Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

December 5, 2016

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: **Notice of Exempt Modification for AT&T/ LTE 3C Crown Site BU: 829046**
AT&T Site ID: CT2099
56 Norfield Road, Weston, CT 06883
Latitude: 41° 12' 8.4" / Longitude: -73° 22' 46.6"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 163-foot level of the existing 190-foot monopole at 56 Norfield Road in Weston, CT. The tower is owned by Crown Castle. The property is owned by the Town of Weston. AT&T intends to replace three (3) RRU12/A2s with three (3) RRU32 B2s, as well as, add two (2) DC and one (1) Fiber cables.

A request for original zoning documents was sent to the Town of Weston but has not been answered.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to Ms. Nina Daniel, First-Selectman, Town of Weston as well as the property owner, and tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeffrey Barbadora.

Sincerely,

Jeffrey Barbadora
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
781-729-0053
Jeff.Barbadora@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: Ms. Nina Daniel, First-Selectman
Town of Weston
PO Box 1007
Weston, CT 06883

Town of Weston
PO Box 1007
Weston, CT 06883

Town of Weston, CT

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Owner and Parcel Information

Owner Name	TOWN OF WESTON TOWN HALL & FIRE DEPARTMENT	**Today's Date**	December 5, 2016
Mailing Address	56 NORFIELD ROAD	**Parcel ID**	13094 (Account #: E00130)
	WESTON, CT 06883	**Map/Block/Lot**	22/6/28
Location Address	56 NORFIELD ROAD		
Subdivision Map / Lot	/	**Acreage**	0.00
Use Class / Description	901 Municipal	**Subdivision**	

Current Appraised Value Information

Building Value	XF Value	OB Value	Land Value	Special Land Value	Total Appraised Value	Net Appraised Value	Current Assessment
$ 3,796,500	$ 0	$ 26,800	$ 0		$ 3,823,300	$ 3,823,300	$ 2,676,300

Assessment History

Year	Building	OB/Misc	Land	Total Assessment
2015	$ 2,657,600	$ 18,700	0	$ 2,676,300
2014	$ 2,657,600	$ 18,700	0	$ 2,676,300
2013	$ 2,657,600	$ 18,700	0	$ 2,676,300

Land Information

Use	Class	Area	Value
Municipal	E	0 AC	

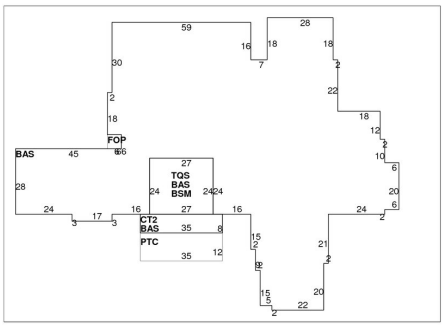
Commercial Building Information

Style	Year Built	Eff Year Built	Gross Area	Stories	Grade	Exterior Wall	Interior Wall	Wall Height	# Units
Library	1963	1993	13,500	1	B+	Stone/Masonry	Drywall	10	1
Roof Cover	**Roof Structure**	**Floor Type**	**Heat Type**	**Heat Fuel**	**AC Type**	**Sprinkler**	**Construction**	**Plumbing**	**Comm Walls**
Wood Shingle	Gable	Carpet Vinyl/Asphalt	Oil	Forced Air	Heat/AC Split	%	Masonry	Average	0%

Building Sub Areas

Code	Description	Living Area	Gross Area
BAS	First Floor	11,468	11,468
BSM	Basement Area	0	648
CT2	Cath. Ceil 2 St.	0	280
FOP	Framed Open Porch	0	36
PTC	Patio - Concrete	0	420
TQS	Three Quarter Story	486	648
	Totals	**11,954**	**13,500**

Building Sketch Enlarge



Building Photo Enlarge

Out Buildings / Extra Features

Description	Sub Description	Area	Year Built	Value
Paving Asph.		9,000 S.F.	2008	$ 21,900
Light (1)		1 UNITS	2008	$ 2,000
Light (2)		1 UNITS	2008	$ 2,900

Sale Information

Sale Date	Sale Price	Deed Book/Page	Sale Qualification	Reason	Vacant or Improved	Owner
00/00/0000						TOWN OF WESTON TOWN HALL & FIRE DEPARTMENT

Permit Information

Permit ID	Issue Date	Type	Description	Amount	Inspection Date	% Complete	Date Complete	Comments
7737	04/20/2016					100	04/20/2016	INSULATION
7604	06/08/2015			$ 15,000		100	03/29/2016	T-MOBILE
7099	10/16/2012				07/31/2013	100	12/06/2012	RENOVATE ONION BARN
7056	07/09/2012			$ 130,592		100		CELL TOWERS
6776	09/14/2010			$ 186,338		100		ROOFING
6739	06/28/2010			$ 13,000		100	06/01/2011	ANTENNAE PANELS
5787	07/14/2005					100		SEE PERMIT

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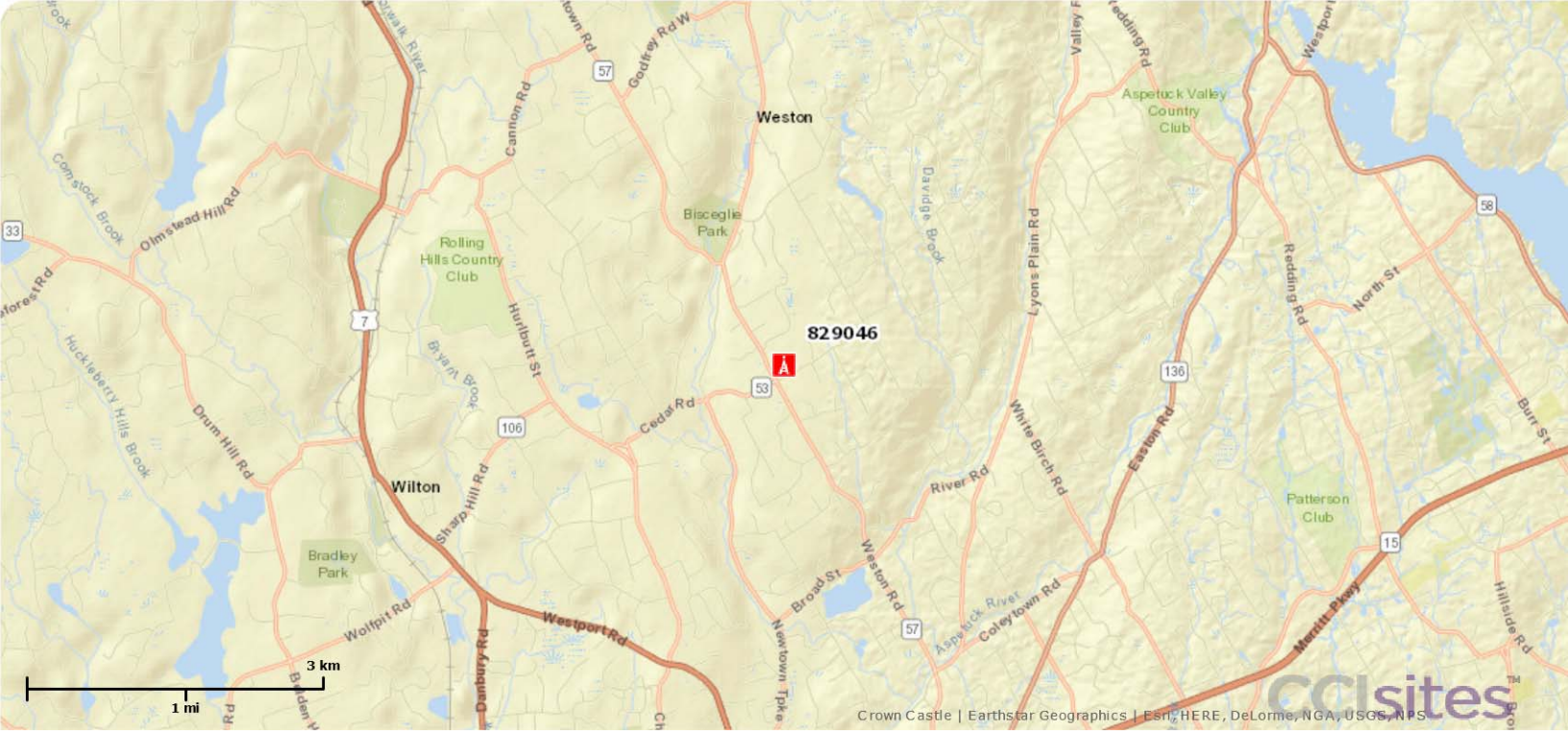

829046
Weston
Wilton
Bisceglie Park
Rolling Hills Country Club
Aspetuck Valley Country Club
Patterson Club
Bradley Park
Cannon Rd
Godfrey Rd W
Olmstead Hill Rd
Hurlbutt St
Cedar Rd
Sharp Hill Rd
Drum Hill Rd
Huckleberry Hills Brook
Bryam Brook
Comstock Brook
Davids Brook
Lyons Plain Rd
White Birch Rd
River Rd
Broad St
Weston Rd
Newtown Turnpike
Coleytown Rd
Aspetuck River
Easton Rd
Redding Rd
North St
Burr St
Hillside Rd
Merritt Pkwy
Wolfpit Rd
Westport Rd
Danbury Rd
3 km
1 mi
Crown Castle | Earthstar Geographics | Esri, HERE, DeLorme, NGA, USGS, NPS
CCIsites

PROJECT TEAM

CLIENT REPRESENTATIVE:

EMPIRE TELECOM
16 ESQUIRE ROAD
BILLERICA, MA 01821
DAVID COOPER
617-639-4908
dcooper@empiretelecomm.com

SITE ACQUISITION & ZONING:

EMPIRE TELECOM
16 ESQUIRE ROAD
BILLERICA, MA 01821
DAVID COOPER
617-639-4908
dcooper@empiretelecomm.com

ENGINEERING:

TRYLON TSF
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 75038
PHONE: 1-855-669-5421

RF ENGINEER:

AT&T MOBILITY - NEW ENGLAND
550 COCHITUATE ROAD
SUITE 550 13 & 14
FRAMINGHAM, MA 01701
CAMERON SYME
508-596-7146
cs6970@att.com

CONSTRUCTION MANAGEMENT:

EMPIRE TELECOM
16 ESQUIRE ROAD
BILLERICA, MA 01821
GRZEGORZ "GREG" DORMAN
484-683-1750
gdorman@empiretelecomm.com

TOWER OWNER:

CROWN CASTLE
12 GILL STREET, SUITE 5800
WOBURN, MA 01801

GENERAL NOTES

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

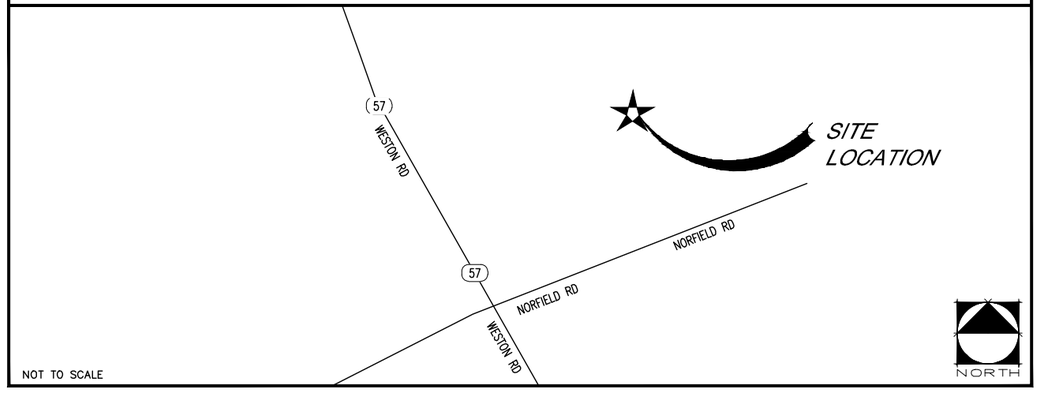
SITE INFORMATION

LATITUDE:	41° 12' 7.86996" N
LONGITUDE:	73° 22' 46.19604" W
LAT./LONG. TYPE:	NAD 83
GROUND ELEVATION:	N/A
APN/UPC:	N/A
AREA OF CONSTRUCTION:	EXISTING
ZONING/JURISDICTION:	CITY OF WESTON
CURRENT ZONING:	N/A
EXISTING USE:	TELECOMMUNICATIONS FACILITY
COUNTY:	FAIRFIELD COUNTY
HANDICAP REQUIREMENTS:	FACILITY IS UNMANNED AND NOT FOR HUMAT HABITATION. HANDICAPPED ACCESS NOT REQUIRED.

