HP1	3	HEAD PLATE WELDMENT	F03
#CH1	6	C200x21 CHANNEL	F02
#SA1	12	L102x102x10mm SUPPORT ANGLE	F02
#S3	6	19mm THICK SPACER PLATE	F02
#B1	24	5/8" x 2-1/2" lg. A325 BOLT ASSEMBLY	-
#B2	48	5/8" x 2-1/4" lg. A325 BOLT ASSEMBLY W/ TAPERED WASHER (AND ADDITIONAL WASHER)	-

**BAR LIST FOR REINFORCING STEEL (THREE GUY ANCHORS)**

BAR LOCATION	BAR SIZE	BAR TYPE	TOTAL LENGTH OF BAR	BENDING DIAGRAM		QTY. REQ'D
				DIM. A	DIM. B	
ANCHOR	20M	STRAIGHT	3648	3648	-	27
ANCHOR	10M	STIRRUP	4394	1048	1048	45

**NOTES:**

- STEEL EXPOSED TO THE SOIL IS TO BE PAINTED LIBERALLY WITH BAKOR 710-11 (OR EQUAL) WATERPROOFING COMPOUND TO PROVIDE ADDITIONAL CORROSION PROTECTION.
- THE CONTRACTOR IS FULLY RESPONSIBLE FOR REINFORCED CONCRETE WORKS.
- CONCRETE MATERIAL AND METHOD OF CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS OF CSA A23.1.
- ALL CONCRETE SHALL HAVE MINIMUM SPECIFIED 28 DAY COMPRESSIVE STRENGTH OF 32 MPa, SLUMP OF 75mm TO 150mm, WITH ENTRAINED AIR OF 4% TO 7% UNLESS NOTED OTHERWISE. CEMENT SHALL BE TYPE HS.
- ALL REINFORCING STEEL BARS SHALL CONFORM TO CSA G30.18 AND HAVE A YIELD STRENGTH OF 400MPa UNLESS OTHERWISE NOTED.
- LAPS, ANCHORS AND SPLICES SHALL COMPLY WITH THE REQUIREMENTS OF CSA A23.3.
- CONCRETE TESTS FOR SLUMP AND AIR SHALL BE COMPLETED BY A THIRD PARTY FIRM. TESTING METHOD SHALL CONFORM TO CSA A23.2.
- DESIGN LOADS ARE AS PER THE VARCON INC. STRUCTURAL ANALYSIS. FACTORED LOADS HAVE A 30% RESERVE CAPACITY DESIGNED. FACTORED BASIS LOADS ARE:
  - VERTICAL: 205kN
  - HORIZONTAL: 230kN
  - RESULTANT: 308kN
- ESTIMATED VOLUME OF CONCRETE (PER ANCHOR) = 5.5 CUBIC METERS.



**CLIENT INFORMATION**



**CLIENT PROJECT MANAGER:**  
ERIC GLYNN  
PROJECT MANAGER

**PROJECT INFORMATION**

**PROJECT TITLE:**  
TOWER REMEDIATION AND INSTALLATION

**SITE NAME:**  
PTARMIGAN, NT

**DRAWN BY:**

PTN

**DESIGNED BY:**

ROBERT MOSS, P.ENG.

**APPROVED BY:**

JORDAN CHASE, BScE.

**ENGINEERING SEAL**



**DRAWING TITLE**

TOWER GUY ANCHOR FOUNDATION

**PROJECT NUMBER**

50273

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

**SHEET** 09

**LEGEND:**

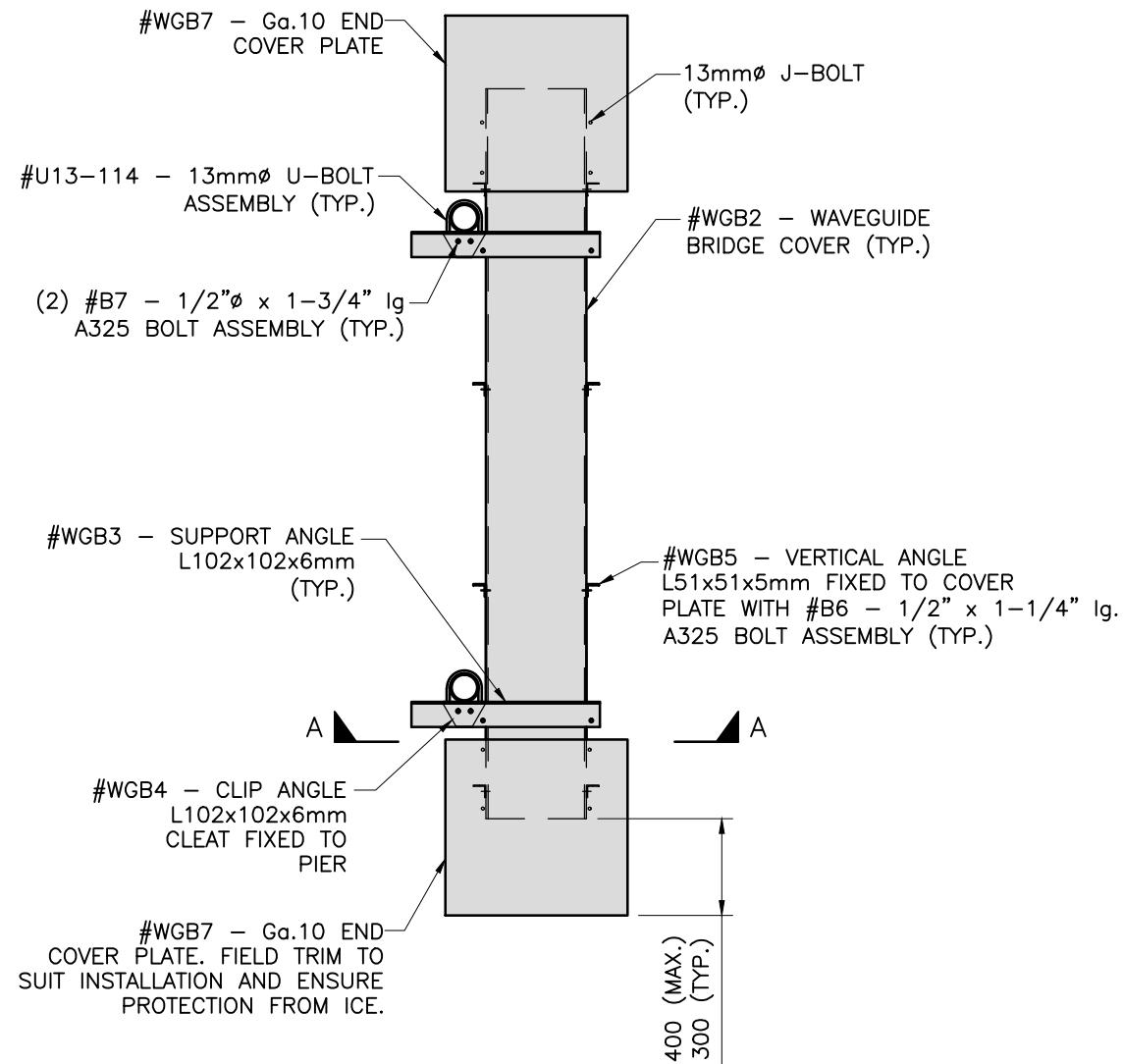
SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.

**NOTES:**

CUT END COVER PLATES & BENT PLATES TO SUIT SITE CONDITIONS.

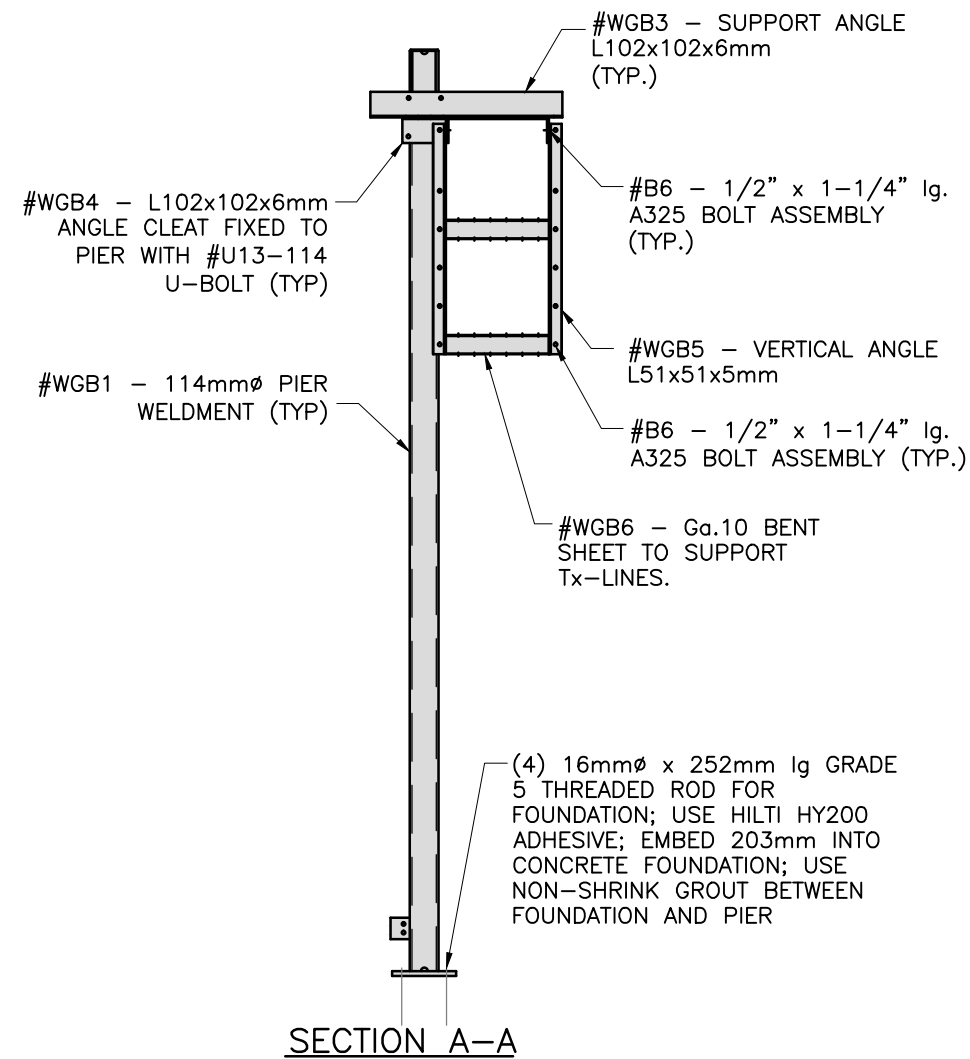
ADJUSTMENT TO ELEVATION OF BRIDGE MAY BE REQUIRED TO SUIT EXISTING BUILDING

TRANSMISSION LINES WILL NEED TO BE ROUTED AROUND PROPOSED ANTI-CLIMB TO SUIT RCMP CSS REQUIREMENTS.



**WAVEGUIDE BRIDGE DETAILS**  
SCALE 1:30 (11"x17" SHEET)

BILL OF MATERIAL - WAVEGUIDE BRIDGE DETAILS			
MARK	QTY	DESCRIPTION	DWG NO.
#WGB1	2	114mmØ PIER WELDMNT	F04
#WGB2	1	WAVEGUIDE BRIDGE COVER	F05
#WGB3	2	L102x102x10mm SUPPORT ANGLE	F06
#WGB4	2	L102x102x10mm CLIP ANGLE	F06
#WGB5	8	L51x51x5mm VERTICAL ANGLE	F07
#WGB6	8	10 Ga Tx LINE HANGER	F08
#WGB7	2	ICE SHIELD	F09
#U13-114	4	13mmØ U-BOLT ASSEMBLY (114mmØ FITS)	F24
#B6	24	1/2"Øx1-1/4" lg. A325 BOLT ASSEMBLY	-
#B7	4	1/2"Øx1-3/4" lg. A325 BOLT ASSEMBLY	-
-	12	13mmØ J-BOLT ASSEMBLY	-
-	8	16mmØ x 252mm lg. GRADE 5 THREADED ROD C/W HILTI HY200 GLUE (2) NUT & (1) WASHER	-



**SECTION A-A**



CLIENT INFORMATION



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ERIC GLYNN  
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TOWER REMEDIATION AND  
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PTARMIGAN, NT

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PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

WAVEGUIDE BRIDGE DETAILS

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

PROJECT NUMBER

50273

SHEET

10

**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.

CONTRACTOR TO REFERENCE SOIL REPORT BY JACQUES WHITFORD (#1004979) AS TO ENSURE FENCING FOUNDATIONS DEPTHS ARE ADEQUATE FOR SITE CONDITIONS.

FENCE SCREW PILE DETAILS PROVIDED FOR INFORMATION ONLY. ACTUAL INSTALLATION MAY VARY TO SUIT LOCAL REQUIREMENTS AND PRACTICES.

**BAR LIST FOR REINFORCING STEEL (TWO WAVEGUIDE PIERS)**

BAR LOCATION	BAR SIZE	BAR TYPE	TOTAL LENGTH OF BAR	BENDING DIAGRAM		QTY. REQ'D
				DIM. A	DIM. B	
PIER	20M	STRAIGHT	3100	3100	-	8
PIER	10M	TIE	998	254	-	18

**NOTES:**

1. CONCRETE WORK SHALL BE IN ACCORDANCE WITH CSA A23.1, 23.2 & 23.3 (LATEST EDITION).
2. ALL REINFORCING STEEL SHALL BE DEFORMED BILLET STEEL CONFORMING TO CSA G30.18 GRADE 400.
3. ALL REINFORCING STEEL SHALL HAVE A MIN. 76mm CONCRETE COVERAGE.
4. ENSURE BOTTOM OF FOUNDATION IS RESTING ON UNDISTURBED SOIL OR TOP OF TOWER FOUNDATION (NO FRACTURED OR LOOSE ROCK).
5. CONCRETE IS TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 32 MPa AT 28 DAYS. TYPE HS CEMENT TO BE USED.
6. BACKFILL (IF NECESSARY) SHALL BE PLACED IN 150-200mm VERTICAL LIFTS AND COMPACTED TO A MINIMUM 95% S.P.D.D. THE FILL MATERIAL SHALL BE FREE FROM LARGE ROCKS, WASTE, AND DEBRIS AND SHALL BE PLACED AT OR NEAR THE OPTIMUM MOISTURE CONTENT.
7. BACKFILL SHALL BE PLACED SO AS TO PREVENT THE ACCUMULATION OF WATER AROUND THE INSTALLATION.
8. ALL GROUT SHALL BE NON-FERROUS AND NON-SHRINK WITH A MINIMUM COMPRESSIVE STRENGTH OF 48 MPa AT 28 DAYS. EDGES OF GROUT SHALL BE TAPERED AT 45°.
9. HEIGHT OF WAVEGUIDE PIER CAN BE ADJUSTED IF SITE CONDITIONS REQUIRE PLACEMENT ONTO TOWER BASE FOUNDATION. PLACEMENT ONTO TOP OF TOWER FOUNDATION REQUIRES THE VERTICAL BARS TO BE CHEMICALLY BONDED TO THE TOWER BASE USING HY200 ADHESIVE SYSTEM OR EQUAL.
15. ESTIMATED VOLUME OF CONCRETE (PER PIER) = 0.6 CUBIC METERS.



**CLIENT INFORMATION**



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TOWER REMEDIATION AND INSTALLATION

**SITE NAME:**  
PTARMIGAN, NT

**DRAWN BY:**  
PTN

**DESIGNED BY:**  
ROBERT MOSS, P.ENG.

**APPROVED BY:**  
JORDAN CHASE, BScE.

**ENGINEERING SEAL**



**DRAWING TITLE**

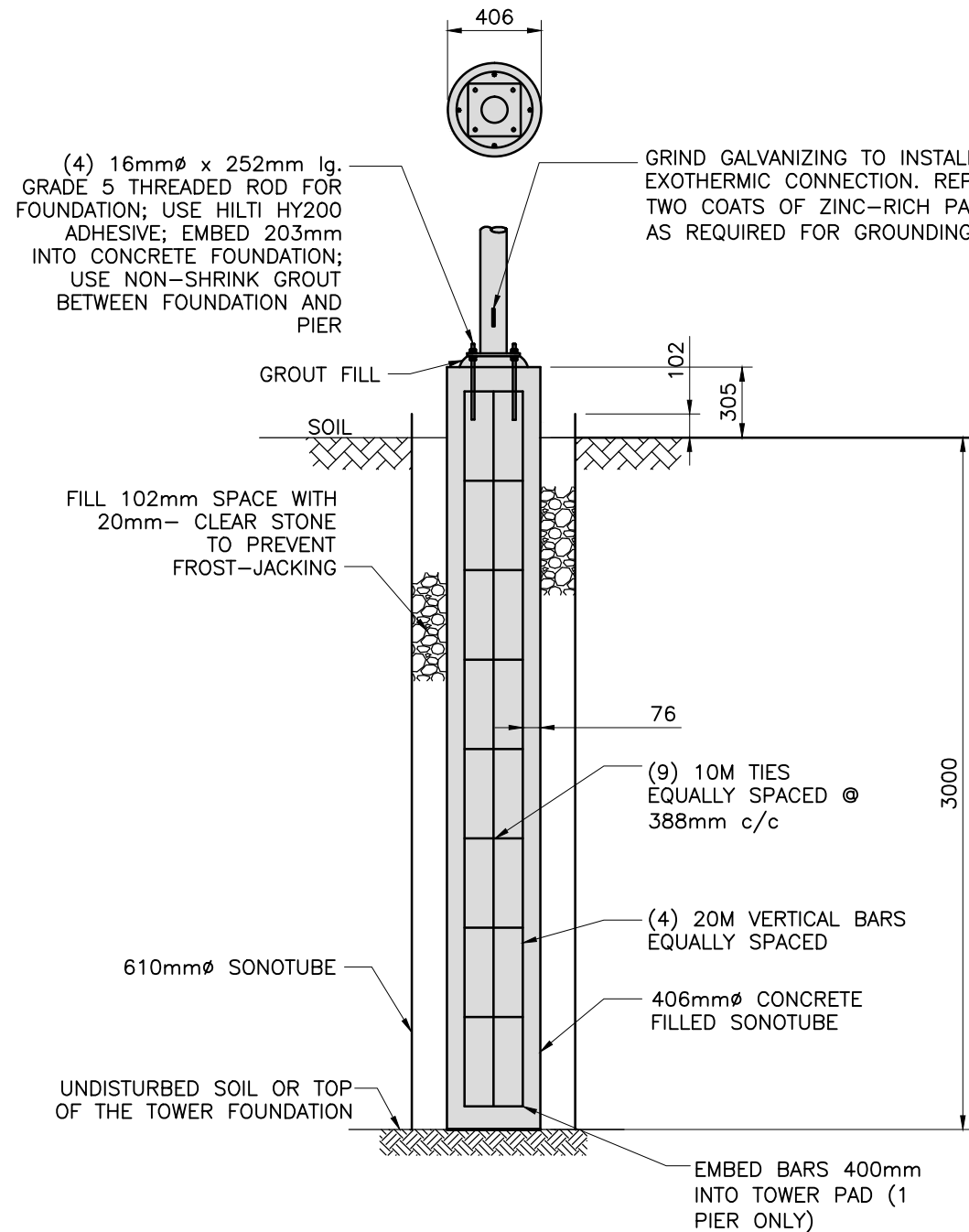
WAVEGUIDE BRIDGE AND FENCING PIER DETAILS

**PROJECT NUMBER**

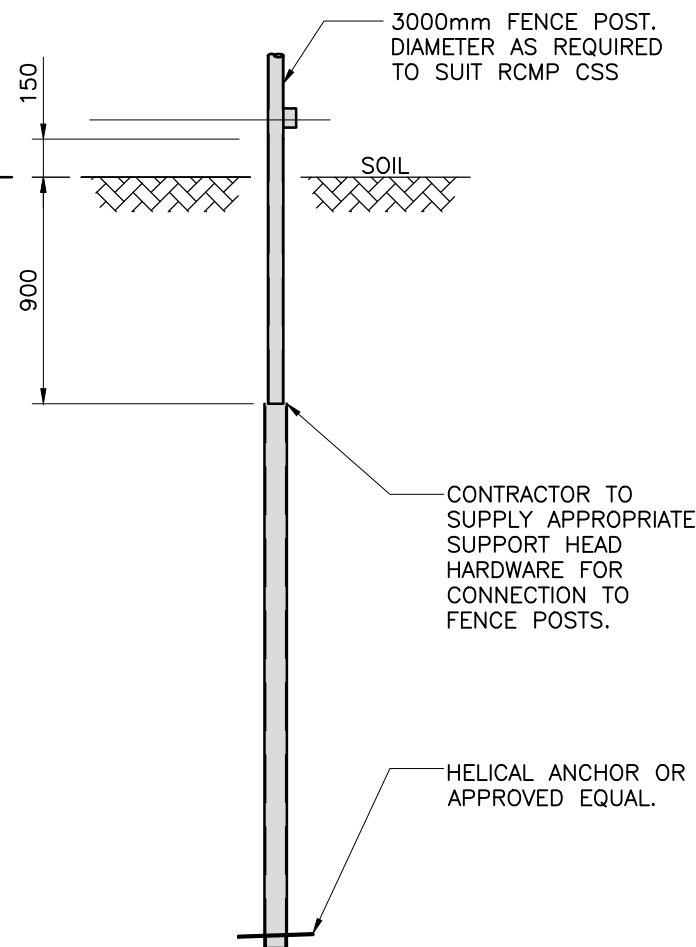
50273

**SHEET**

11



**WGB ANCHOR PIER DETAIL**  
SCALE 1:30 (11x17" SHEET)



**TYPICAL FENCE PIER DETAIL**  
SCALE 1:30 (11x17" SHEET)

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.

SYMBOL	GROUNDING HARDWARE
	INSULATED #2/0 COPPER (APPROX. 142.0m)
	BARE #2/0 COPPER WIRE (APPROX. 320.0m)
●	19Ø x 3050 LONG COPPER CLAD GROUND RODS (QTY 13)
△	EXOTHERMIC CONNECTION (CADWELD OR EQUAL)
⊗	BURNDY DISSIMILAR METAL FITTING

**NOTES:**

1. AT GROUND LEVEL, BURY GROUND RODS AND CONDUCTORS A MINIMUM OF 3000mm BELOW FINISHED GRADE OR TO BEDROCK DEPTH. LAY FLAT OUTWARDS IF VERTICAL EMBEDMENT IS NOT POSSIBLE.
2. EACH LOOP MUST FORM A CLOSED CIRCLE WITHOUT SHARP BENDS.
3. EACH LOOP MUST MAINTAIN A 1000mm MIN. CLEARANCE FROM FOUNDATIONS WHERE POSSIBLE
4. APPLY ANTI-OXIDANT COMPOUND (T&B BLACKBURN CT-CONTAX OR EQUAL) TO POINT OF CONTACT AT INTERNAL AND EXTERNAL CONNECTIONS.
5. DETAILS REGARDING THE SHELTER CONSTRUCTION ARE LIMITED. CONTRACTOR SHALL COMPLETE GROUNDING CONNECTIONS TO THE RELOCATED SHELTER TO SUIT THE CONSTRUCTION AND THE RCMP.



CLIENT INFORMATION



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APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



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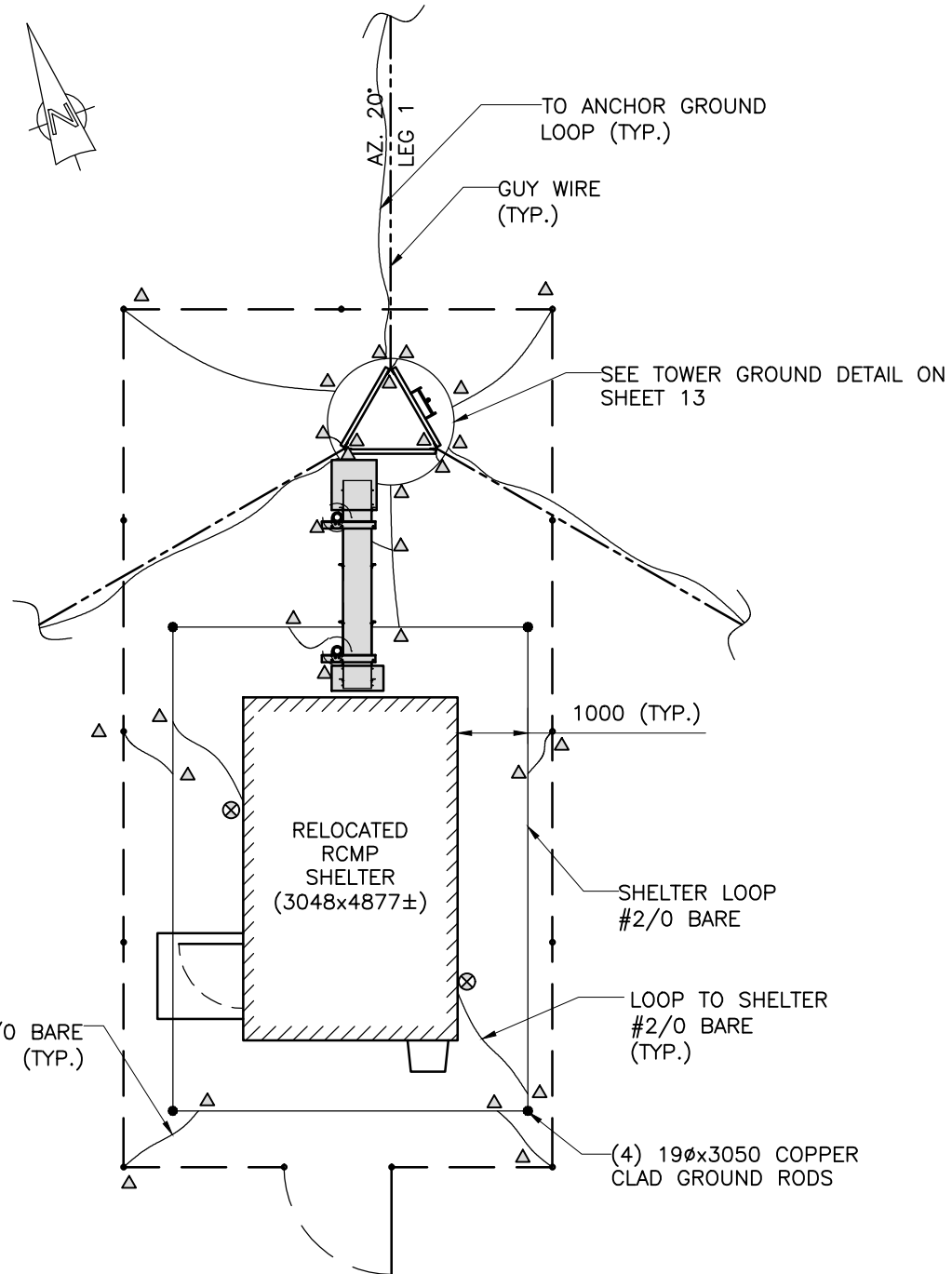
COMPOUND GROUNDING  
DETAIL

PROJECT NUMBER

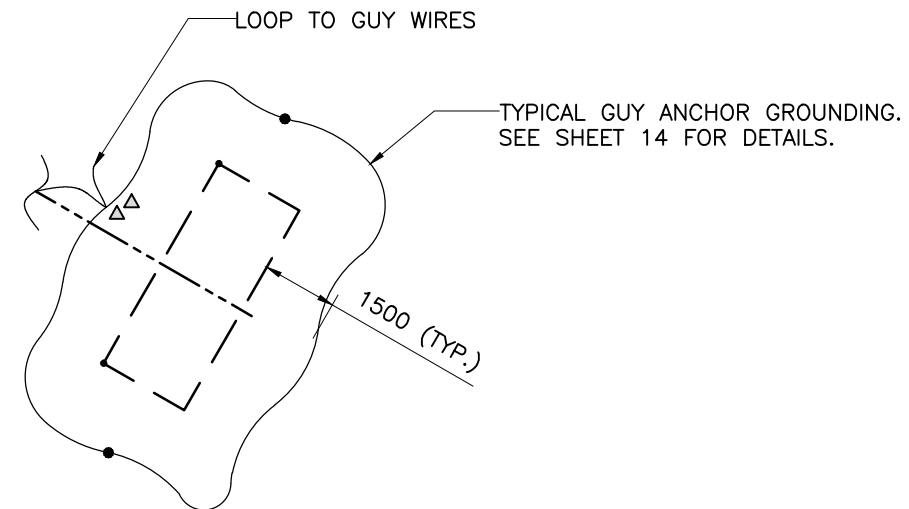
50273

SHEET

12



**COMPOUND GROUNDING DETAIL**  
SCALE 1:100 (11x17" SHEET)



**GUY ANCHOR GROUNDING - PLAN**  
SCALE 1:100 (11x17" SHEET)

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.



CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

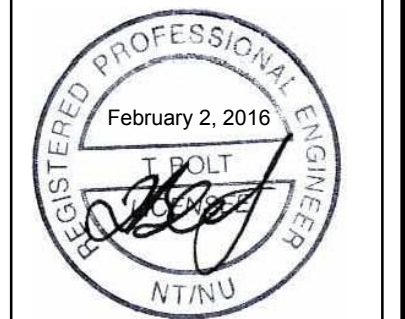
SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

TOWER GROUNDING DETAILS

PROJECT NUMBER

50273

SHEET

13

#2/0 BARE COPPER FROM BASE RING TO THE ANCHOR RINGS. BURY IN TRENCH (3000mm MIN. DEPTH)

BARE #2/0 CONDUCTOR; BURY IN TRENCH

1500 (MIN.)

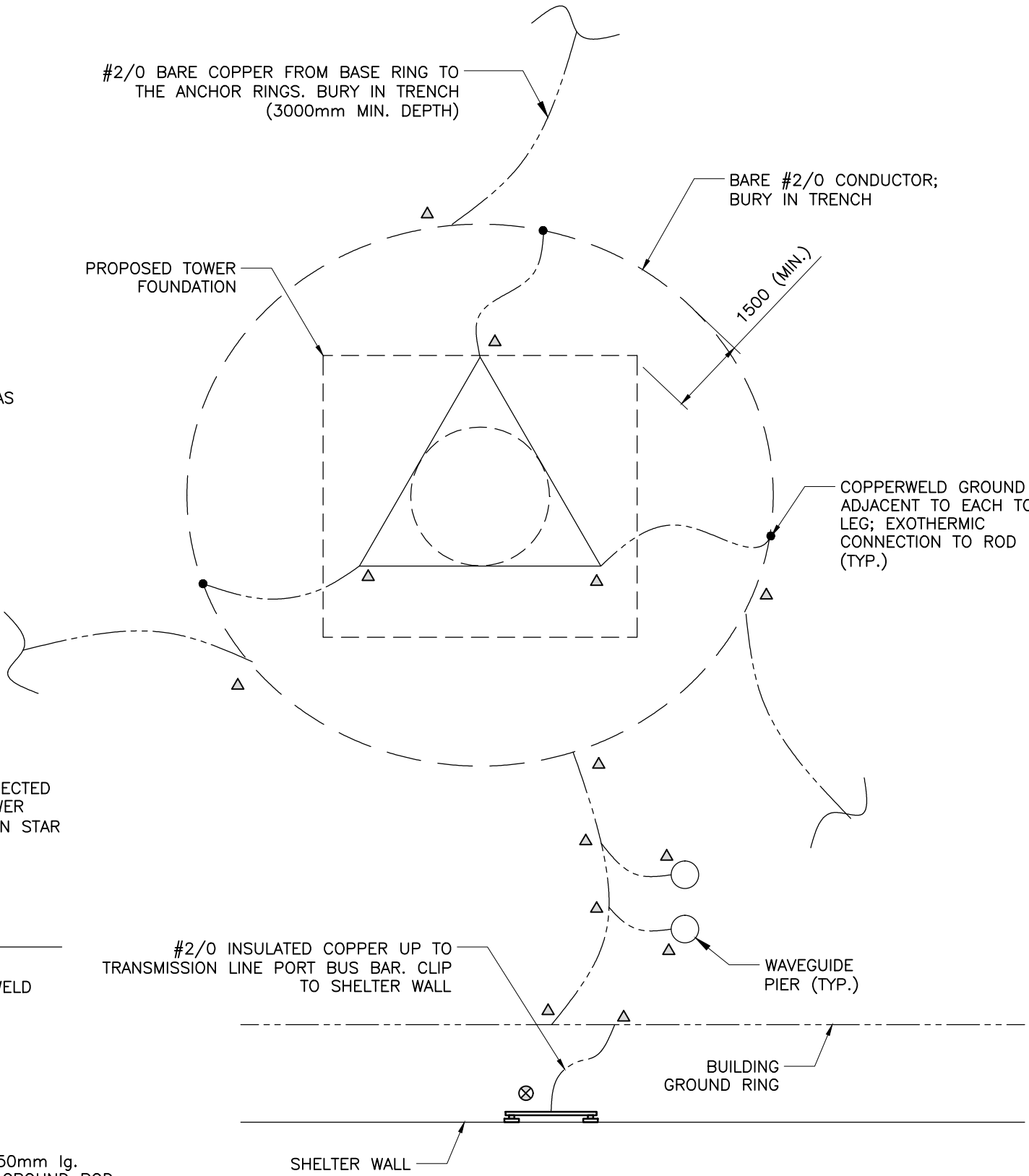
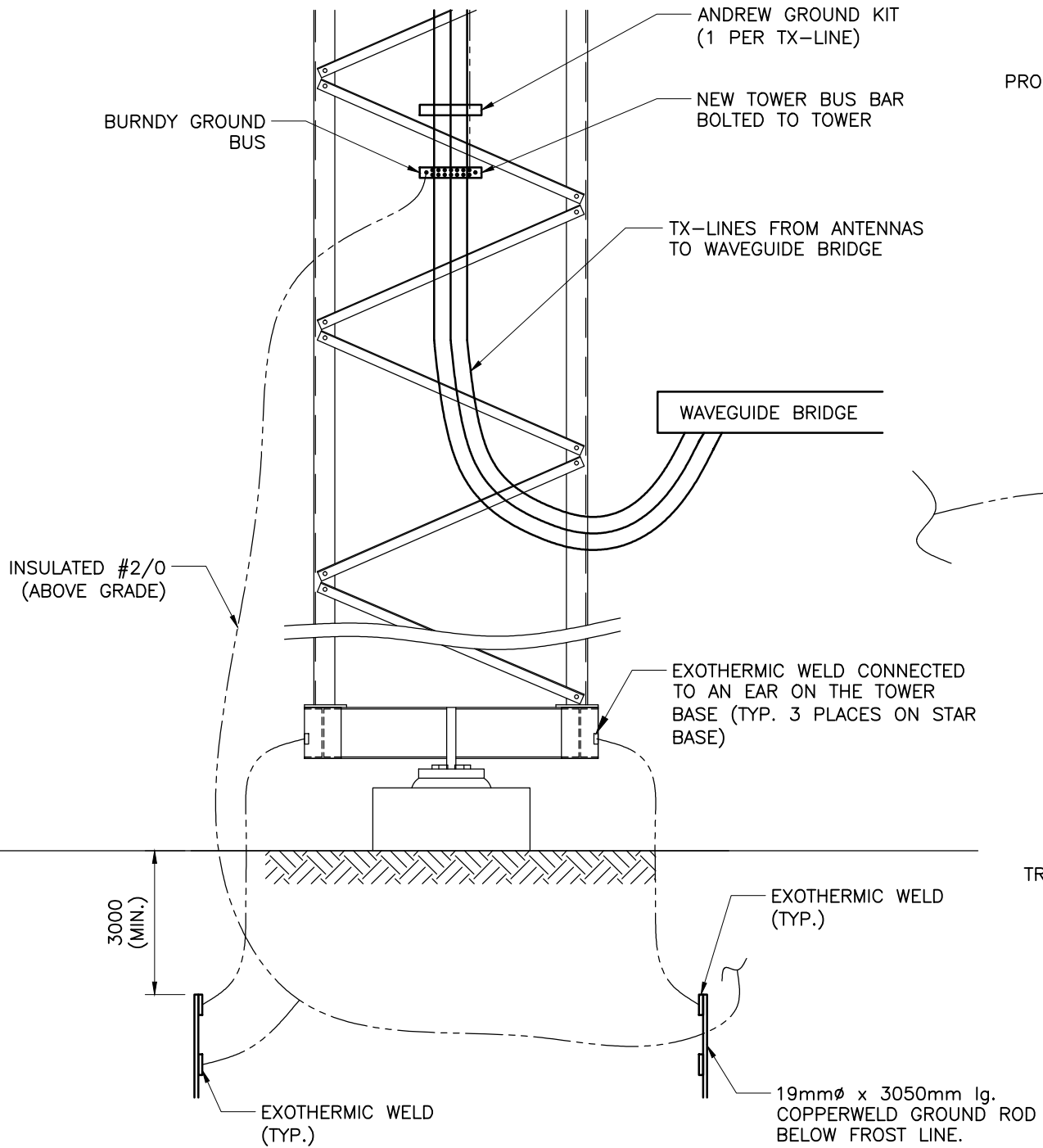
COPPERWELD GROUND ROD ADJACENT TO EACH TOWER LEG; EXOTHERMIC CONNECTION TO ROD (TYP.)

#2/0 INSULATED COPPER UP TO TRANSMISSION LINE PORT BUS BAR. CLIP TO SHELTER WALL

WAVEGUIDE PIER (TYP.)