at&t Mobility

LTE 1900 BWE
CT2099
WESTON DT
56 NORFIELD ROAD
WESTON, CT 06883
FA CODE: 10035306

VICINITY MAP



DRIVING DIRECTIONS

2099 WESTON POLICE DEPTMERRIT PARKWAY NORTH TO EXIT 42 AT END MAKE RIGHT FOLLOW ROUTE 57 TO NORFIELD RD MAKE RIGHT TAKE SECOND LEFT INTO TOWN OFFICES. FOLLOW TO COMMUNICATION CENTER UNDER MONO-POLE. WE ARE THE DOOR WITH TRACESS LAST ON THE RIGHT FACING COMPOUND.DEMARC IN METER ROOM (KEY IN WITH THE COMMUNICATION CENTER, BEHIND YOU FACING SITE) ADDRESS: 56A NORFIELD RD, WESTON, CONNECTICUTACCESS: 24/7 DOOR COMBO (GET KEY # 22 FROM DISPATCH FOR GENERATOR ROOM ACCESS SPANS) KEY FROM COMMUNICATION CENTER FOR TELCO CIRCUITCONTACT: WESTON POLICE DEPARTMENT.SECURITY: NO ISSUESPOWER COMPANY: UNITED ILLUMINATING (800) 722-5584METER #: JUMPED OUT POLICE: (203) 222-2600SWITCH ID: BRPTCTBSC= 02 BCF= 09 GSM CIRCUIT ID: DHXV 264367 HCGS 723918TDMA CIRCUIT ID DHPV 931688 & DHPV 931689 SNET: (800) 448-1008 AND (203) 420-3131 (24-HR REPAIR)

CODE COMPLIANCE

BUILDING CODE: 2012 CONNECTICUT COMMERCIAL BUILDING CODE

ELECTRICAL CODE: 2014 CONNECTICUT ELECTRICAL CODE

LIGHTNING PROTECTION CODE: NFPA 780 – 2000, LIGHTNING PROTECTION CODE

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

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

CONNECTICUT ONE CALL SYSTEM, INC. 1-800-922-4455 STOP. CALL BEFORE YOU DIG!

CONNECTICUT LAW REQUIRES
TWO WORKING DAYS NOTICE PRIOR TO ANY EARTH MOVING ACTIVITIES BY CALLING 800-922-4455 OR DIAL 811

APPROVALS

AT&T (RF): _____ DATE: _____

AT&T (CONST.): _____ DATE: _____

AT&T (OPS): _____ DATE: _____

TOWER OWNER: _____ DATE: _____

JURISDICTIONAL APPROVAL

BASED ON INFORMATION PROVIDED BY AT&T REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409(A), AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW AND LIMITED/PARTIAL ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW OR ADMINISTRATIVE REVIEW).

PROJECT DESCRIPTION

THIS PROJECT WILL BE COMPRISED OF:
CHANGES ON THE EXISTING SELF MONOPOLE TOWER:

- REUSE (9) EXISTING ANTENNA (3) PER SECTOR FOR (3) SECTORS.
- REMOVE (3) EXISTING RRUS-12+RRUS-A2 (1) PER SECTOR FOR (3) SECTORS.
- INSTALL (3) NEW RRUS-32 B2, (1) PER SECTOR FOR (3) SECTORS.
- REUSE (1) EXISTING DC6 SQUID.
- REUSE (2) EXISTING DC POWER TRUNK.
- REUSE (1) EXISTING FIBER TRUNK.
- REUSE (12)EXISTING RF CABLES.

CHANGES IN THE EXISTING AT&T EQUIPMENT ENCLOSURE AREA:

- INSTALL (1) NEW XMU.

SHEET	DESCRIPTION
T-1	TITLE SHEET
GN-1	GROUNDING & GENERAL NOTES
A-1	COMPOUND PLAN
A-2	EQUIPMENT LAYOUTS
A-3	ANTENNA LAYOUTS
A-4	TOWER ELEVATION
A-5	DETAILS
G-1	GROUNDING, ONE-LINE DIAGRAM & DETAILS

at&t Mobility
1355 WEST UNIVERSITY DRIVE
MESA, AZ 85201-5419

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

PLANS PREPARED BY:
Trylon
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 75038

NO.	DATE	DESCRIPTION	BY
A	11/05/16	FOR REVIEW	GOP
0	11/22/16	ISSUE FOR CONSTRUCTION	VSK

SITE INFORMATION:

CT2099
WESTON DT
FA CODE: 10035306

56 NORFIELD ROAD
WESTON, CT 06883

SEAL:

MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

TITLE SHEET

SHEET NUMBER:

T-1

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR – EMPIRE TELECOM
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY
   OEM – ORIGINAL EQUIPMENT MANUFACTURER

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

7. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

8. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR

9. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF ALL SCR1 'AP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

12. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

14. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy=36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741-000-3APS-A00Z-00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

16. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

17. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

18. SINCE THE CELL SITE MAY BE ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

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

    - INTERNATIONAL BUILDING CODE: IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
    - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
    - FIRE/LIFE SAFETY CODE: NFPA-101 2009 WITH LOCAL & COUNTY AMENDMENTS

20. SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

    - AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
    - AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, THIRTEENTH EDITION
    - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
    - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA-222-G-1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
    - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
    - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
    - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVELY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT
    - TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

21. FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

GROUNDING NOTES:

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 25471-000-3PS-EG00-0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; 2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.

13. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV-G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE CHANGED FROM 2 AWG TO 2/0 AWG. IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM EIGHT FEET (8') TO TEN FEET (10').

14. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE ½" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50.

at&t Mobility
1355 WEST UNIVERSITY DRIVE
MESA, AZ 85201-5419

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

PLANS PREPARED BY:
Trylon
1825 W. WALNUT HILL LANE SUITE 302
IRVING, TX 75038

NO.	DATE	DESCRIPTION	BY
A	11/05/16	FOR REVIEW	GOP
0	11/22/16	ISSUE FOR CONSTRUCTION	VSK

SITE INFORMATION:

CT2099
WESTON DT
FA CODE: 10035306

56 NORFIELD ROAD
WESTON, CT 06883

SEAL:

11-22-2016

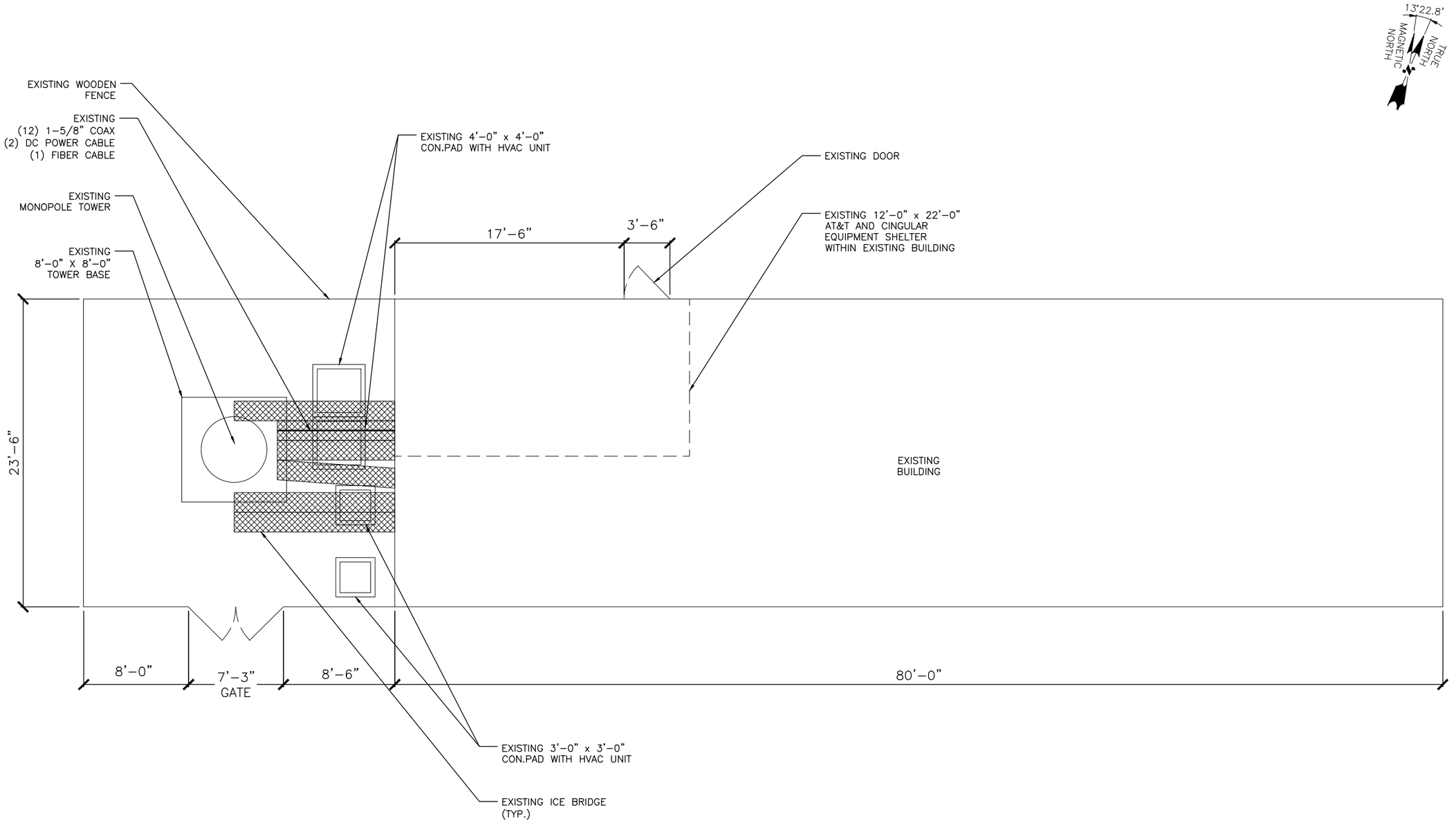
MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

GENERAL NOTES &
GROUNDING NOTES

SHEET NUMBER:

GN-1



COMPOUND PLAN

22"x34" SCALE: 1/4" = 1'-0"
11"x17" SCALE: 1/8" = 1'-0"

4' 3' 2' 1' 0" 4'

1

at&t Mobility
1355 WEST UNIVERSITY DRIVE
MESA, AZ 85201-5419

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

PLANS PREPARED BY:
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SEAL:

STATE OF CONNECTICUT
MICHAEL F. PLAHOVINSAK
No. 25849
PROFESSIONAL ENGINEER
11-22-2016

MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
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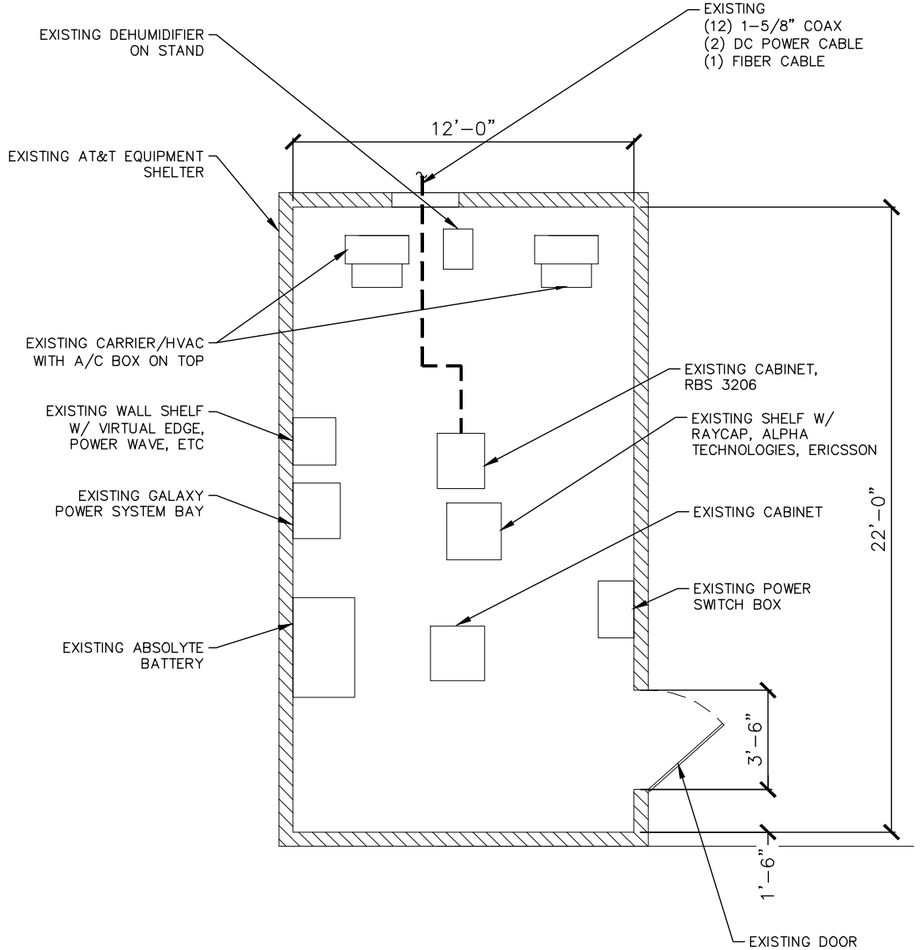
SHEET TITLE:

COMPOUND PLAN

SHEET NUMBER:

A-1

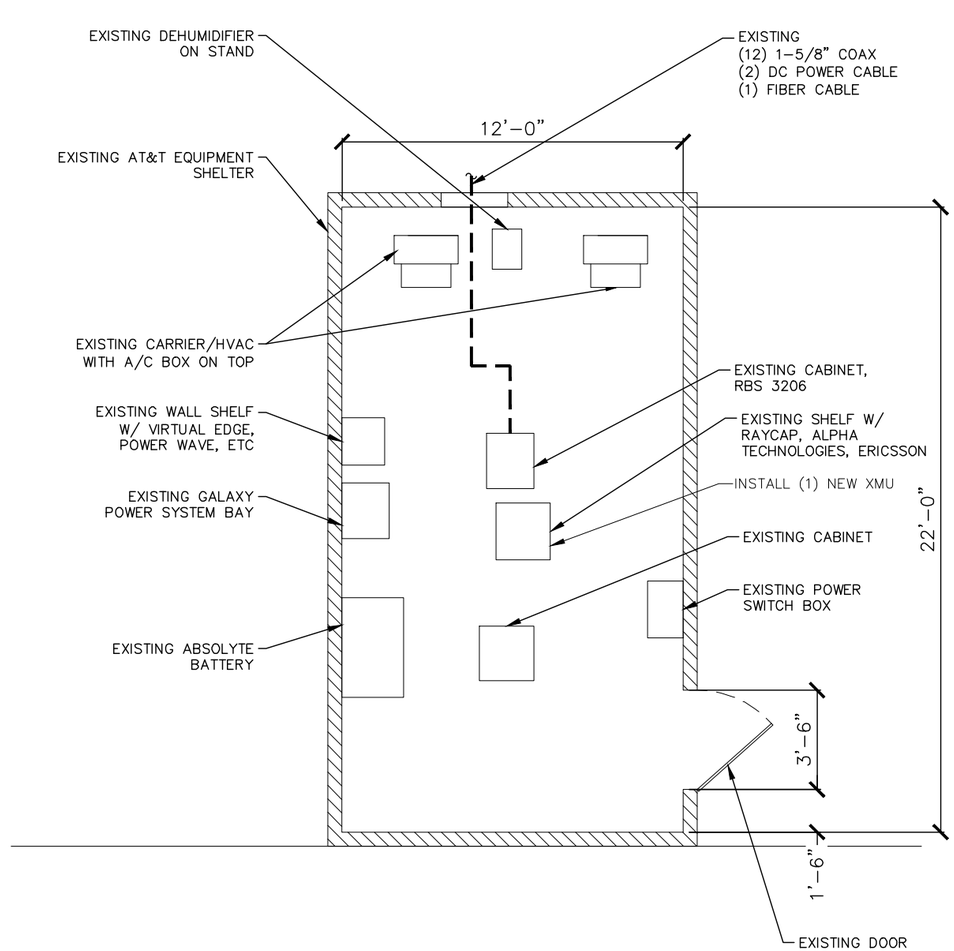


EXISTING EQUIPMENT LAYOUT

22"x34" SCALE: 3/8" = 1'-0"
11"x17" SCALE: 3/16" = 1'-0"

2' 1' 0" 2'

1



PROPOSED EQUIPMENT LAYOUT

22"x34" SCALE: 3/8" = 1'-0"
11"x17" SCALE: 3/16" = 1'-0"

2' 1' 0" 2'

2

at&t Mobility
1355 WEST UNIVERSITY DRIVE
MESA, AZ 85201-5419

EMPIRE telecom
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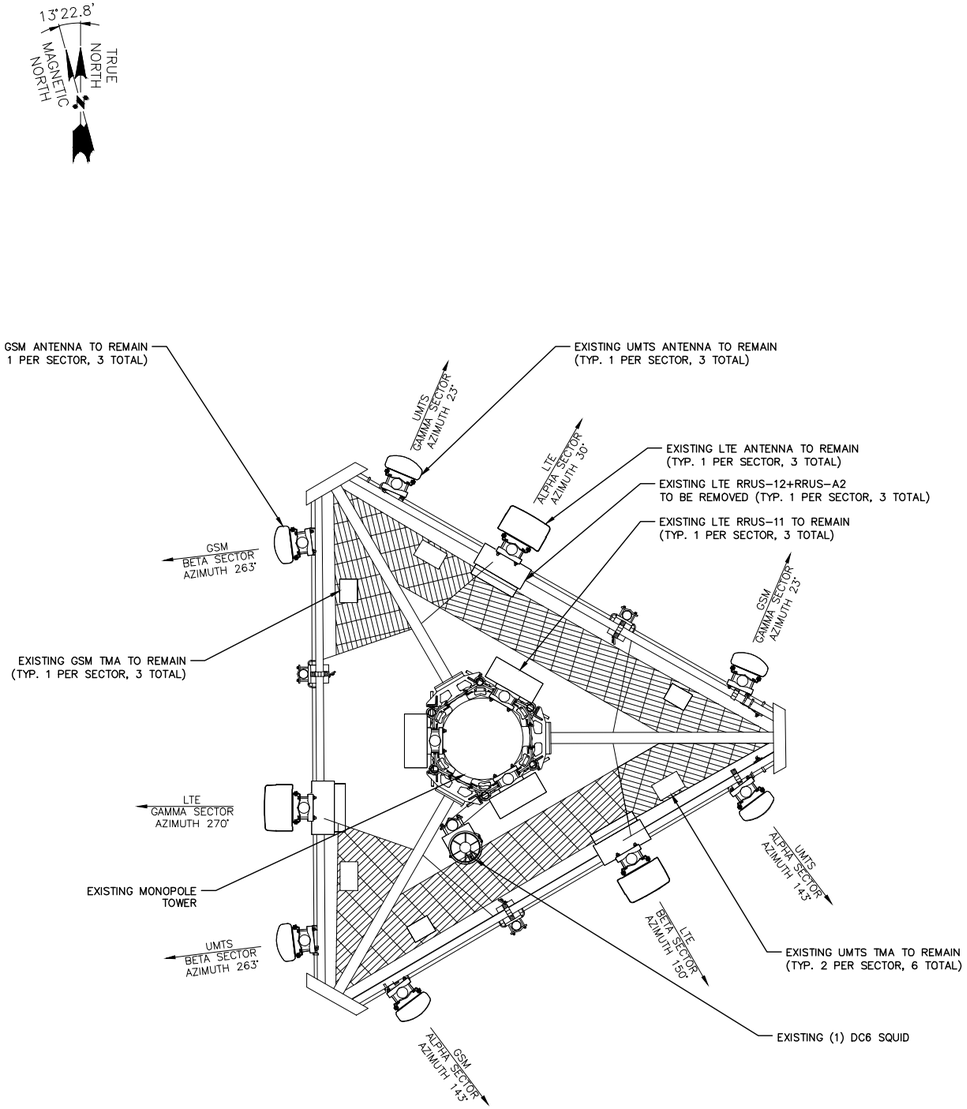
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

EQUIPMENT LAYOUTS

SHEET NUMBER:

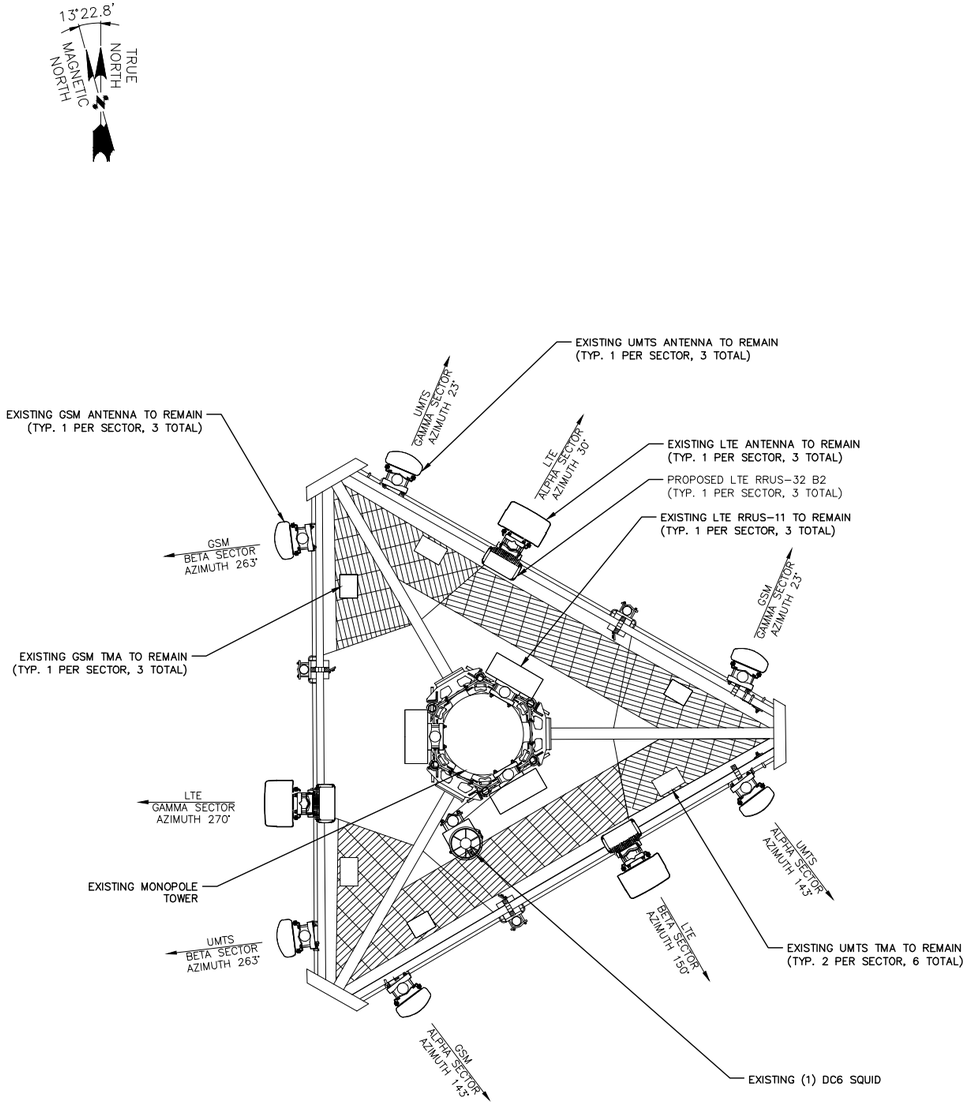
A-2



EXISTING ANTENNA LAYOUT

22"x34" SCALE: 1/2" = 1'-0"
11"x17" SCALE: 1/4" = 1'-0"
2' 1' 0" 2'