BUILDING GROUND RING

SHELTER WALL

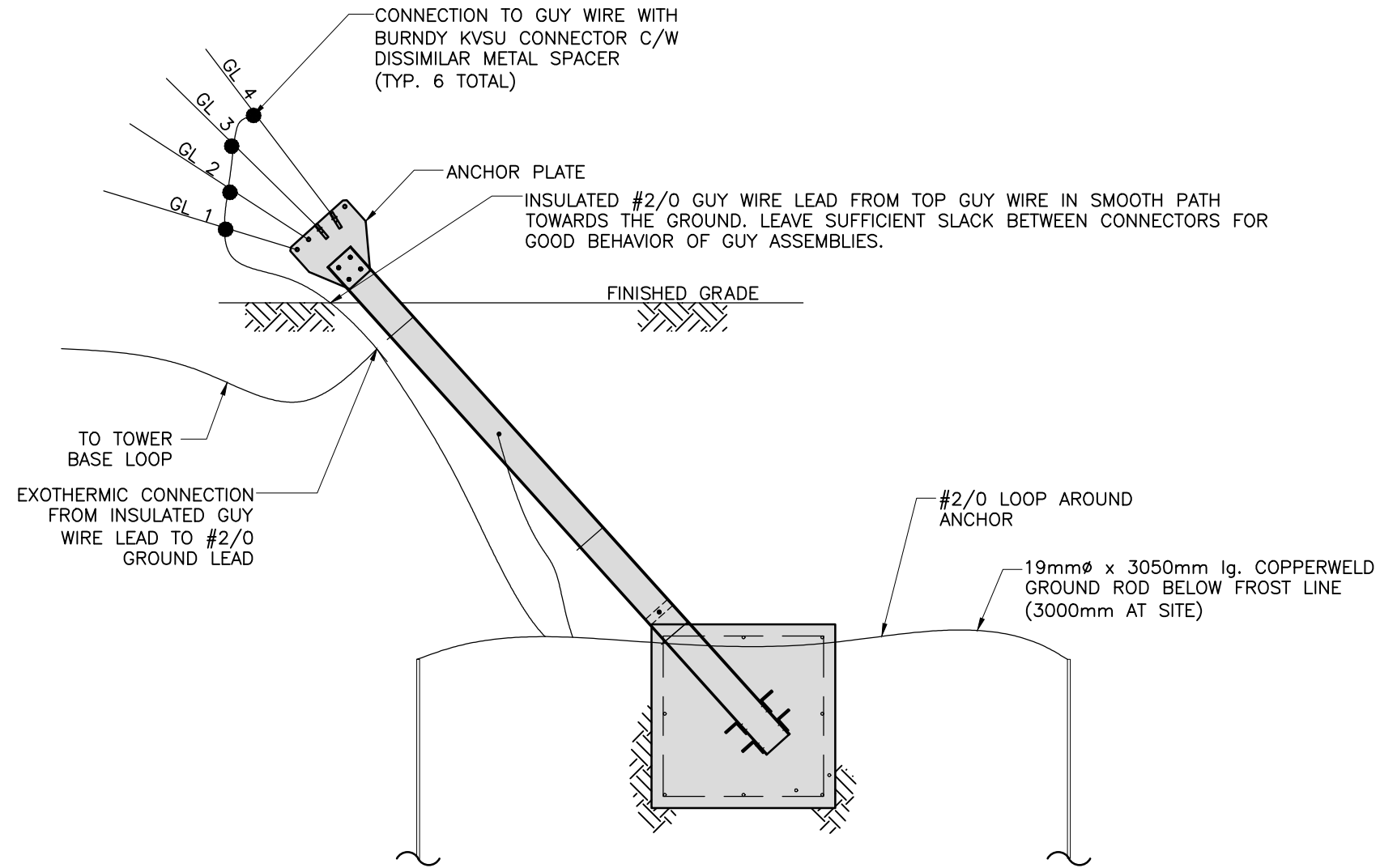


TOWER GROUNDING DETAILS – ELEVATION  
SCALE 1:30 (11x17" SHEET)

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.



**TOWER GUY ANCHOR GROUNDING DETAIL**  
SCALE 1:40 (11x17" SHEET)

**GENERAL NOTES (GROUNDING ABOVE GRADE):**

1. ALL GROUND WIRE BELOW GRADE IS TO BE #2/0 COPPER WIRE.
2. ALL COPPER WIRE TO GROUND ROD CONNECTIONS TO BE MADE WITH EXOTHERMIC CONNECTIONS (CADWELD OR EQUAL).
3. ALL COPPER WIRE TO WIRE CONNECTIONS TO BE MADE WITH EXOTHERMIC CONNECTIONS (CADWELD OR EQUAL).
4. GROUND RODS MUST BE MIN. 3000mm BELOW GRADE FOR EARTH CONDITIONS – DRIVE RODS VERTICALLY.
5. LEAVE 6m TAILS FOR ALL ABOVE GRADE GROUNDING AT ANCHORS.



CLIENT INFORMATION



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ERIC GLYNN  
PROJECT MANAGER

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TOWER REMEDIATION AND  
INSTALLATION

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PTARMIGAN, NT

DRAWN BY:  
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ROBERT MOSS, P.ENG.

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ENGINEERING SEAL



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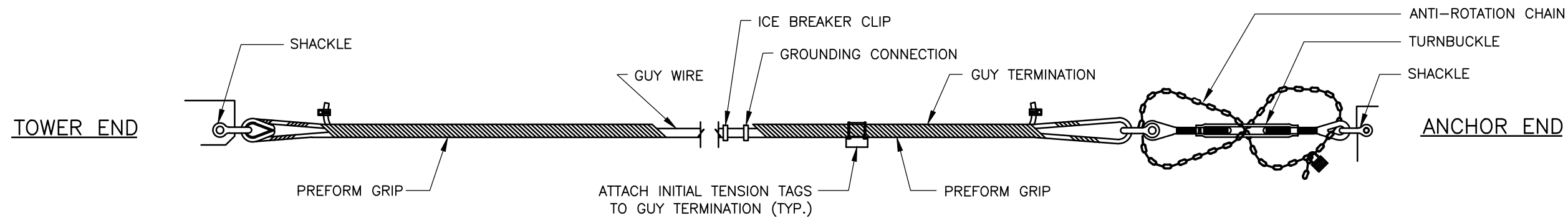
TOWER GUY ANCHOR  
GROUNDING DETAIL

				PROJECT NUMBER
				50273
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	SHEET 14
REV.	BY	DATE	DESCRIPTION	

**GUY HARDWARE NOTES:**

1. ALL GUY ASSEMBLIES SHALL CONFORM TO CSA S37-13 REQUIREMENTS AND SHALL BE CHOSEN SUCH THAT THE GUY HARDWARE CAN GAIN 100% EFFICIENCY.
2. PREFORMED GUY TERMINATIONS WHEN SPECIFIED SHALL BE INSTALLED AS PER MANUFACTURERS' WRITTEN RECOMMENDATIONS.
3. ALL TURNBUCKLES AND SHACKLES SHALL BE CROSBY. MANUFACTURED FROM AISI 1035 STEEL, QUENCHED AND TEMPER, AND HOT DIP GALVANIZED AS PER CSA S37-13 REQUIREMENTS.
4. ALL TURNBUCKLES SHALL BE INSTALLED WITH A MINIMUM OF 250mm TAKE-UP.
5. INSTALL NEW G-450 WIRE ROPE CLIP BY CROSBY TO ACT AS ICE BREAKER 300mm ABOVE GUY TERMINATION.
6. YELLOW GUY MARKERS ARE REQUIRED.

ESTIMATED GUY LENGTHS ARE BASED ON 64m ANCHOR RADIUS



**GUY WIRE ASSEMBLY**

	GUY LEVEL (m)	INIT. TENSION (kN)	GUY AZ.	GUY SIZE/TYPE	GUY TERM. TYPE (BOTTOM)	SHACKLE SIZE (BOTTOM)	SHACKLE SIZE (TOP)	TURNBUCKLE SIZE / TYPE	GUY TERM TYPE (TOP)	ESTIMATED GUY LENGTHS (m)
GUY LEVEL 1	19.5m	11.97	20°	(1) 1/2" E.H.S. (NEW)	PREFORM GRIP (NEW)	3/4" (NEW)	3/4" (NEW)	7/8" X 18" / EYE-JAW (NEW)	PREFORM GRIP (NEW)	70.1 + 12.0 = 82.1m
	19.5m	11.97	140°	(1) 1/2" E.H.S. (NEW)	PREFORM GRIP (NEW)	3/4" (NEW)	3/4" (NEW)	7/8" X 18" / EYE-JAW (NEW)	PREFORM GRIP (NEW)	70.1 + 12.0 = 82.1m
	19.5m	11.97	260°	(1) 1/2" E.H.S. (NEW)	PREFORM GRIP (NEW)	3/4" (NEW)	3/4" (NEW)	7/8" X 18" / EYE-JAW (NEW)	PREFORM GRIP (NEW)	70.1 + 12.0 = 82.1m
GUY LEVEL 2	42.1m	15.57	20°	(1) 9/16" E.H.S (NEW)	PREFORM GRIP (NEW)	3/4" (NEW)	7/8" (NEW)	7/8" X 18" / EYE-JAW (NEW)	PREFORM GRIP (NEW)	76.5 + 12.0 = 88.5m
	42.1m	15.57	140°	(1) 9/16" E.H.S (NEW)	PREFORM GRIP (NEW)	3/4" (NEW)	7/8" (NEW)	7/8" X 18" / EYE-JAW (NEW)	PREFORM GRIP (NEW)	76.5 + 12.0 = 88.5m
	42.1m	15.57	260°	(1) 9/16" E.H.S (NEW)	PREFORM GRIP (NEW)	3/4" (NEW)	7/8" (NEW)	7/8" X 18" / EYE-JAW (NEW)	PREFORM GRIP (NEW)	76.5 + 12.0 = 88.5m
GUY LEVEL 3	63.4m	11.97	20°	(2) 1/2" E.H.S. (NEW)	PREFORM GRIP (NEW)	3/4" (NEW)	3/4" (NEW)	7/8" X 18" / EYE-JAW (NEW)	PREFORM GRIP (NEW)	90.2 + 12.0 = 102.2m
	63.4m	11.97	140°	(2) 1/2" E.H.S. (NEW)	PREFORM GRIP (NEW)	3/4" (NEW)	3/4" (NEW)	7/8" X 18" / EYE-JAW (NEW)	PREFORM GRIP (NEW)	90.2 + 12.0 = 102.2m
	63.4m	11.97	260°	(2) 1/2" E.H.S. (NEW)	PREFORM GRIP (NEW)	3/4" (NEW)	3/4" (NEW)	7/8" X 18" / EYE-JAW (NEW)	PREFORM GRIP (NEW)	90.2 + 12.0 = 102.2m
GUY LEVEL 4	84.7m	11.97	20°	(2) 1/2" E.H.S. (NEW)	PREFORM GRIP (NEW)	3/4" (NEW)	3/4" (NEW)	7/8" X 18" / EYE-JAW (NEW)	PREFORM GRIP (NEW)	106.1 + 12.0 = 118.1m
	84.7m	11.97	140°	(2) 1/2" E.H.S. (NEW)	PREFORM GRIP (NEW)	3/4" (NEW)	3/4" (NEW)	7/8" X 18" / EYE-JAW (NEW)	PREFORM GRIP (NEW)	106.1 + 12.0 = 118.1m
	84.7m	11.97	260°	(2) 1/2" E.H.S. (NEW)	PREFORM GRIP (NEW)	3/4" (NEW)	3/4" (NEW)	7/8" X 18" / EYE-JAW (NEW)	PREFORM GRIP (NEW)	106.1 + 12.0 = 118.1m

**GUY HARDWARE**

0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION
REV.	BY	DATE	DESCRIPTION



CLIENT INFORMATION

CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL

DRAWING TITLE  
GUY ASSEMBLIES AND SUMMERY

PROJECT NUMBER  
50273

SHEET 15



## SECTION IDENTIFICATION

SECTION	LEG	DIAGONAL	SUB-HORIZONTAL	PAINT	COMMENTS
BOTTOM OF TOWER					
1	L102x102x8	L51x38x5 (LLV)	–	WHITE	REGULAR BRACING NO SHIM PLATES REQUIRED
2	L102x102x8	L51x38x5 (LLV)	–	ORANGE	REGULAR BRACING NO SHIM PLATES REQUIRED
3	L102x102x8	L51x38x5 (LLV)	–	WHITE	REGULAR BRACING (2) 1/16" SHIM PLATES REQUIRED ON TOP SIDE OF SPLICE
4	L102x102x6	L51x38x5 (LLV)	–	ORANGE	REGULAR BRACING AND GUY LUG ON BOTTOM SIDE NO SHIM PLATES REQUIRED
5	L102x102x6	L51x38x5 (LLV)	–	WHITE	REGULAR BRACING NO SHIM PLATES REQUIRED
6	L102x102x6	L51x38x5 (LLV)	–	ORANGE	REGULAR BRACING (2) 1/16" SHIM PLATES REQUIRED ON BOTTOM SIDE OF SPLICE
7	L102x102x8	L51x38x5 (LLV)	–	WHITE	REGULAR BRACING AND GUY LUG ON TOP SIDE NO SHIM PLATES REQUIRED
8	L102x102x8	L51x38x5 (LLV)	–	ORANGE	BOTTOM HALF X-BRACED (2) 1/16" SHIM PLATES REQUIRED ON TOP SIDE OF SPLICE
9	L102x102x6	L51x38x5 (LLV)	–	WHITE	REGULAR BRACING NO SHIM PLATES REQUIRED
10	L102x102x6	L51x38x5 (LLV)	–	ORANGE	REGULAR BRACING (2) 1/16" SHIM PLATES REQUIRED ON BOTTOM SIDE OF SPLICE
11	L102x102x8	L51x38x5 (LLV)	–	WHITE	X-BRACING TORSION RESISTOR ON BOTTOM SIDE (2) 1/16" SHIM PLATES REQUIRED ON TOP SIDE OF SPLICE
12	L76x76x6	L51x38x5 (LLV)	–	ORANGE	X-BRACING
13	L76x76x6	L51x38x5 (LLV)	L51x51x5	WHITE	X-BRACING WITH ALL PANELS REINFORCED WITH SUB-HORIZONTALS
14	L76x76x6	L51x38x5 (LLV)	L51x51x5	ORANGE	SHORT SECTION X-BRACING WITH BOTTOM 2 PANELS REINFORCED WITH SUB-HORIZONTALS
15	L76x76x6	L51x38x5 (LLV)	–	WHITE	BOTTOM HALF X-BRACED. TR ON BOTTOM SIDE. DIAGONALS IN TORSION RESISTOR ARE L51x51x6
16	L76x76x6	L51x38x5 (LLV)	–	ORANGE	SHORT SECTION REGULAR BRACING
TOP OF TOWER					

## NOTES:

- PRIOR TO ERECTION AND REMEDIATION, THE CONTRACTOR IS TO IDENTIFY THE TOWER SECTIONS. CARE SHOULD BE TAKEN IF THE SECTIONS REQUIRE RELOCATION. ANY DAMAGE TO EXISTING SECTIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REMEDIATE.
- THE SECTIONS SHALL BE LABELED WITH TAGS. SOME SECTIONS ARE IDENTICAL AND THUS THE OBSTRUCTION MARKING SHOULD BE FOLLOWED TO ENSURE THE BANDS ARE CONTINUOUS.
- ORIENTATION SHALL BE OBSERVED TO ENSURE THAT THE BRACING IS IN A CONTINUOUS PATTERN AND THAT THE LADDER TABS ARE ON THE SAME FACE.
- AFTER IDENTIFICATION THE TOWER DIAGONALS SHALL BE INSPECTED AND REPLACED AS REQUIRED. THE TOWER ALSO REQUIRES NEW TORSION RESISTOR ASSEMBLIES TO BE INSTALLED DURING OR SHORTLY AFTER TOWER MAST ERECTION. SEE SHEET 16 AND SHEETS 18 TO 21 FOR DIAGONAL REPLACEMENT AND TORSION RESISTOR DETAILS, RESPECTIVELY.



## CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

## PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

SECTION IDENTIFICATION

				PROJECT NUMBER
				50273
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	SHEET
REV.	BY	DATE	DESCRIPTION	
				16

**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.

**NOTE:**  
BOLT QUANTITIES HAVE BEEN INCREASED BY 5%

BILL OF MATERIAL - SPLICE CONNECTION DETAILS			
MARK	QTY	DESCRIPTION	DWG NO.
#SP1	66	FB. 76x8mm SPLICE PLATE	F10
#SP2	114	FB. 51x6mm SPLICE PLATE	F10
#SH1	30	2mm THICK. SHIM PLATE	F10
#B3	416	5/8"φx2" lg. A325 BOLT ASSEMBLY	-
#B4	151	5/8"φx1-3/4" lg. A325 BOLT ASSEMBLY	-



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APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

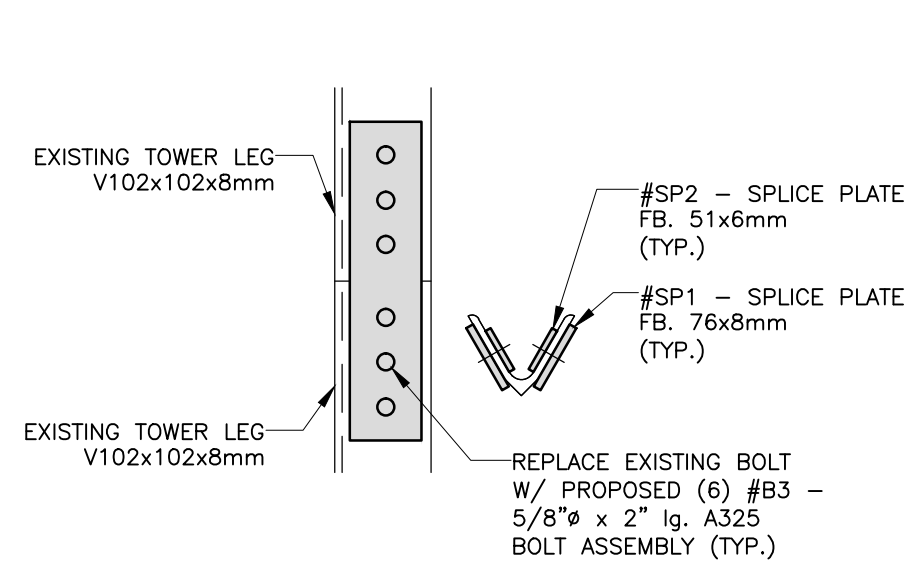
SPLICE CONNECTION DETAILS

PROJECT NUMBER

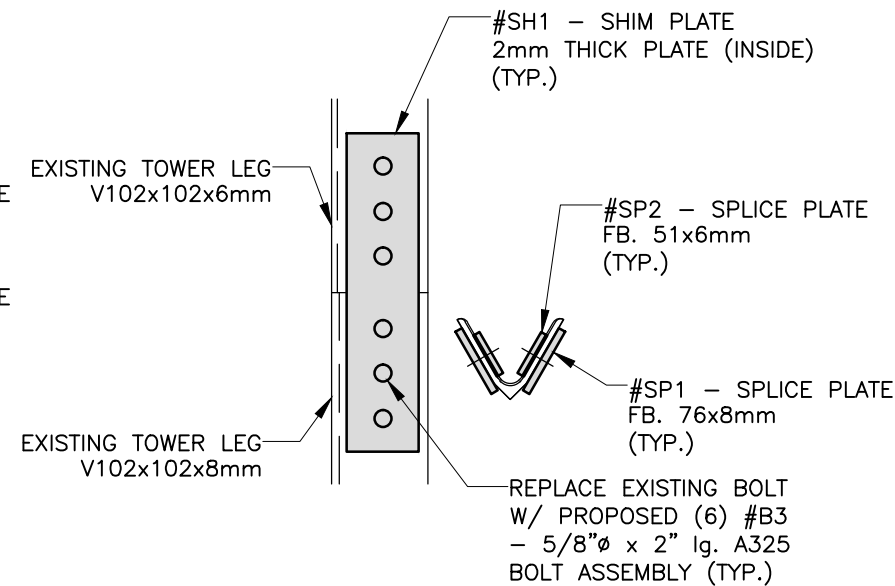
50273

SHEET

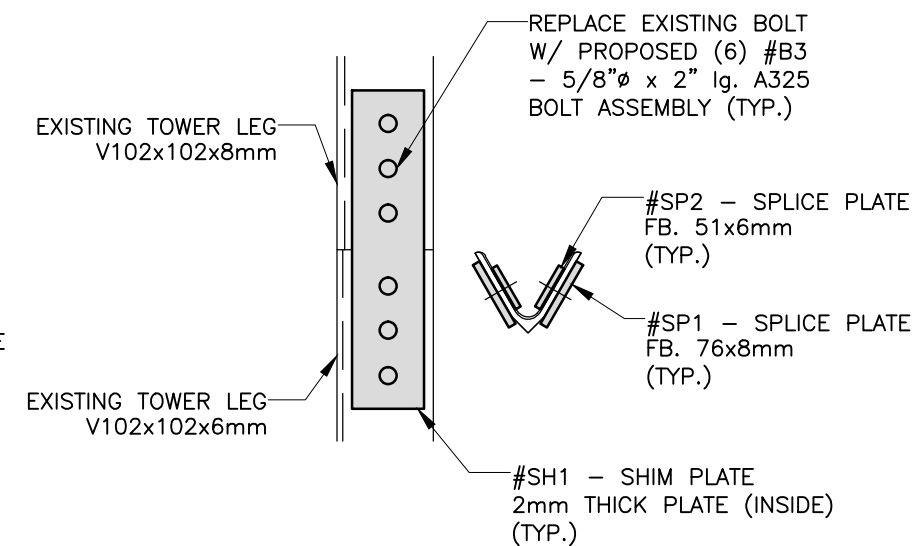
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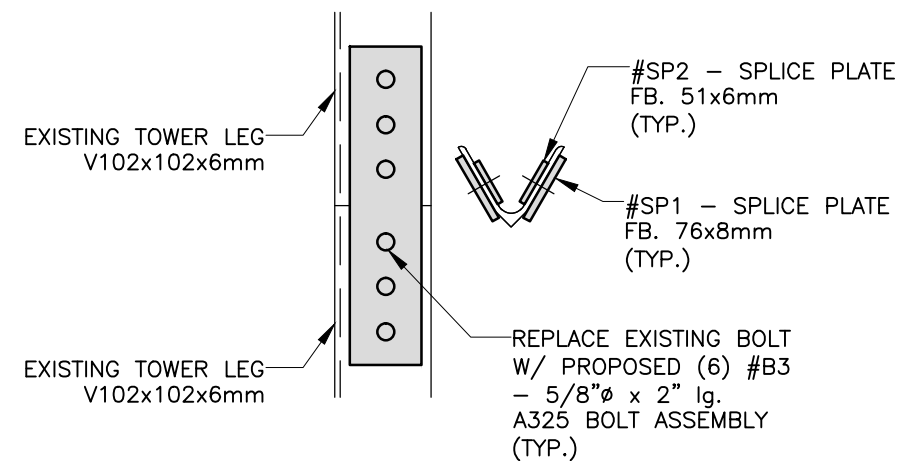
SECTIONS 1-2, 2-3 AND 7-8



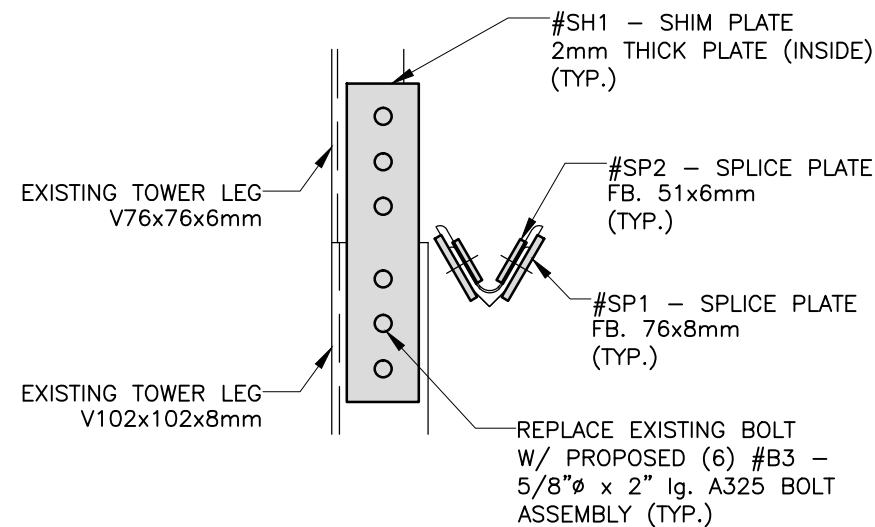
SECTIONS 3-4 AND 8-9



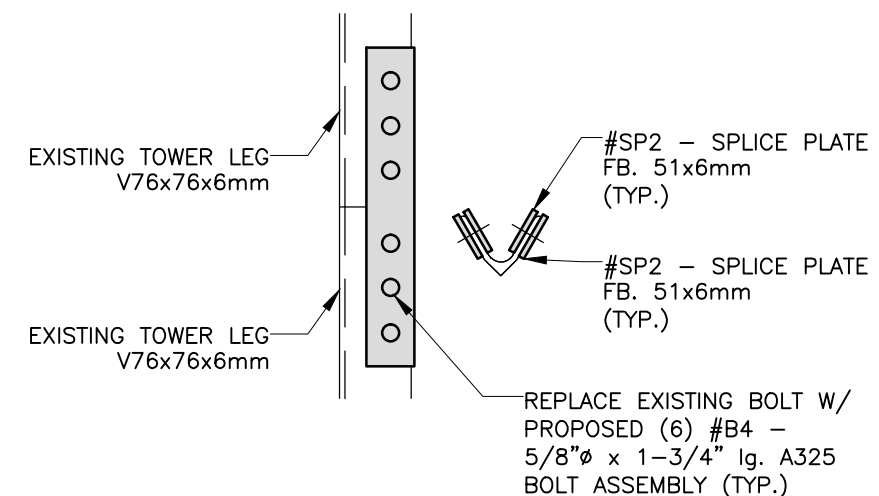
SECTIONS 6-7 AND 10-11



SECTIONS 4-5, 5-6 AND 9-10



SECTIONS 11-12



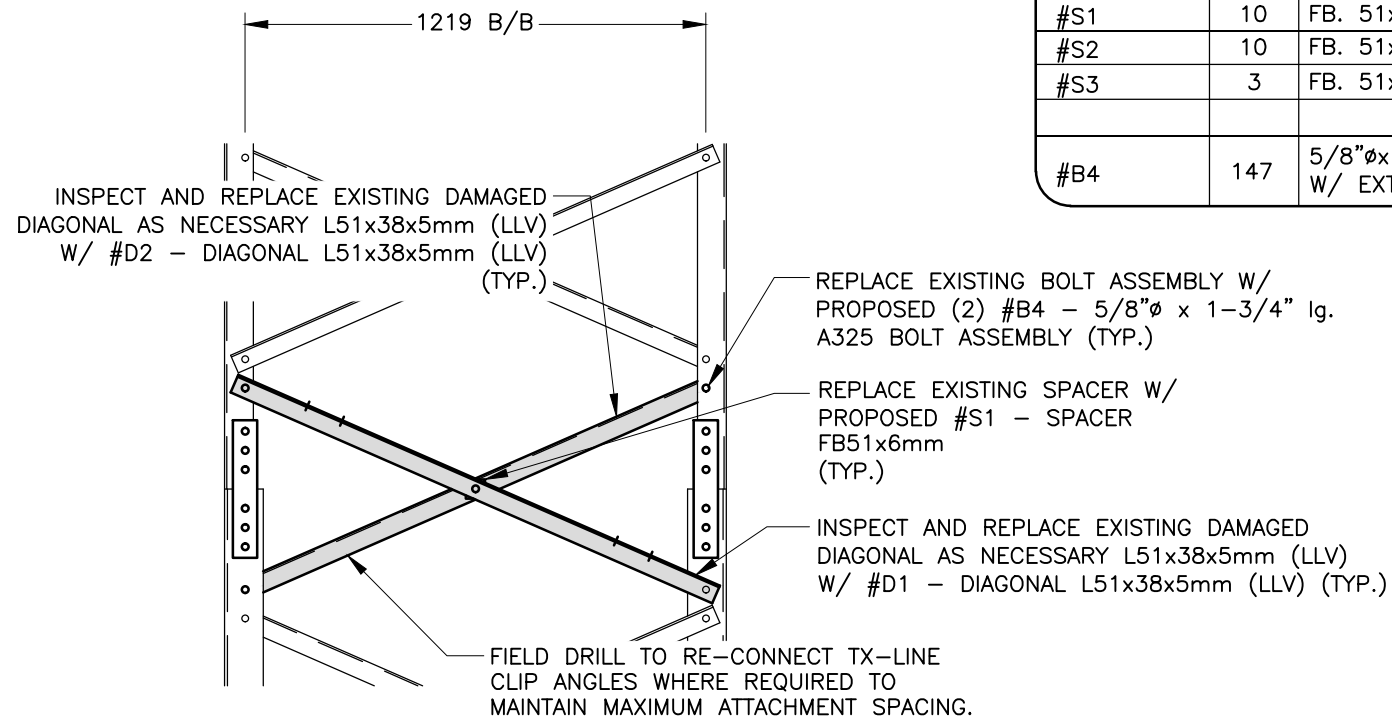
SECTIONS 12-13, 13-14, 14-15 AND 15-16

SPLICE CONNECTION DETAILS  
SCALE 1:8 (11x17" SHEET)

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

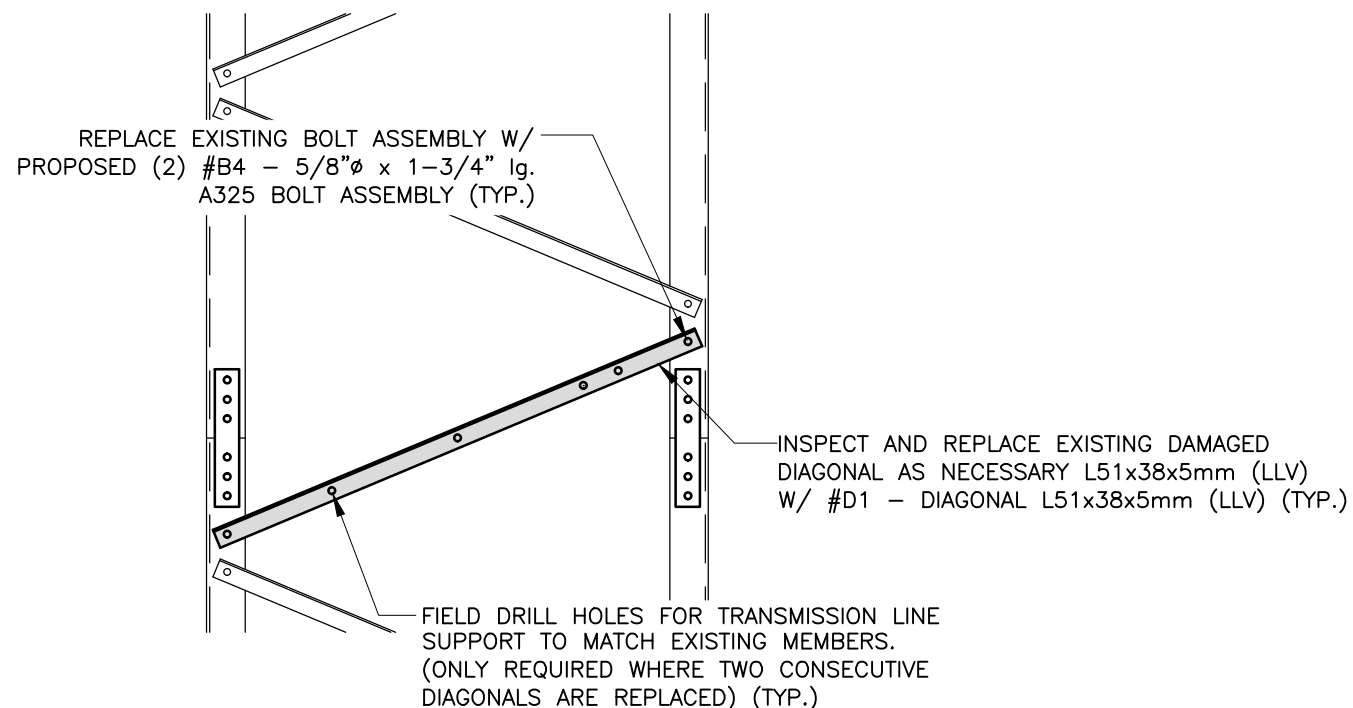
**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.



**X-BRACING – DIAGONAL REPLACEMENT**

SCALE 1:20 (11x17" SHEET)



**REGULAR BRACING – DIAGONAL REPLACEMENT**

SCALE 1:20 (11x17" SHEET)

BILL OF MATERIAL – DIAGONAL REPLACEMENT			
MARK	QTY	DESCRIPTION	DWG NO.
#D1	20	L51x38x5mm DIAGONAL (OUTSIDE)	F10
#D2	20	L51x38x5mm DIAGONAL (OUTSIDE OR INSIDE)	F10
#D3	1	L51x38x5mm DIAGONAL (OUTSIDE OR INSIDE)	F10
#S1	10	FB. 51x6mm SPACER PLATE	F11
#S2	10	FB. 51x10mm SPACER PLATE	F11
#S3	3	FB. 51x16mm SPACER PLATE	F11
#B4	147	5/8"φx1-3/4" lg. A325 BOLT ASS'Y W/ EXTRA WASHER	-

**NOTES:**

1. TYPICAL BENT DIAGONALS ARE THOSE ON THE TOP OF THE SECTIONS. TYPICAL DETAILS ARE SHOWN. THERE IS A SHORTER BENT MEMBER (#D3, NOT DETAILED BELOW) AT THE BASE OF SECTION 1 THAT REQUIRES REPLACEMENT
2. DUE TO RESTING POSITION OF TOWER, SOME DIAGONALS MAY BE BENT. CONTRACTOR IS TO REPLACE BENT MEMBERS AS REQUIRED.
3. BOLT QUANTITIES HAVE BEEN INCREASED BY 5%

BILL OF MATERIAL – DIAGONAL REPLACEMENT	
SECTION	DESCRIPTION
1-2	REGULAR BRACING
2-3	REGULAR BRACING
3-4	REGULAR BRACING
4-5	REGULAR BRACING
5-6	REGULAR BRACING
6-7	REGULAR BRACING
7-8	X-BRACING
8-9	REGULAR BRACING
9-10	REGULAR BRACING
10-11	X-BRACING
11-12	X-BRACING
12-13	X-BRACING
13-14	X-BRACING
14-15	X-BRACING
15-16	REGULAR BRACING



CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

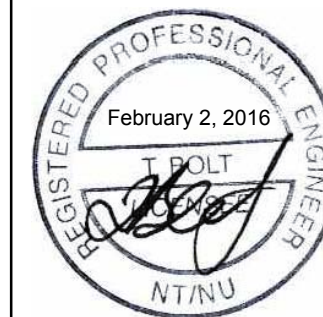
SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

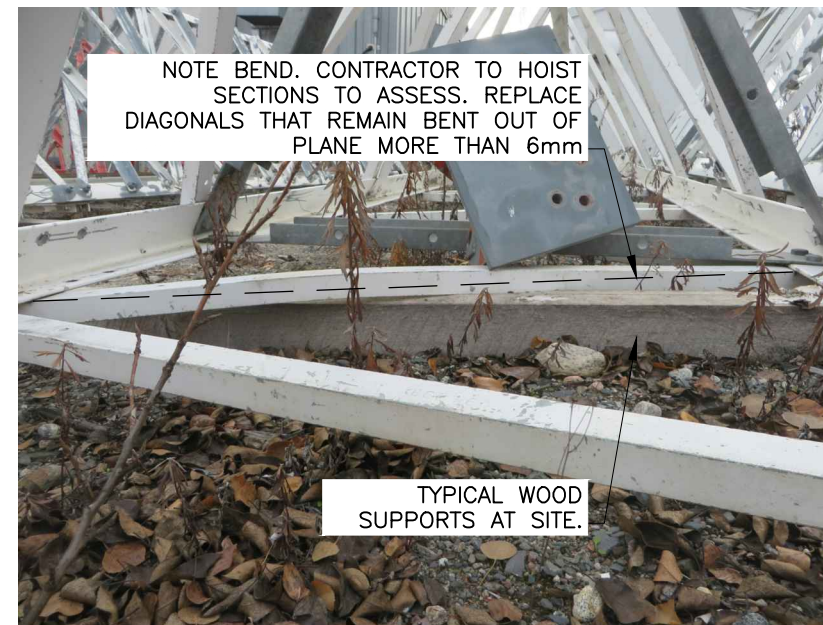
APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

DIAGONAL REPLACEMENT



**EXAMPLE OF BENT DIAGONAL**

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

PROJECT NUMBER

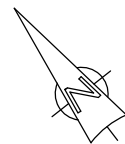
50273

SHEET

18

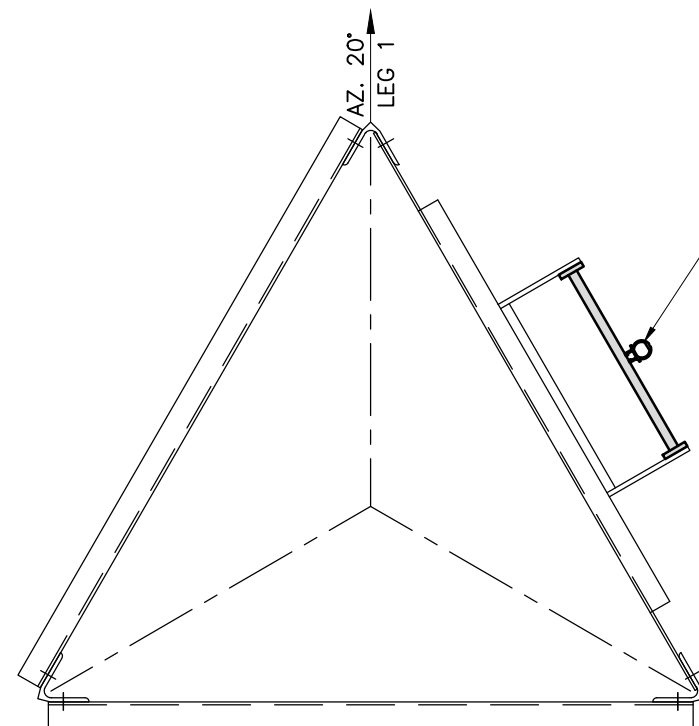
**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.



**NOTE:**  
BOLT QUANTITIES HAVE BEEN INCREASED BY 5%

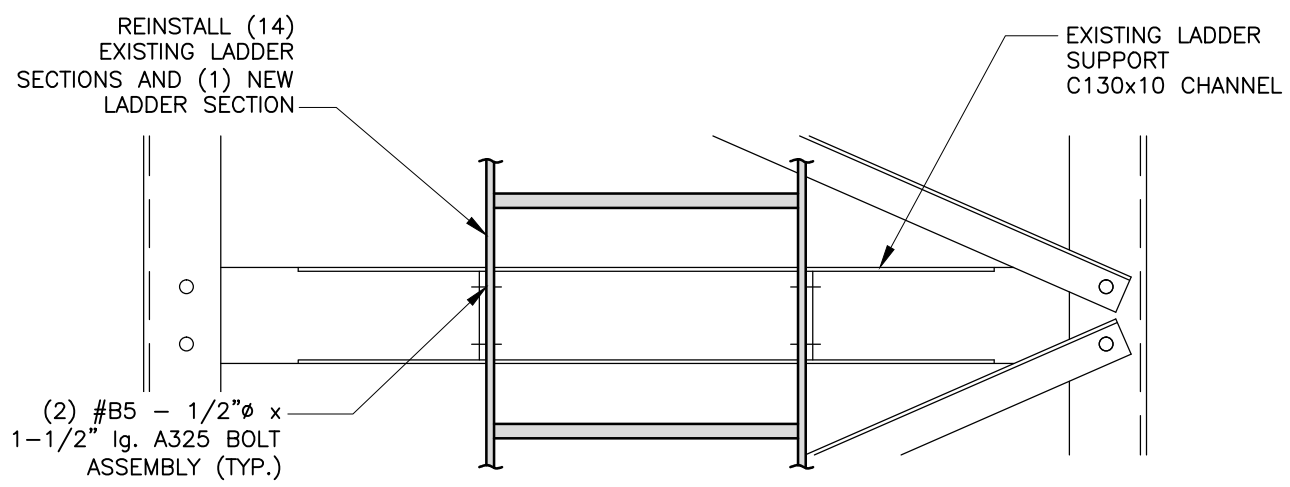
NEW LADDER SECTION MAY REQUIRE SOME MODIFICATION TO SUIT SITE CONDITIONS.