1



PROPOSED ANTENNA LAYOUT

22"x34" SCALE: 1/2" = 1'-0"
11"x17" SCALE: 1/4" = 1'-0"
2' 1' 0" 2'

2

at&t Mobility
1355 WEST UNIVERSITY DRIVE
MESA, AZ 85201-5419

EMPIRE telecom
16 ESQUIRE ROAD
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PLANS PREPARED BY:
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IRVING, TX 75038

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0	11/22/16	ISSUE FOR CONSTRUCTION	VSK

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WESTON DT
FA CODE: 10035306

56 NORFIELD ROAD
WESTON, CT 06883

SEAL:

STATE OF CONNECTICUT
MICHAEL F. PLAHOVINSAK
No. 25849
REGISTERED PROFESSIONAL ENGINEER
ORIGINAL SIGNATURE

11-22-2016

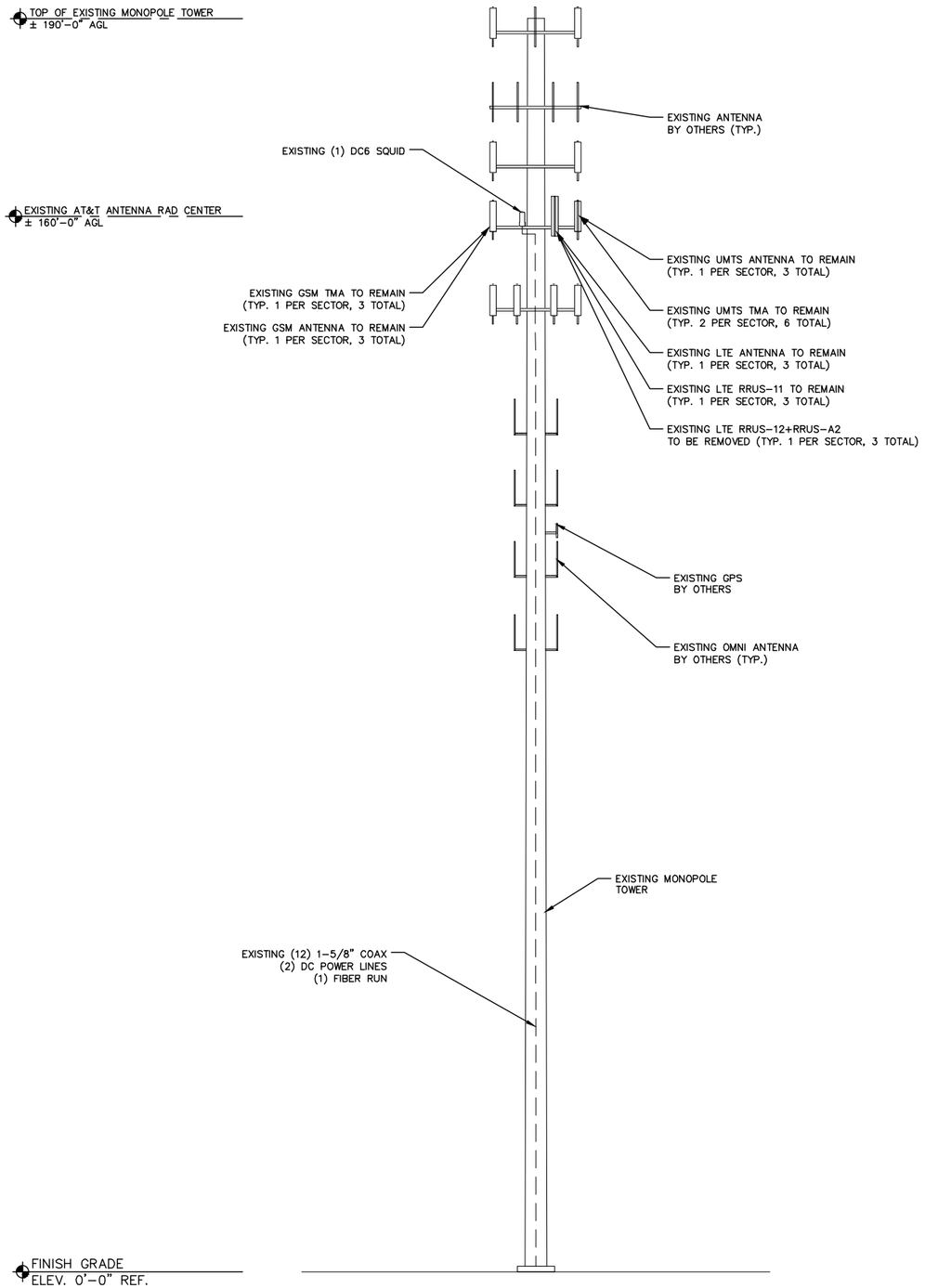
MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

ANTENNA LAYOUTS

SHEET NUMBER:

A-3

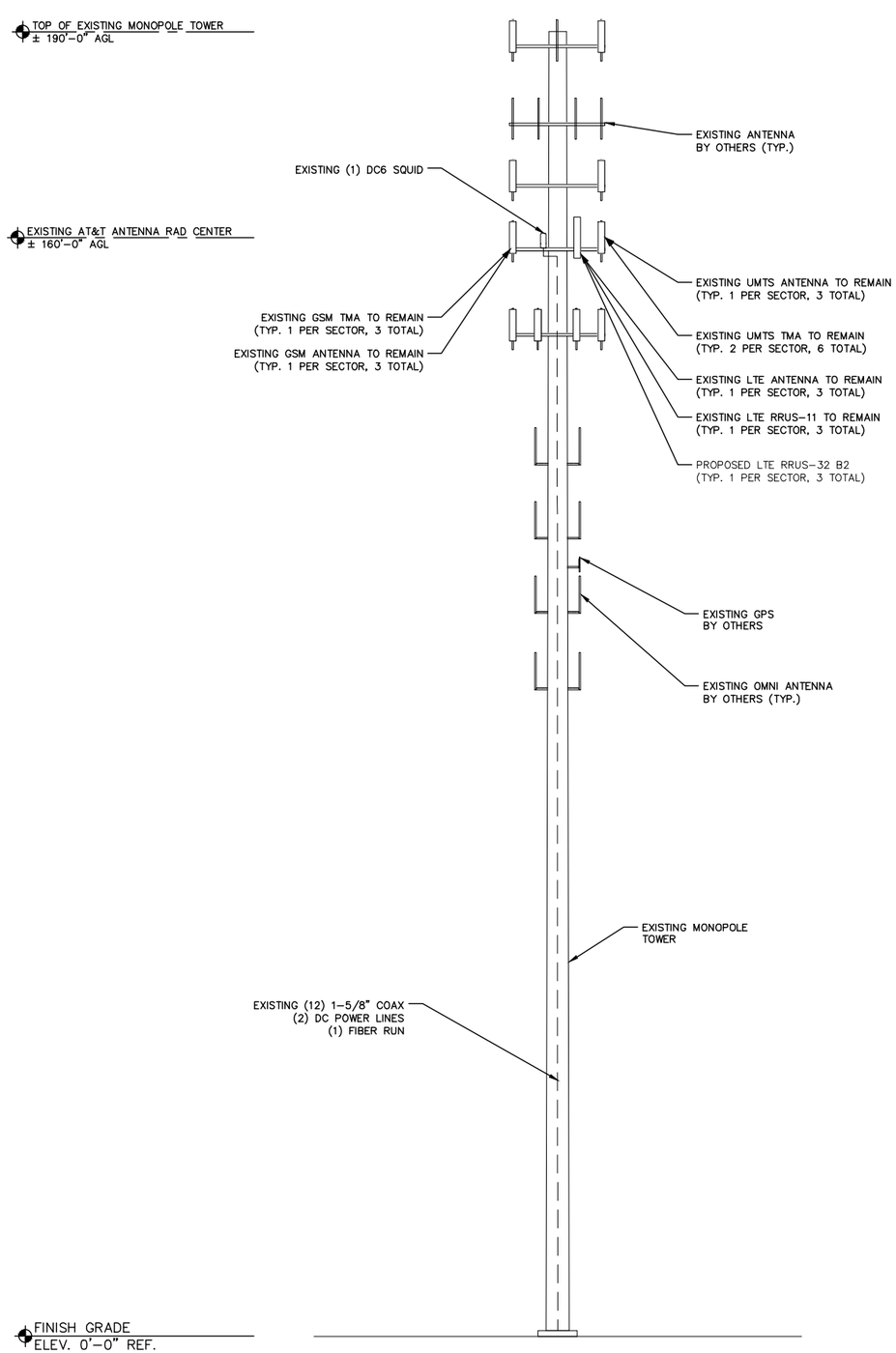


EXISTING TOWER ELEVATION

22"x34" SCALE: 3/32" = 1'-0"
11"x17" SCALE: 3/64" = 1'-0"

8' 4' 0" 8'

1



PROPOSED TOWER ELEVATION

22"x34" SCALE: 3/32" = 1'-0"
11"x17" SCALE: 3/64" = 1'-0"

8' 4' 0" 8'

2

at&t Mobility
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PLANS PREPARED BY:
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SEAL:

STATE OF CONNECTICUT
MICHAEL F. PLAHOVINSAK
No. 25849
PROFESSIONAL ENGINEER
11-22-2016

MICHAEL F. PLAHOVINSAK, P.E. #25849
Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

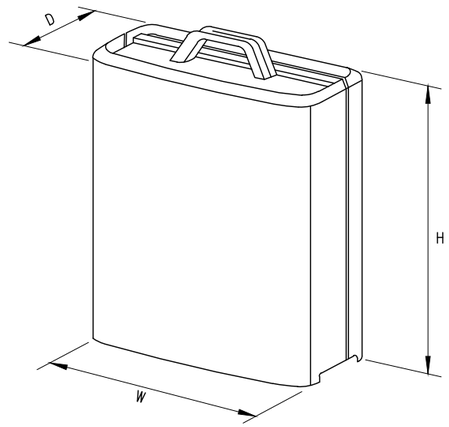
SHEET TITLE:

TOWER ELEVATION

SHEET NUMBER:

A-4

NOT USED | N.T.S | 1



MODEL	L x W x H	WEIGHT
RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
RRUS-12	20.4" x 18.5" x 7.5"	58 LBS
RRUS-32	29.9" x 13.3" x 9.5"	77 LBS
RRUS-32 B2	20.9" x 9.5" x 3.3"	77 LBS
RRUS-E2	20.4" x 18.5" x 7.5"	58 LBS
A2 MODULE	16.4" x 15.2" x 3.4"	22 LBS

RRUS DETAILS | N.T.S | 2

NOT USED | N.T.S | 3

NOT USED | N.T.S | 4

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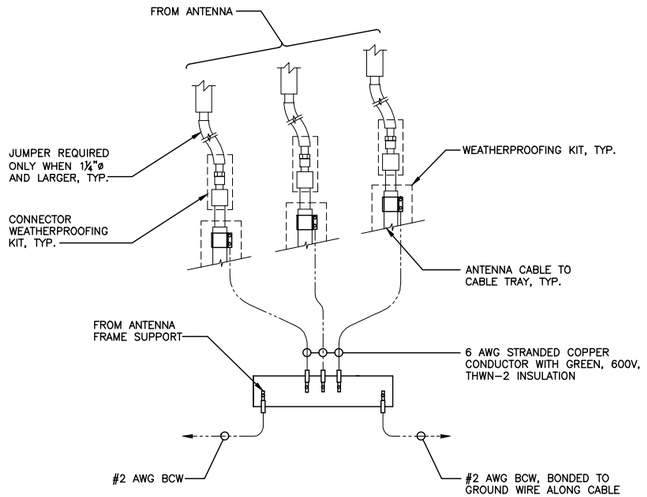
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

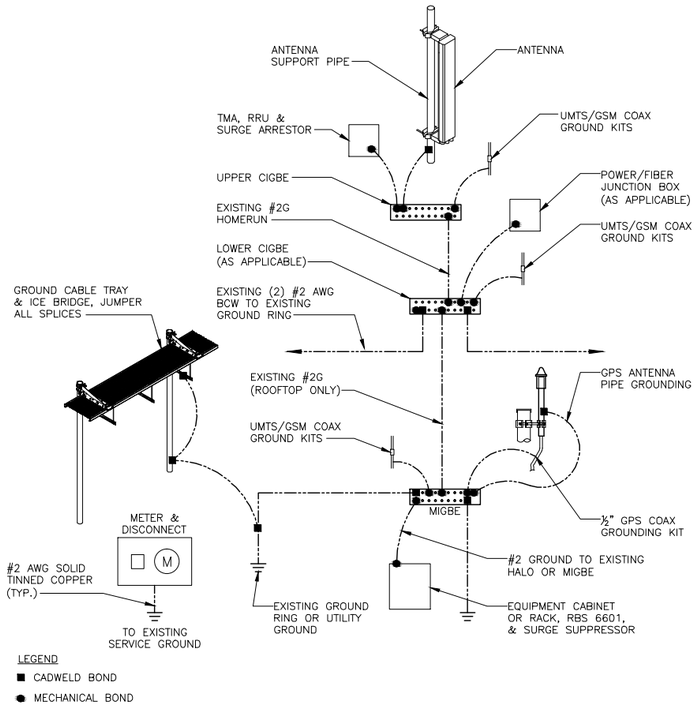
DETAILS

SHEET NUMBER:

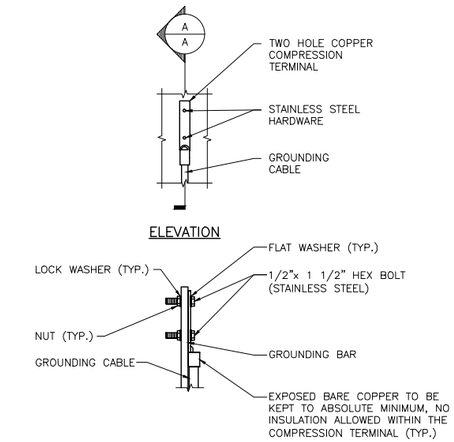
A-5



GROUND WIRE TO GROUND BAR CONNECTION DETAILS | N.T.S | 1



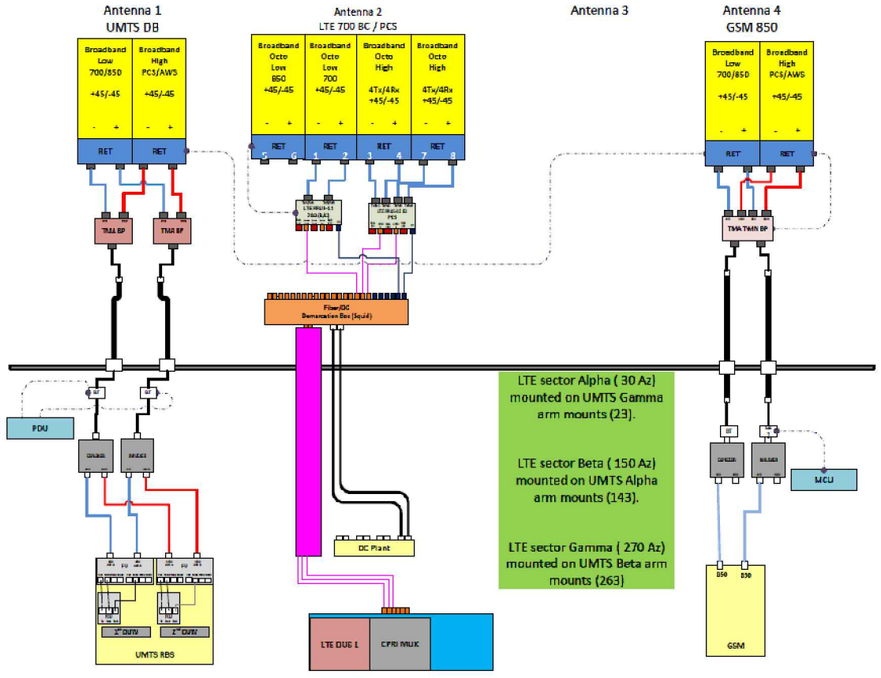
GROUND RISER DIAGRAM | N.T.S | 2



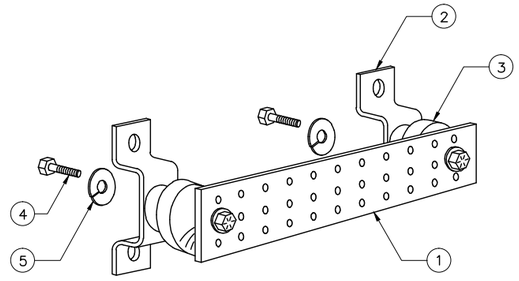
NOTE:

1. "DOUBLING UP" OR "STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAILS | N.T.S | 3



PLUMBING DIAGRAM | N.T.S | 4



ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20"x 4"x ¼")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	⅜"-11x1" H.H.C.S.
5	4	⅜" LOCK WASHER

NOTES:

EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION

SECTION '"P" – SURGE PRODUCERS
- CABLE ENTRY PORTS (HATCH PLATES) (#2)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- TELCO GROUND BAR
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
- +24V POWER SUPPLY RETURN BAR (#2)
- –48V POWER SUPPLY RETURN BAR (#2)
- RECTIFIER FRAMES

SECTION "A" – SURGE ABSORBERS
- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)

GROUND BAR DETAILS | N.T.S | 5

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Sole Proprietor - Independent Engineer
18301 S.R. 161, Plain City, OH 43064
614-398-6250 / mike@mfpeng.com

SHEET TITLE:

GROUNDING, ONE-LINE DIAGRAM & DETAILS

SHEET NUMBER:

G-1

PAUL J. FORD & COMPANY

Date: **November 14, 2016**

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
cpoelking@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT2099
	Carrier Site Name:	Weston DT
Crown Castle Designation:	**Crown Castle BU Number:**	829046
	Crown Castle Site Name:	Weston/ Rt-57/ Norfield R
	Crown Castle JDE Job Number:	401126
	Crown Castle Work Order Number:	1315158
	Crown Castle Application Number:	365190 Rev. 2
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37516-0710.004.7805
Site Data:	**56 Norfield Rd. (Town Hall), Weston, Fairfield County, CT**	
	Latitude *41° 12' 8.4"*, Longitude *-73° 22' 46.6"*	
	190 Foot - Monopole Tower	

Dear Sean Dempsey,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 966643, in accordance with application 365190, revision 2.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B with a maximum topographic factor, Kzt, of 1.0 and Risk Category II were used in this analysis.

We at *Paul J. Ford and Company* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Christopher Poelking, E.I.
Structural Designer

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER
11-14-16

Date: **November 14, 2016**

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
cpoelking@pjfweb.com

Subject: Structural Analysis Report

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	Carrier Site Name:	Weston DT
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	190 Foot - Monopole Tower	

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Respectfully submitted by:

Christopher Poelking, E.I.
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 190-ft Monopole tower designed by PIROD MANUFACTURES INC. in January of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B with a maximum topographic factor, Kzt, of 1.0 and Risk Category II were used in this analysis.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
160.0	163.0	3	ericsson	RRUS 32 B2	1 2	3/8 3/4	-