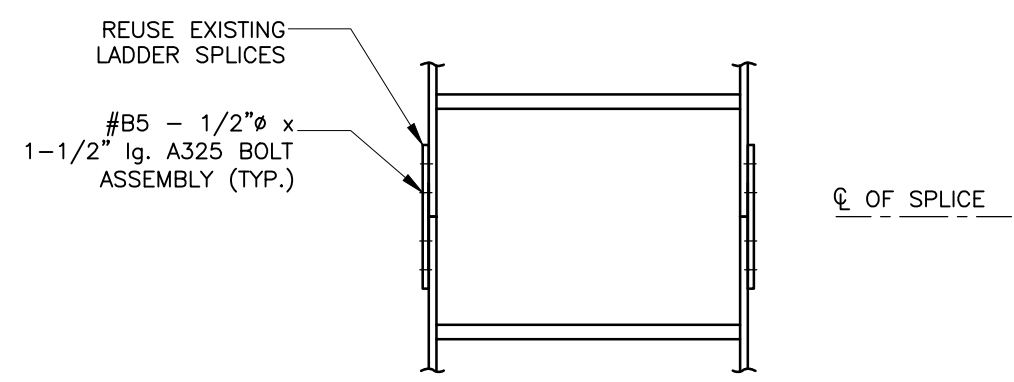
CONTRACTOR TO SUPPLY AND INSTALL 91.4m OF TRYLON SAFETY RAIL TO EXISTING 19mmØ SR LADDER AT SITE. ATTACHMENT METHOD AND CONNECTION SPACING TO BE PER MANUFACTURER RECOMMENDATIONS.

**PROPOSED SAFETY RAIL INSTALLATION**  
SCALE 1:15 (11x17" SHEET)

BILL OF MATERIAL – LADDER REFURBISHMENT AND ATTACHMENT			
MARK	QTY	DESCRIPTION	DWG NO.
#LD1	1	6.1m LADDER SECTION	F19
#B5	248	1/2"Ø x 1-1/2" lg. A325 BOLT ASSEMBLY	–



**LADDER SUPPORT DETAIL**  
(TYP. 3 PLACES PER LADDER SECTION)  
SCALE 1:10 (11x17" SHEET)



**LADDER TO LADDER CONNECTION**  
SCALE 1:10 (11x17" SHEET)

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



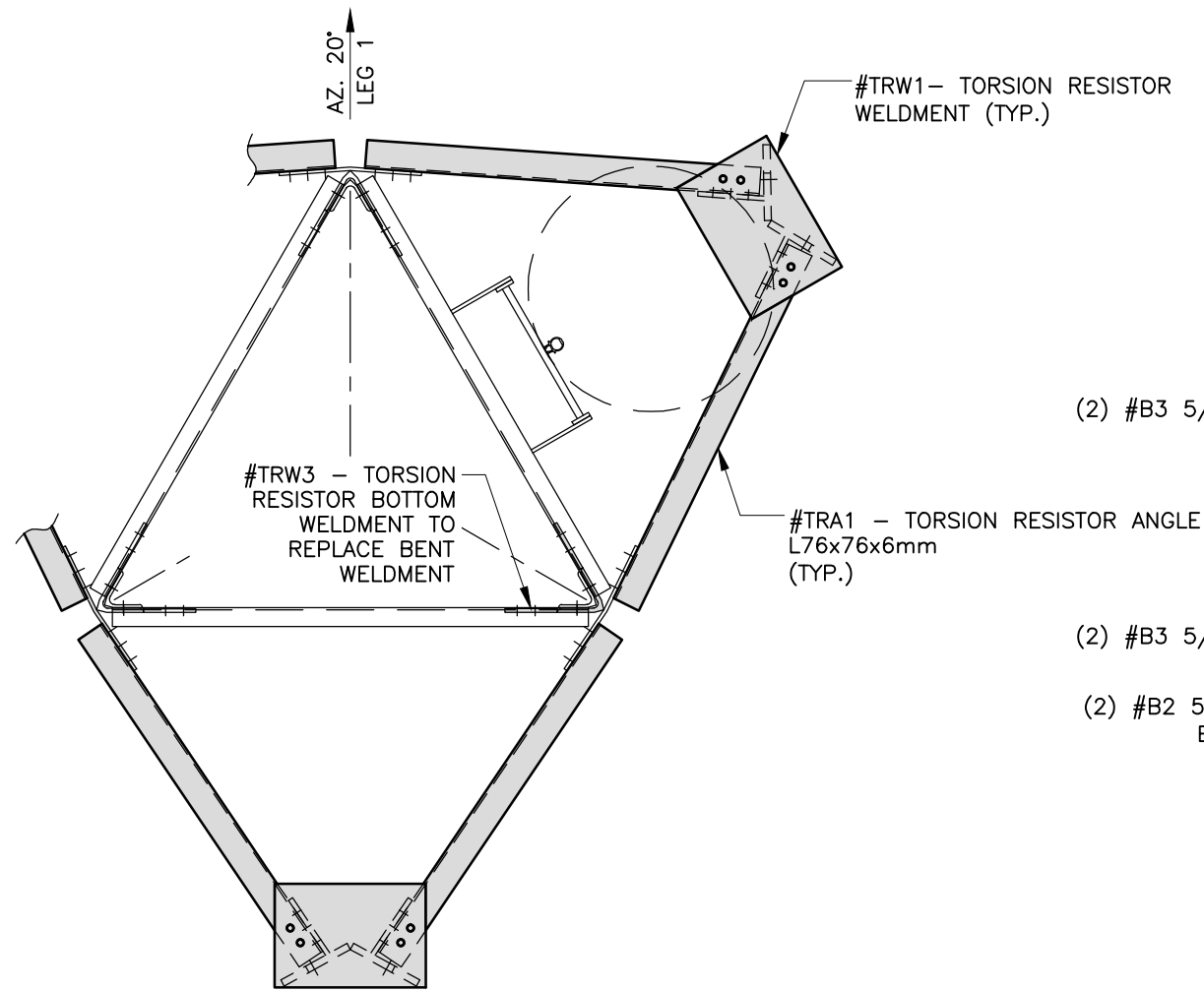
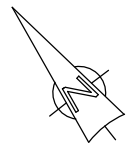
DRAWING TITLE  
LADDER AND RAIL ASSEMBLY

				PROJECT NUMBER
				50273
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	SHEET 19
REV.	BY	DATE	DESCRIPTION	

**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.

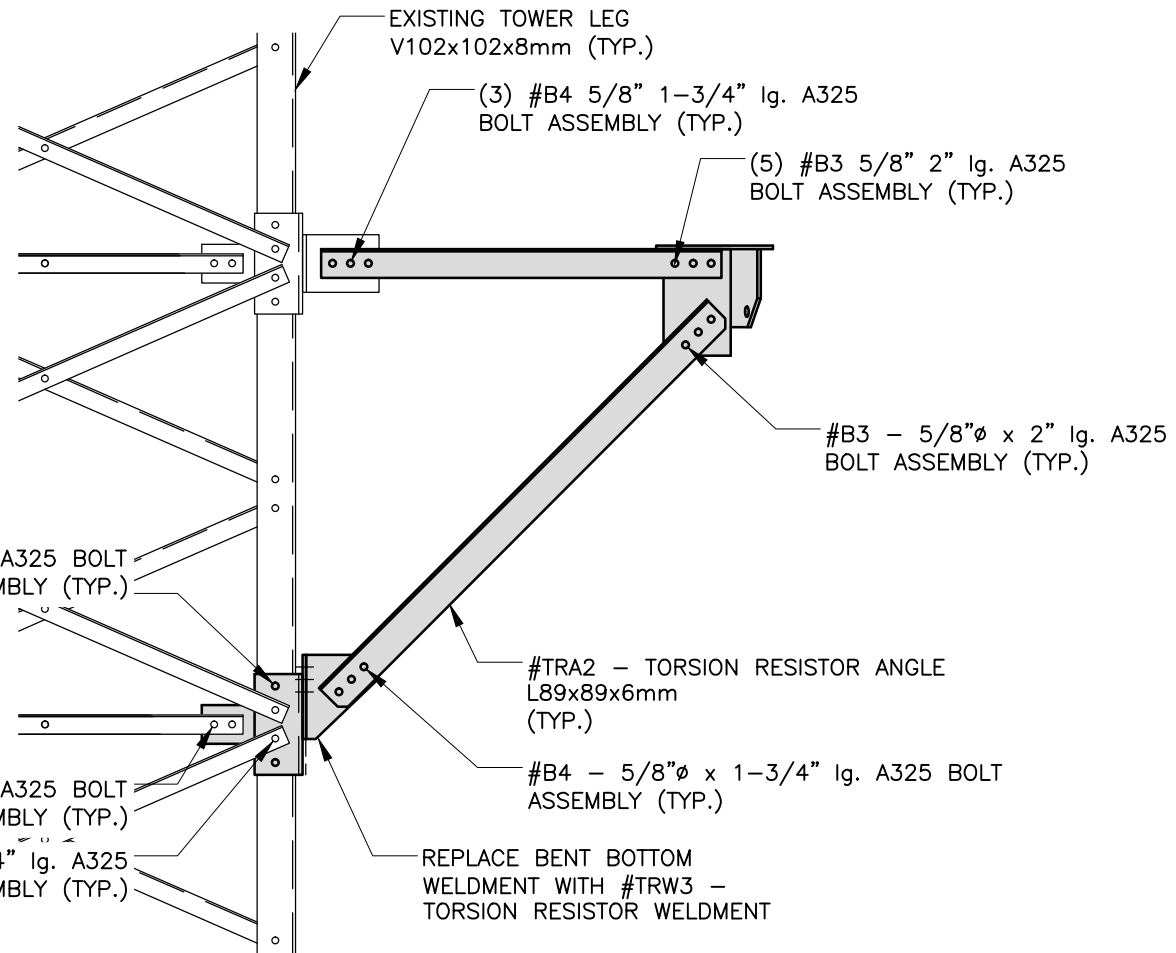
CONTRACTOR TO SUPPLY AND INSTALL OBSTRUCTION SIGNAGE ABOVE AND BELOW TORSION RESISTOR TO MEET RCMP CSS REQUIREMENTS AS THE CLIMBING CIRCLE HAS BEEN IMPACTED.



PLAN VIEW

PROPOSED TORSION RESISTOR AT EL. 63.4m  
SCALE 1:20 (11x17" SHEET)

BILL OF MATERIAL - PROPOSED TORSION RESISTOR AT EL. 63.4m			
MARK	QTY	DESCRIPTION	DWG NO.
#TRW1	3	TORSION RESISTOR WELDMENT	F11
#TRW3	1	TORSION RESISTOR BOTTOM WELDMENT	F13
#TRA1	6	L76x76x6mm TORSION RESISTOR ANGLE	F15
#TRA2	6	L89x89x6mm TORSION RESISTOR ANGLE	F15
#B2	4	5/8"φ x 2-1/4" lg. A325 BOLT ASSEMBLY	-
#B3	56	5/8"φ x 2" lg. A325 BOLT ASSEMBLY	-
#B4	36	5/8"φ x 1-3/4" lg. A325 BOLT ASSEMBLY	-



ELEVATION



CLIENT INFORMATION



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ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

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PTN

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ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

PROPOSED TORSION RESISTOR  
AT EL. 63.4m

PROJECT NUMBER

50273

SHEET

20

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.

BILL OF MATERIAL – PROPOSED TORSION RESISTOR AT EL. 84.7m			
MARK	QTY	DESCRIPTION	DWG NO.
#TRW2	3	TORSION RESISTOR WELDMENT	F16
#TRA3	6	L89x89x6mm TORSION RESISTOR ANGLE	F18
#TRA4	6	L89x89x6mm TORSION RESISTOR ANGLE	F18
#TRA5	6	L89x89x6mm TORSION RESISTOR ANGLE	F18
#S2	6	FB. 89x13x89mm lg. SPACER PLATE	F19
#SH2	6	FB. 89x3mm SHIM PLATE	F19
#B3	60	5/8"φ x 2" lg. A325 BOLT ASSEMBLY	–
#B4	18	5/8"φ x 1-3/4" lg. A325 BOLT ASSEMBLY	–



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PROJECT MANAGER

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ROBERT MOSS, P.ENG.

APPROVED BY:  
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ENGINEERING SEAL



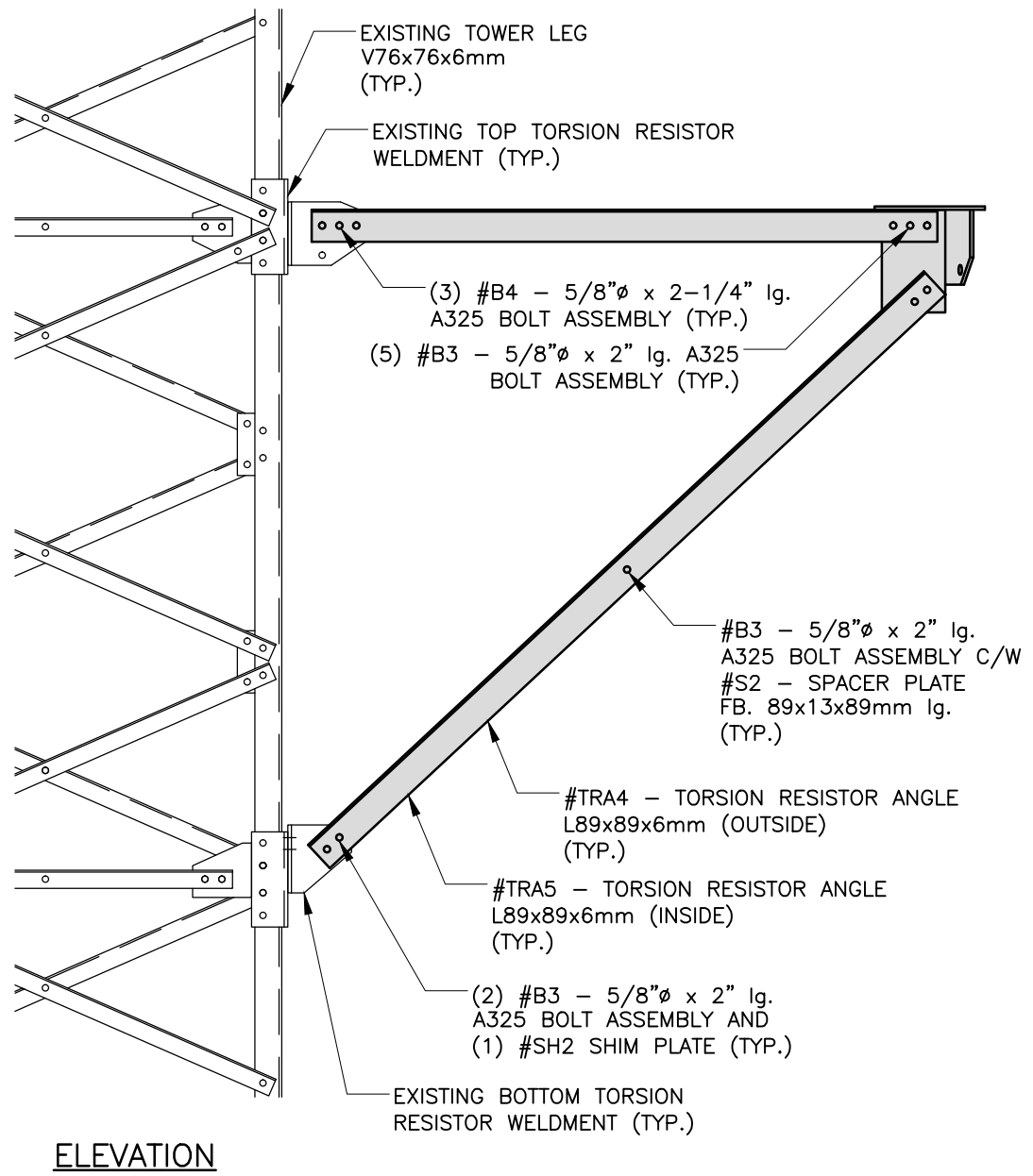
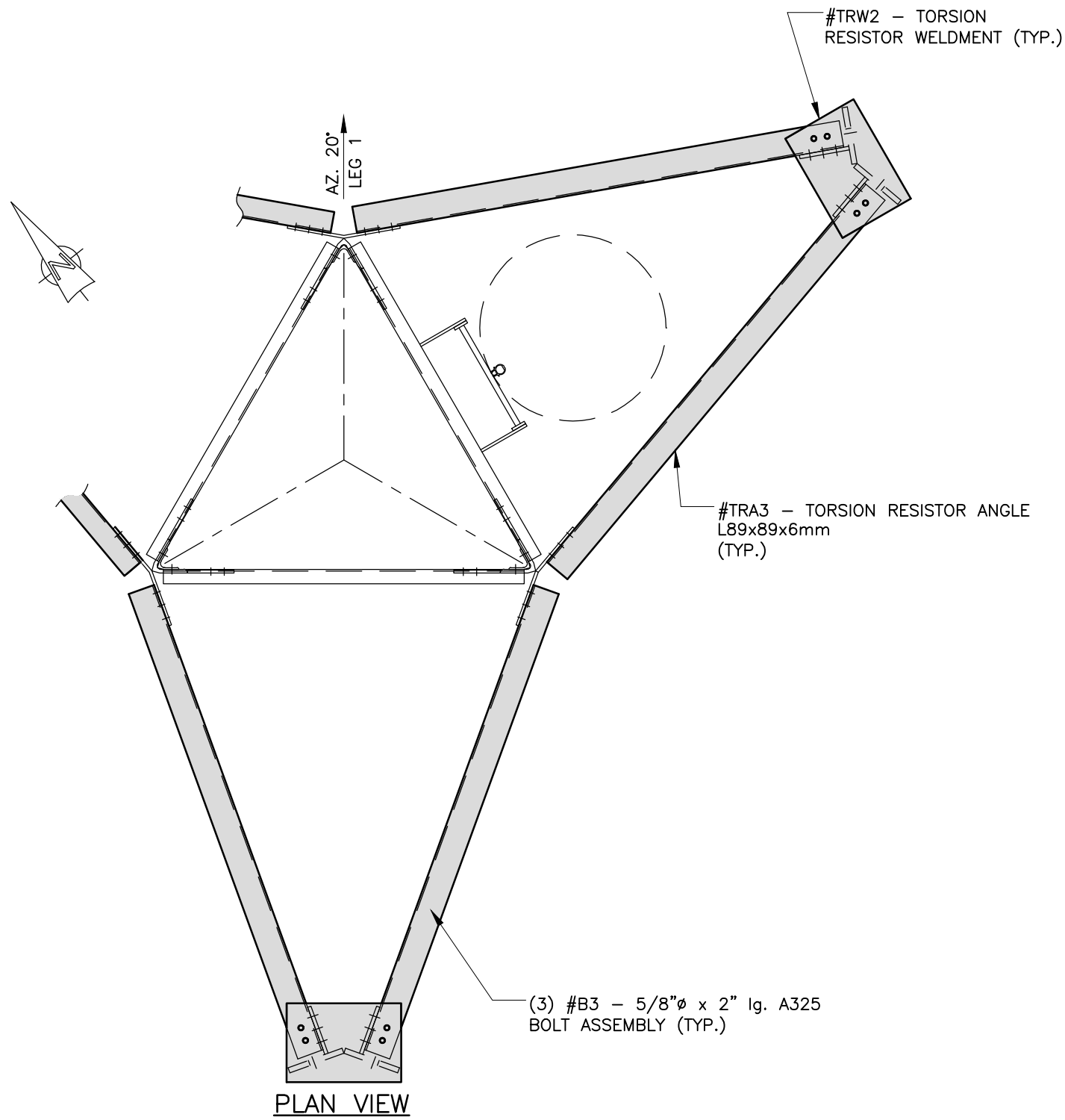
DRAWING TITLE

PROPOSED TORSION RESISTOR AT EL. 84.7m

PROJECT NUMBER

50273

SHEET 21



PROPOSED TORSION RESISTOR AT EL. 84.7m  
SCALE 1:20 (11x17" SHEET)

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

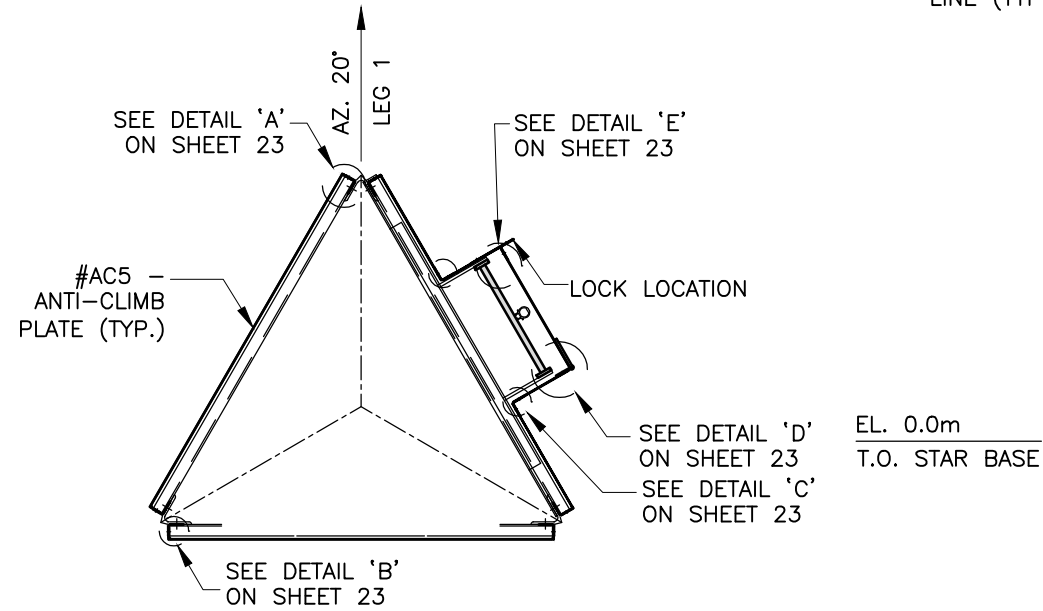
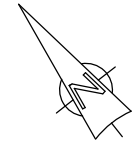
**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.

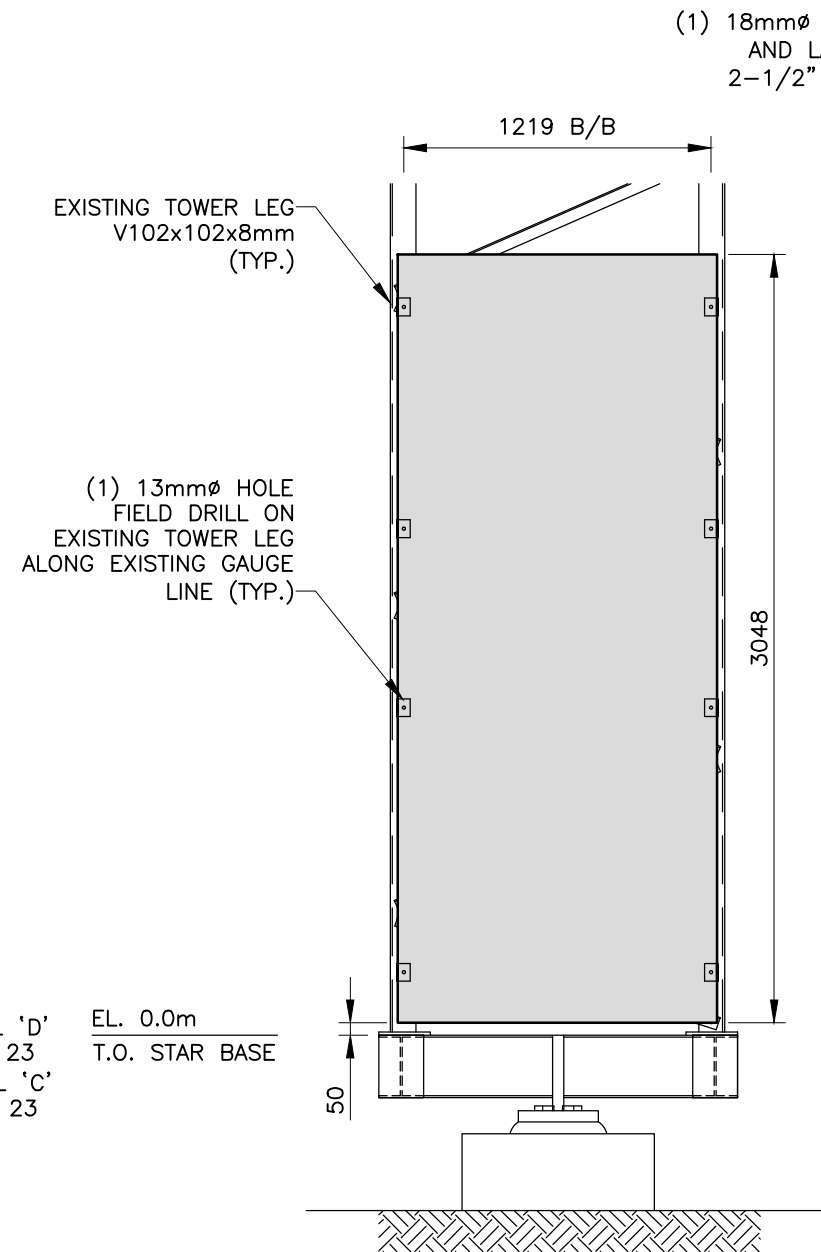
**NOTES:**

POSITIONING OF LOCK, HINGE AND ATTACHMENTS ARE TO SUIT EXISTING CONDITIONS ON SITE.

PROPOSED TRANSMISSION LINE ROUTING WILL REQUIRE ADJUSTMENT AT TOWER BASE TO SUIT ANTI-CLIMB INSTALLATION.

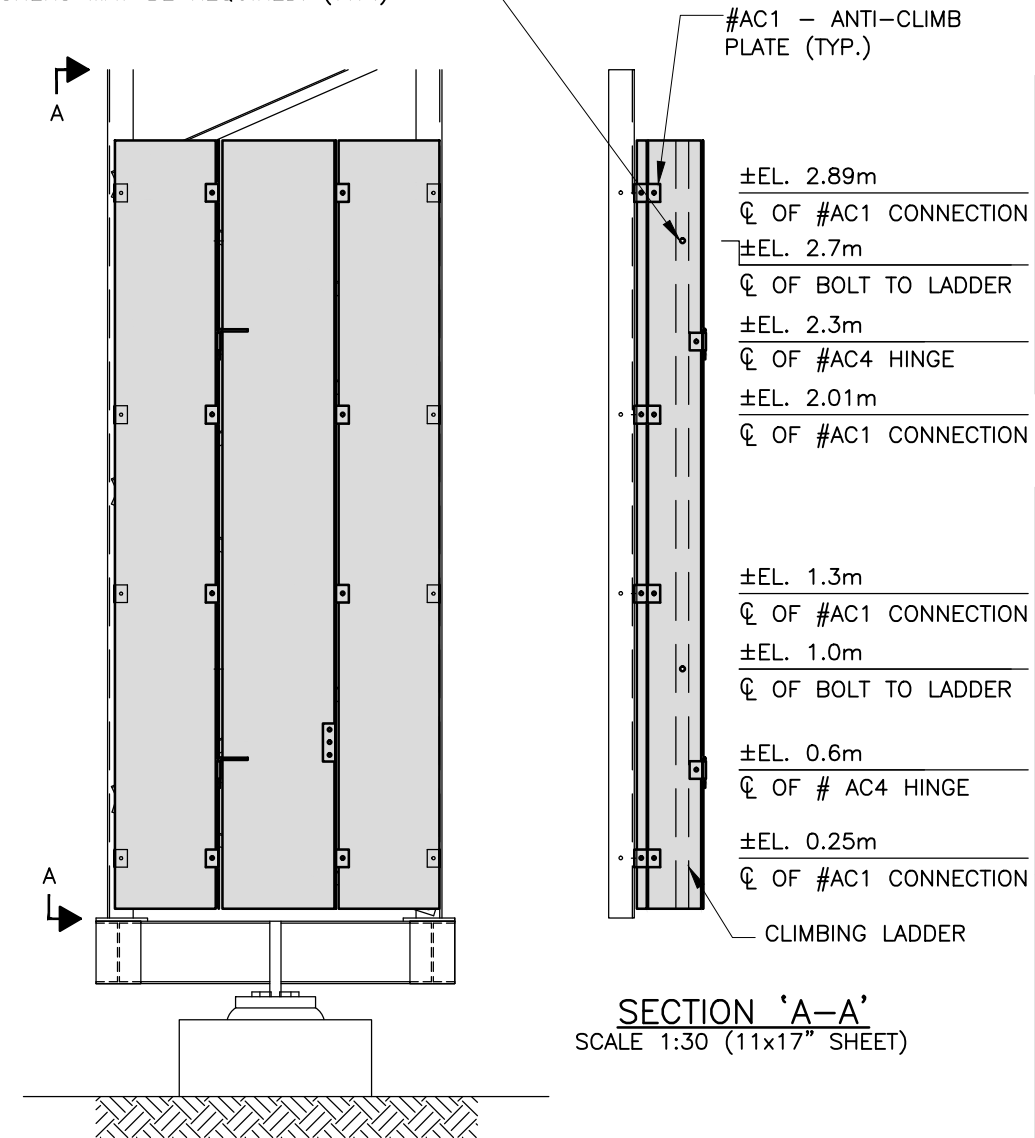


**ANTI-CLIMB - PLAN VIEW**  
SCALE 1:25 (11x17" SHEET)



**ANTI-CLIMB - ELEVATION VIEW**  
**<<FACE 2 AND 3>>**  
SCALE 1:30 (11x17" SHEET)

(1) 18mmØ HOLE FIELD DRILL THROUGH ON #AC3 AND LADDER SUPPORT FOR #B1 - 5/8"Ø x 2-1/2" lg. A325 BOLT ASSEMBLY. ADDITIONAL WASHERS MAY BE REQUIRED. (TYP.)



**ANTI-CLIMB - ELEVATION VIEW**  
**<<FACE 1>>**  
SCALE 1:30 (11x17" SHEET)

**SECTION 'A-A'**  
SCALE 1:30 (11x17" SHEET)



CLIENT INFORMATION



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ERIC GLYNN  
PROJECT MANAGER

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PROJECT TITLE:  
TOWER REMEDIATION AND INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

ANTI-CLIMB INSTALLATION  
(1 OF 2)

PROJECT NUMBER

50273

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

SHEET

22

**NOTE:**  
CONTRACTOR TO SUPPLY ADDITIONAL WASHERS FOR 1/2" AND 5/8" BOLTS.

**NOTE:**  
TAKE CARE TO POSITION #AC3 TO ENSURE BOLT #B1 IS ADEQUATE TO CONNECT TO EXISTING LADDER RUNG.

BILL OF MATERIAL - ANTI-CLIMB			
MARK	QTY	DESCRIPTION	DWG NO.
#AC1	32	ANTI-CLIMB PLATE	F20
#AC2	2	ANTI-CLIMB PLATE	F20
#AC3	2	ANTI-CLIMB PLATE	F20
#AC4	2	ANTI-CLIMB WELDMENT	F21
#AC5	2	ANTI-CLIMB PLATE	F21
#AC6	1	ANTI-CLIMB WELDMENT	F22
#AC7	1	ANTI-CLIMB PLATE	F22
#AC8	1	ANTI-CLIMB PLATE	F22
#SC1	72	GALVANIZED SELF-TAPPING SHEET METAL SCREW	-
#B1	2	5/8"φ x 2-1/2" lg. A325 BOLT ASSEMBLY W/ ADDITIONAL WASHERS	-
#B5	32	1/2"φ x 1-1/2" lg. A325 BOLT ASSEMBLY	-
-	2	COTTER PIN	-



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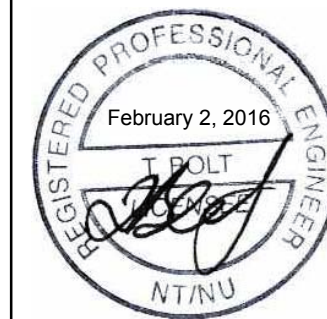
SITE NAME:  
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ENGINEERING SEAL



DRAWING TITLE

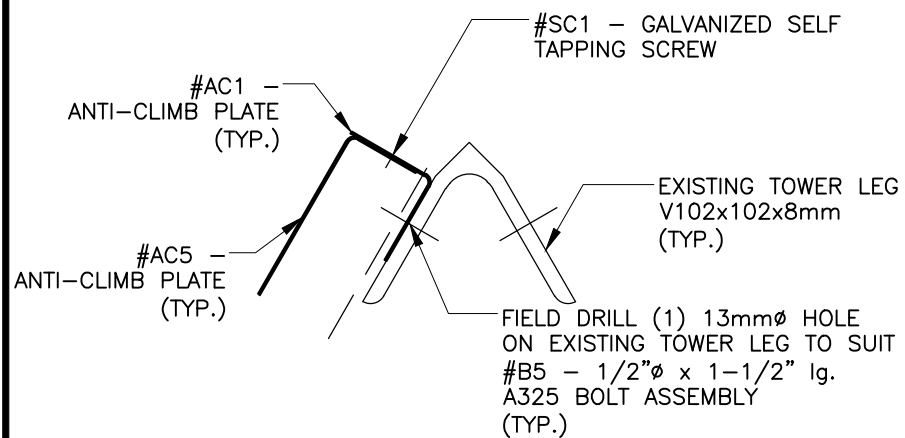
ANTI-CLIMB INSTALLATION  
(2 OF 2)

PROJECT NUMBER

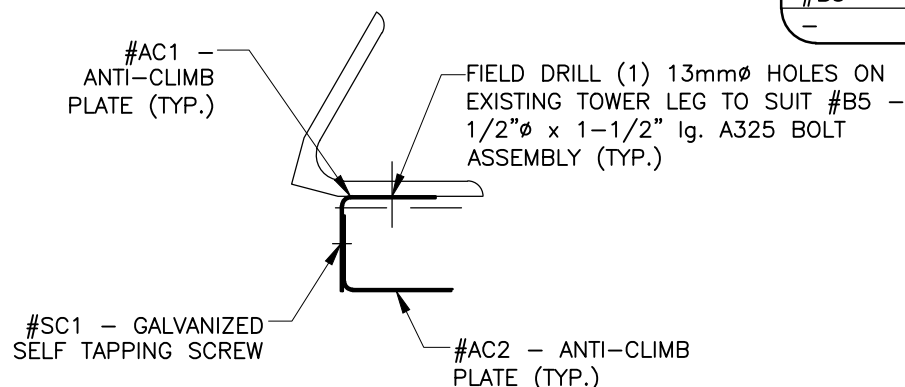
50273

SHEET

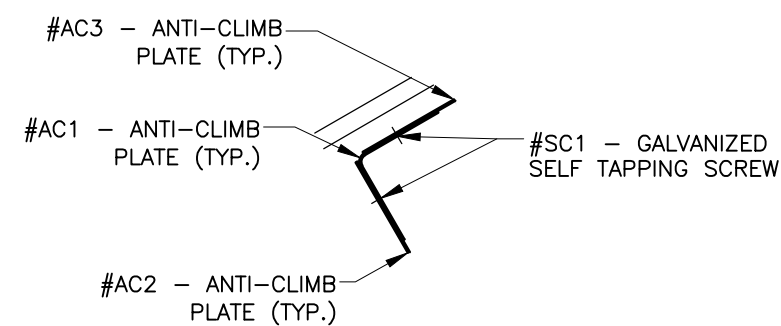
23



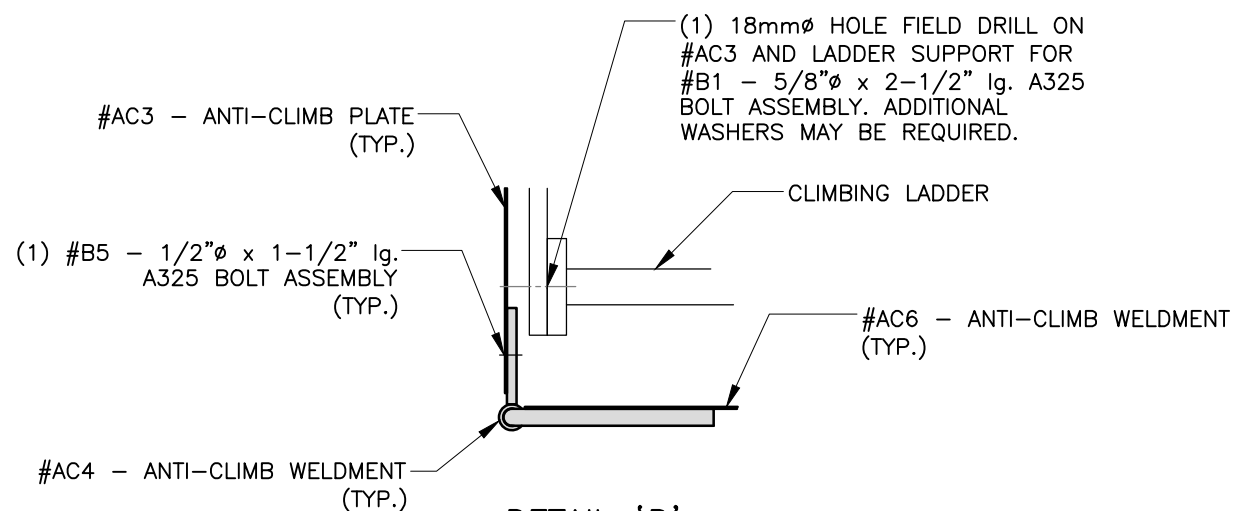
DETAIL 'A'  
SCALE 1:4 (11x17" SHEET)



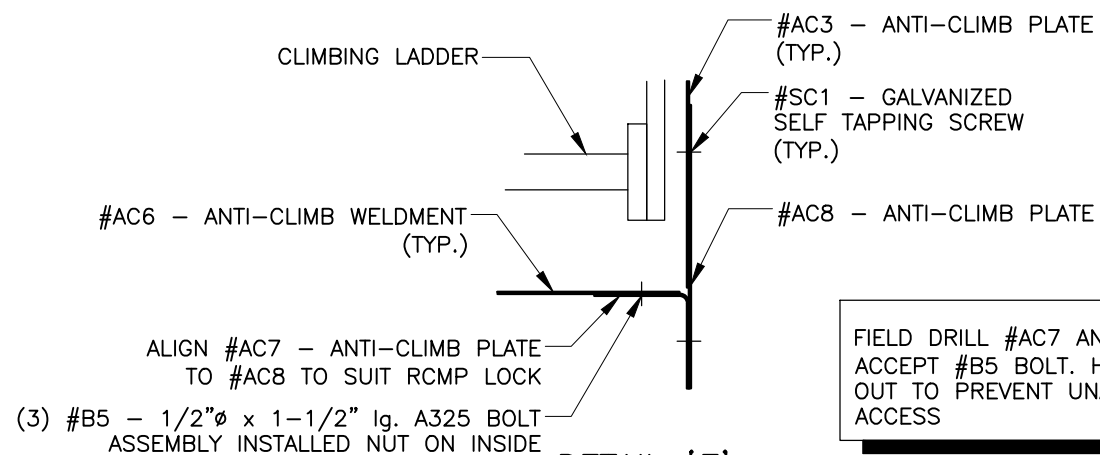
DETAIL 'B'  
SCALE 1:4 (11x17" SHEET)