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
188.0	193.0	1	rfs celwave	PD201-7	1 1 1 1	1-1/4 5/16 5/8 7/8	1
	189.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
	188.0	1	tower mounts	Platform Mount [LP 403-1]			
	187.0	1	radiowaves	SP2-5.8			
185.0	188.0	3	alcatel lucent	TME-1900MHZ RRH	-	-	1
		3	alcatel lucent	TME-800MHz RRH			
	185.0	1	tower mounts	Side Arm Mount [SO 102-3]			
184.0	185.0	1	tower mounts	Side Arm Mount [SO 701-1]	-	-	1
179.0	185.0	2	rfs celwave	458-2D	2	7/8	1
	179.0	12	tower mounts	6' x 2" Mount Pipe			
		1	tower mounts	Platform Mount [LP 403-1]			
170.0	170.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	2 13	7/8 1-5/8	1
		3	ericsson	Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		4	ericsson	RRUS 11 B12			
		1	tower mounts	Platform Mount [LP 405-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
160.0	163.0	3	ericsson	RRUS12/RRUS A2	1	5/8	3
		3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe	2 12	7/8 1-5/8	1
		3	ericsson	RRUS-11			
		12	powerwave technologies	7020.00			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		3	powerwave technologies	TT19-08BP111-001			
		1	raycap	DC6-48-60-18-8F			
	160.0	1	tower mounts	Platform Mount [LP 403-1]			
150.0	150.0	3	alcatel lucent	RRH2X60-1900	1	1-5/8	2
		3	alcatel lucent	RRH2x60-700			
		3	alcatel lucent	RRH4X45-AWS4 B66			
		6	commscope	SBNHH-1D85C w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		3	antel	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	12	1-5/8	1
		2	antel	LPA-80080/6CF w/ Mount Pipe			
		4	decibel	DB846F65ZAXY w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 403-1]			
125.0	130.0	1	rfs celwave	PD128-1	1 1	1/2 7/8	1
		1	rfs celwave	PD201-1			
	125.0	2	tower mounts	Side Arm Mount [SO 701-1]			
110.0	115.0	2	rfs celwave	PD128-1	2	1/2	1
	110.0	2	tower mounts	Side Arm Mount [SO 701-1]			
100.0	101.0	1	gps	GPS_A	1	1/2	1
	100.0	1	tower mounts	Side Arm Mount [SO 701-1]			
95.0	100.0	2	rfs celwave	PD128-1	2	1/2	1
	95.0	2	tower mounts	Side Arm Mount [SO 701-1]			
80.0	85.0	1	decibel	DB222	2	1/2	1
		1	rfs celwave	PD128-1			
	80.0	2	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
-	-	-	-	-	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Arcnet, A99.506-247B, 10/15/1999	3529916	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PiRod, A-116331, 1/5/2000	3755295	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PiRod, A-116331, 1/5/2000	3529917	CCISITES
FABRICATION DRAWINGS	Sabre, 61801-MR, 8/2/2012	-	SABRE
4-POST-MODIFICATION INSPECTION #1	Sabre, 61801, 11/19/2012	3774763	CCISITES
4-POST-MODIFICATION INSPECTION #2	TEP, 48073, 11/10/2014	5392198	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole has been reinforced in conformance with the referenced modification drawings.
5) The rock anchors have been analyzed assuming reinforced concrete-type action in the interaction between the rock anchors and the rock.
6) The existing anchor brackets have been welded through their chamfer region. This analysis assumes no damage to the weld from the pole shaft to the base plate has occurred and that the weld is complete and effective.
7) In accordance with discussions with CCI Corporate Engineering: Based on the assumption that the monopole manufacturer (ROHN/PiRod) has designed the flange plates at splices to adequately develop the full capacity of the unreinforced shaft section using unpublished and/or proprietary methodologies, we are assuming that if our analysis shows that both the existing shaft and the existing flange bolts are at a usage capacity of 100% or less, then the existing flange plates are at a usage capacity of 100% or less and no additional analysis of the flange plate is required.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J. Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	190 - 180	Pole	30" x 0.375"	1	-4.065	1311.060	3.3	Pass
L2	180 - 160	Pole	36" x 0.375"	2	-12.998	1490.100	15.2	Pass
L3	160 - 140	Pole	42" x 0.375"	3	-24.356	1668.870	33.3	Pass
L4	140 - 120	Pole	P48x0.375	4	-30.023	1847.490	47.1	Pass
L5	120 - 113.33	Pole	54" x 0.375"	5	-32.056	2026.000	43.8	Pass
L6	113.33 - 103.917	Pole	RPS 54" x 0.49915"	6	-35.900	2803.770	40.0	Pass
L7	103.917 - 100	Pole	RPS 54" x 0.49915"	7	-37.429	2805.280	43.0	Pass
L8	100 - 89.583	Pole	RPS 60" x 0.48494"	8	-42.044	2942.340	43.1	Pass
L9	89.583 - 85.417	Pole	RPS 60" x 0.56821"	9	-44.058	3532.380	39.4	Pass
L10	85.417 - 83.917	Pole	RPS 60" x 0.65218"	10	-44.900	4150.610	35.2	Pass
L11	83.917 - 80	Pole	RPS 60" x 0.54038"	11	-46.776	3331.580	44.8	Pass
L12	80 - 60	Pole	RPS 60" x 0.58339"	12	-56.971	3648.500	54.0	Pass
L13	60 - 58.417	Pole	RPS 60" x 0.70948"	13	-57.908	4580.270	45.5	Pass
L14	58.417 - 48.417	Pole	P60x5/8	14	-63.218	4139.150	54.6	Pass
L15	48.417 - 40	Pole	RPS 60" x 0.77929"	15	-68.754	5266.430	48.3	Pass
L16	40 - 31.083	Pole	RPS 60" x 0.77929"	16	-74.612	5266.430	52.8	Pass
L17	31.083 - 28.917	Pole	RPS 60" x 0.90145"	17	-76.213	5874.560	47.1	Pass
L18	28.917 - 20	Pole	RPS 60" x 0.74524"	18	-81.788	5064.190	61.3	Pass
L19	20 - 4.583	Pole	RPS 60" x 0.87181"	19	-92.894	5927.660	58.5	Pass
L20	4.583 - 0	Pole	RPS 60" x 1.10184"	20	-96.973	5148.730	66.1	Pass
							Summary	
						Pole (L20)	66.1	Pass
						Rating =	66.1	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	71.9	Pass
1	Base Plate	0	59.9	Pass
1	Base Foundation	0	45.2	Pass
1	Flange Connection	20	63.6	Pass
1	Flange Connection	40	55.8	Pass
1	Flange Connection	60	53.5	Pass
1	Flange Connection	80	43.7	Pass
1	Flange Connection	100	54.9	Pass
1, 2	Flange Connection	120	49.0	Pass
1, 2	Flange Connection	140	33.5	Pass
1, 2	Flange Connection	160	15.2	Pass
1, 2	Flange Connection	180	3.3	Pass

Structure Rating (max from all components) =	71.9%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) See assumption #7

4.1) Recommendations

The monopole and its foundation have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

1) Tower is located in Fairfield County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 93 mph.
4) Structure Class II.
5) Exposure Category B.
6) Topographic Category 1.
7) Crest Height 0.000 ft.
8) Nominal ice thickness of 0.750 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56.000 pcf.
11) A wind speed of 50 mph is used in combination with ice.
12) Temperature drop of 50.000 °F.
13) Deflections calculated using a wind speed of 60 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	√ Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric		

Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*
L1	190.000-180.000	10.000	30" x 0.375"	A53-B-42 (42 ksi)
L2	175.000-155.000	20.000	36" x 0.375"	A53-B-42 (42 ksi)
L3	155.000-135.000	20.000	42" x 0.375"	A53-B-42 (42 ksi)
L4	135.000-115.000	20.000	P48x0.375	A53-B-42 (42 ksi)
L5	115.000-108.330	6.670	54" x 0.375"	A53-B-42

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade
L6	108.330-98.917	9.413	RPS 54" x 0.49915"	(42 ksi) Reinf 40.46 ksi
L7	98.917-95.000	3.917	RPS 54" x 0.49915"	(40 ksi) Reinf 40.49 ksi
L8	95.000-84.583	10.417	RPS 60" x 0.48494"	(40 ksi) Reinf 40.76 ksi
L9	84.583-80.417	4.166	RPS 60" x 0.56821"	(41 ksi) Reinf 39.88 ksi
L10	80.417-78.917	1.500	RPS 60" x 0.65218"	(40 ksi) Reinf 38.97 ksi
L11	78.917-75.000	3.917	RPS 60" x 0.54038"	(39 ksi) Reinf 40.16 ksi
L12	75.000-55.000	20.000	RPS 60" x 0.58339"	(40 ksi) Reinf 39.81 ksi
L13	55.000-53.417	1.583	RPS 60" x 0.70948"	(40 ksi) Reinf 38.51 ksi
L14	53.417-43.417	10.000	P60x5/8	(39 ksi) A53-B-42
L15	43.417-35.000	8.417	RPS 60" x 0.77929"	(42 ksi) Reinf 40.36 ksi
L16	35.000-26.083	8.917	RPS 60" x 0.77929"	(40 ksi) Reinf 40.36 ksi
L17	26.083-23.917	2.166	RPS 60" x 0.90145"	(40 ksi) Reinf 39.04 ksi
L18	23.917-15.000	8.917	RPS 60" x 0.74524"	(39 ksi) Reinf 40.56 ksi
L19	15.000-0.417	15.417	RPS 60" x 0.87181"	(41 ksi) Reinf 40.67 ksi
L20	0.417-4.166	4.583	RPS 60" x 1.10184"	(41 ksi) Reinf 28.06 ksi (28 ksi)

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 190.000-180.000				1	1	1			
L2 180.000-160.000				1	1	1			
L3 160.000-140.000				1	1	1			
L4 140.000-120.000				1	1	1			
L5 120.000-113.330				1	1	1			
L6 113.330-103.917				1	1	1			
L7 103.917-100.000				1	1	1			
L8 100.000-89.583				1	1	1			

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L9 89.583-85.417				1	1	1			
L10 85.417-83.917				1	1	1			
L11 83.917-80.000				1	1	1			
L12 80.000-60.000				1	1	1			
L13 60.000-58.417				1	1	1			
L14 58.417-48.417				1	1	1			
L15 48.417-40.000				1	1	1			
L16 40.000-31.083				1	1	1			
L17 31.083-28.917				1	1	1			
L18 28.917-20.000				1	1	1			
L19 20.000-4.583				1	1	1			
L20 4.583-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
ATCB-B01(5/16")	C	No	Inside Pole	188.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
LDF4.5-50(5/8")	C	No	Inside Pole	188.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
LDF5-50A(7/8")	C	No	Inside Pole	188.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
TYPE I(1-1/4")	C	No	Inside Pole	188.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
****								
LDF5-50A(7/8")	C	No	Inside Pole	179.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
****								
LDF5-50A(7/8")	C	No	Inside Pole	170.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
MLE Hybrid 9Power/18Fiber RL 2(1-5/8")	C	No	Inside Pole	170.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
LDF7-50A(1-5/8")	C	No	Inside Pole	170.000 - 0.000	5	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	170.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	170.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
****								

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF5-50A(7/8")	C	No	Inside Pole	160.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	160.000 - 0.000	10	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	160.000 - 0.000	2	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
FB-L98B-034-XXX(3/8")	C	No	Inside Pole	160.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	160.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
****								
LDF7-50A(1-5/8")	C	No	Inside Pole	150.000 - 0.000	11	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
HB158-1-08U8-S8J18(1-5/8")	C	No	Inside Pole	150.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
HB158-1-08U8-S8J18(1-5/8")	C	No	Inside Pole	150.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
****								
LDF5-50A(7/8")	C	No	Inside Pole	125.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
LDF4P-50A(1/2)	C	No	Inside Pole	125.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
*****								
LDF4-50A(1/2")	C	No	Inside Pole	110.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
****								
LDF4-50A(1/2")	C	No	Inside Pole	100.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
LDF4-75A(1/2")	C	No	Inside Pole	95.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
****								
LDF4-75A(1/2")	C	No	Inside Pole	80.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
**********								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	51.167 - 0.000	1	No Ice	0.208	0.000
						1/2" Ice	0.319	0.000
						1" Ice	0.431	0.000
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	115.333 - 51.167	1	No Ice	0.167	0.000
						1/2" Ice	0.278	0.000
						1" Ice	0.389	0.000
****								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	25.083 - 15.083	1	No Ice	0.208	0.001
						1/2" Ice	0.319	0.002
						1" Ice	0.431	0.004
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	45.417 - 35.417	1	No Ice	0.167	0.015
						1/2" Ice	0.278	0.016
						1" Ice	0.389	0.017
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	65.583 - 55.583	1	No Ice	0.208	0.001
						1/2" Ice	0.319	0.002
						1" Ice	0.431	0.004
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	85.917 - 75.917	1	No Ice	0.167	0.015
						1/2" Ice	0.278	0.016
						1" Ice	0.389	0.017
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	91.083 - 81.083	1	No Ice	0.167	0.000
						1/2" Ice	0.278	0.000

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						1" Ice	0.389	0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	190.000-180.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.009
L2	180.000-160.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.980	0.152
L3	160.000-140.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	11.880	0.619
L4	140.000-120.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	11.880	0.738
L5	120.000-113.330	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	4.296	0.248
L6	113.330-103.917	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	7.160	0.352
L7	103.917-100.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	2.980	0.147
L8	100.000-89.583	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	8.174	0.394
L9	89.583-85.417	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	3.947	0.166
L10	85.417-83.917	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.641	0.080
L11	83.917-80.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	4.105	0.208
L12	80.000-60.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	17.057	0.834
L13	60.000-58.417	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.534	0.062
L14	58.417-48.417	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	8.312	0.386
L15	48.417-40.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	7.656	0.404
L16	40.000-31.083	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	7.918	0.411
L17	31.083-28.917	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.738	0.083
L18	28.917-20.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	8.213	0.347
L19	20.000-4.583	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	13.394	0.596
L20	4.583-0.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	3.677	0.176

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	190.000-180.000	A	1.782	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.009
L2	180.000-160.000	A	1.767	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	5.514	0.734
L3	160.000-140.000	A	1.745	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	32.822	3.725
L4	140.000-120.000	A	1.720	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	32.525	3.787
L5	120.000-113.330	A	1.702	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	11.864	1.251
L6	113.330-103.917	A	1.690	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	20.238	1.754
L7	103.917-100.000	A	1.679	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	8.387	0.726
L8	100.000-89.583	A	1.667	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	23.007	1.918
L9	89.583-85.417	A	1.654	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	11.325	0.771
L10	85.417-83.917	A	1.648	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	4.773	0.301
L11	83.917-80.000	A	1.643	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	11.860	0.784
L12	80.000-60.000	A	1.617	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	47.124	3.687
L13	60.000-58.417	A	1.590	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	4.163	0.288
L14	58.417-48.417	A	1.574	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	22.245	1.755
L15	48.417-40.000	A	1.545	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	20.204	1.534
L16	40.000-31.083	A	1.511	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	20.537	1.570
L17	31.083-28.917	A	1.486	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	4.384	0.354
L18	28.917-20.000	A	1.456	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	20.531	1.456
L19	20.000-4.583	A	1.359	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	32.105	2.322
L20	4.583-0.000	A	1.149	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	8.006	0.572