DETAIL 'C'  
SCALE 1:4 (11x17" SHEET)



DETAIL 'D'  
SCALE 1:4 (11x17" SHEET)



DETAIL 'E'  
SCALE 1:4 (11x17" SHEET)

FIELD DRILL #AC7 AND #AC8 TO ACCEPT #B5 BOLT. HEADS TO FACE OUT TO PREVENT UNAUTHORIZED ACCESS

DETAIL 'D' AND 'E' ROTATED FOR CLARITY

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION



**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.

**NOTE:**  
TX-LINES NOT SHOWN FOR CLARITY.

**BILL OF MATERIALS - PROPOSED ANTENNA MOUNT AT EL. 91.4m**

MARK	QTY	DESCRIPTION	DRAWING
#FM1	2	L102x102x10 FACEMOUNT	F23
#CL1	4	L152x102x10mm CLIP ANGLE	F23
#PM1	1	HSS 89øx8x3048mm lg. PIPEMOUNT	F23
#PM2	1	HSS 60øx5x1829mm lg. PIPEMOUNT	F23
#U13-60	4	13mmø U-BOLT ASSEMBLY (FITS 60mmø)	F24
#U13-89	4	13mmø U-BOLT ASSEMBLY (FITS 89mmø)	F24
#B3	16	5/8"ø x 2" lg. A325 BOLT ASSEMBLY	-



**CLIENT INFORMATION**



**CLIENT PROJECT MANAGER:**  
ERIC GLYNN  
PROJECT MANAGER

**PROJECT INFORMATION**

**PROJECT TITLE:**  
TOWER REMEDIATION AND  
INSTALLATION

**SITE NAME:**  
PTARMIGAN, NT

**DRAWN BY:**  
PTN

**DESIGNED BY:**  
ROBERT MOSS, P.ENG.

**APPROVED BY:**  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

PROPOSED ANTENNA MOUNT  
AT EL. 91.4m

PROJECT NUMBER

50273

SHEET

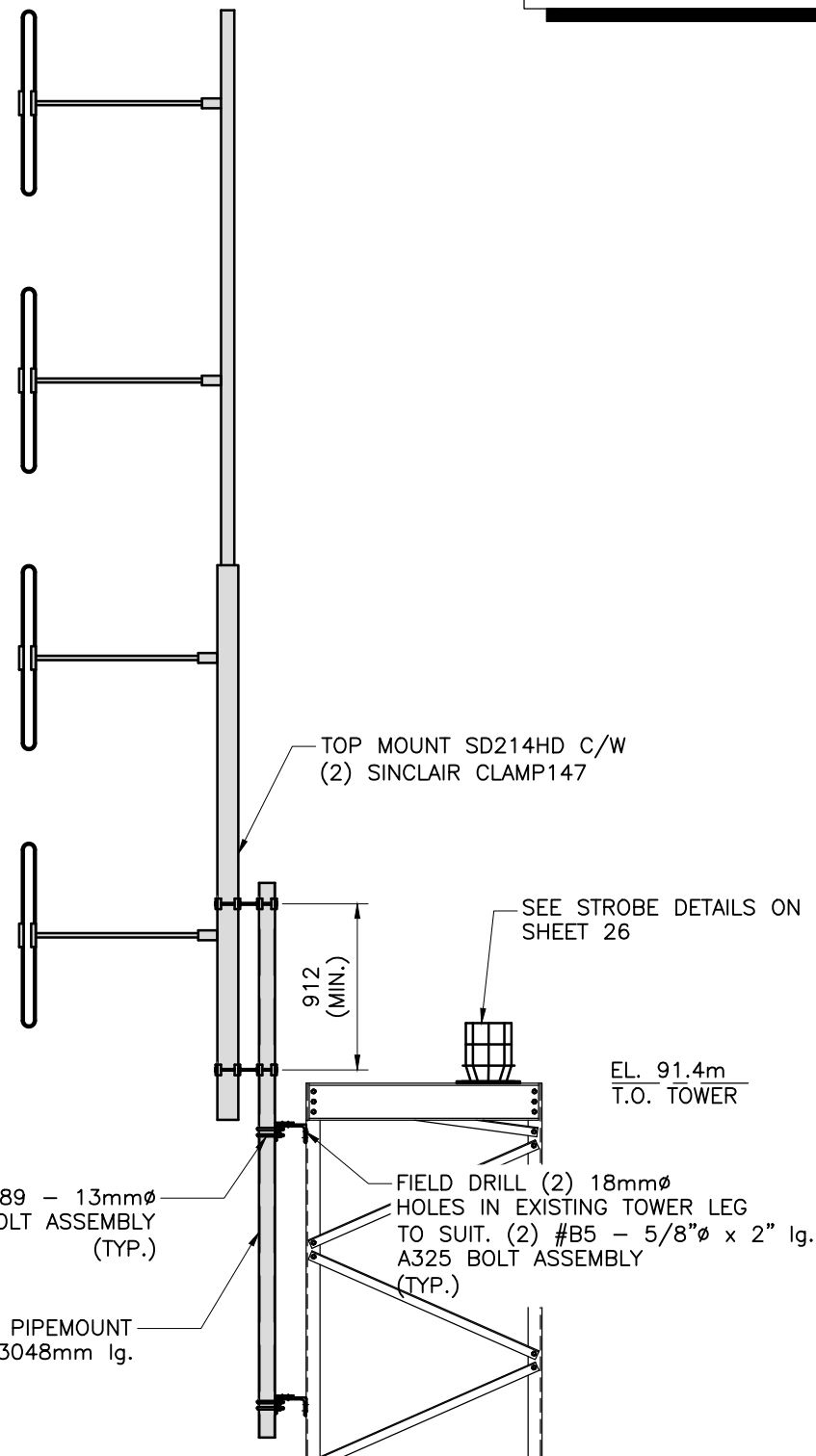
24

EL. 94.5m  
CL OF ANTENNA

1

EL. 91.1m  
TOP BOOM

EL. 89.6m  
BOTTOM BOOM



**ELEVATION VIEW**

SCALE 1:40 (11x17" SHEET)

**PROPOSED ANTENNA MOUNT AT EL. 91.4m**

PROPOSED  
SY206EB ANTENNA  
C/W (1) SINCLAIR CLAMP008

#PM2 - PIPEMOUNT  
HSS 60øx5x1829mm lg.

(2) #B3 - 5/8"ø x 2" lg.  
A325 BOLT ASSEMBLY  
(TYP.)

#FM1 - FACE MOUNT  
L102x102x10mm  
(TYP.)

#PM1 - PIPEMOUNT  
HSS 89øx8x3048mm lg.

#CL1 - CLIP ANGLE  
L152x102x10mm (LLH)  
(TYP.)

#SB1 - STROBE BASE PLATE  
10mm THICK

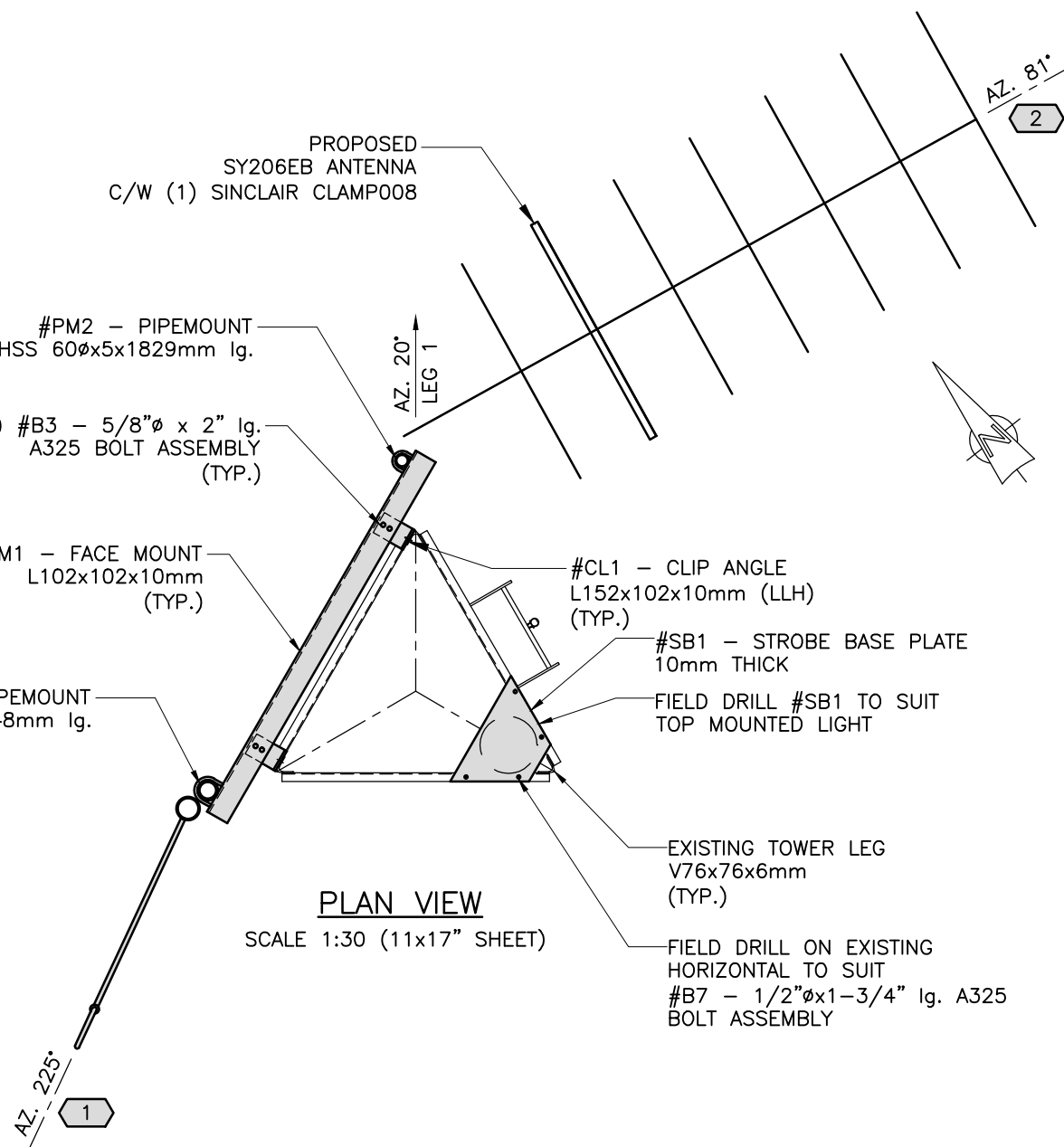
FIELD DRILL #SB1 TO SUIT  
TOP MOUNTED LIGHT

EXISTING TOWER LEG  
V76x76x6mm  
(TYP.)

FIELD DRILL ON EXISTING  
HORIZONTAL TO SUIT  
#B7 - 1/2"øx1-3/4" lg. A325  
BOLT ASSEMBLY

**PLAN VIEW**

SCALE 1:30 (11x17" SHEET)



REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

**LEGEND:**

SHADED AREAS INDICATE ELEMENTS INCLUDED IN THIS SCOPE.

**NOTE:**  
TX-LINES NOT SHOWN FOR CLARITY.

**BILL OF MATERIALS – PROPOSED ANTENNA MOUNT AT EL. 61.0m, 42.7m**

MARK	QTY	DESCRIPTION	DRAWING
#PM3	2	HSS 60Øx5x600mm lg. PIPEMOUNT	F24



**CLIENT INFORMATION**



**CLIENT PROJECT MANAGER:**  
ERIC GLYNN  
PROJECT MANAGER

**PROJECT INFORMATION**

**PROJECT TITLE:**  
TOWER REMEDIATION AND INSTALLATION

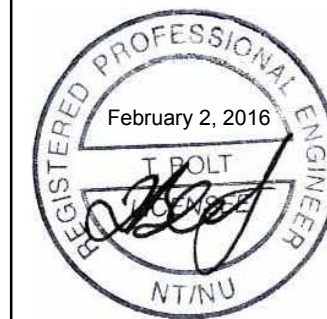
**SITE NAME:**  
PTARMIGAN, NT

**DRAWN BY:**  
PTN

**DESIGNED BY:**  
ROBERT MOSS, P.ENG.

**APPROVED BY:**  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

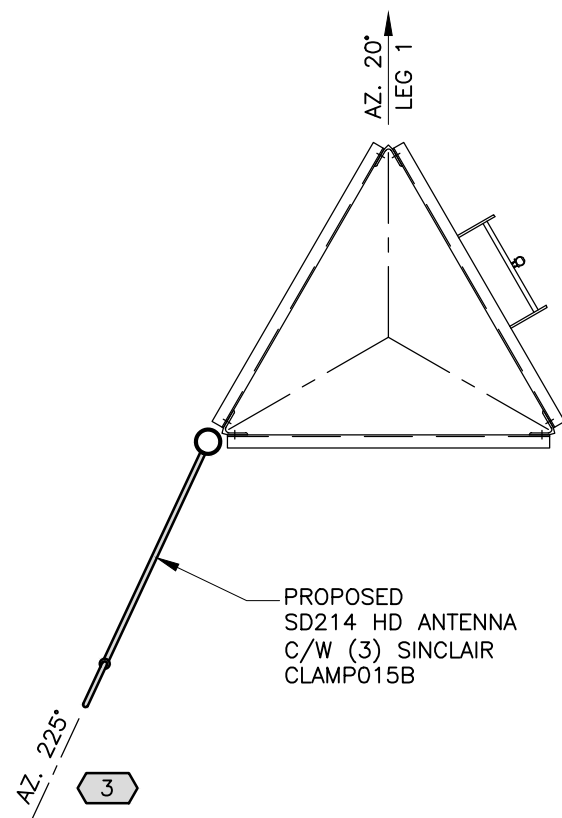
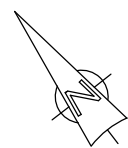
PROPOSED ANTENNAS AT EL. 88.4m, 61.0m AND 42.7m

PROJECT NUMBER

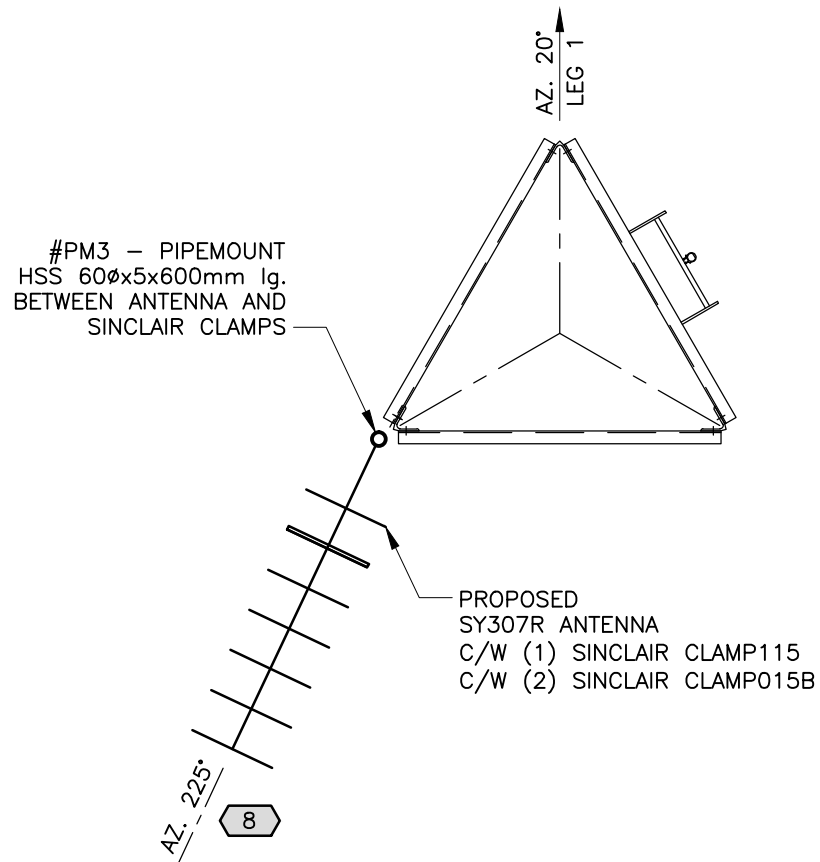
50273

SHEET

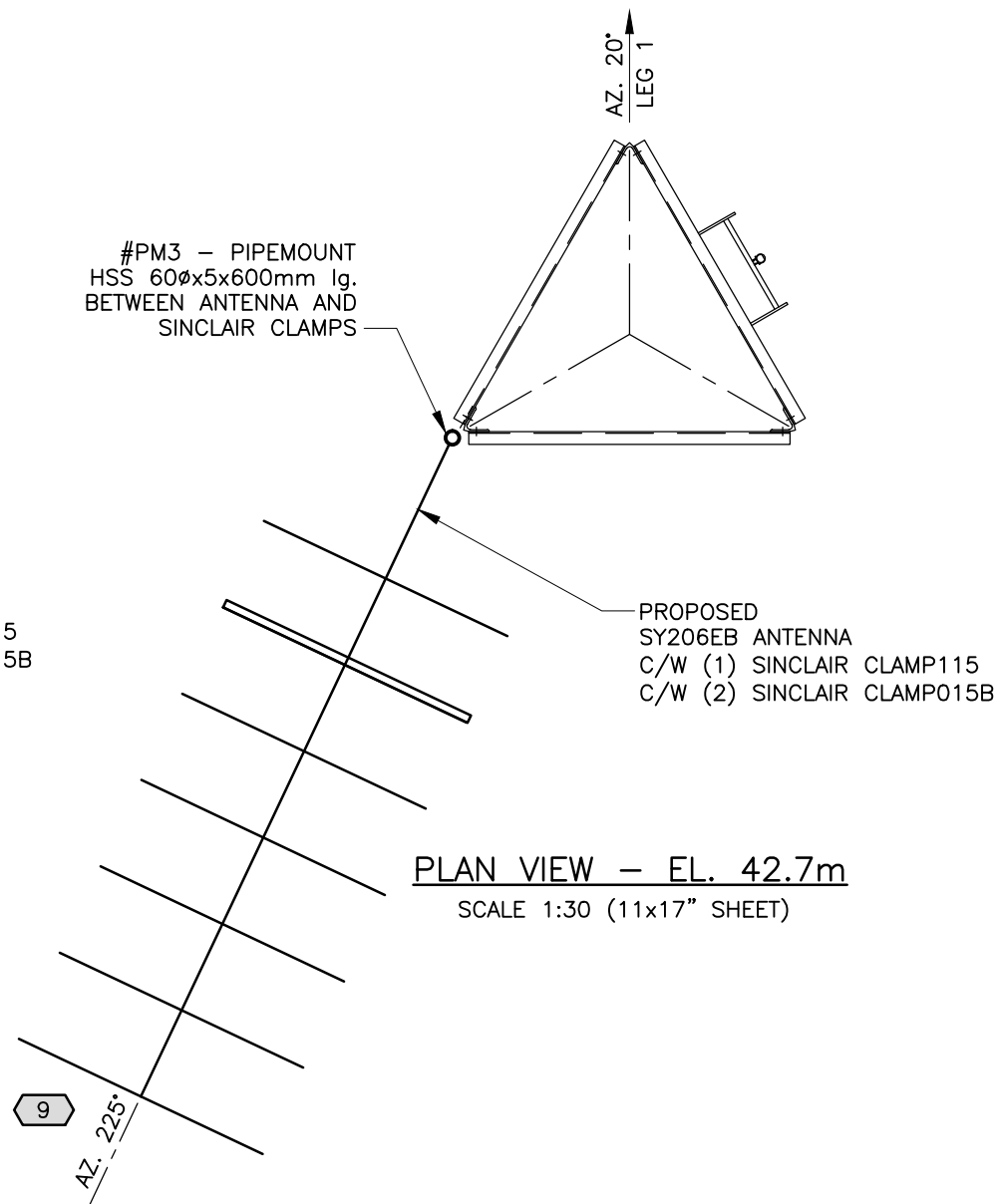
25



**PLAN VIEW – EL. 88.4m**  
SCALE 1:30 (11x17" SHEET)



**PLAN VIEW – EL. 61.0m**  
SCALE 1:30 (11x17" SHEET)



**PLAN VIEW – EL. 42.7m**  
SCALE 1:30 (11x17" SHEET)

**PROPOSED ANTENNAS AT EL. 88.4m, 61.0m AND 42.7m**

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

BILL OF MATERIALS - LIGHTING SYSTEM DETAILS			
MARK	QTY	DESCRIPTION	DRAWING
#SB1	1	10mm THICK STROBE BASE PLATE	F24
#B8	4	1/2"φ x 2" lg. A325 BOLT ASSEMBLY C/W TAPERED WASHER	-



CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

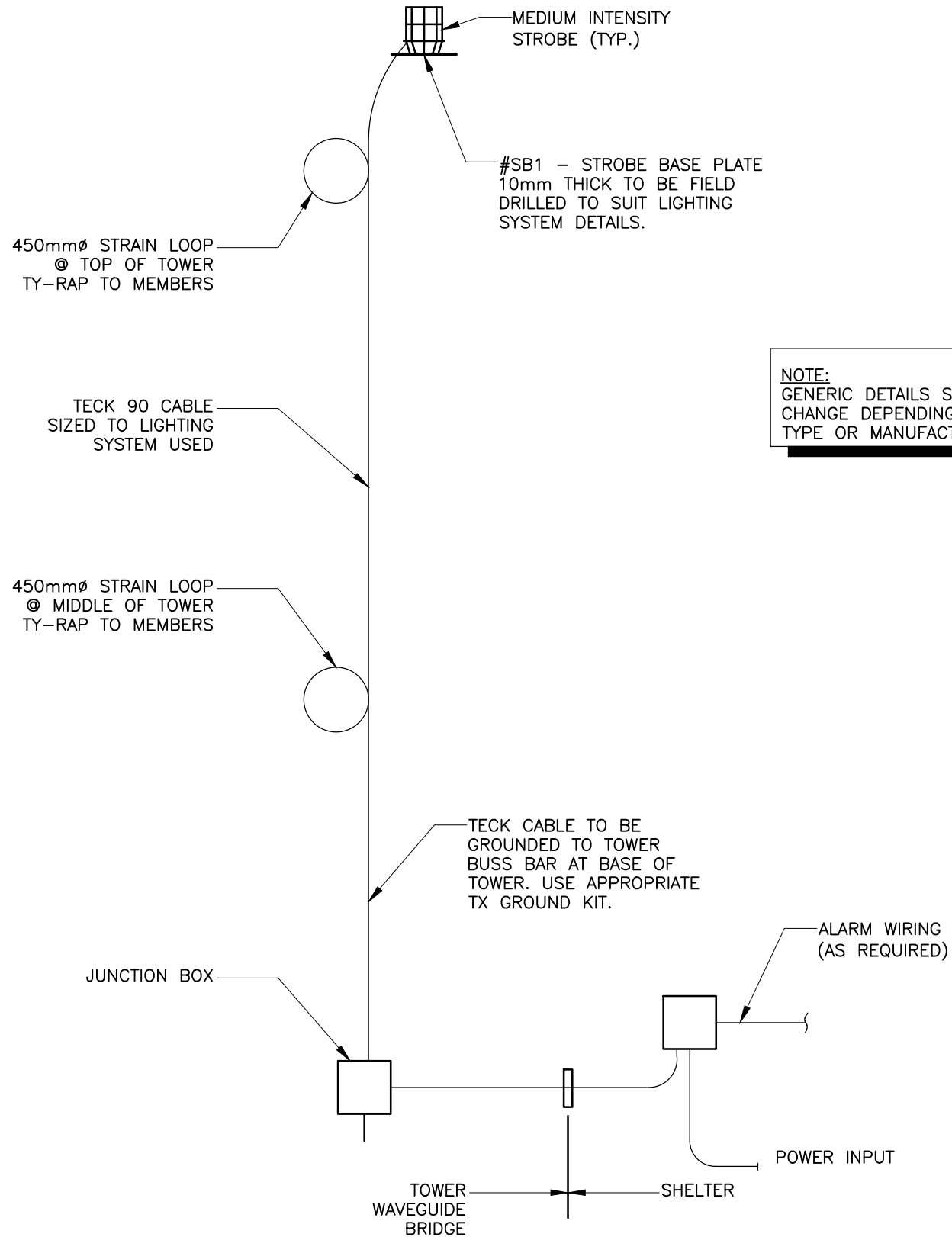
LIGHTING SYSTEM DETAILS

PROJECT NUMBER

50273

SHEET

26



**NOTE:**  
GENERIC DETAILS SHOWN. DETAILS MAY CHANGE DEPENDING ON LIGHTING SYSTEM TYPE OR MANUFACTURER.

LIGHTING SYSTEM DETAILS

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
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PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

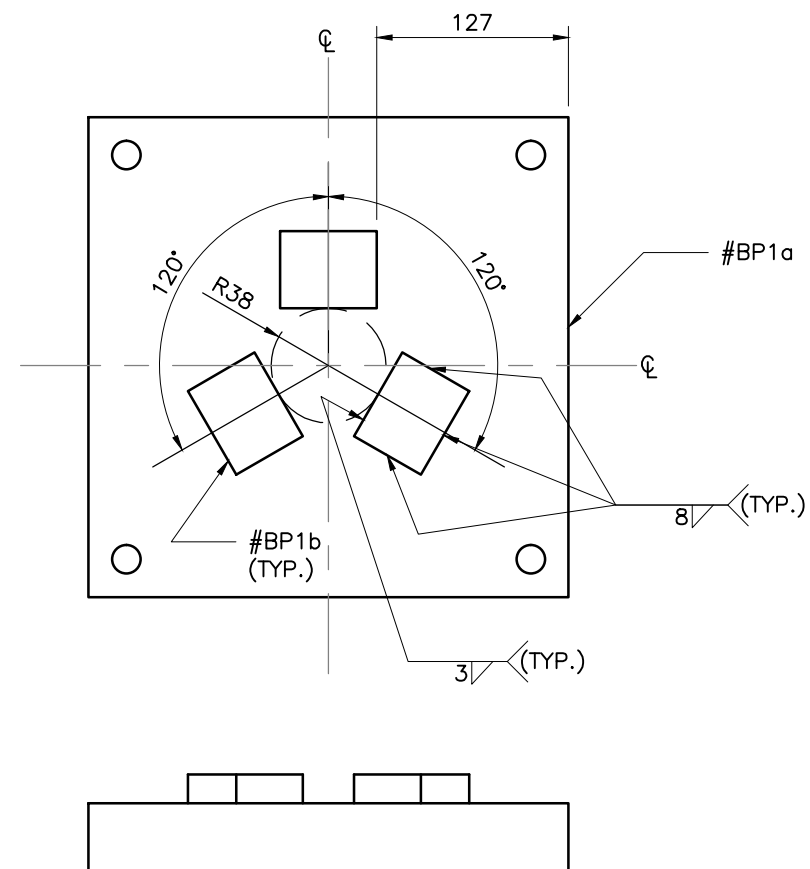
APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

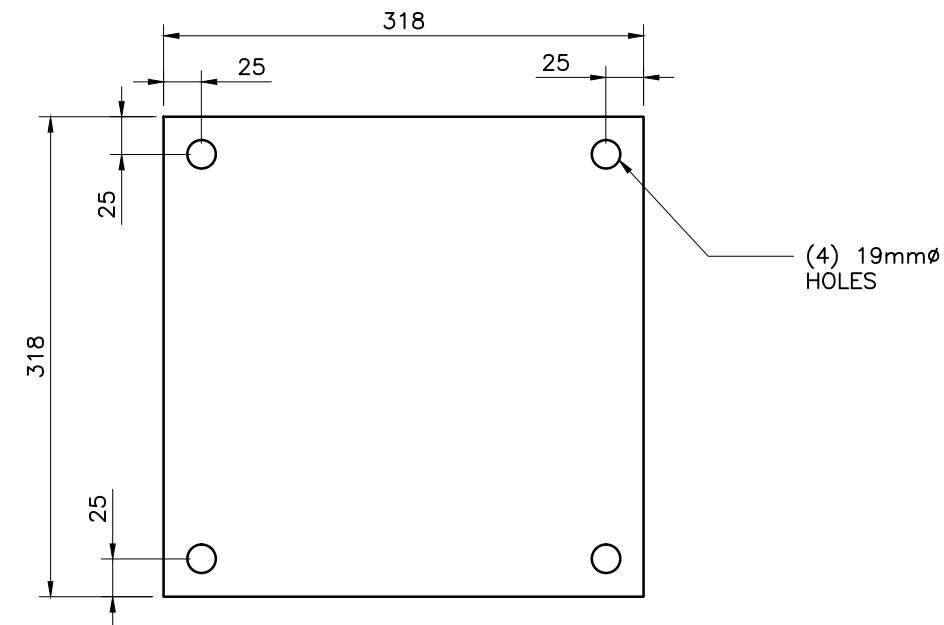
MEMBER DETAILS --  
SHEET 01



**#BP1 - BASE PLATE WELDMENT**

SCALE 1:5 (11x17" SHEET)

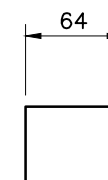
WELDMENT  
FINISH: HDG



**#BP1a**

SCALE 1:5 (11x17" SHEET)

44mm THICK PLATE  
MATERIAL: CSA G40.21 300W  
QTY: 1

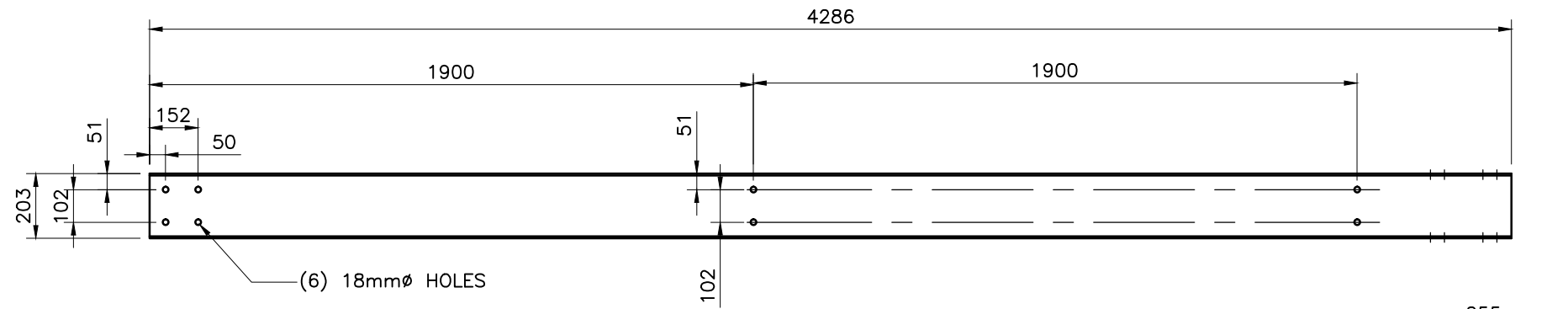


**#BP1b**

SCALE 1:5 (11x17" SHEET)

FB51x19  
MATERIAL: CSA G40.21 300W  
QTY: 3

REV.	BY	DATE	DESCRIPTION	PROJECT NUMBER	SHEET
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	50273	F01



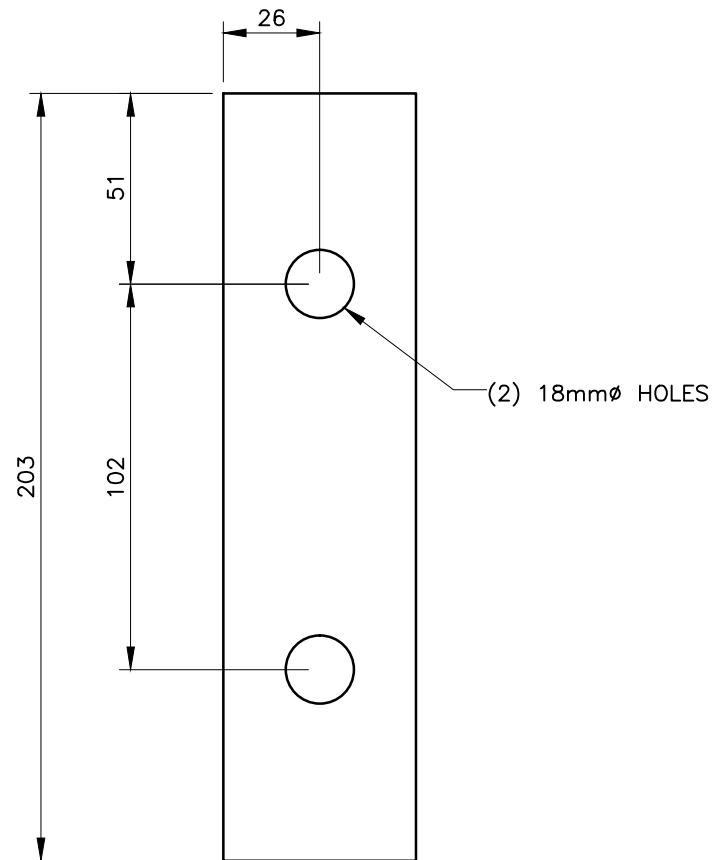
(6) 18mm $\varnothing$  HOLES



(4) 18mm $\varnothing$  HOLES

**#CH1 - CHANNEL**

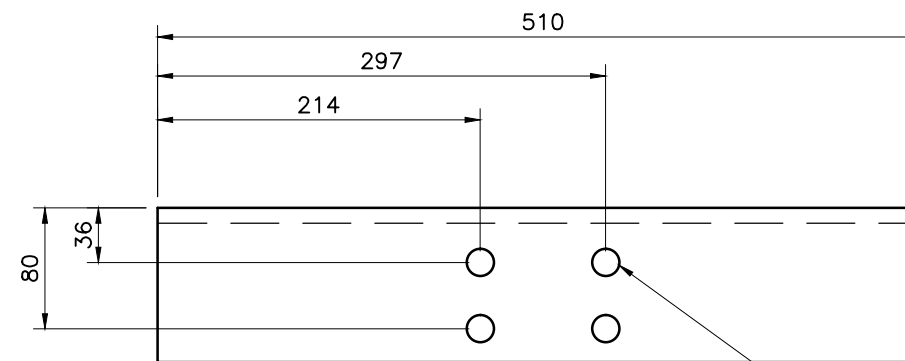
SCALE 1:15 (11"x17" SHEET)  
 C200 x 17  
 MATERIAL: CSA G40.21 300W  
 FINISH: HDG



(2) 18mm $\varnothing$  HOLES

**#S3 - SPACER PLATE**

SCALE 1:2 (11"x17" SHEET)  
 FB51x19  
 MATERIAL: CSA G40.21 300W  
 FINISH: HDG



(4) 18mm $\varnothing$  HOLES

**#SA1 - SUPPORT ANGLE**

SCALE 1:15 (11"x17" SHEET)  
 L102x102x10mm  
 MATERIAL: CSA G40.21 300W  
 FINISH: HDG



CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
 ERIC GLYNN  
 PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
 TOWER REMEDIATION AND  
 INSTALLATION

SITE NAME:  
 PTARMIGAN, NT

DRAWN BY:  
 PTN

DESIGNED BY:  
 ROBERT MOSS, P.ENG.

APPROVED BY:  
 JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

MEMBER DETAILS -  
 SHEET 02

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

PROJECT NUMBER

50273

SHEET

F02

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

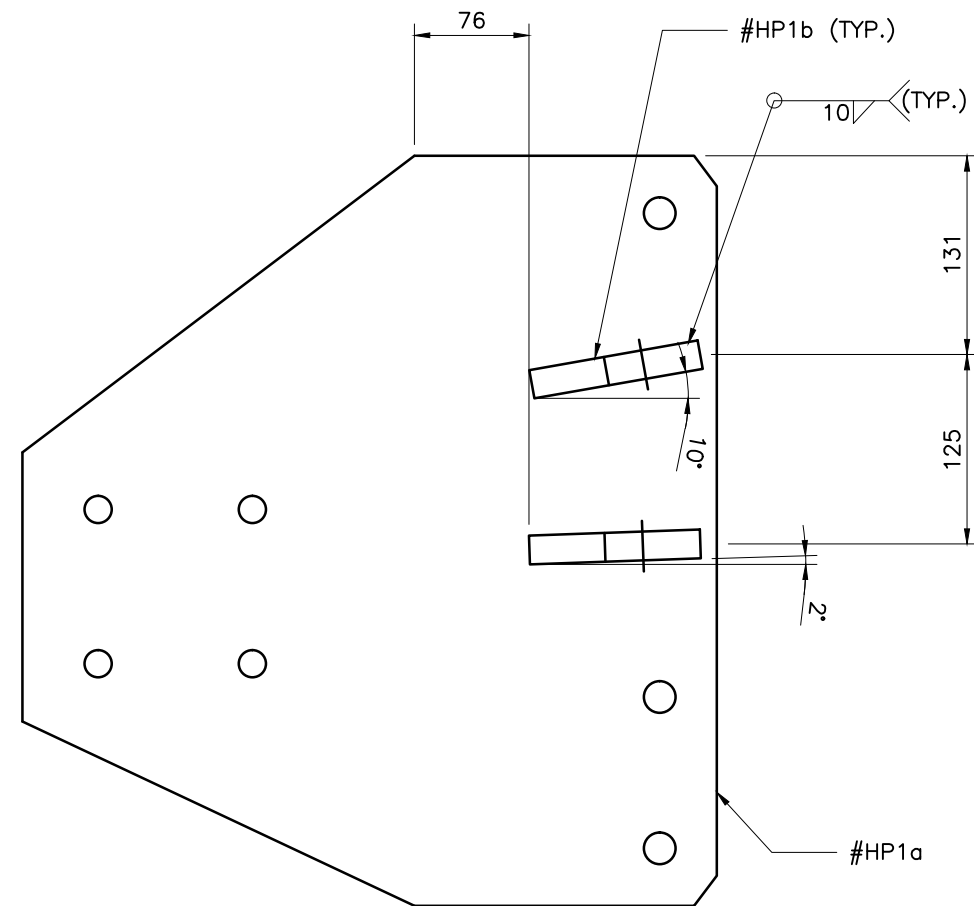
MEMBER DETAILS --  
SHEET 03

PROJECT NUMBER

50273

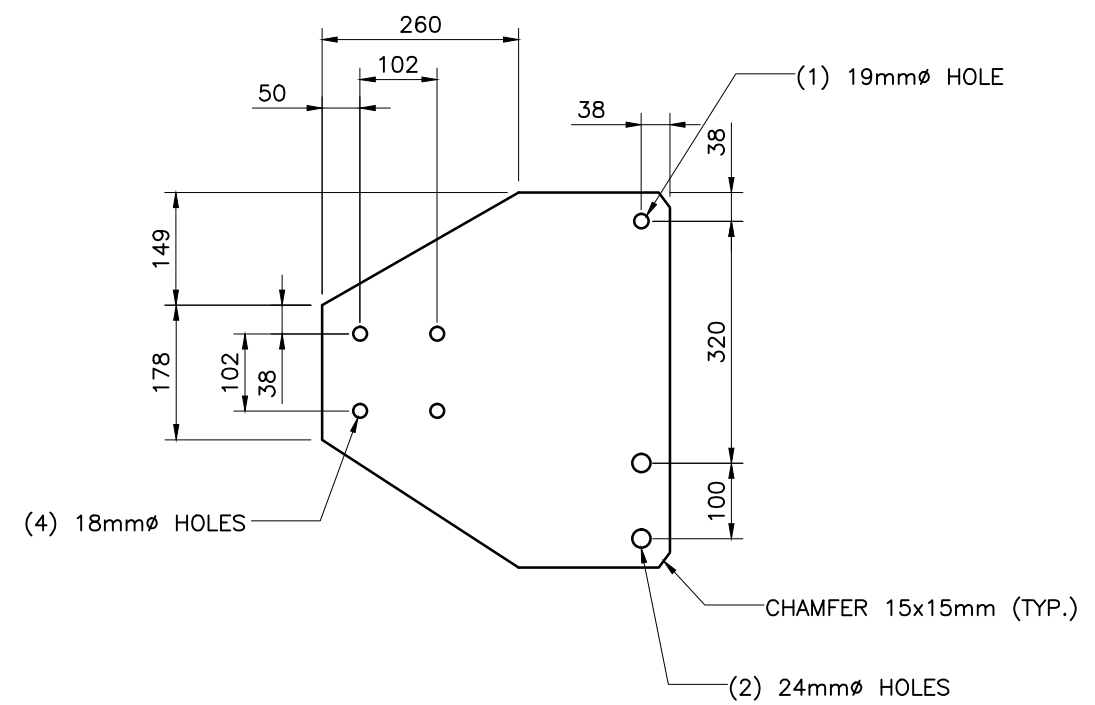
SHEET

F03

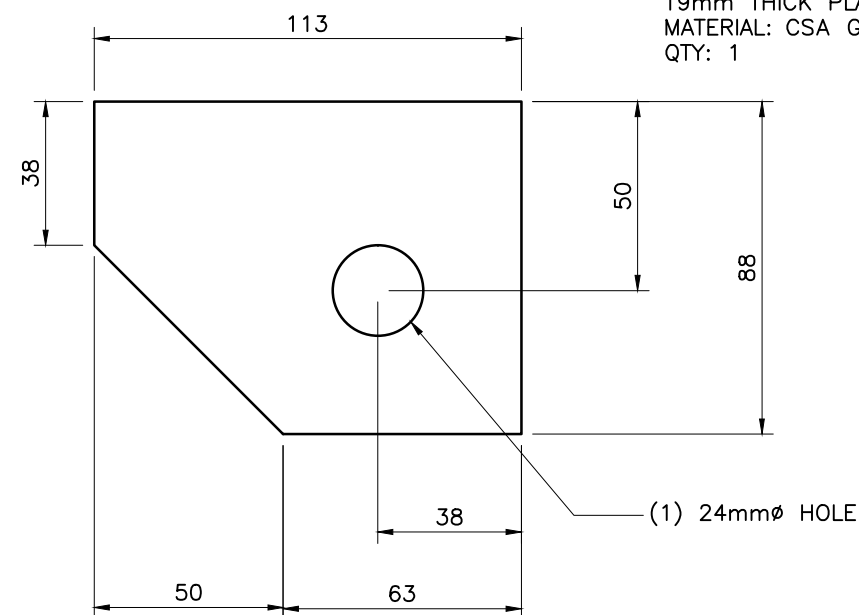


#HP1 - HEAD PLATE WELDMENT  
SCALE 1:5 (11x17" SHEET)

WELDMENT  
FINISH: HDG



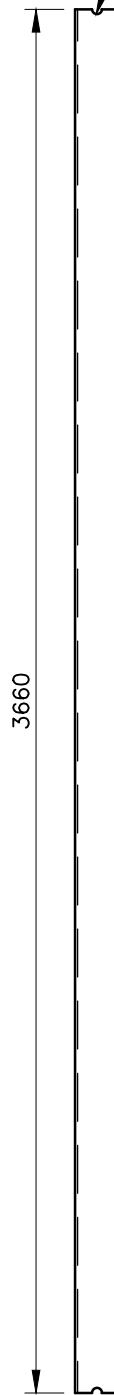
#HP1a  
SCALE 1:10 (11x17" SHEET)  
19mm THICK PLATE  
MATERIAL: CSA G40.21 300W  
QTY: 1



#HP1b  
SCALE 1:2 (11x17" SHEET)  
19mm THICK PLATE  
MATERIAL: CSA G40.21 300W  
QTY: 4

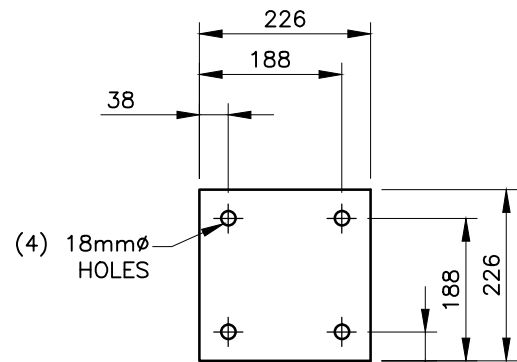
REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

1/2 OF 25mmØ HOLE THRU (TYP)



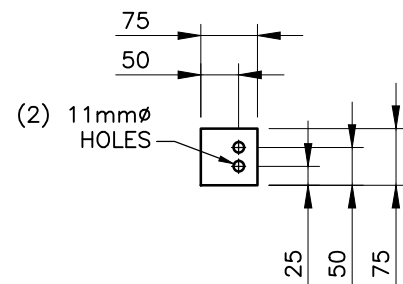
**#WCB1a**  
SCALE 1:20 (11x17" SHEET)

114mmØ x 6mm HSS  
MATERIAL: ASTM A500 GRADE C  
QTY: 1



**#WCB1b**  
SCALE 1:10 (11x17" SHEET)

19mm PLATE  
MATERIAL: G40.21 300W  
QTY: 1



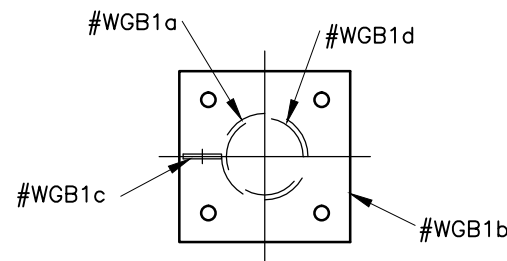
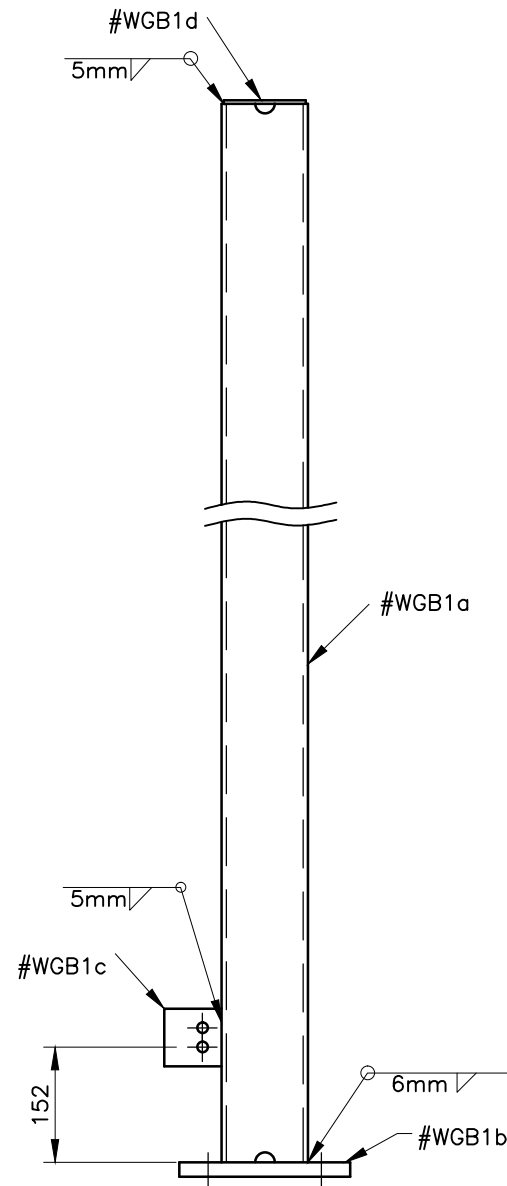
**#WCB1c**  
SCALE 1:10 (11x17" SHEET)

6mm PLATE  
MATERIAL: G40.21 300W  
QTY: 1



**#WCB1d**  
SCALE 1:10 (11x17" SHEET)

5mm PLATE  
MATERIAL: G40.21 300W  
QTY: 1



**#WGB1 – PIER WELDMENT**  
SCALE 1:10 (11x17" SHEET)

WELDMENT  
FINISH: HDG



CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

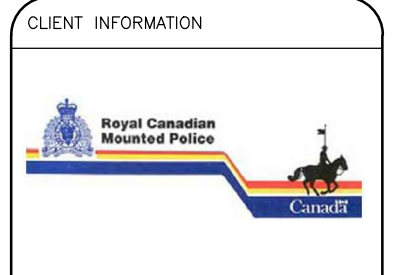
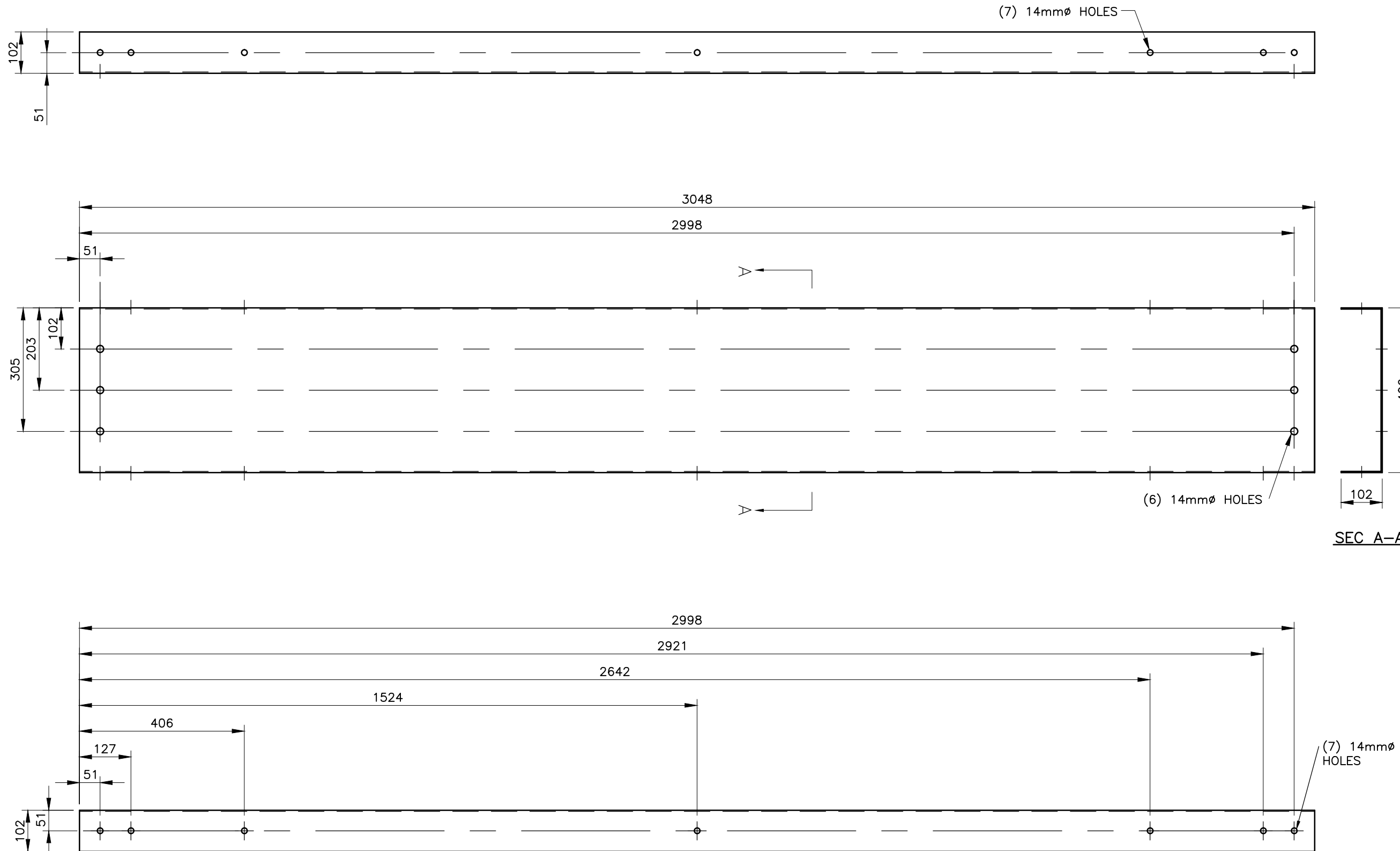
ENGINEERING SEAL



DRAWING TITLE

MEMBER DETAILS –  
SHEET 04

				PROJECT NUMBER
				50273
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	SHEET
REV.	BY	DATE	DESCRIPTION	
				F04



CLIENT INFORMATION  
 CLIENT PROJECT MANAGER:  
 ERIC GLYNN  
 PROJECT MANAGER

PROJECT INFORMATION  
 PROJECT TITLE:  
 TOWER REMEDIATION AND  
 INSTALLATION  
 SITE NAME:  
 PTARMIGAN, NT

DRAWN BY:  
 PTN

DESIGNED BY:  
 ROBERT MOSS, P.ENG.

APPROVED BY:  
 JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE  
 MEMBER DETAILS --  
 SHEET 05

**#WGB2 – WAVEGUIDE COVER**

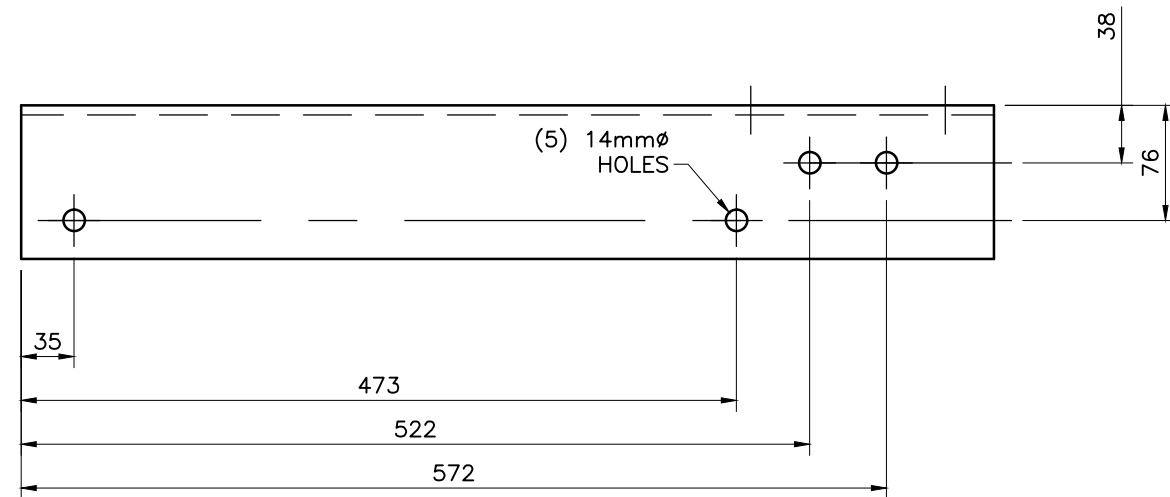
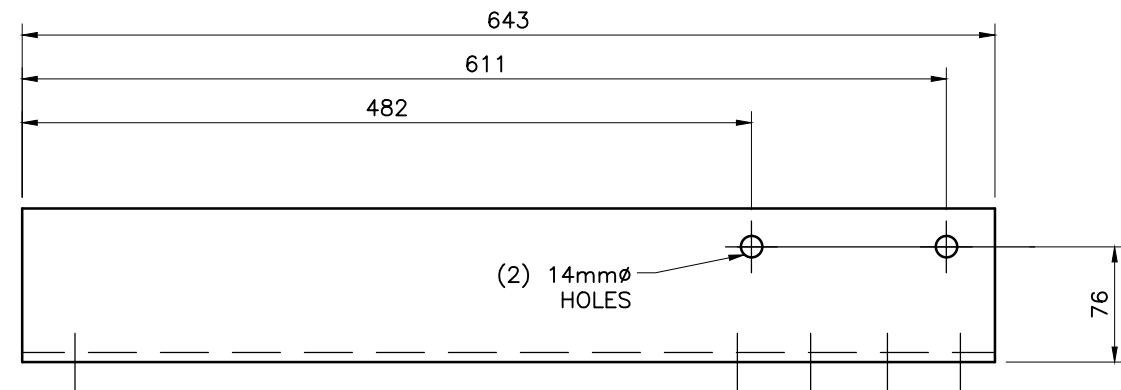
SCALE 1:10 (11x17" SHEET)

10 GAUGE SHEET METAL (BENT)  
 MATERIAL: ASTM A36 (OR BETTER)  
 FINISH: HDG

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

PROJECT NUMBER	50273
SHEET	F05

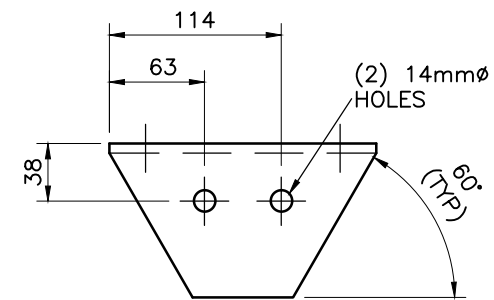
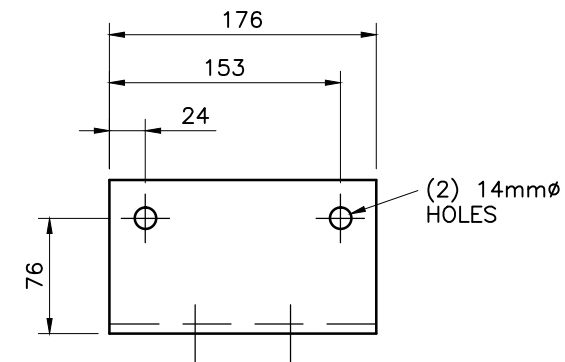




**#WGB3 – SUPPORT ANGLE**

SCALE 1:5 (11x17" SHEET)

L102x102x6mm  
MATERIAL: G40.21 300W  
FINISH: HDG



**#WGB4 – CLIP ANGLE**

SCALE 1:5 (11x17" SHEET)

L102x102x6mm  
MATERIAL: G40.21 300W  
FINISH: HDG

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

MEMBER DETAILS –  
SHEET 06

				PROJECT NUMBER
				50273
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	SHEET F06
REV.	BY	DATE	DESCRIPTION	

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

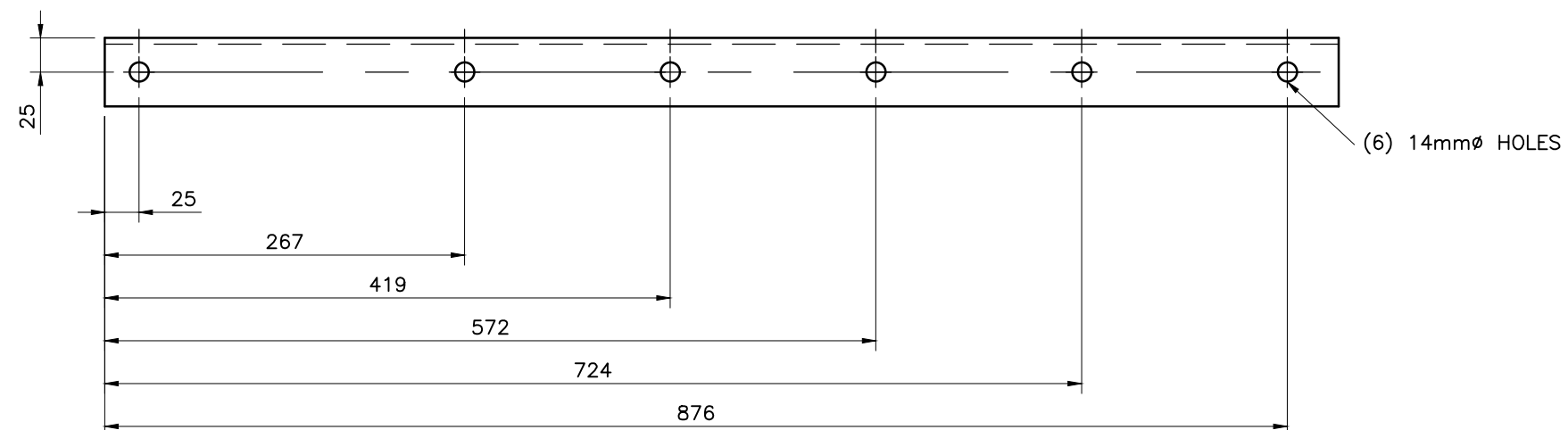
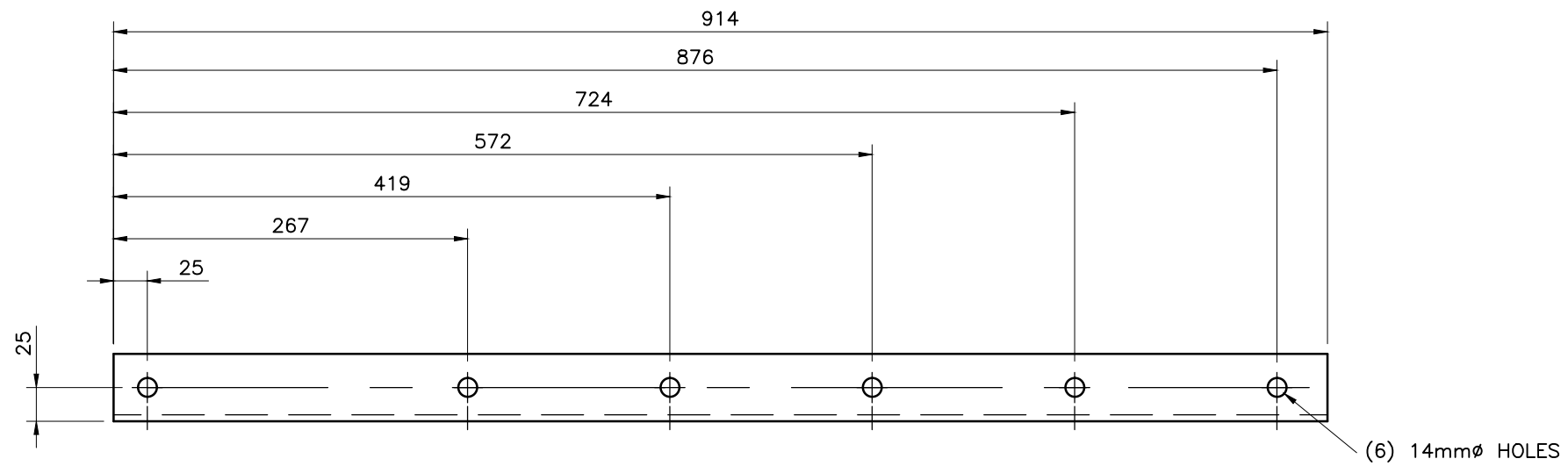
APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

MEMBER DETAILS --  
SHEET 07



**#WGB5 – VERTICAL ANGLE**

SCALE 1:5 (11x17" SHEET)

L51x51x5mm  
MATERIAL: ASTM A36 (OR BETTER)  
FINISH: HDG

				PROJECT NUMBER
				50273
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	SHEET F07
REV.	BY	DATE	DESCRIPTION	

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

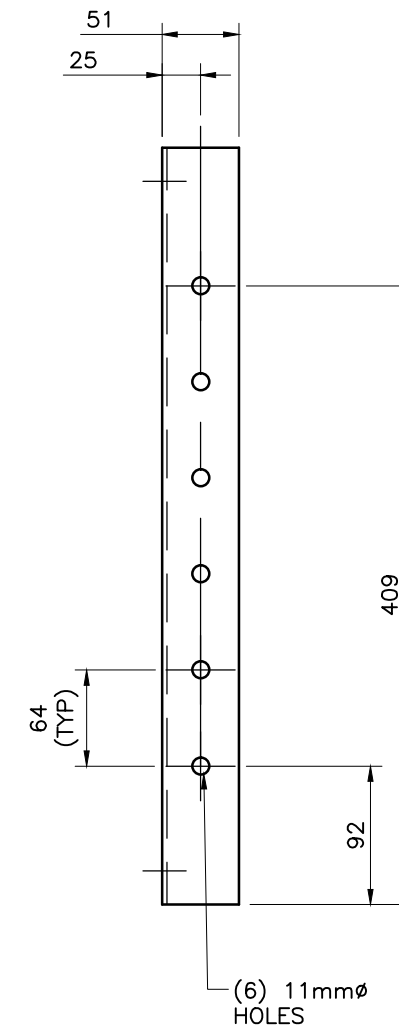
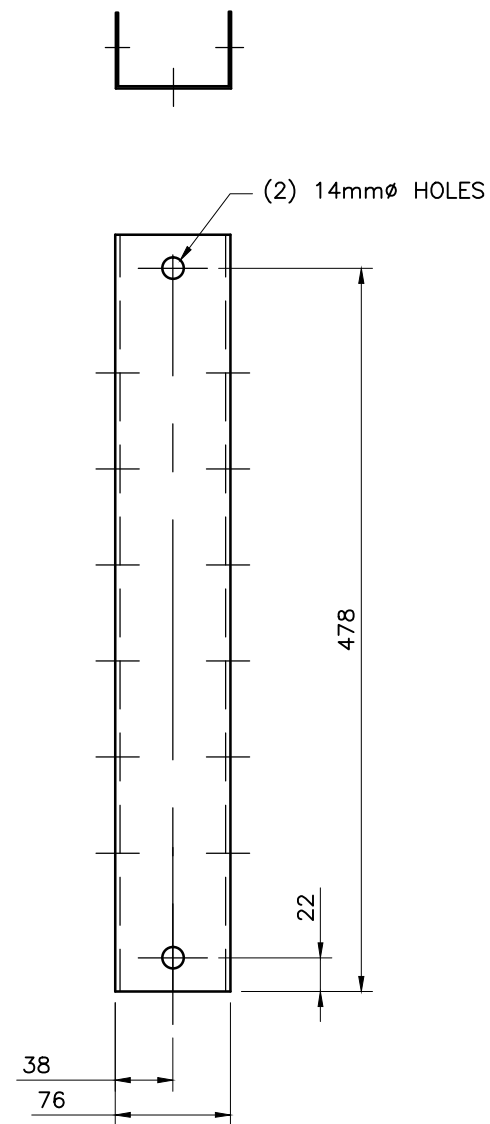
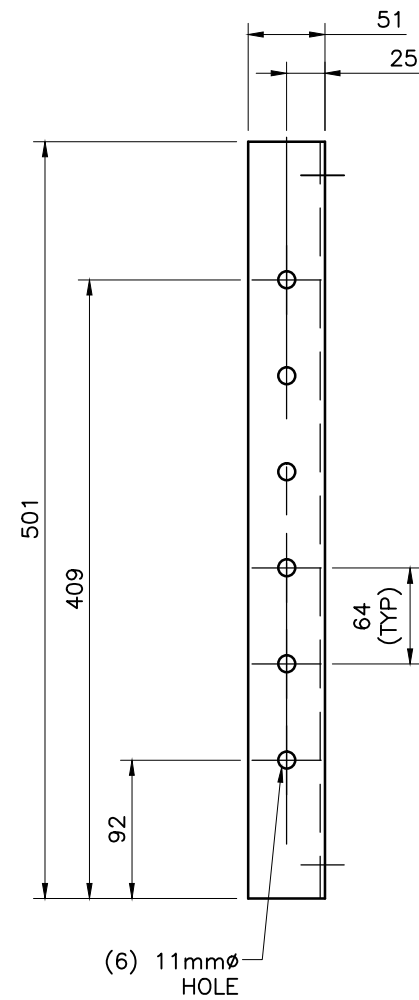
APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

MEMBER DETAILS --  
SHEET 08



**#WGB6 - Tx LINE HANGER**

SCALE 1:5 (11x17" SHEET)

10 GAUGE SHEET METAL  
MATERIAL: ASTM A36 (OR BETTER)  
FINISH: HDG

				PROJECT NUMBER
				50273
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	SHEET F08
REV.	BY	DATE	DESCRIPTION	



CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

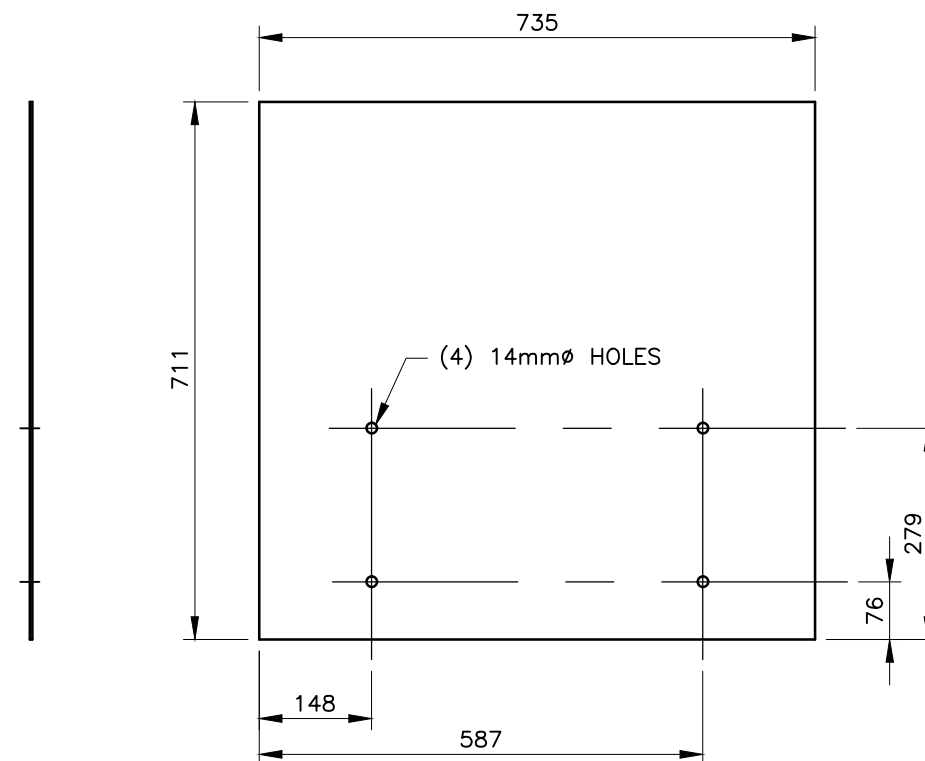
APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

MEMBER DETAILS --  
SHEET 09

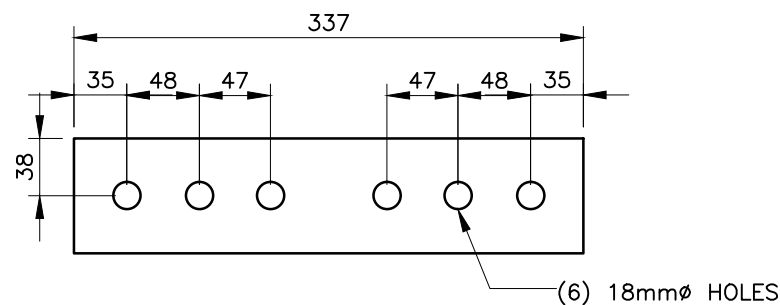


#WGB7 - ICE SHIELD

SCALE 1:10 (11x17" SHEET)

10 GAUGE SHEET METAL  
MATERIAL: ASTM A36 (OR BETTER)  
FINISH: HDG

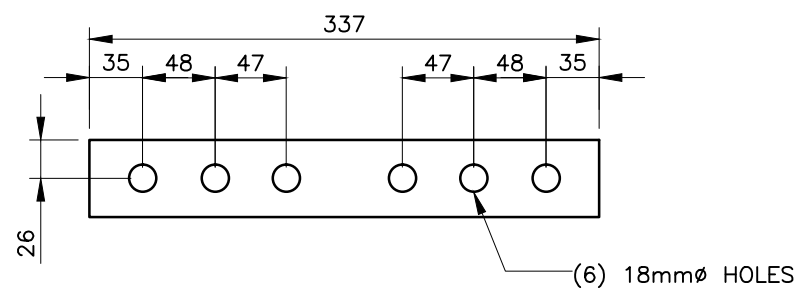
				PROJECT NUMBER
				50273
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	SHEET F09
REV.	BY	DATE	DESCRIPTION	



**#SP1 – SPLICE PLATE**

SCALE 1:5 (11"x17" SHEET)

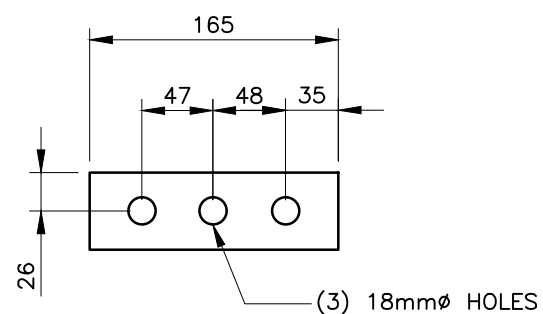
FB 76x8mm  
MATERIAL: CSA G40.21 300W  
FINISH: HDG



**#SP2 – SPLICE PLATE**

SCALE 1:5 (11"x17" SHEET)

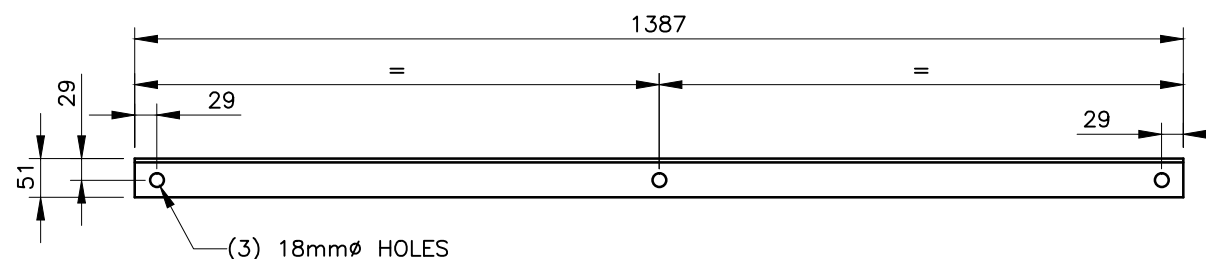
FB 51x6mm  
MATERIAL: CSA G40.21 300W  
FINISH: HDG



**#SH1 – SHIM PLATE**

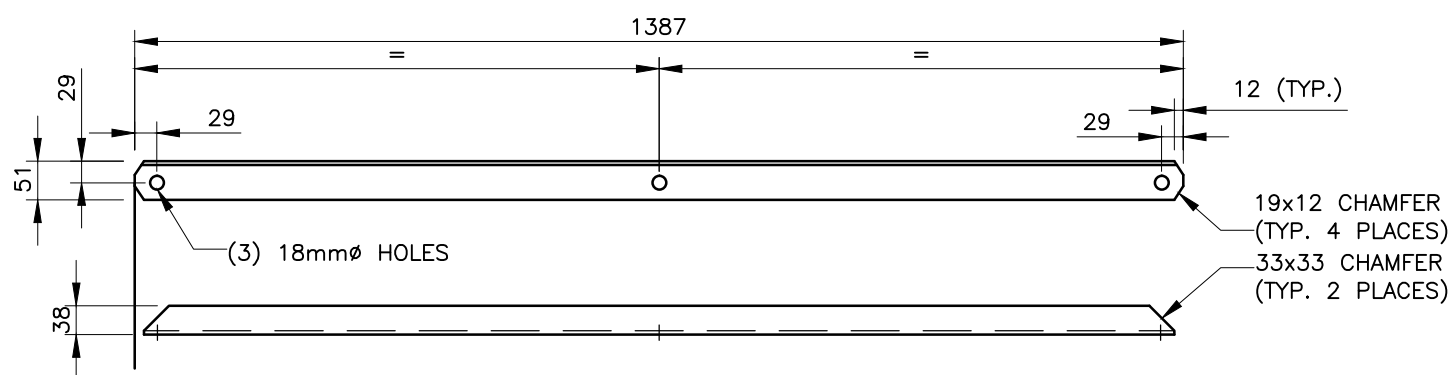
SCALE 1:5 (11"x17" SHEET)

2mm THICK PLATE (OR 16GA. GALV. PLATE)  
MATERIAL: CSA G40.21 300W  
FINISH: HDG



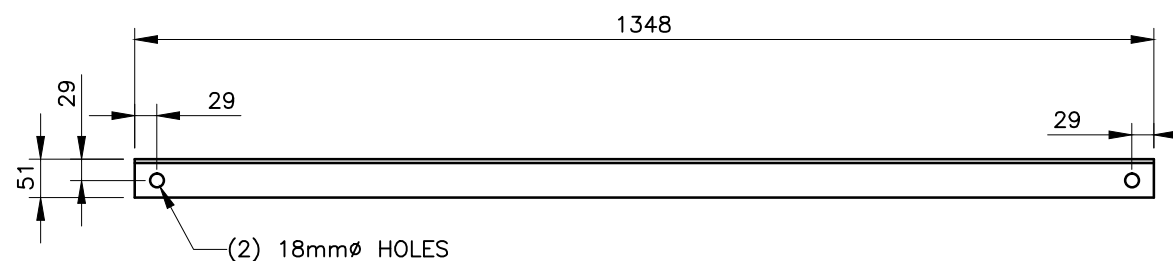
**#D1 – DIAGONAL**

SCALE 1:10 (11"x17" SHEET)  
L51x38x5mm (LLV)  
MATERIAL: CSA G40.21 300W  
FINISH: HDG



**#D2 – DIAGONAL**

SCALE 1:10 (11"x17" SHEET)  
L51x38x5mm (LLV)  
MATERIAL: CSA G40.21 300W  
FINISH: HDG



**#D3 – DIAGONAL**

SCALE 1:10 (11"x17" SHEET)  
L51x38x5mm (LLV)  
MATERIAL: CSA G40.21 300W  
FINISH: HDG

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

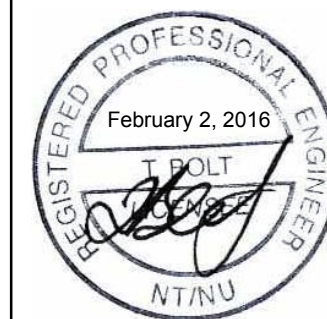
SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

MEMBER DETAILS –  
SHEET 10

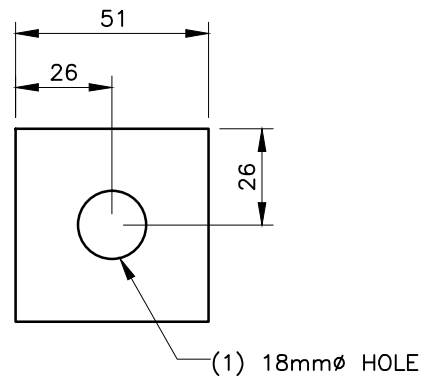
PROJECT NUMBER

50273

SHEET

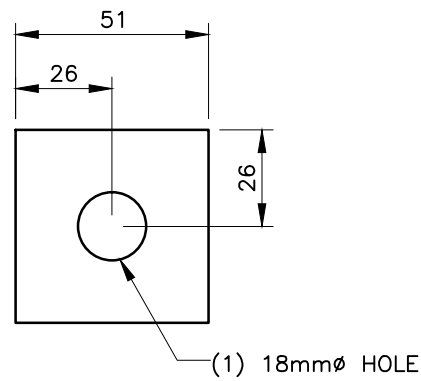
F10

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION



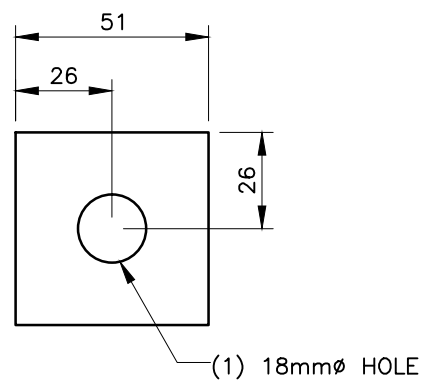
**#S1 – SPACER PLATE**

SCALE 1:2 (11"x17" SHEET)  
 FB. 51x6mm  
 MATERIAL: CSA G40.21 300W  
 FINISH: HDG



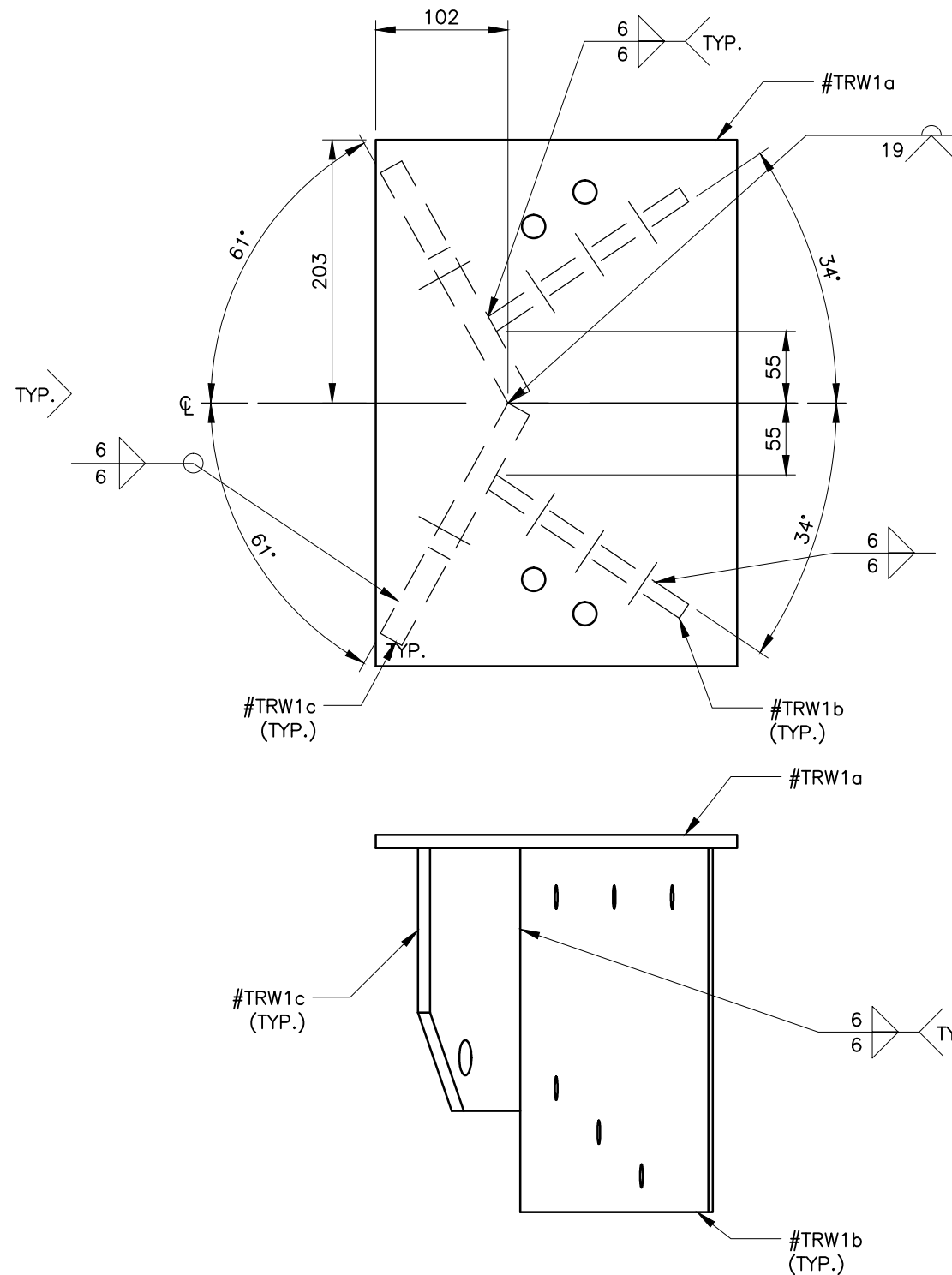
**#S2 – SPACER PLATE**

SCALE 1:2 (11"x17" SHEET)  
 FB. 51x10mm  
 MATERIAL: CSA G40.21 300W  
 FINISH: HDG



**#S3 – SPACER PLATE**

SCALE 1:2 (11"x17" SHEET)  
 FB. 51x16mm  
 MATERIAL: CSA G40.21 300W  
 FINISH: HDG



FOR #TRW1 SEE PART DETAILS ON SHEET F12.