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	190.000-180.000	0.000	0.000	0.000	0.000
L2	180.000-160.000	-0.124	0.072	-0.301	0.174
L3	160.000-140.000	-0.660	0.381	-1.374	0.793
L4	140.000-120.000	-0.672	0.388	-1.429	0.825
L5	120.000-113.330	-0.732	0.423	-1.585	0.915
L6	113.330-103.917	-0.845	0.488	-1.813	1.047
L7	103.917-100.000	-0.845	0.488	-1.809	1.044
L8	100.000-89.583	-0.881	0.509	-1.916	1.106
L9	89.583-85.417	-1.035	0.597	-2.209	1.275
L10	85.417-83.917	-1.166	0.673	-2.444	1.411
L11	83.917-80.000	-1.125	0.650	-2.369	1.368
L12	80.000-60.000	-0.946	0.546	-2.007	1.159
L13	60.000-58.417	-1.054	0.609	-2.164	1.249
L14	58.417-48.417	-0.926	0.535	-1.930	1.114
L15	48.417-40.000	-1.000	0.577	-2.036	1.175
L16	40.000-31.083	-0.980	0.566	-1.980	1.143
L17	31.083-28.917	-0.898	0.519	-1.808	1.044
L18	28.917-20.000	-1.010	0.583	-1.982	1.144
L19	20.000-4.583	-0.962	0.555	-1.851	1.068
L20	4.583-0.000	-0.898	0.519	-1.635	0.944

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
PD201-7	C	From Leg	4.000 0.000 5.000	188.000	No Ice 1/2" Ice 1" Ice	1.015 1.809 2.620	1.015 1.809 2.620	0.004 0.013 0.026
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	188.000	No Ice 1/2" Ice 1" Ice	8.262 8.822 9.346	6.946 8.127 9.021	0.083 0.151 0.227
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	188.000	No Ice 1/2" Ice 1" Ice	8.262 8.822 9.346	6.946 8.127 9.021	0.083 0.151 0.227
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	188.000	No Ice 1/2" Ice	8.262 8.822 9.346	6.946 8.127 9.021	0.083 0.151 0.227

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
(2) 2.375" OD x 4' Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice 1/2" Ice 1" Ice	0.866 1.111 1.365	0.866 1.111 1.365	0.018 0.025 0.035
(2) 2.375" OD x 4' Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice 1/2" Ice 1" Ice	0.866 1.111 1.365	0.866 1.111 1.365	0.018 0.025 0.035
(2) 2.375" OD x 4' Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	188.000	No Ice 1/2" Ice 1" Ice	0.866 1.111 1.365	0.866 1.111 1.365	0.018 0.025 0.035
Platform Mount [LP 403-1]	C	None		0.000	188.000	No Ice 1/2" Ice 1" Ice	18.850 24.300 29.750	18.850 24.300 29.750	1.500 1.797 2.093
****									
TME-800MHz RRH	A	From Leg	4.000 0.000 3.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	2.134 2.320 2.512	1.773 1.946 2.127	0.053 0.074 0.098
TME-800MHz RRH	B	From Leg	4.000 0.000 3.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	2.134 2.320 2.512	1.773 1.946 2.127	0.053 0.074 0.098
TME-800MHz RRH	C	From Leg	4.000 0.000 3.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	2.134 2.320 2.512	1.773 1.946 2.127	0.053 0.074 0.098
TME-1900MHZ RRH	A	From Leg	4.000 0.000 3.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	2.492 2.695 2.906	3.258 3.484 3.718	0.044 0.075 0.110
TME-1900MHZ RRH	B	From Leg	4.000 0.000 3.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	2.492 2.695 2.906	3.258 3.484 3.718	0.044 0.075 0.110
TME-1900MHZ RRH	C	From Leg	4.000 0.000 3.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	2.492 2.695 2.906	3.258 3.484 3.718	0.044 0.075 0.110
Side Arm Mount [SO 102-3]	C	None		0.000	185.000	No Ice 1/2" Ice 1" Ice	3.000 3.480 3.960	3.000 3.480 3.960	0.081 0.111 0.141
****									
Side Arm Mount [SO 701-1]	C	From Leg	0.000 0.000 1.000	0.000	184.000	No Ice 1/2" Ice 1" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093
****									
458-2D	B	From Leg	4.000 0.000 6.000	0.000	179.000	No Ice 1/2" Ice 1" Ice	3.667 5.031 6.412	3.667 5.031 6.412	0.022 0.049 0.084
458-2D	C	From Leg	4.000 0.000 6.000	0.000	179.000	No Ice 1/2" Ice 1" Ice	3.667 5.031 6.412	3.667 5.031 6.412	0.022 0.049 0.084
Platform Mount [LP 403-1]	C	None		0.000	179.000	No Ice 1/2" Ice 1" Ice	18.850 24.300 29.750	18.850 24.300 29.750	1.500 1.797 2.093
(4) 6' x 2'' Mount Pipe	A	From Leg	4.000	0.000	179.000	No Ice	1.425	1.425	0.022

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
(4) 6' x 2'' Mount Pipe	B	From Leg	4.000	0.000	179.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
(4) 6' x 2'' Mount Pipe	C	From Leg	4.000	0.000	179.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.000	0.000	170.000	No Ice	6.329	5.642	0.112
			0.000			1/2" Ice	6.775	6.426	0.169
			0.000			1" Ice	7.214	7.131	0.233
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.000	0.000	170.000	No Ice	6.329	5.642	0.112
			0.000			1/2" Ice	6.775	6.426	0.169
			0.000			1" Ice	7.214	7.131	0.233
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.000	0.000	170.000	No Ice	6.329	5.642	0.112
			0.000			1/2" Ice	6.775	6.426	0.169
			0.000			1" Ice	7.214	7.131	0.233
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	A	From Leg	4.000	0.000	170.000	No Ice	11.782	11.038	0.159
			0.000			1/2" Ice	12.502	12.564	0.254
			0.000			1" Ice	13.232	14.116	0.360
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	B	From Leg	4.000	0.000	170.000	No Ice	11.782	11.038	0.159
			0.000			1/2" Ice	12.502	12.564	0.254
			0.000			1" Ice	13.232	14.116	0.360
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	C	From Leg	4.000	0.000	170.000	No Ice	11.782	11.038	0.159
			0.000			1/2" Ice	12.502	12.564	0.254
			0.000			1" Ice	13.232	14.116	0.360
KRY 112 144/1	A	From Leg	4.000	0.000	170.000	No Ice	0.350	0.175	0.011
			0.000			1/2" Ice	0.426	0.234	0.014
			0.000			1" Ice	0.509	0.301	0.019
KRY 112 144/1	B	From Leg	4.000	0.000	170.000	No Ice	0.350	0.175	0.011
			0.000			1/2" Ice	0.426	0.234	0.014
			0.000			1" Ice	0.509	0.301	0.019
KRY 112 144/1	C	From Leg	4.000	0.000	170.000	No Ice	0.350	0.175	0.011
			0.000			1/2" Ice	0.426	0.234	0.014
			0.000			1" Ice	0.509	0.301	0.019
(2) RRUS 11 B12	A	From Leg	4.000	0.000	170.000	No Ice	2.833	1.182	0.051
			0.000			1/2" Ice	3.043	1.330	0.072
			0.000			1" Ice	3.259	1.485	0.095
RRUS 11 B12	B	From Leg	4.000	0.000	170.000	No Ice	2.833	1.182	0.051
			0.000			1/2" Ice	3.043	1.330	0.072
			0.000			1" Ice	3.259	1.485	0.095
RRUS 11 B12	C	From Leg	4.000	0.000	170.000	No Ice	2.833	1.182	0.051
			0.000			1/2" Ice	3.043	1.330	0.072
			0.000			1" Ice	3.259	1.485	0.095
Platform Mount [LP 405-1]	C	None		0.000	170.000	No Ice	20.800	20.800	1.800
						1/2" Ice	28.100	28.100	2.066
						1" Ice	35.400	35.400	2.332
PD201-7	C	From Leg	4.000	0.000	170.000	No Ice	1.015	1.015	0.004

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000 4.000			1/2" Ice 1" Ice	1.809 2.620	1.809 2.620	0.013 0.026
***									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	5.840 6.268 6.697	4.778 5.508 6.213	0.086 0.143 0.208
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	5.840 6.268 6.697	4.778 5.508 6.213	0.086 0.143 0.208
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	5.840 6.268 6.697	4.778 5.508 6.213	0.086 0.143 0.208
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	9.895 10.470 11.010	7.179 8.362 9.259	0.099 0.175 0.261
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	9.895 10.470 11.010	7.179 8.362 9.259	0.099 0.175 0.261
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	9.895 10.470 11.010	7.179 8.362 9.259	0.099 0.175 0.261
(2) LGP21401	A	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381	0.347 0.442 0.544	0.014 0.021 0.030
(2) LGP21401	B	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381	0.347 0.442 0.544	0.014 0.021 0.030
(2) LGP21401	C	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	1.104 1.239 1.381	0.347 0.442 0.544	0.014 0.021 0.030
RRUS-11	A	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	2.791 2.998 3.213	1.192 1.340 1.496	0.050 0.071 0.095
RRUS-11	B	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	2.791 2.998 3.213	1.192 1.340 1.496	0.050 0.071 0.095
RRUS-11	C	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	2.791 2.998 3.213	1.192 1.340 1.496	0.050 0.071 0.095
(4) 7020.00	A	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	0.102 0.147 0.199	0.175 0.239 0.311	0.002 0.005 0.009
(4) 7020.00	B	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	0.102 0.147 0.199	0.175 0.239 0.311	0.002 0.005 0.009
(4) 7020.00	C	From Leg	4.000 0.000 3.000	0.000	160.000	No Ice 1/2" Ice 1" Ice	0.102 0.147 0.199	0.175 0.239 0.311	0.002 0.005 0.009
TT19-08BP111-001	A	From Leg	4.000	0.000	160.000	No Ice	0.553	0.446	0.016