**#TRW1 – TORSION RESISTOR WELDMENT**

SCALE 1:5 (11X17" SHEET)

FINISH: HDG



CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
 ERIC GLYNN  
 PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
 TOWER REMEDIATION AND  
 INSTALLATION

SITE NAME:  
 PTARMIGAN, NT

DRAWN BY:  
 PTN

DESIGNED BY:  
 ROBERT MOSS, P.ENG.

APPROVED BY:  
 JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

MEMBER DETAILS –  
 SHEET 11

				PROJECT NUMBER
				50273
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	SHEET F11
REV.	BY	DATE	DESCRIPTION	



CLIENT INFORMATION

CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

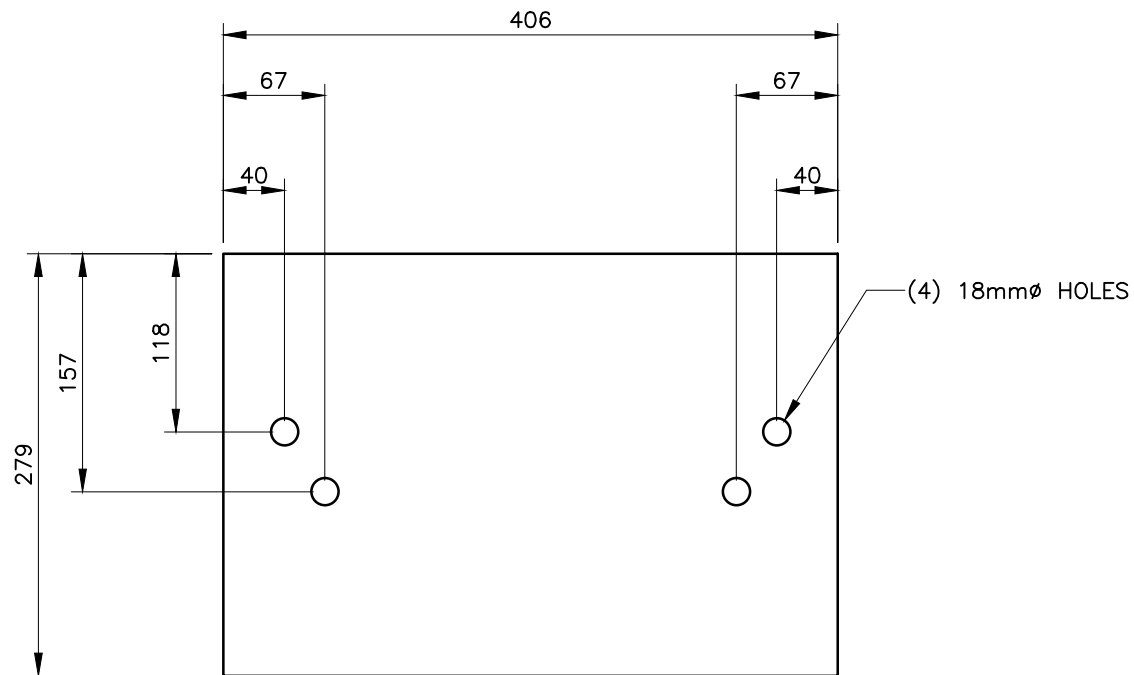
ENGINEERING SEAL



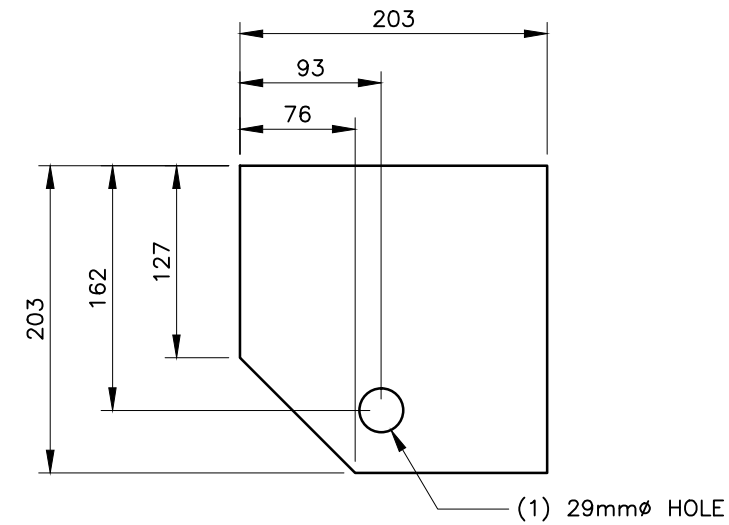
DRAWING TITLE

MEMBER DETAILS --  
SHEET 12

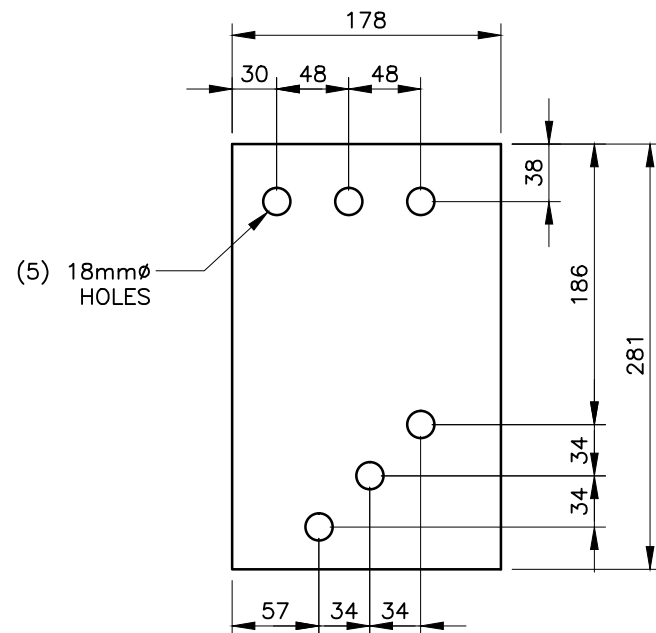
PROJECT NUMBER	
50273	
SHEET	F12



#TRW1a  
SCALE 1:5 (11X17" SHEET)  
13mm PLATE  
MATERIAL: CSA G40.21 300W  
QTY: 1



#TRW1c  
SCALE 1:5 (11X17" SHEET)  
19mm PLATE  
MATERIAL: CSA G40.21 300W  
QTY: 2



#TRW1b  
SCALE 1:5 (11X17" SHEET)  
13mm PLATE  
MATERIAL: CSA G40.21 300W  
QTY: 2

NOTE:  
SEE WELDMENT DETAILS ON SHEET F11.

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

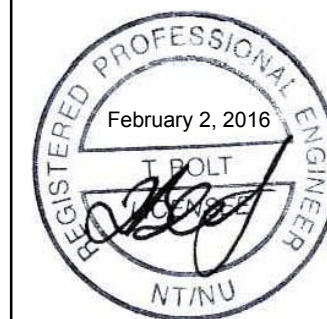
SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

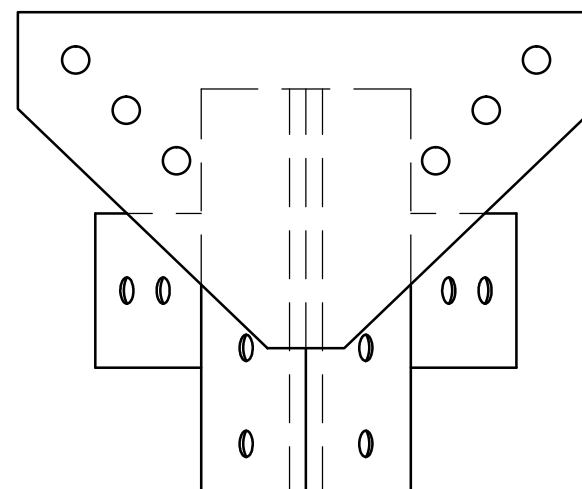
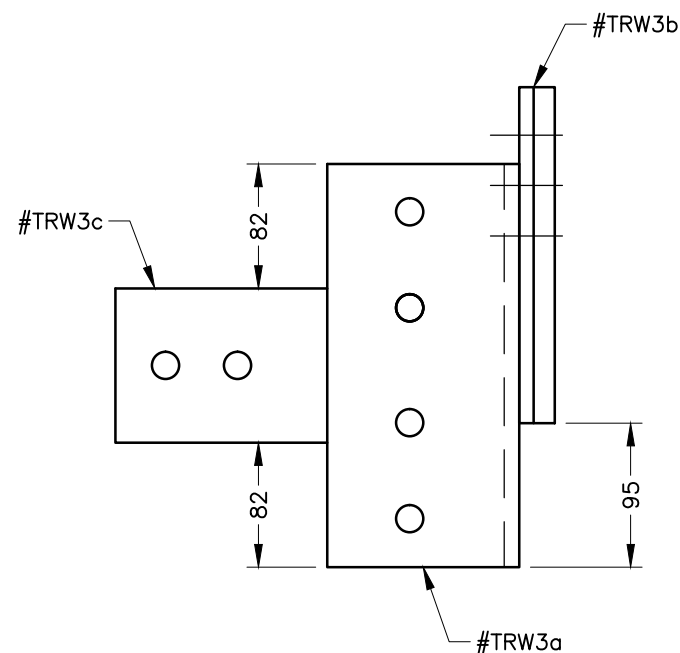
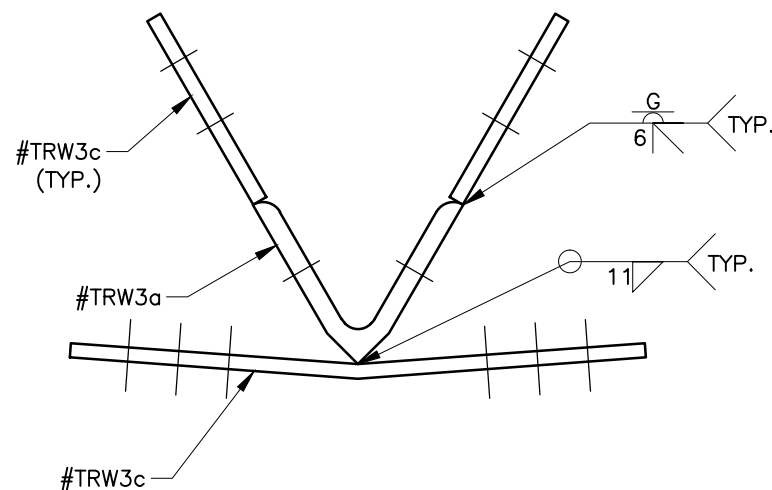
APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

MEMBER DETAILS --  
SHEET 13



**NOTE:**  
SEE PART DETAILS ON SHEET F14.

**#TRW3 – TORSION RESISTOR WELDMENT**

SCALE 1:5 (11X17" SHEET)

FINISH: HDG

				PROJECT NUMBER
				50273
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	SHEET F13
REV.	BY	DATE	DESCRIPTION	



CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

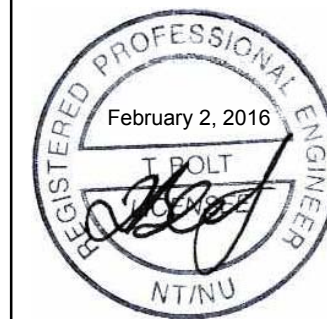
SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



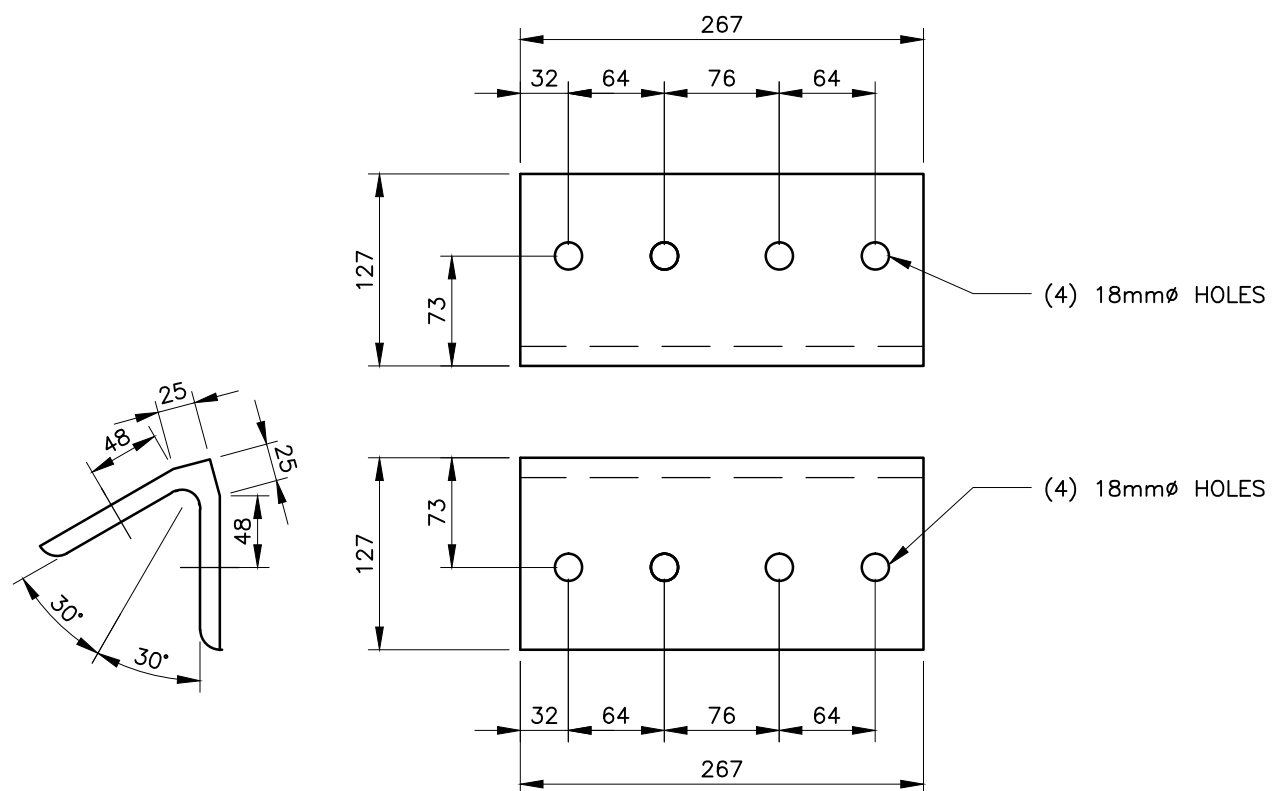
DRAWING TITLE

MEMBER DETAILS –  
SHEET 14

PROJECT NUMBER

50273

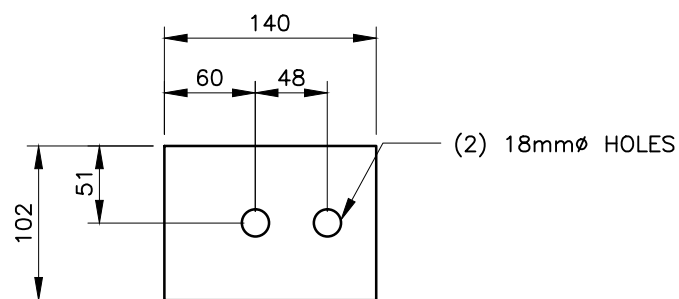
SHEET F14



#TRW3a

SCALE 1:5 (11X17" SHEET)

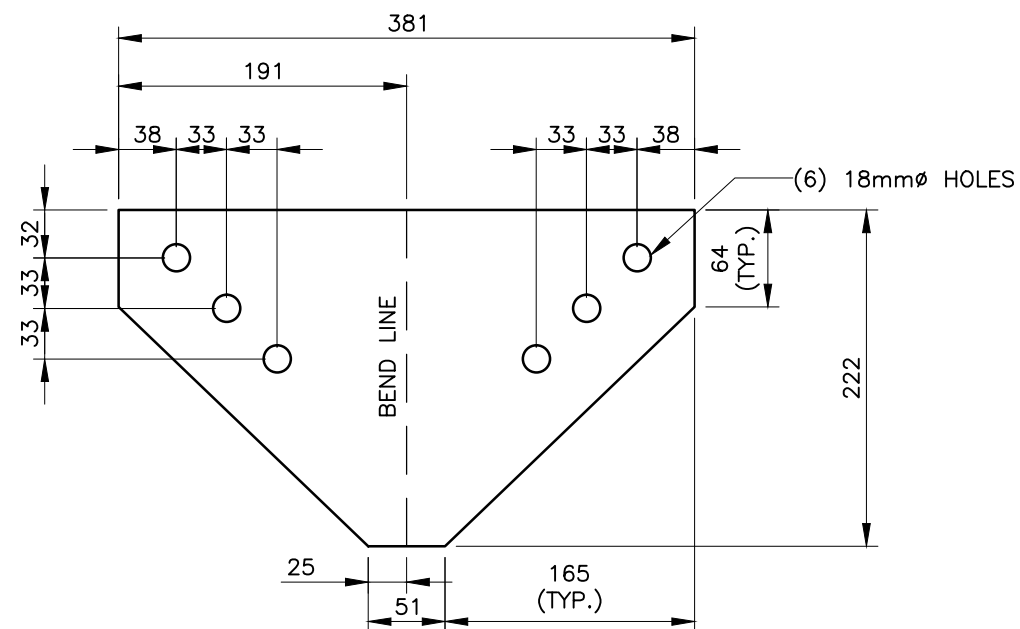
V127x127x13mm  
MATERIAL: CSA G40.21 300W  
QTY: 1



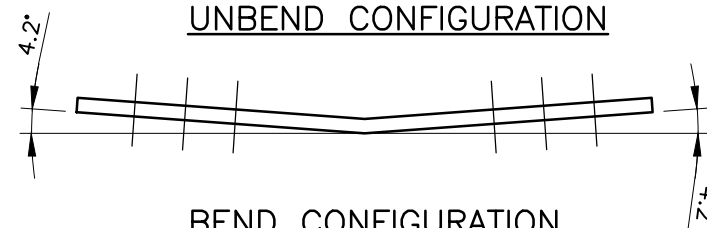
#TRW3c

SCALE 1:5 (11X17" SHEET)

10mm PLATE  
MATERIAL: CSA G40.21 300W  
QTY: 2



UNBEND CONFIGURATION



BEND CONFIGURATION

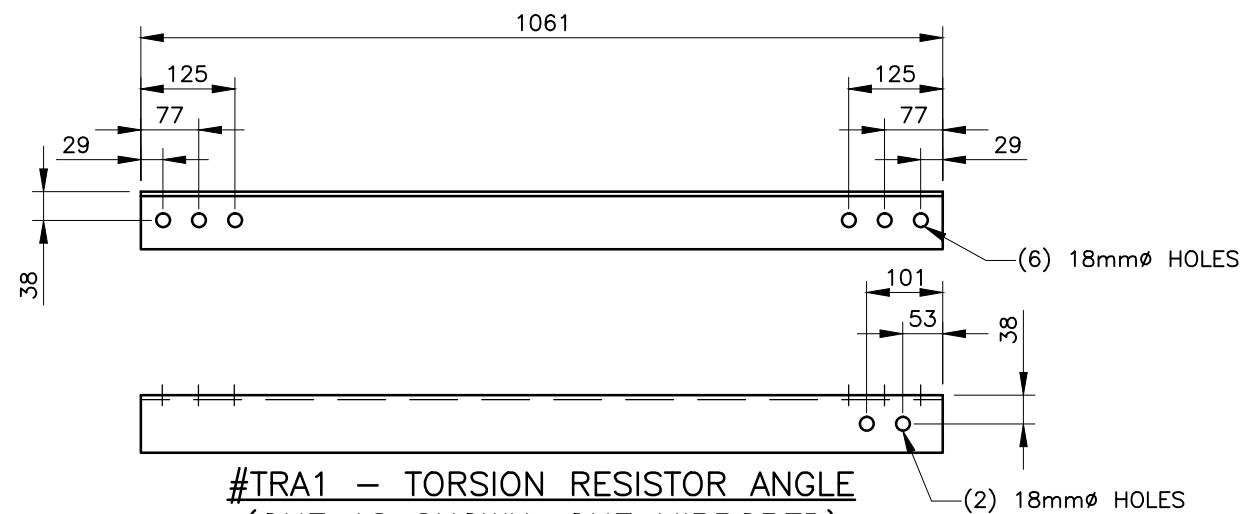
#TRW3b

SCALE 1:5 (11X17" SHEET)

10mm PLATE  
MATERIAL: CSA G40.21 300W  
QTY: 1

NOTE:  
SEE WELDMENT DETAILS ON SHEET F13.

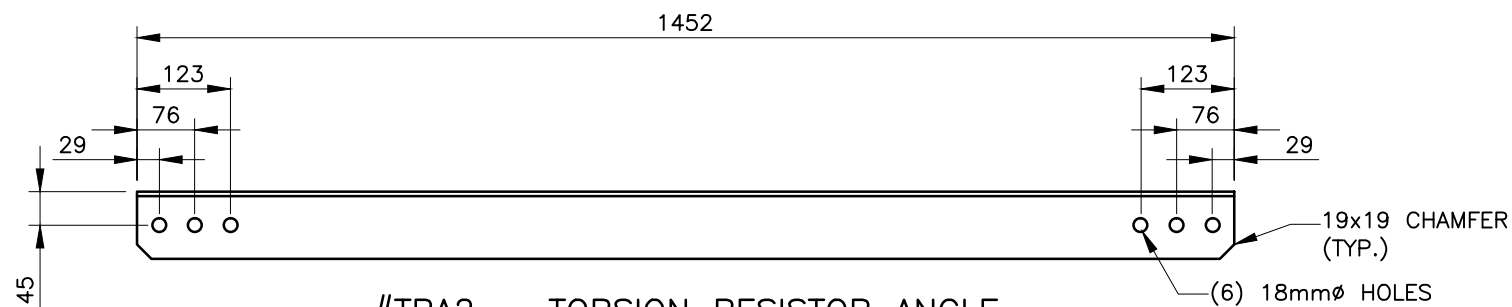
REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION



**#TRA1 – TORSION RESISTOR ANGLE**  
**(ONE AS SHOWN, ONE MIRRORED)**

SCALE 1:10 (11x17" SHEET)

L76x76x6mm  
MATERIAL: CSA G40.21 300W  
FINISH: HDG



**#TRA2 – TORSION RESISTOR ANGLE**

SCALE 1:10 (11x17" SHEET)

L89x89x6mm  
MATERIAL: CSA G40.21 300W  
FINISH: HDG

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

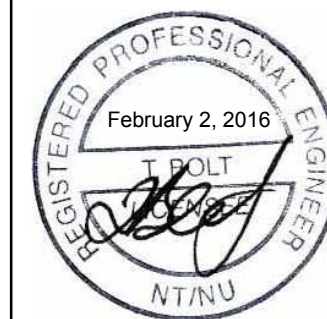
SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

MEMBER DETAILS –  
SHEET 15

				PROJECT NUMBER
				50273
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	SHEET F15
REV.	BY	DATE	DESCRIPTION	

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

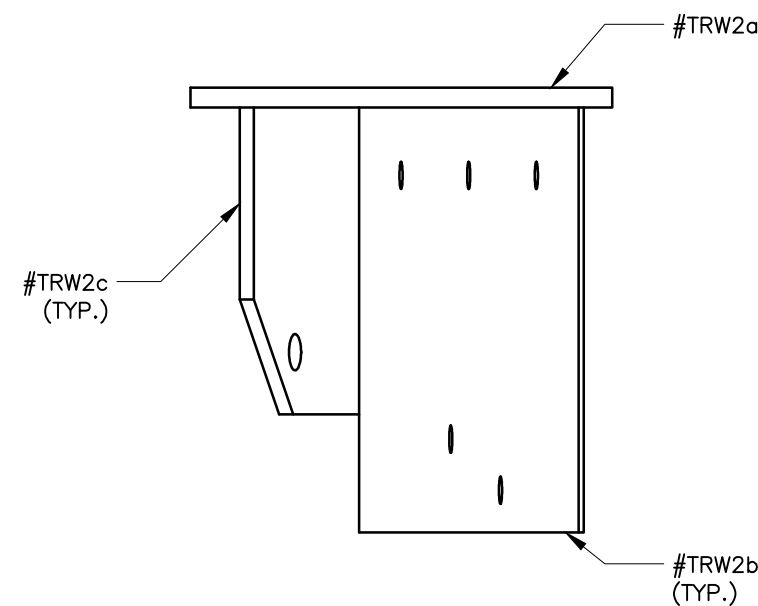
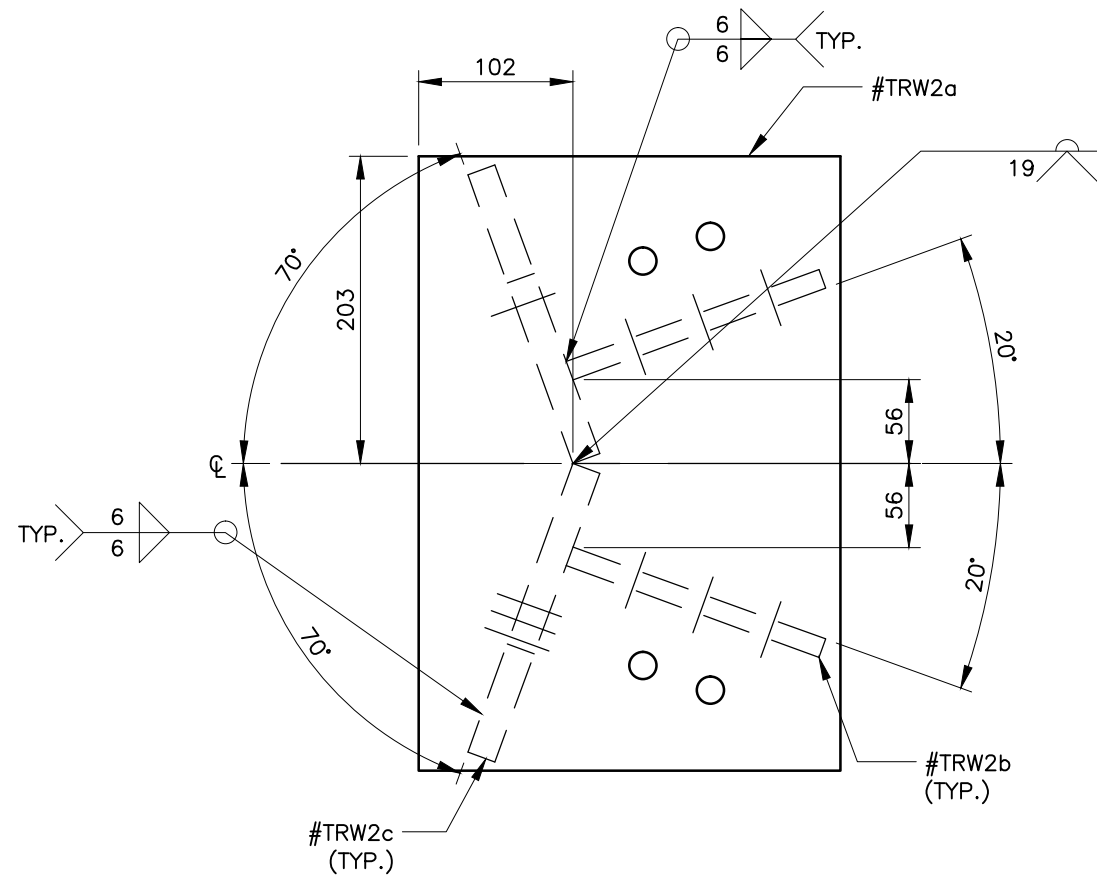
MEMBER DETAILS --  
SHEET 16

PROJECT NUMBER

50273

SHEET

F16



NOTE:  
SEE PART DETAILS ON SHEET F17.

**#TRW2 - TORSION RESISTOR WELDMENT**

SCALE 1:5 (11X17" SHEET)

FINISH: HDG

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

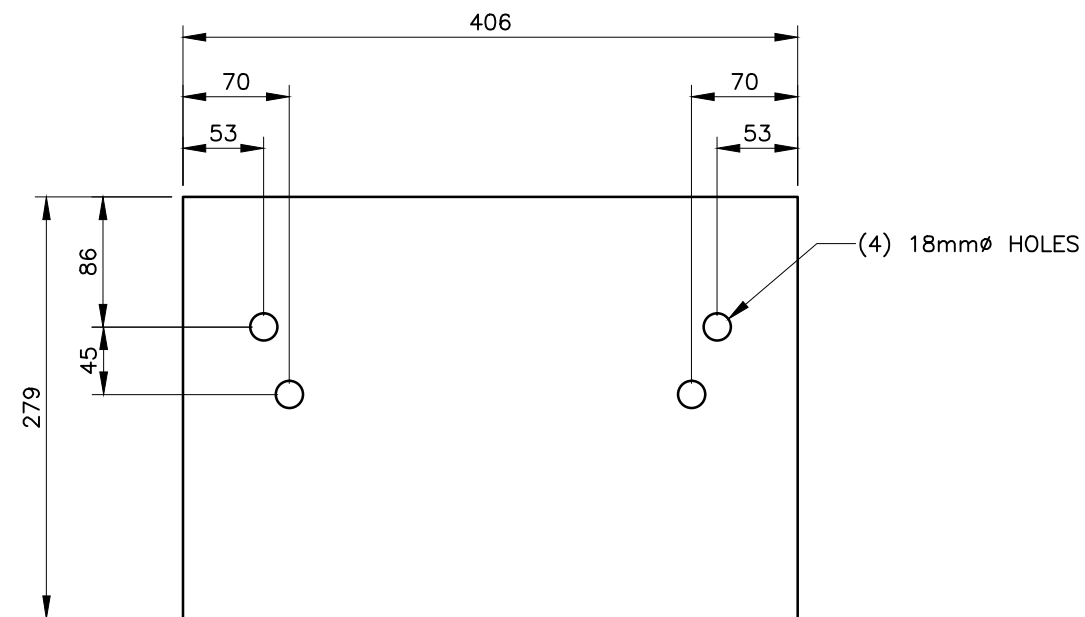
MEMBER DETAILS --  
SHEET 17

PROJECT NUMBER

50273

SHEET

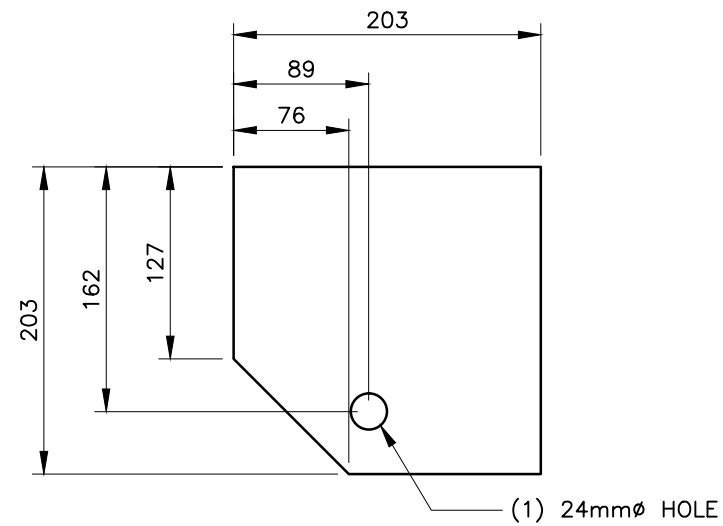
F17



#TRW2a

SCALE 1:5 (11X17" SHEET)

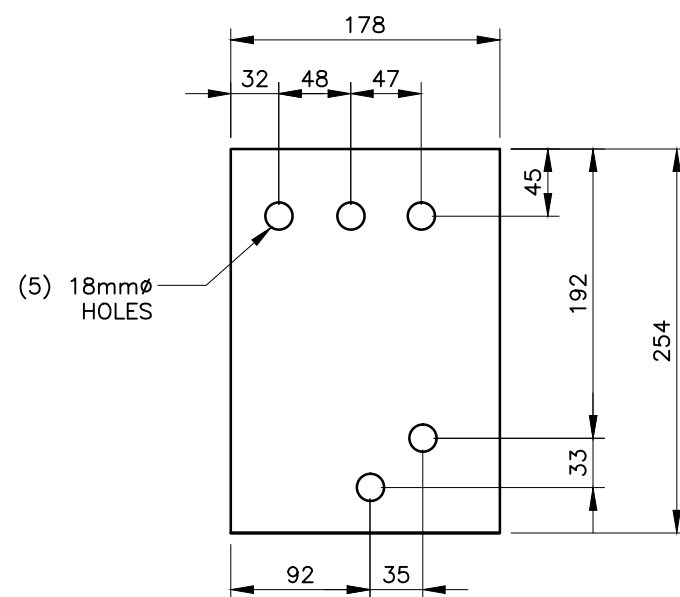
13mm PLATE  
MATERIAL: CSA G40.21 300W  
QTY: 1



#TRW2c

SCALE 1:5 (11X17" SHEET)

19mm PLATE  
MATERIAL: CSA G40.21 300W  
QTY: 2



#TRW2b

SCALE 1:5 (11X17" SHEET)

13mm PLATE  
MATERIAL: CSA G40.21 300W  
QTY: 2

NOTE:  
SEE WELDMENT DETAILS ON SHEET F16.

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION



CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

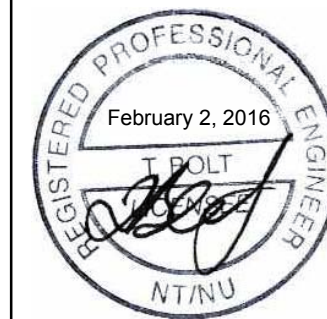
SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

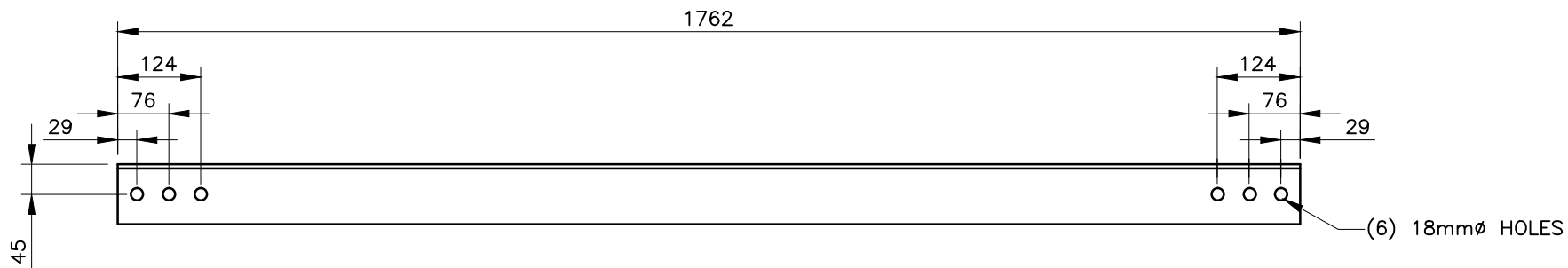
MEMBER DETAILS --  
SHEET 18

PROJECT NUMBER

50273

SHEET

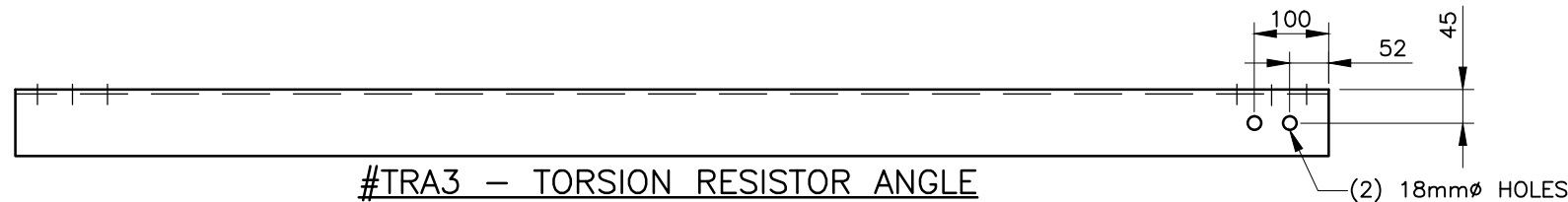
F18



#TRA3 – TORSION RESISTOR ANGLE  
(HALF AS SHOWN, HALF MIRRORED)

SCALE 1:10 (11x17" SHEET)

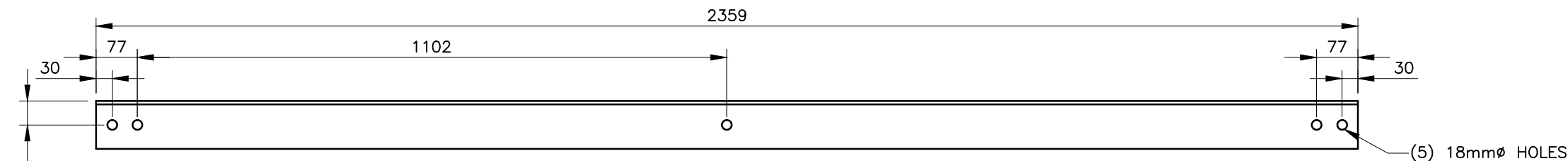
L89x89x6mm  
MATERIAL: CSA G40.21 300W  
FINISH: HDG



#TRA4 – TORSION RESISTOR ANGLE

SCALE 1:10 (11x17" SHEET)

L89x89x6mm  
MATERIAL: CSA G40.21 300W  
FINISH: HDG

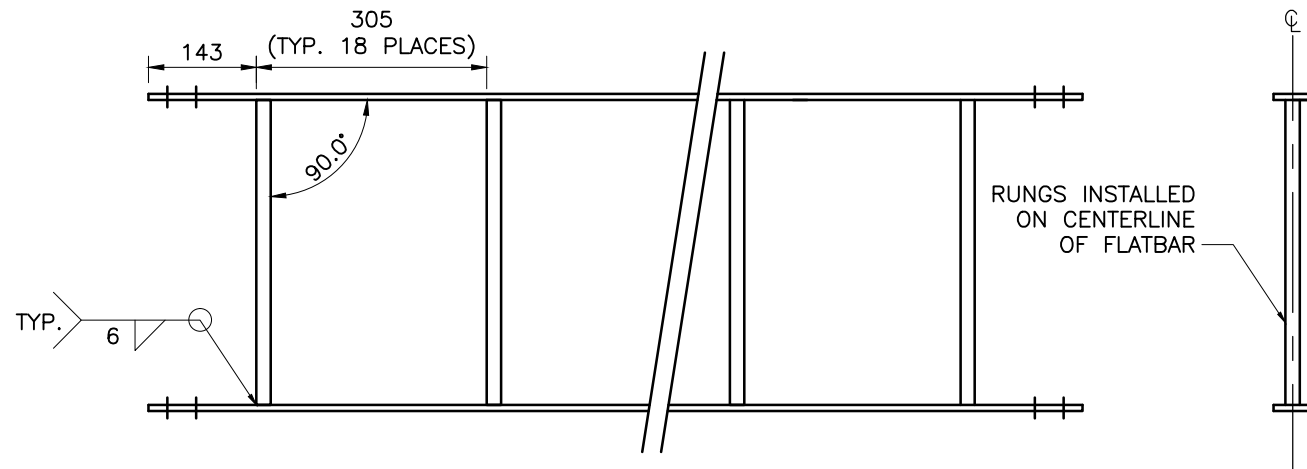


#TRA5 – TORSION RESISTOR ANGLE  
(HALF AS SHOWN, HALF MIRRORED)

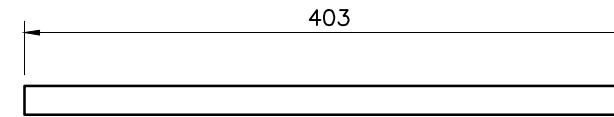
SCALE 1:10 (11x17" SHEET)

L89x89x6mm  
MATERIAL: CSA G40.21 300W  
FINISH: HDG

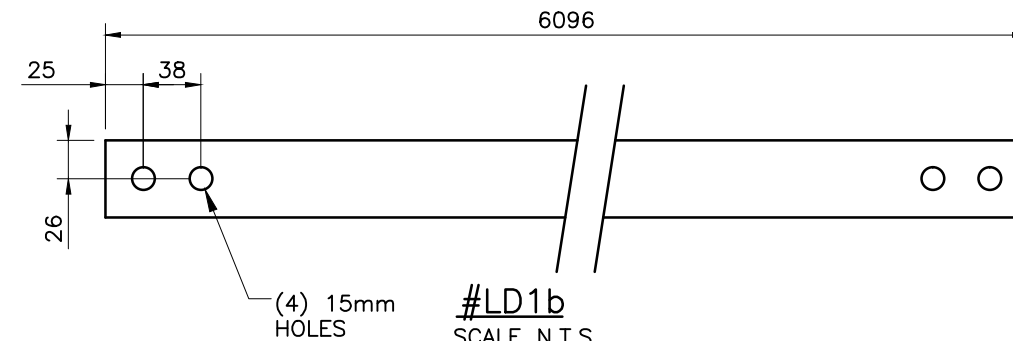
REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION



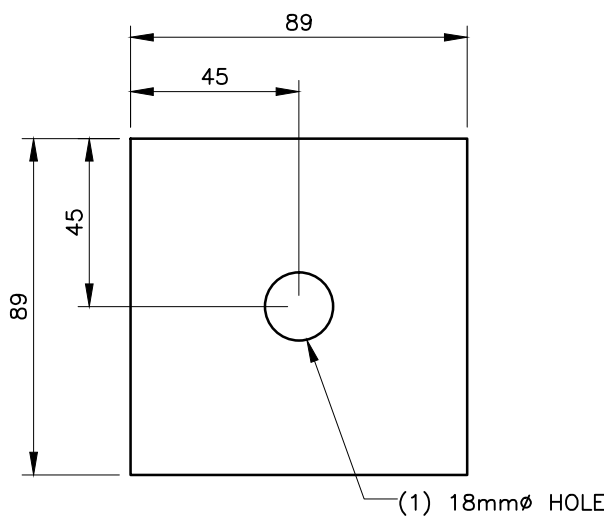
**#LD1**  
 SCALE 1:10 (11"x17" SHEET)  
 WELDMENT  
 FINISH: HDG



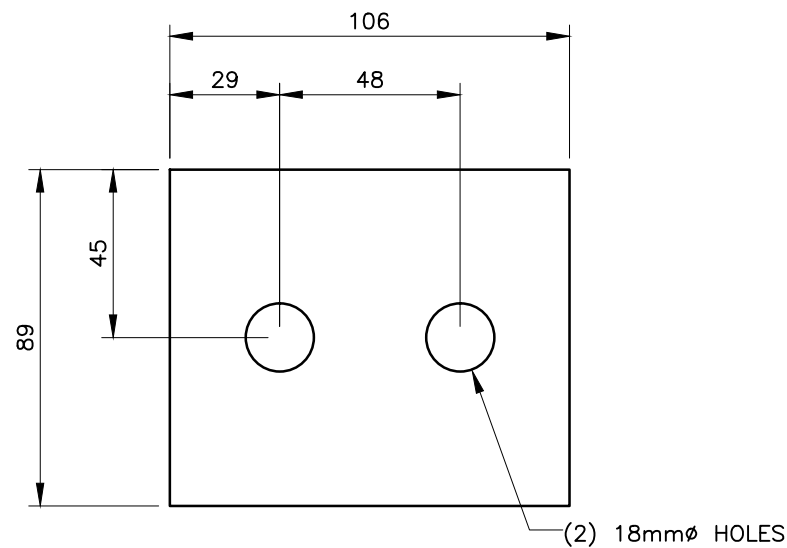
**#LD1a**  
 SCALE 1:5 (11"x17" SHEET)  
 SR19  
 MATERIAL: CSA G40.21 300W  
 QTY: 20



**#LD1b**  
 SCALE N.T.S.  
 FB51x8  
 MATERIAL: CSA G40.21 300W  
 QTY: 2



**#S2 - SPACER PLATE**  
 SCALE 1:2 (11"x17" SHEET)  
 FB. 89x13mm  
 MATERIAL: CSA G40.21 300W  
 FINISH: HDG



**#SH2 - SHIM PLATE**  
 SCALE 1:2 (11"x17" SHEET)  
 FB. 89x3mm  
 MATERIAL: CSA G40.21 300W  
 FINISH: HDG



CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
 ERIC GLYNN  
 PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
 TOWER REMEDIATION AND  
 INSTALLATION

SITE NAME:  
 PTARMIGAN, NT

DRAWN BY:  
 PTN

DESIGNED BY:  
 ROBERT MOSS, P.ENG.

APPROVED BY:  
 JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

MEMBER DETAILS -  
 SHEET 19

				PROJECT NUMBER
				50273
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	SHEET F19
REV.	BY	DATE	DESCRIPTION	

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

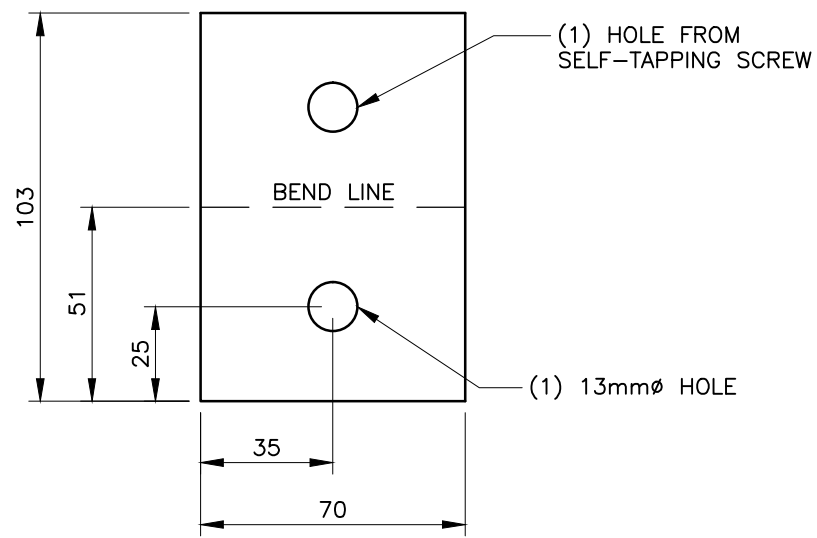
MEMBER DETAILS --  
SHEET 20

PROJECT NUMBER

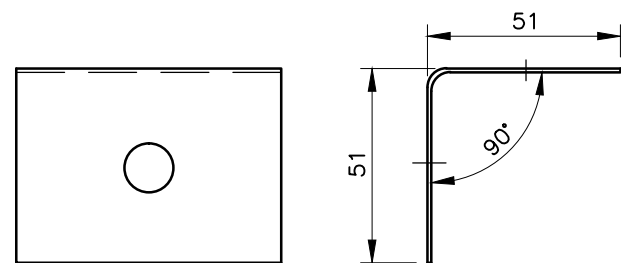
50273

SHEET

F20



UNBENT CONFIGURATION

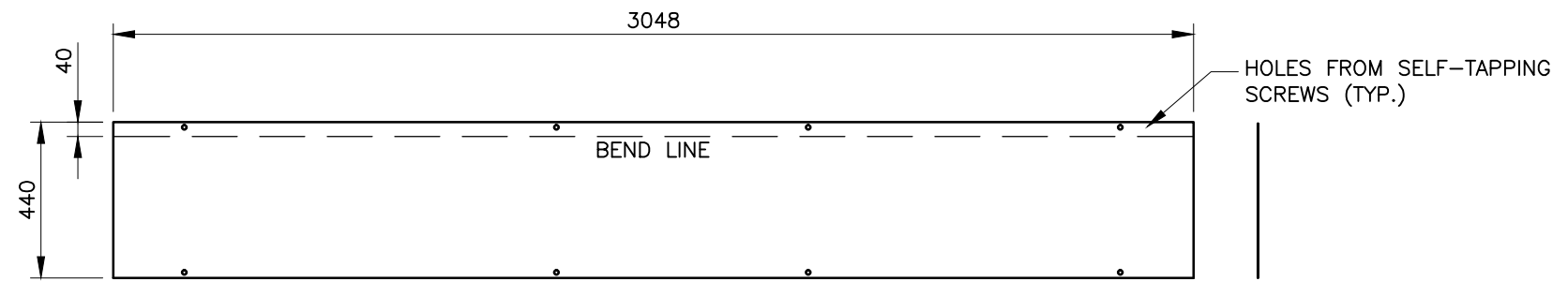


BENT CONFIGURATION

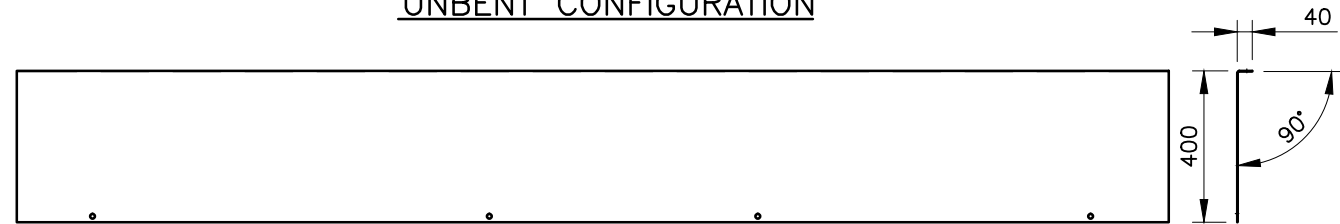
#AC1 - ANTI-CLIMB PLATE

SCALE 1:2 (11"x17" SHEET)

12 GAUGE SHEET METAL  
FINISH: HDG



UNBENT CONFIGURATION

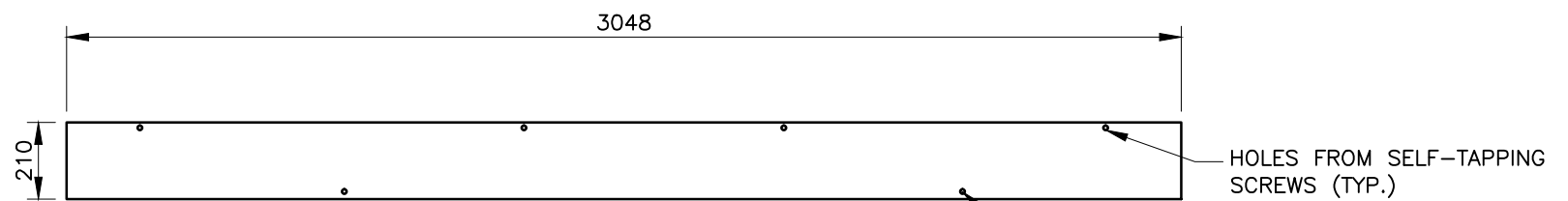


BENT CONFIGURATION

#AC2 - ANTI-CLIMB PLATE

SCALE 1:20 (11"x17" SHEET)

12 GAUGE SHEET METAL  
FINISH: HDG



#AC3 - ANTI-CLIMB PLATE

SCALE 1:20 (11"x17" SHEET)

12 GAUGE SHEET METAL  
FINISH: HDG

FIELD DRILL (2) 13mm $\phi$  HOLES  
FOR #AC4 TO SUIT SITE  
CONDITIONS (ONE PIECE ONLY)

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

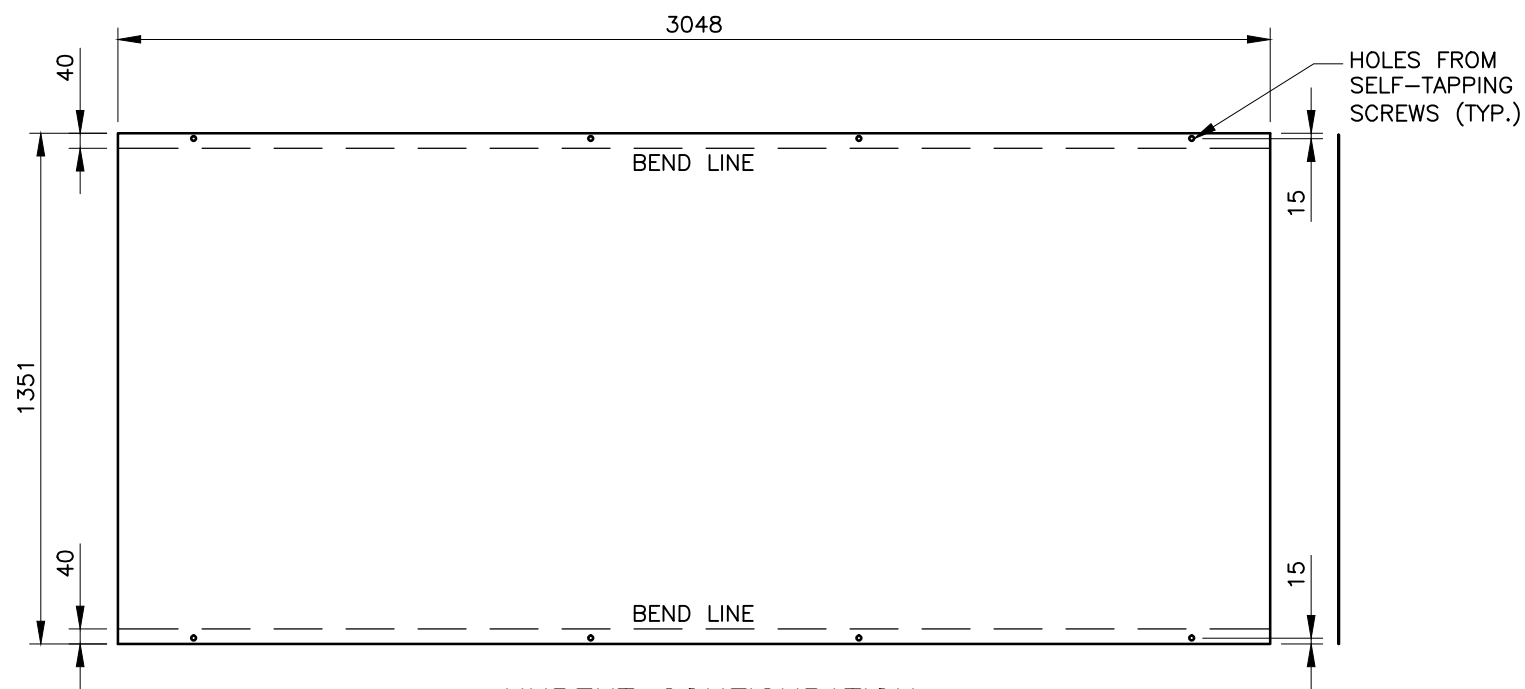
APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL

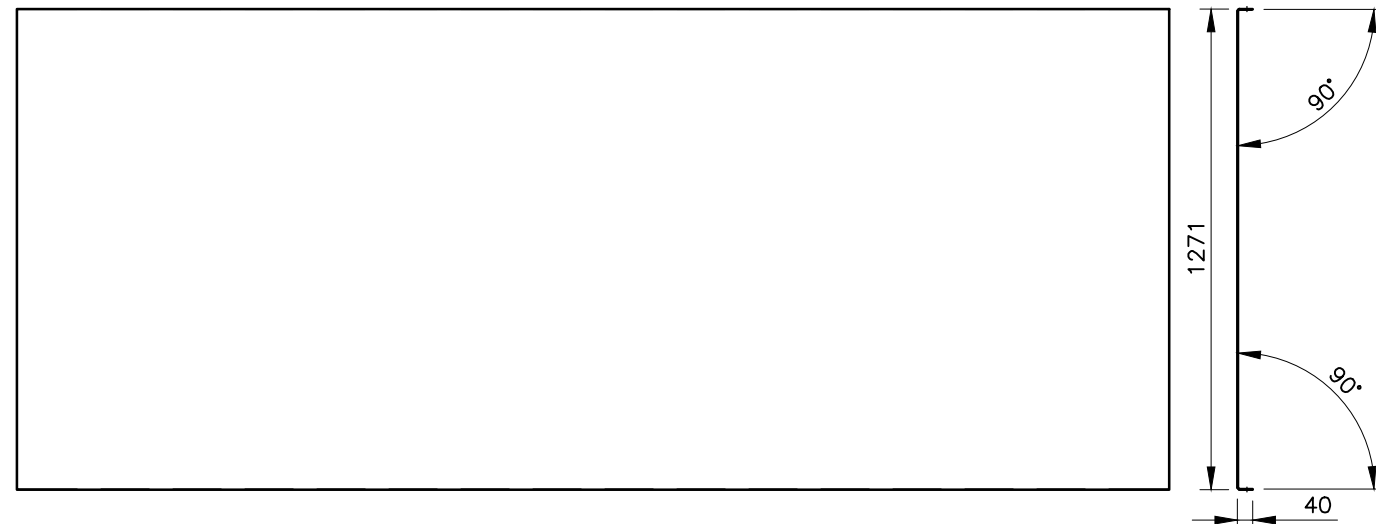


DRAWING TITLE

MEMBER DETAILS --  
SHEET 21



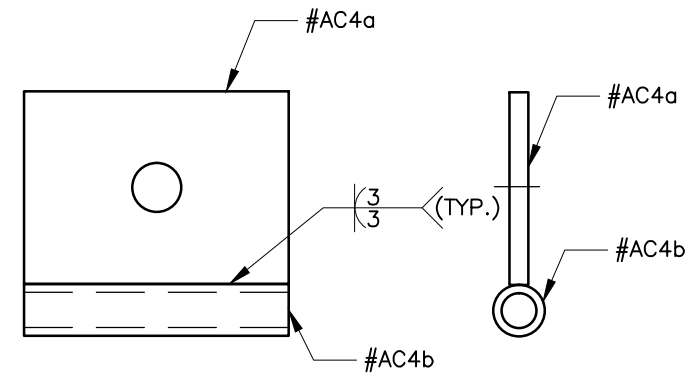
UNBENT CONFIGURATION



BENT CONFIGURATION

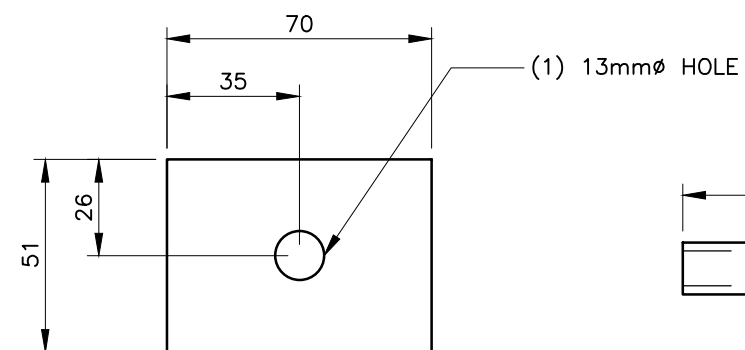
**#AC5 - ANTI-CLIMB PLATE**  
SCALE 1:20 (11"x17" SHEET)

12 GAUGE SHEET METAL  
FINISH: HDG



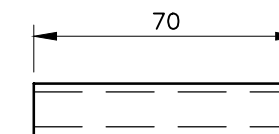
**#AC4 - ANTI-CLIMB WELDMENT**  
SCALE 1:2 (11"x17" SHEET)

WELDMENT  
FINISH: HDG



**#AC4a**  
SCALE 1:2 (11"x17" SHEET)

FB.51x5mm  
MATERIAL: CSA G40.21 300W  
QTY: (1) REQUIRED



**#AC4b**  
SCALE 1:2 (11"x17" SHEET)

SCH40.NPS 1/4 (13.7øx2mm)  
MATERIAL: ASTM A36  
QTY: (1) REQUIRED

REV.	BY	DATE	DESCRIPTION	PROJECT NUMBER
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION	50273



CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

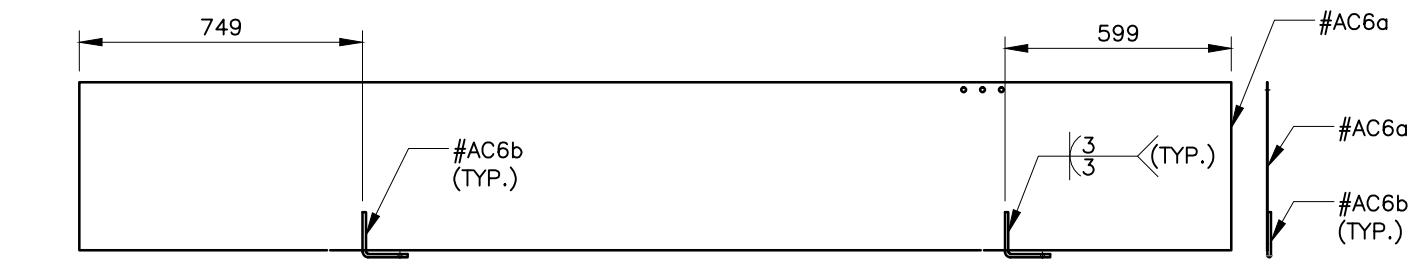
MEMBER DETAILS --  
SHEET 22

PROJECT NUMBER

50273

SHEET

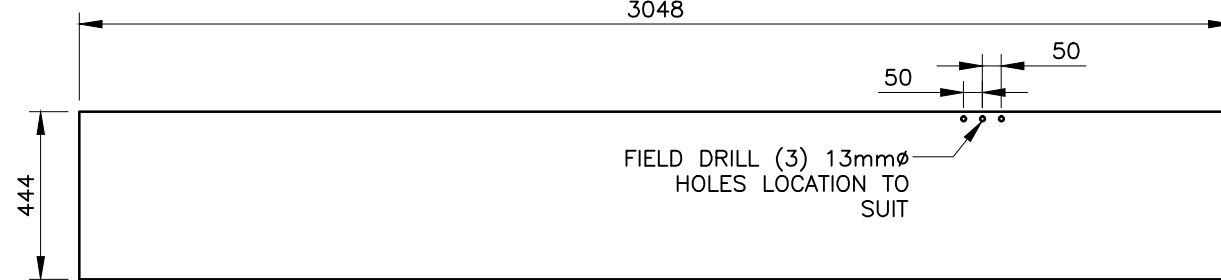
F22



**#AC6 – ANTI-CLIMB WELDMENT**

SCALE 1:20 (11"x17" SHEET)

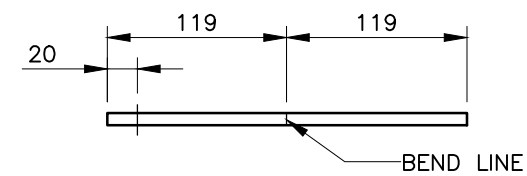
WELDMENT  
FINISH: HDG



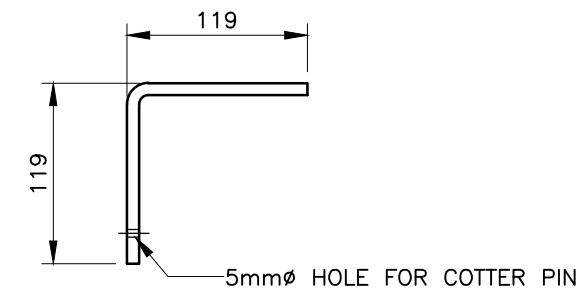
**#AC6a**

SCALE 1:20 (11"x17" SHEET)

12 GAUGE SHEET METAL  
QTY: (1) REQUIRED



**UNBENT CONFIGURATION**

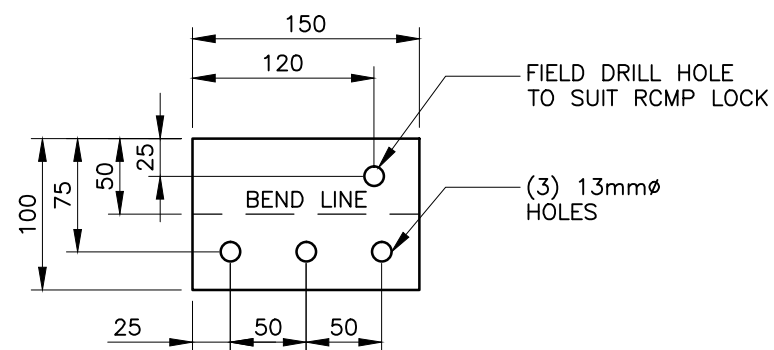


**BENT CONFIGURATION**

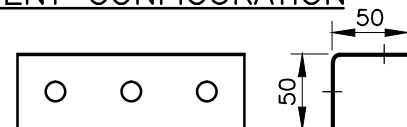
**#AC6b**

SCALE 1:5 (11"x17" SHEET)

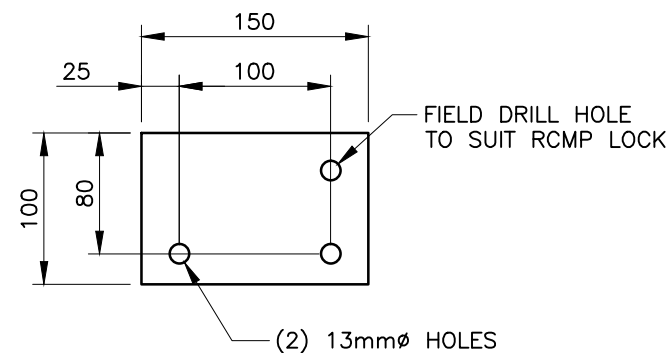
SR 8mmØ  
MATERIAL: CSA G40.21 300W  
QTY: (2) REQUIRED



**UNBENT CONFIGURATION**



**BENT CONFIGURATION**



**#AC8 – ANTI-CLIMB PLATE**

SCALE 1:5 (11"x17" SHEET)

12 GAUGE SHEET METAL  
FINISH: HDG

**#AC7 – ANTI-CLIMB PLATE**

SCALE 1:5 (11"x17" SHEET)

12 GAUGE SHEET METAL  
FINISH: HDG

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

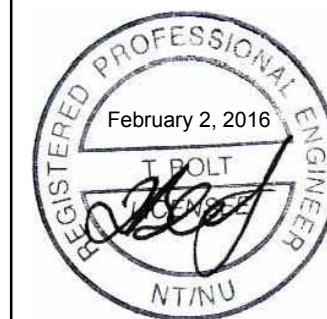
SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



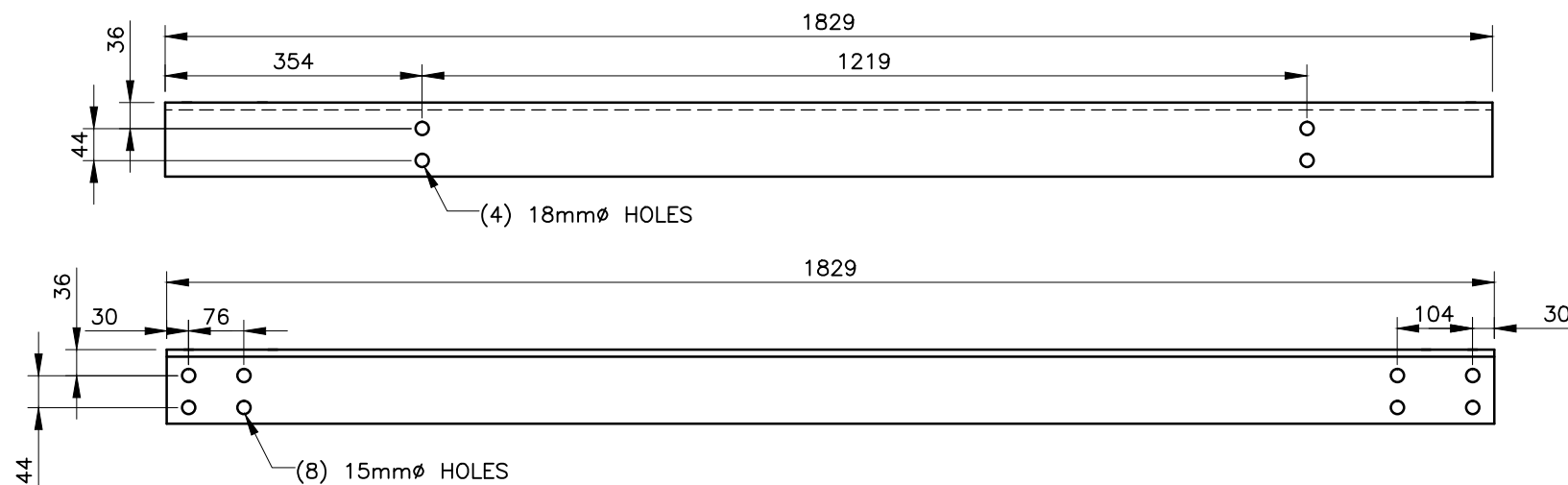
DRAWING TITLE

MEMBER DETAILS --  
SHEET 23

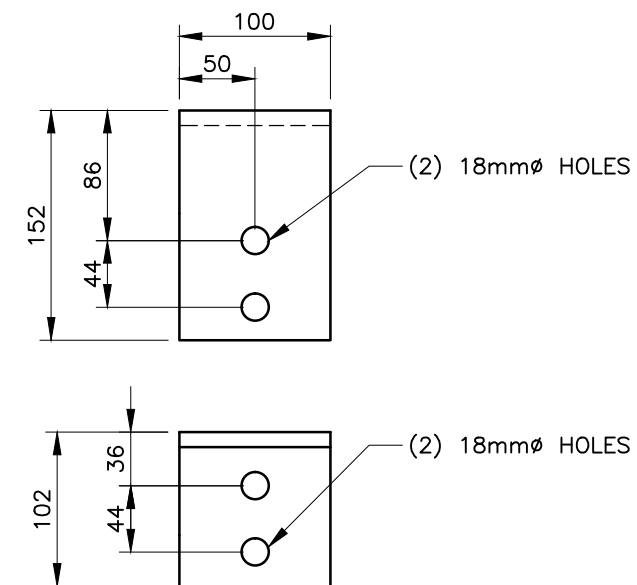
PROJECT NUMBER

50273

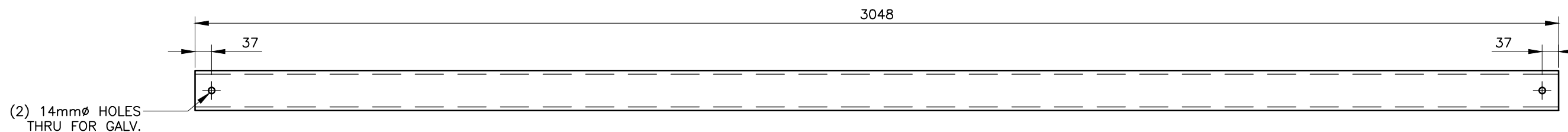
SHEET **F23**



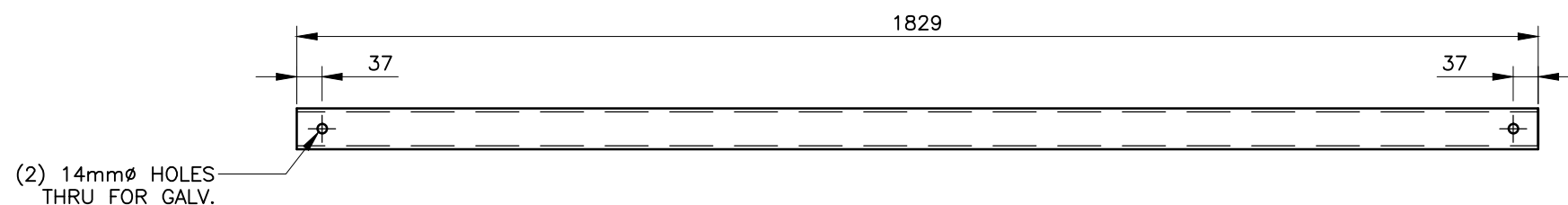
**#FM1 - BOOM ARM**  
SCALE 1:10 (11"x17" SHEET)  
L102x102x10mm  
MATERIAL: CSA G40.21 300W  
FINISH: HDG



**#CL1 - CLIP ANGLE**  
SCALE 1:5 (11"x17" SHEET)  
L152x102x10mm  
MATERIAL: CSA G40.21 300W  
FINISH: HDG



**#PM1 - PIPEMOUNT**  
SCALE 1:10 (11x17" SHEET)  
HSS89Ø x 8mm  
MATERIAL: ASTM A500 GRADE C  
FINISH: HDG



**#PM2 - PIPEMOUNT**  
SCALE 1:10 (11x17" SHEET)  
HSS60Ø x 5mm  
MATERIAL: ASTM A500 GRADE C  
FINISH: HDG

REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

CLIENT INFORMATION



CLIENT PROJECT MANAGER:  
ERIC GLYNN  
PROJECT MANAGER

PROJECT INFORMATION

PROJECT TITLE:  
TOWER REMEDIATION AND  
INSTALLATION

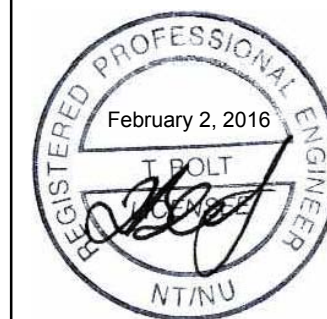
SITE NAME:  
PTARMIGAN, NT

DRAWN BY:  
PTN

DESIGNED BY:  
ROBERT MOSS, P.ENG.

APPROVED BY:  
JORDAN CHASE, BScE.

ENGINEERING SEAL



DRAWING TITLE

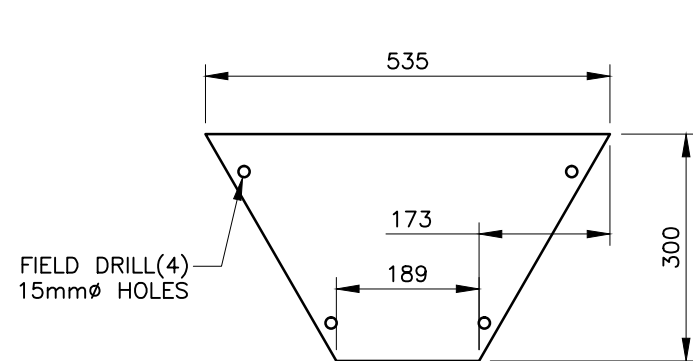
MEMBER DETAILS --  
SHEET 24

PROJECT NUMBER

50273

SHEET

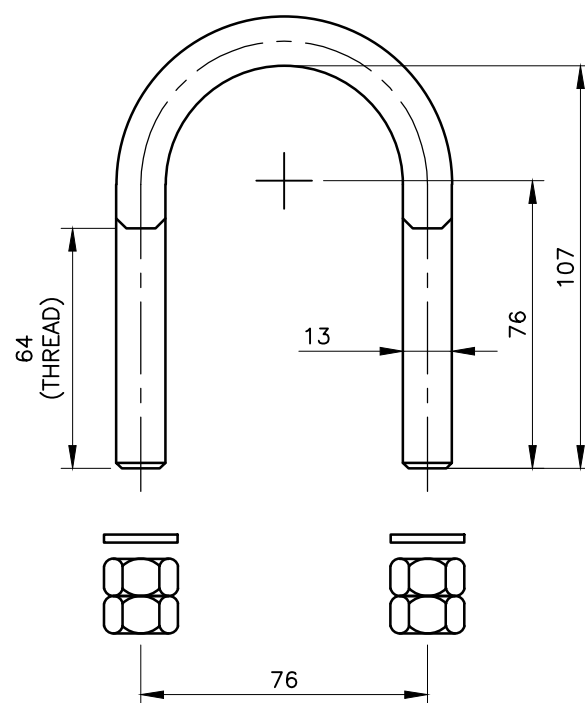
F24



**#SB1 – STROBE BASE PLATE**

SCALE 1:10 (11"x17" SHEET)

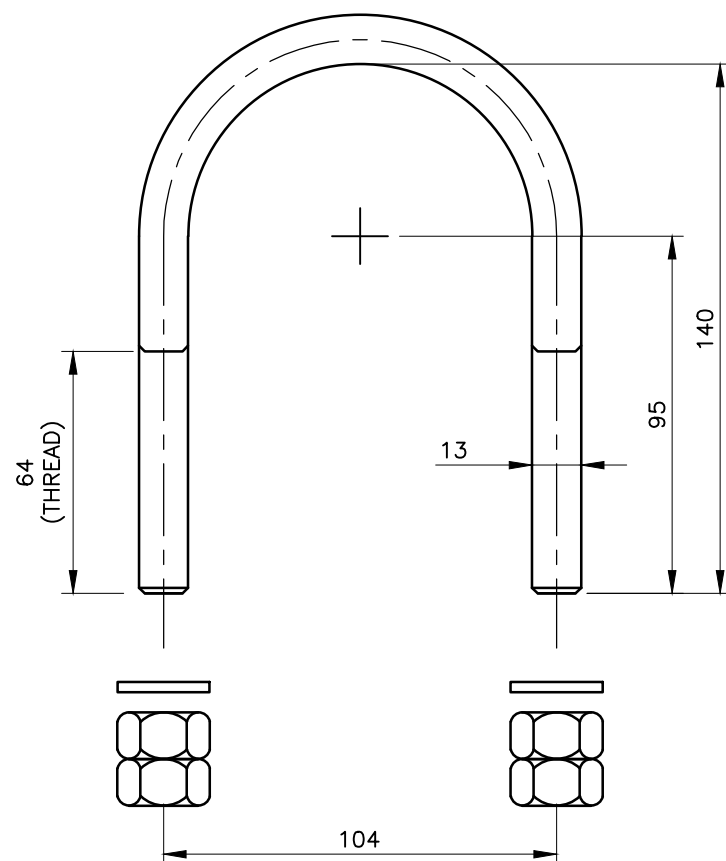
10mm THICK PLATE  
MATERIAL: CSA G40.21 300W  
FINISH: HDG



**#U13-60**

SCALE 1:2 (11"x17" SHEET)

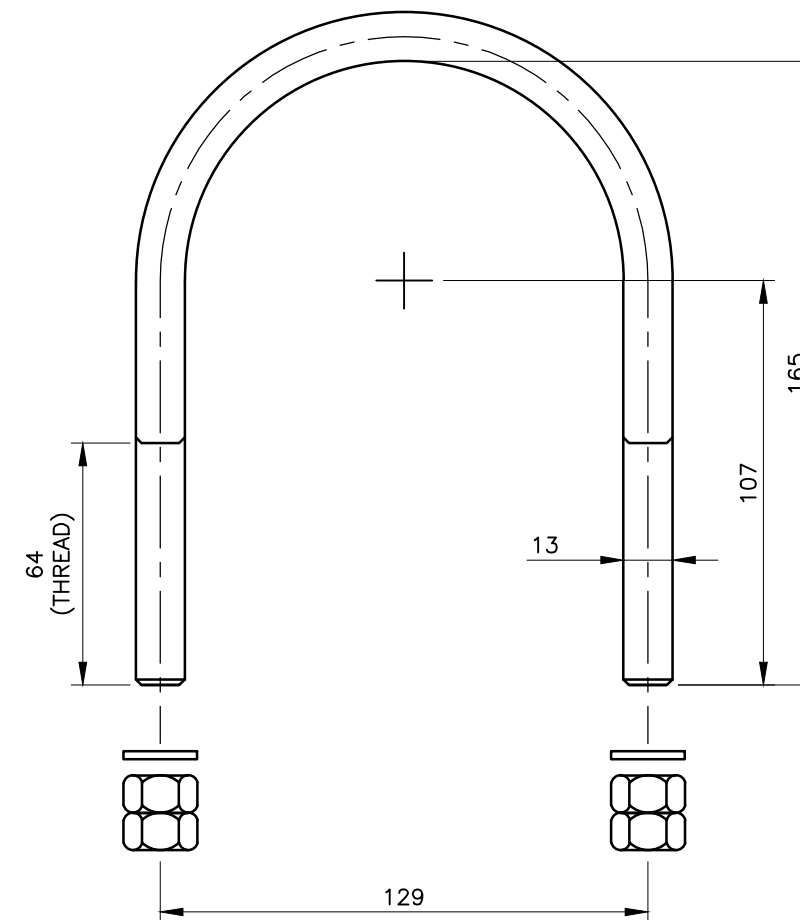
13mm U-BOLT  
MATERIAL: ASTM A307  
NUTS & F.W. Gr.5  
FINISH: HDG



**#U13-89**

SCALE 1:2 (11"x17" SHEET)

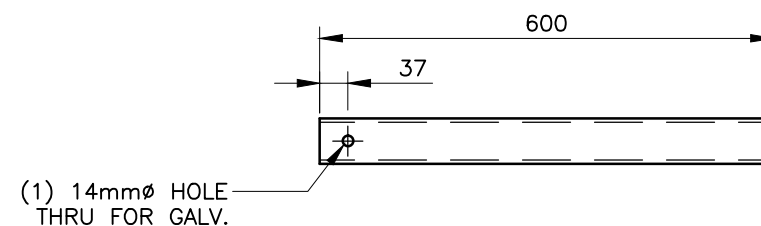
13mm U-BOLT  
MATERIAL: ASTM A307  
NUTS & F.W. Gr.5  
FINISH: HDG



**#U13-114**

SCALE 1:2 (11"x17" SHEET)

13mm U-BOLT  
MATERIAL: ASTM A307  
NUTS & F.W. Gr.5  
FINISH: HDG



**#PM3 – PIPEMOUNT**

SCALE 1:10 (11"x17" SHEET)

HSS60 x 5mm  
MATERIAL: ASTM A500 GRADE C  
FINISH: HDG

**NOTE:**  
ALL U-BOLT KITS TO INCLUDE THE  
FOLLOWING:  
(1) A307 U-BOLT  
(2) Gr.5 FLAT WASHERS  
(4) Gr.5 HEX NUTS

THREADS ARE TO BE ROLLED, NOT CUT

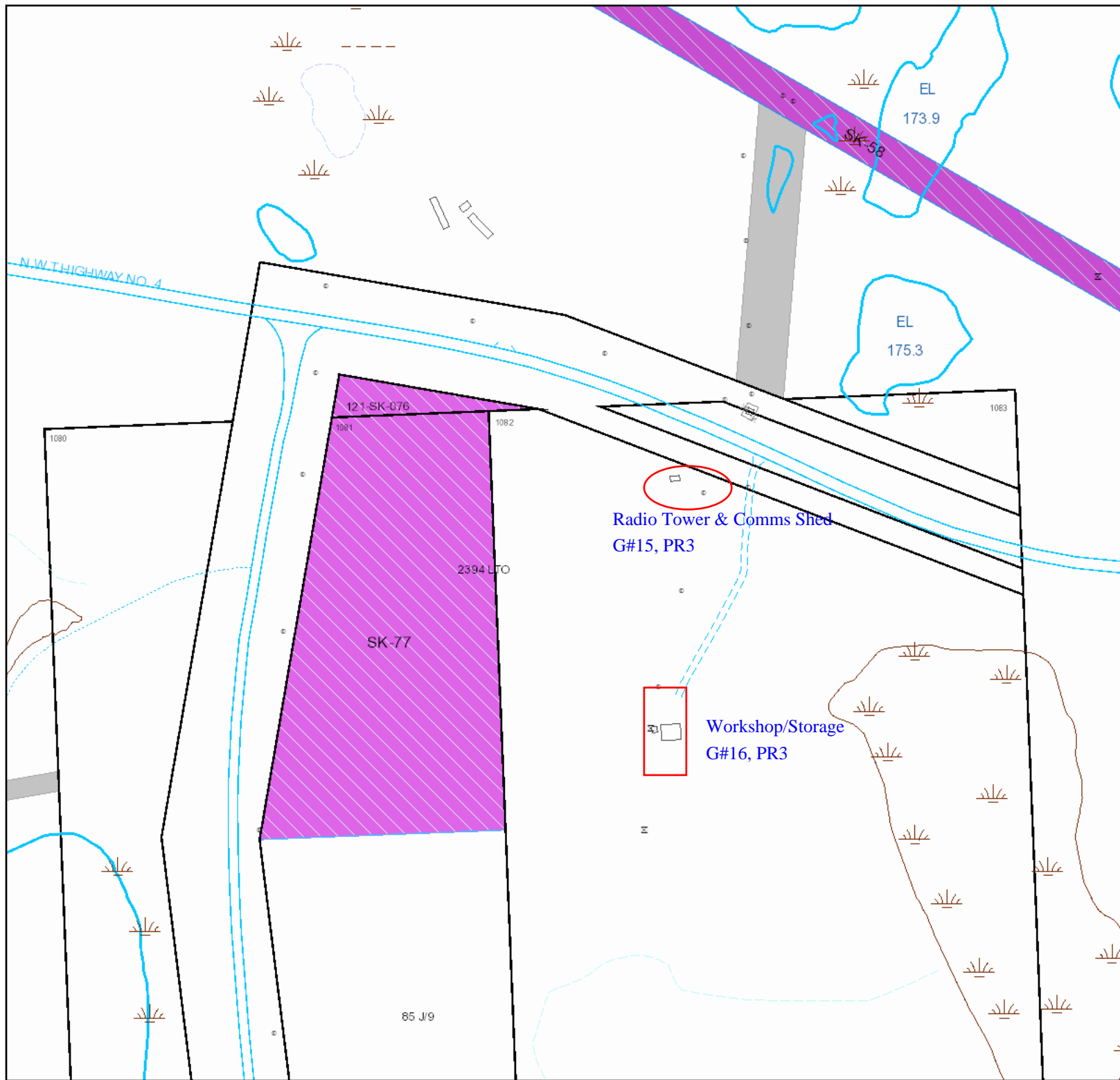
REV.	BY	DATE	DESCRIPTION
0	PTN	2016-01-29	ISSUED FOR CONSTRUCTION

# RCMP RR Ptarmigan

## Legend

- Unsurveyed Sketch
- Unsurveyed Federal Sketch
- Unsurveyed Commissioner's Sketch
- Unsurveyed Municipal Sketch
- Unsurveyed Private Sketch
- Unsurveyed IAB Sketch
- Unsurveyed Inuvialuit Sketch
- Surveyed Parcel
- Block Land Transfer
- Municipal Boundary
- Seismic Reserve
- Watershed Boundaries
- Building Footprint
- Structure Point
  - Pole (Hydro, Light, etc) Marker, Sign
  - Tower, Antenna, Dish
- Structure Line
  - Bridge, Culvert
  - Dock, Retaining Wall, Ramp
  - Fence, Gate, Guide Rail
  - Park, Recreation Area, Cemetary
  - Pipeline (Subsurface), Hydrant, Manhole
  - Pipeline (Surface) Outdoors
  - Pit, Borrow Site, Quarry, Dump Site
  - Pole (Hydro, Light, etc) Marker, Sign
  - Tower, Antenna, Dish
- Structure Polygon
  - Park, Recreation Area, Cemetary
  - Pit, Borrow Site, Quarry, Dump Site
  - Pole (Hydro, Light, etc) Marker, Sign
  - Tower, Antenna, Dish
- Transportation Labels
- Transportation Line
  - Access Road or Other Travelled Area
  - Asphalt Road
  - Closed Road
  - Gravel Road

Scale 1:2,607  
 Date July 07, 2011



# Site-Specific 10-yr. Wind Pressure Report (V2.1 2016-01-04 Format)

## Site Information:

Name: Yellowknife, YT  
 Latitude: 62° 30' 15.6" N  
 Longitude: 114° 16' 52.8" W  
 Tower Height (m): 91.4  
 Elevation MSL (m): 168

## Results:

**Note:** Following direction from the S37 Committee,  $Q_e$  can no longer be provided.

$Q_{nbc}$ (Pa): 360	$Q_{nbc} = 360(Z/10)^{0.2}$	$V_{nbc} = 52.79$ mph
Icing: As per CAN/CSA S37-13		
$Q_{Min}$ (Pa) 250	$Q_{Min} = 250(Z/10)^{0.2}$	$V_{Min} = 43.99$ mph

## Wind Pressure Formula (for z in metres and result in Pa):

$$Q_h = 0.12919 \{ [0.0000 e^{(-0.0000 z)} + 1.0000 \ln(z/0.3000) / \ln(z/0.3000)] 46.92 \}^2 (z/10)^{0.259}$$

## Profile Formula General Form:

$$Q_h = 0.12919 \{ [a_1 e^{(-a_2 z)} + a_3 \ln(z/z_h) / \ln(z/z_{01})] v_{01} \}^2 (z/10)^{0.259}$$

## Site Values of Coefficients:

$$a_1 = 0.0000, a_2 = 0.0000, a_3 = 1.0000, z_h = 0.3000, z_{01} = 0.3000, v_{01} = 46.92 \text{ mph}$$

## Definitions

**Tower Height:** Height of the tower from ground level at the base of the tower to the top of the structure.

**$Q_{nbc}$ :** Regionally representative reference wind pressure at 10 m in the format of the National Building Code of Canada and the  $Q_{nbc}$  value is profiled with the  $z/10$  power law.

**$Q_{Min}$ :** Minimum reference wind pressure (320 Pa, 300 Pa, and 250 Pa for the 50-year, 30-year, and 10-year return periods respectively) profiled with the  $z/10$  power law as per Section 5.4.1 of S37-13.

**Wind Pressure Formula:** Formula for the design wind pressure as a function of height. (Ref.: S37-13, 5.3.1)

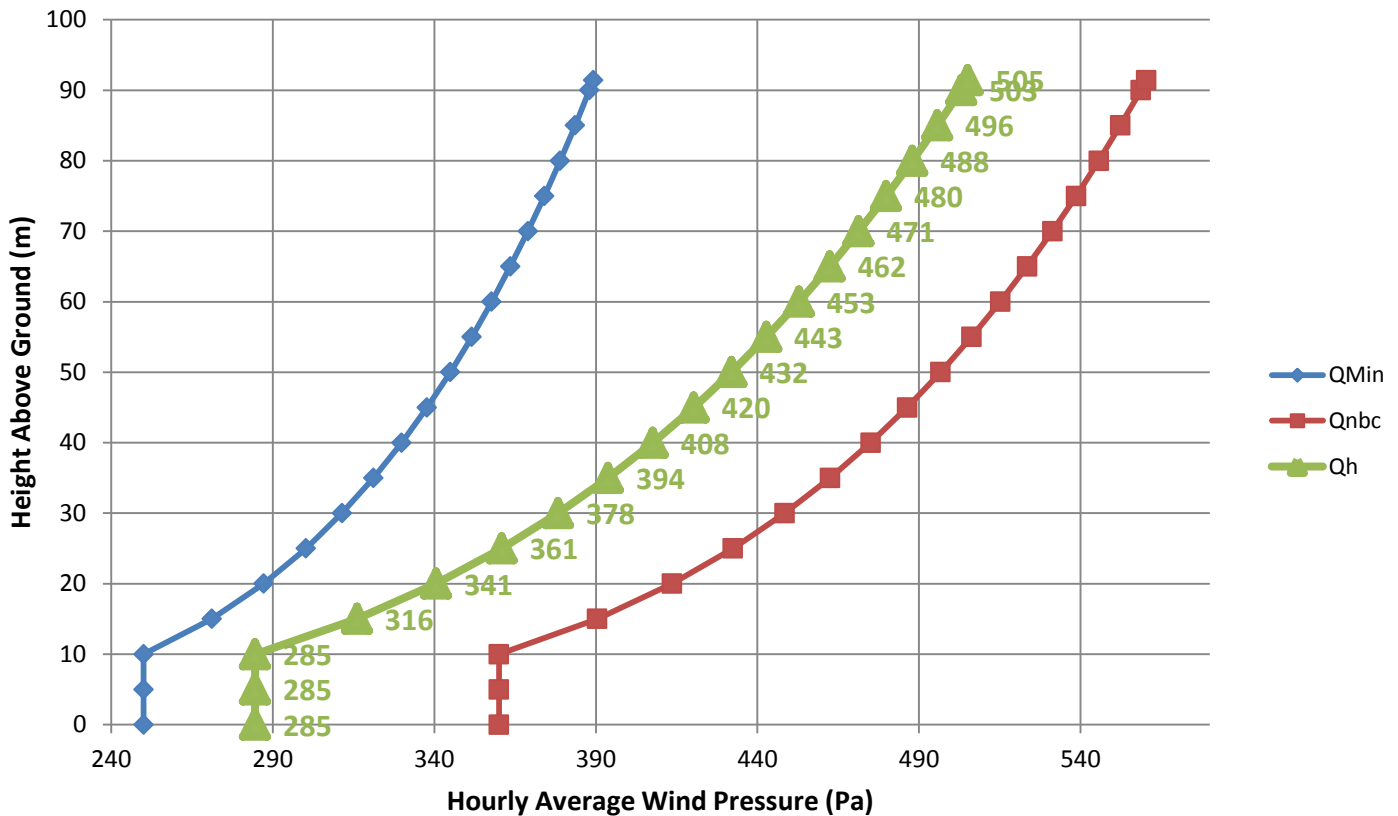
**Height (Z):** the vertical distance (m) above ground level at the base of the tower.

**Note:** No wind pressure value less than 90% of the value at 10 m should be used for heights less than 10 m a.g.l.

These wind pressures were evaluated using a version of the methods described by Taylor and Lee (1984) "Simple Guidelines for Estimating Wind Speed Variations Due to Small Scale Topographic Features", Climatological Bulletin 18 2, using the Boyd (1969) analysis of thirty year return period wind speeds (which is also used for the National Building Code of Canada), modified by a technique described by Wieringa (1980) "Representativeness of Wind Observations at Airports" Bulletin of the American Meteorological Society, 61 9, as input data. The uncertainty in NBCC regionally representative reference wind pressures is about [+15%,-15%].

Environment Canada has not made and does not make any representations or warranties, either expressed or implied, arising by law or otherwise, respecting the accuracy of recommended climatic information. In no event will Environment Canada be responsible for any prejudice, loss or damages which may occur as a result of the use of design wind pressure recommendations.

10-yr. Wind Pressure Profile Graph for Yellowknife, YT 91.4m Tower



$Q_{nbc}$  Profile: Regionally representative reference wind profiled with the  $z^{2/10}$  power law.

$Q_{Min}$  Profile: Minimum site-specific wind pressure (320 Pa, 300 Pa, and 250 Pa for the 50-year, 30-year, and 10-year return periods respectively) profiled with the  $z^{2/10}$  power law.

$Q_h$  Profile: The site-specific wind pressure profile directly from the Taylor and Lee (1984) simple guidelines.

**Explanatory notes regarding the new report format and changes to calculation methods.**

1. The most significant change from the previous versions of the reports is that the exponent used in the  $Q_h$  equation is no longer fixed at 0.2. The exponent now varies continuously from 0.2 for open terrain to 0.32 for closed terrain.
2. A new  $Q_{min}$  profile has been added to the graphs and it represents the minimum acceptable reference wind pressure profile. It starts with the minimum 10-metre reference wind pressure of 320 Pa for a 50-year return period as per section 5.4.1 of S37-13 and then uses the same  $z^{2/10}$  power law formulation as the  $Q_{NBC}$  profile to generate the curve. The corresponding 10-metre reference wind pressures for the 10-year and 30-year return periods are 250 Pa and 300 Pa respectively.
3.  $Q_h$  will always be plotted even when they are less than  $Q_{Min}$ . This will allow designers to see how  $Q_h$  varies over the height of the tower. Also, in rough terrain and for taller towers, the  $Q_h$  profile might cross the  $Q_{Min}$  profile.
4. The coefficients for the  $Q_h$  equation will now always be given regardless of the  $Q_{NBC}$  or  $Q_{Min}$  values.
5. The wind speeds will be given for each of the 4 equations ( $Q_h$ ,  $Q_{NBC}$ , or  $Q_{Min}$ ) too.

# Site-Specific 30-yr. Wind Pressure Report (V2.1 2016-01-04 Format)

## Site Information:

Name: Yellowknife, YT  
 Latitude: 62° 30' 15.6" N  
 Longitude: 114° 16' 52.8" W  
 Tower Height (m): 91.4  
 Elevation MSL (m): 168

## Results:

**Note:** Following direction from the S37 Committee,  $Q_e$  can no longer be provided.

$Q_{nbc}$ (Pa): 430	$Q_{nbc} = 430(Z/10)^{0.2}$	$V_{nbc} = 57.69$ mph
Icing: As per CAN/CSA S37-13		
$Q_{Min}$ (Pa) 300	$Q_{Min} = 300(Z/10)^{0.2}$	$V_{Min} = 48.19$ mph

## Wind Pressure Formula (for z in metres and result in Pa):

$$Q_h = 0.12919 \{ [0.0000 e^{(-0.0000 z)} + 1.0000 \ln(z/0.3000) / \ln(z/0.3000)] 51.35 \}^2 (z/10)^{0.259}$$

## Profile Formula General Form:

$$Q_h = 0.12919 \{ [a_1 e^{(-a_2 z)} + a_3 \ln(z/z_h) / \ln(z/z_{01})] v_{01} \}^2 (z/10)^{0.259}$$

## Site Values of Coefficients:

$$a_1 = 0.0000, a_2 = 0.0000, a_3 = 1.0000, z_h = 0.3000, z_{01} = 0.3000, v_{01} = 51.35 \text{ mph}$$

## Definitions

**Tower Height:** Height of the tower from ground level at the base of the tower to the top of the structure.

**$Q_{nbc}$ :** Regionally representative reference wind pressure at 10 m in the format of the National Building Code of Canada and the  $Q_{nbc}$  value is profiled with the  $z/10$  power law.

**$Q_{Min}$ :** Minimum reference wind pressure (320 Pa, 300 Pa, and 250 Pa for the 50-year, 30-year, and 10-year return periods respectively) profiled with the  $z/10$  power law as per Section 5.4.1 of S37-13.

**Wind Pressure Formula:** Formula for the design wind pressure as a function of height. (Ref.: S37-13, 5.3.1)

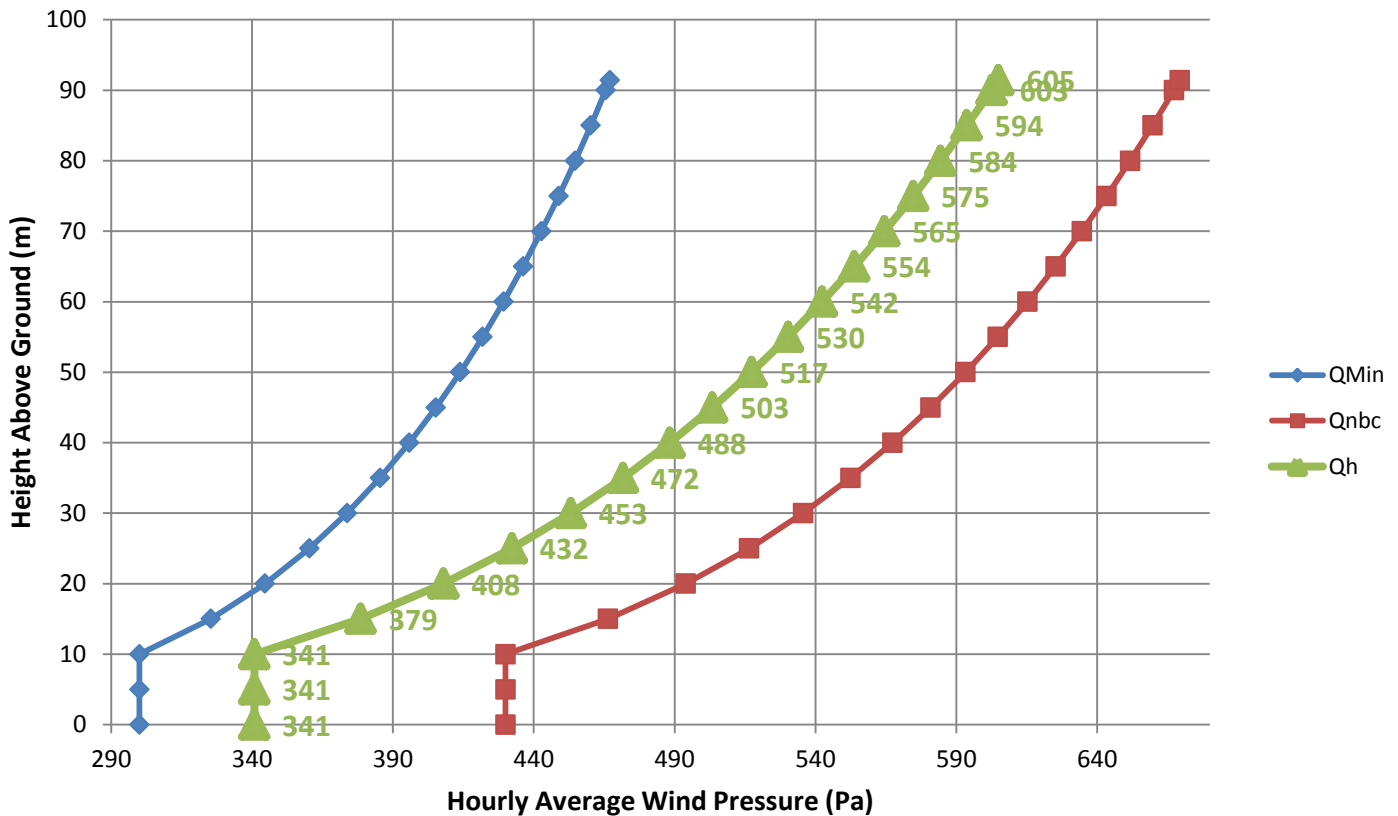
**Height (Z):** the vertical distance (m) above ground level at the base of the tower.

**Note:** No wind pressure value less than 90% of the value at 10 m should be used for heights less than 10 m a.g.l.

These wind pressures were evaluated using a version of the methods described by Taylor and Lee (1984) "Simple Guidelines for Estimating Wind Speed Variations Due to Small Scale Topographic Features", Climatological Bulletin 18 2, using the Boyd (1969) analysis of thirty year return period wind speeds (which is also used for the National Building Code of Canada), modified by a technique described by Wieringa (1980) "Representativeness of Wind Observations at Airports" Bulletin of the American Meteorological Society, 61 9, as input data. The uncertainty in NBCC regionally representative reference wind pressures is about [+15%,-15%].

Environment Canada has not made and does not make any representations or warranties, either expressed or implied, arising by law or otherwise, respecting the accuracy of recommended climatic information. In no event will Environment Canada be responsible for any prejudice, loss or damages which may occur as a result of the use of design wind pressure recommendations.

30-yr. Wind Pressure Profile Graph for Yellowknife, YT 91.4m Tower



$Q_{nbc}$  Profile: Regionally representative reference wind profiled with the  $z/10$  power law.

$Q_{Min}$  Profile: Minimum site-specific wind pressure (320 Pa, 300 Pa, and 250 Pa for the 50-year, 30-year, and 10-year return periods respectively) profiled with the  $z/10$  power law.

$Q_h$  Profile: The site-specific wind pressure profile directly from the Taylor and Lee (1984) simple guidelines.

**Explanatory notes regarding the new report format and changes to calculation methods.**

1. The most significant change from the previous versions of the reports is that the exponent used in the  $Q_h$  equation is no longer fixed at 0.2. The exponent now varies continuously from 0.2 for open terrain to 0.32 for closed terrain.
2. A new  $Q_{min}$  profile has been added to the graphs and it represents the minimum acceptable reference wind pressure profile. It starts with the minimum 10-metre reference wind pressure of 320 Pa for a 50-year return period as per section 5.4.1 of S37-13 and then uses the same  $z/10$  power law formulation as the  $Q_{NBC}$  profile to generate the curve. The corresponding 10-metre reference wind pressures for the 10-year and 30-year return periods are 250 Pa and 300 Pa respectively.
3.  $Q_h$  will always be plotted even when they are less than  $Q_{Min}$ . This will allow designers to see how  $Q_h$  varies over the height of the tower. Also, in rough terrain and for taller towers, the  $Q_h$  profile might cross the  $Q_{Min}$  profile.
4. The coefficients for the  $Q_h$  equation will now always be given regardless of the  $Q_{NBC}$  or  $Q_{Min}$  values.
5. The wind speeds will be given for each of the 4 equations ( $Q_h$ ,  $Q_{NBC}$ , or  $Q_{Min}$ ) too.



# Site-Specific 50-yr. Wind Pressure Report (V2.1 2016-01-04 Format)

## Site Information:

Name: Yellowknife, YT  
 Latitude: 62° 30' 15.6" N  
 Longitude: 114° 16' 52.8" W  
 Tower Height (m): 91.4  
 Elevation MSL (m): 168

## Results:

**Note:** Following direction from the S37 Committee,  $Q_e$  can no longer be provided.

$Q_{nbc}$ (Pa): 470	$Q_{nbc} = 470(Z/10)^{0.2}$	$V_{nbc} = 60.32$ mph
Icing: As per CAN/CSA S37-13		
$Q_{Min}$ (Pa) 320	$Q_{Min} = 320(Z/10)^{0.2}$	$V_{Min} = 49.77$ mph

## Wind Pressure Formula (for z in metres and result in Pa):

$$Q_h = 0.12919 \{ [0.0000 e^{(-0.0000 z)} + 1.0000 \ln(z/0.3000) / \ln(z/0.3000)] 53.38 \}^2 (z/10)^{0.259}$$

## Profile Formula General Form:

$$Q_h = 0.12919 \{ [a_1 e^{(-a_2 z)} + a_3 \ln(z/z_h) / \ln(z/z_{01})] v_{01} \}^2 (z/10)^{0.259}$$

## Site Values of Coefficients:

$$a_1 = 0.0000, a_2 = 0.0000, a_3 = 1.0000, z_h = 0.3000, z_{01} = 0.3000, v_{01} = 53.38 \text{ mph}$$

## Definitions

**Tower Height:** Height of the tower from ground level at the base of the tower to the top of the structure.

**$Q_{nbc}$ :** Regionally representative reference wind pressure at 10 m in the format of the National Building Code of Canada and the  $Q_{nbc}$  value is profiled with the  $z/10$  power law.

**$Q_{Min}$ :** Minimum reference wind pressure (320 Pa, 300 Pa, and 250 Pa for the 50-year, 30-year, and 10-year return periods respectively) profiled with the  $z/10$  power law as per Section 5.4.1 of S37-13.

**Wind Pressure Formula:** Formula for the design wind pressure as a function of height. (Ref.: S37-13, 5.3.1)

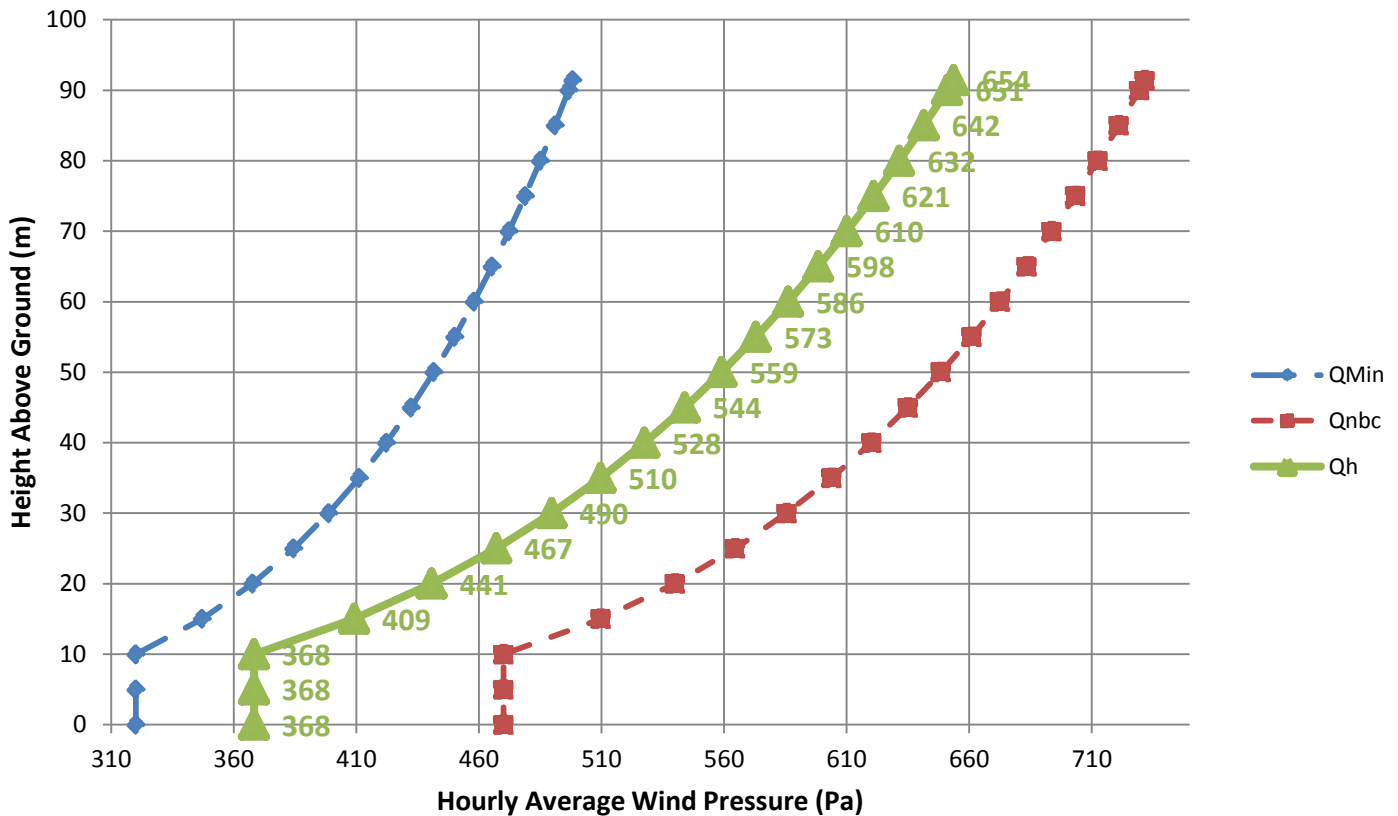
**Height (Z):** the vertical distance (m) above ground level at the base of the tower.

**Note:** No wind pressure value less than 90% of the value at 10 m should be used for heights less than 10 m a.g.l.

These wind pressures were evaluated using a version of the methods described by Taylor and Lee (1984) "Simple Guidelines for Estimating Wind Speed Variations Due to Small Scale Topographic Features", Climatological Bulletin 18 2, using the Boyd (1969) analysis of thirty year return period wind speeds (which is also used for the National Building Code of Canada), modified by a technique described by Wieringa (1980) "Representativeness of Wind Observations at Airports" Bulletin of the American Meteorological Society, 61 9, as input data. The uncertainty in NBCC regionally representative reference wind pressures is about [+15%,-15%].

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50-yr. Wind Pressure Profile Graph for Yellowknife, YT 91.4m Tower



$Q_{nbc}$  Profile: Regionally representative reference wind profiled with the  $^{2/10}$  power law.

$Q_{Min}$  Profile: Minimum site-specific wind pressure (320 Pa, 300 Pa, and 250 Pa for the 50-year, 30-year, and 10-year return periods respectively) profiled with the  $^{2/10}$  power law.

$Q_h$  Profile: The site-specific wind pressure profile directly from the Taylor and Lee (1984) simple guidelines.

**Explanatory notes regarding the new report format and changes to calculation methods.**

1. The most significant change from the previous versions of the reports is that the exponent used in the  $Q_h$  equation is no longer fixed at 0.2. The exponent now varies continuously from 0.2 for open terrain to 0.32 for closed terrain.
2. A new  $Q_{min}$  profile has been added to the graphs and it represents the minimum acceptable reference wind pressure profile. It starts with the minimum 10-metre reference wind pressure of 320 Pa for a 50-year return period as per section 5.4.1 of S37-13 and then uses the same  $^{2/10}$  power law formulation as the  $Q_{NBC}$  profile to generate the curve. The corresponding 10-metre reference wind pressures for the 10-year and 30-year return periods are 250 Pa and 300 Pa respectively.
3.  $Q_h$  will always be plotted even when they are less than  $Q_{Min}$ . This will allow designers to see how  $Q_h$  varies over the height of the tower. Also, in rough terrain and for taller towers, the  $Q_h$  profile might cross the  $Q_{Min}$  profile.
4. The coefficients for the  $Q_h$  equation will now always be given regardless of the  $Q_{NBC}$  or  $Q_{Min}$  values.
5. The wind speeds will be given for each of the 4 equations ( $Q_h$ ,  $Q_{NBC}$ , or  $Q_{Min}$ ) too.