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2"	0.649	0.534	0.022
			3.000			Ice	0.752	0.630	0.029
						1" Ice			
TT19-08BP111-001	B	From Leg	4.000	0.000	160.000	No Ice	0.553	0.446	0.016
			0.000			1/2"	0.649	0.534	0.022
			3.000			Ice	0.752	0.630	0.029
						1" Ice			
TT19-08BP111-001	C	From Leg	4.000	0.000	160.000	No Ice	0.553	0.446	0.016
			0.000			1/2"	0.649	0.534	0.022
			3.000			Ice	0.752	0.630	0.029
						1" Ice			
DC6-48-60-18-8F	C	From Leg	4.000	0.000	160.000	No Ice	0.917	0.917	0.019
			0.000			1/2"	1.458	1.458	0.037
			3.000			Ice	1.643	1.643	0.057
						1" Ice			
RRUS 32 B2	A	From Leg	4.000	0.000	160.000	No Ice	2.731	1.668	0.053
			0.000			1/2"	2.953	1.855	0.074
			3.000			Ice	3.182	2.049	0.098
						1" Ice			
RRUS 32 B2	B	From Leg	4.000	0.000	160.000	No Ice	2.731	1.668	0.053
			0.000			1/2"	2.953	1.855	0.074
			3.000			Ice	3.182	2.049	0.098
						1" Ice			
RRUS 32 B2	C	From Leg	4.000	0.000	160.000	No Ice	2.731	1.668	0.053
			0.000			1/2"	2.953	1.855	0.074
			3.000			Ice	3.182	2.049	0.098
						1" Ice			
Platform Mount [LP 403-1]	C	None		0.000	160.000	No Ice	18.850	18.850	1.500
						1/2"	24.300	24.300	1.797
						Ice	29.750	29.750	2.093
						1" Ice			
4' x 2" Pipe Mount	A	From Leg	4.000	0.000	160.000	No Ice	0.785	0.785	0.029
			0.000			1/2"	1.028	1.028	0.035
			3.000			Ice	1.281	1.281	0.044
						1" Ice			
4' x 2" Pipe Mount	B	From Leg	4.000	0.000	160.000	No Ice	0.785	0.785	0.029
			0.000			1/2"	1.028	1.028	0.035
			3.000			Ice	1.281	1.281	0.044
						1" Ice			
4' x 2" Pipe Mount	C	From Leg	4.000	0.000	160.000	No Ice	0.785	0.785	0.029
			0.000			1/2"	1.028	1.028	0.035
			3.000			Ice	1.281	1.281	0.044
						1" Ice			
****									
(2) DB846F65ZAXY w/ Mount Pipe	A	From Leg	4.000	0.000	150.000	No Ice	7.271	7.821	0.047
			0.000			1/2"	7.832	9.010	0.114
			0.000			Ice	8.348	9.912	0.189
						1" Ice			
(2) DB846F65ZAXY w/ Mount Pipe	B	From Leg	4.000	0.000	150.000	No Ice	7.271	7.821	0.047
			0.000			1/2"	7.832	9.010	0.114
			0.000			Ice	8.348	9.912	0.189
						1" Ice			
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.000	0.000	150.000	No Ice	4.564	10.259	0.046
			0.000			1/2"	5.105	11.427	0.113
			0.000			Ice	5.612	12.312	0.187
						1" Ice			
BXA-171063-12CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.000	0.000	150.000	No Ice	5.029	5.289	0.041
			0.000			1/2"	5.583	6.459	0.087
			0.000			Ice	6.103	7.348	0.140
						1" Ice			
BXA-171063-12CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.000	0.000	150.000	No Ice	5.029	5.289	0.041
			0.000			1/2"	5.583	6.459	0.087
			0.000			Ice	6.103	7.348	0.140
						1" Ice			
BXA-171063-12CF-EDIN-2	C	From Leg	4.000	0.000	150.000	No Ice	5.029	5.289	0.041

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
w/ Mount Pipe			0.000 0.000			1/2" Ice 1" Ice	5.583 6.103	6.459 7.348	0.087 0.140
(2) FD9R6004/2C-3L	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.314 0.386 0.466	0.076 0.119 0.169	0.003 0.005 0.009
(2) FD9R6004/2C-3L	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.314 0.386 0.466	0.076 0.119 0.169	0.003 0.005 0.009
(2) FD9R6004/2C-3L	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.314 0.386 0.466	0.076 0.119 0.169	0.003 0.005 0.009
DB-T1-6Z-8AB-0Z	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	4.800 5.070 5.348	2.000 2.193 2.393	0.044 0.080 0.120
(2) SBNHH-1D85C w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	11.626 12.346 13.074	9.793 11.311 12.854	0.077 0.166 0.266
(2) SBNHH-1D85C w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	11.626 12.346 13.074	9.793 11.311 12.854	0.077 0.166 0.266
(2) SBNHH-1D85C w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	11.626 12.346 13.074	9.793 11.311 12.854	0.077 0.166 0.266
RRH2x60-700	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	3.500 3.761 4.029	1.816 2.052 2.289	0.060 0.083 0.109
RRH2x60-700	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	3.500 3.761 4.029	1.816 2.052 2.289	0.060 0.083 0.109
RRH2x60-700	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	3.500 3.761 4.029	1.816 2.052 2.289	0.060 0.083 0.109
RRH4X45-AWS4 B66	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	2.660 2.878 3.104	1.586 1.769 1.959	0.064 0.084 0.108
RRH4X45-AWS4 B66	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	2.660 2.878 3.104	1.586 1.769 1.959	0.064 0.084 0.108
RRH4X45-AWS4 B66	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	2.660 2.878 3.104	1.586 1.769 1.959	0.064 0.084 0.108
RRH2X60-1900	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	1.874 2.052 2.237	1.218 1.367 1.523	0.043 0.059 0.077
RRH2X60-1900	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	1.874 2.052 2.237	1.218 1.367 1.523	0.043 0.059 0.077
RRH2X60-1900	C	From Leg	4.000 0.000	0.000	150.000	No Ice 1/2"	1.874 2.052	1.218 1.367	0.043 0.059

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			Ice 1" Ice	2.237	1.523	0.077
DB-T1-6Z-8AB-0Z	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	4.800 5.070 5.348	2.000 2.193 2.393	0.044 0.080 0.120
Platform Mount [LP 403-1]	C	None		0.000	150.000	No Ice 1/2" Ice 1" Ice	18.850 24.300 29.750	18.850 24.300 29.750	1.500 1.797 2.093
****									
PD128-1	C	From Leg	4.000 0.000 5.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
PD201-1	B	From Leg	4.000 0.000 5.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	0.628 1.539 2.467	0.628 1.539 2.467	0.004 0.011 0.023
Side Arm Mount [SO 701-1]	C	From Leg	0.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093
Side Arm Mount [SO 701-1]	B	From Leg	0.000 0.000 0.000	0.000	125.000	No Ice 1/2" Ice 1" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093
***									
PD128-1	B	From Leg	4.000 0.000 5.000	0.000	110.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
PD128-1	C	From Leg	4.000 0.000 5.000	0.000	110.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
Side Arm Mount [SO 701-1]	B	From Leg	0.000 0.000 0.000	0.000	110.000	No Ice 1/2" Ice 1" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093
Side Arm Mount [SO 701-1]	C	From Leg	0.000 0.000 0.000	0.000	110.000	No Ice 1/2" Ice 1" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093
****									
GPS_A	B	From Leg	3.000 0.000 1.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	0.255 0.320 0.393	0.255 0.320 0.393	0.001 0.005 0.010
Side Arm Mount [SO 701-1]	B	From Leg	0.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093
***									
PD128-1	A	From Leg	4.000 0.000 5.000	0.000	95.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
PD128-1	C	From Leg	4.000 0.000 5.000	0.000	95.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
Side Arm Mount [SO 701-1]	A	From Leg	0.000 0.000 0.000	0.000	95.000	No Ice 1/2" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Side Arm Mount [SO 701-1]	C	From Leg	0.000 0.000 0.000	0.000	95.000	1" Ice No Ice 1/2" Ice 1" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093
***									
DB222	C	From Leg	4.000 0.000 5.000	0.000	80.000	No Ice 1/2" Ice 1" Ice	1.600 2.880 4.160	1.600 2.880 4.160	0.016 0.021 0.026
PD128-1	B	From Leg	4.000 0.000 5.000	0.000	80.000	No Ice 1/2" Ice 1" Ice	1.277 2.272 3.282	1.277 2.272 3.282	0.013 0.024 0.041
Side Arm Mount [SO 701-1]	B	From Leg	0.000 0.000 0.000	0.000	80.000	No Ice 1/2" Ice 1" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093
Side Arm Mount [SO 701-1]	C	From Leg	0.000 0.000 0.000	0.000	80.000	No Ice 1/2" Ice 1" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
SP2-5.8	A	Paraboloid w/o Radome	From Leg	4.000 0.000 -1.000	0.000		188.000	2.000	No Ice 1/2" Ice 1" Ice	3.140 3.410 3.680	0.022 0.040 0.060

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 190.000-180.000	185.000	1.178	0.025	25.000	A	0.000	25.000	25.000	100.00	0.000	0.000
					B	0.000	25.000		100.00	0.000	0.000
					C	0.000	25.000		100.00	0.000	0.000
L2 180.000-160.000	170.000	1.15	0.024	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	1.980
L3 160.000-140.000	150.000	1.11	0.023	70.000	A	0.000	70.000	70.000	100.00	0.000	0.000
					B	0.000	70.000		100.00	0.000	0.000
					C	0.000	70.000		100.00	0.000	11.880
L4 140.000-120.000	130.000	1.065	0.022	80.000	A	0.000	80.000	80.000	100.00	0.000	0.000
					B	0.000	80.000		100.00	0.000	0.000
					C	0.000	80.000		100.00	0.000	11.880
L5 120.000-113.330	116.665	1.033	0.022	30.015	A	0.000	30.015	30.015	100.00	0.000	0.000
					B	0.000	30.015		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	30.015		100.00	0.000	4.296
L6 113.330-103.917	108.624	1.012	0.021	42.358	A	0.000	42.358	42.358	100.00	0.000	0.000
					B	0.000	42.358		100.00	0.000	0.000
					C	0.000	42.358		100.00	0.000	7.160
L7 103.917-100.000	101.959	0.994	0.021	17.627	A	0.000	17.627	17.627	100.00	0.000	0.000
					B	0.000	17.627		100.00	0.000	0.000
					C	0.000	17.627		100.00	0.000	2.980
L8 100.000-89.583	94.792	0.973	0.020	52.085	A	0.000	52.085	52.085	100.00	0.000	0.000
					B	0.000	52.085		100.00	0.000	0.000
					C	0.000	52.085		100.00	0.000	8.174
L9 89.583-85.417	87.500	0.951	0.020	20.830	A	0.000	20.830	20.830	100.00	0.000	0.000
					B	0.000	20.830		100.00	0.000	0.000
					C	0.000	20.830		100.00	0.000	3.947
L10 85.417-83.917	84.667	0.942	0.020	7.500	A	0.000	7.500	7.500	100.00	0.000	0.000
					B	0.000	7.500		100.00	0.000	0.000
					C	0.000	7.500		100.00	0.000	1.641
L11 83.917-80.000	81.959	0.934	0.020	19.585	A	0.000	19.585	19.585	100.00	0.000	0.000
					B	0.000	19.585		100.00	0.000	0.000
					C	0.000	19.585		100.00	0.000	4.105
L12 80.000-60.000	70.000	0.892	0.019	100.000	A	0.000	100.000	100.000	100.00	0.000	0.000
					B	0.000	100.000		100.00	0.000	0.000
					C	0.000	100.000		100.00	0.000	17.057
L13 60.000-58.417	59.209	0.851	0.018	7.915	A	0.000	7.915	7.915	100.00	0.000	0.000
					B	0.000	7.915		100.00	0.000	0.000
					C	0.000	7.915		100.00	0.000	1.534
L14 58.417-48.417	53.417	0.826	0.017	50.000	A	0.000	50.000	50.000	100.00	0.000	0.000
					B	0.000	50.000		100.00	0.000	0.000
					C	0.000	50.000		100.00	0.000	8.312
L15 48.417-40.000	44.209	0.783	0.016	42.085	A	0.000	42.085	42.085	100.00	0.000	0.000
					B	0.000	42.085		100.00	0.000	0.000
					C	0.000	42.085		100.00	0.000	7.656
L16 40.000-31.083	35.542	0.735	0.015	44.585	A	0.000	44.585	44.585	100.00	0.000	0.000
					B	0.000	44.585		100.00	0.000	0.000
					C	0.000	44.585		100.00	0.000	7.918
L17 31.083-28.917	30.000	0.701	0.015	10.830	A	0.000	10.830	10.830	100.00	0.000	0.000
					B	0.000	10.830		100.00	0.000	0.000
					C	0.000	10.830		100.00	0.000	1.738
L18 28.917-20.000	24.459	0.7	0.015	44.585	A	0.000	44.585	44.585	100.00	0.000	0.000
					B	0.000	44.585		100.00	0.000	0.000
					C	0.000	44.585		100.00	0.000	8.213
L19 20.000-4.583	12.292	0.7	0.015	77.085	A	0.000	77.085	77.085	100.00	0.000	0.000
					B	0.000	77.085		100.00	0.000	0.000
					C	0.000	77.085		100.00	0.000	13.394
L20 4.583-0.000	2.292	0.7	0.015	22.915	A	0.000	22.915	22.915	100.00	0.000	0.000
					B	0.000	22.915		100.00	0.000	0.000
					C	0.000	22.915		100.00	0.000	3.677

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 190.000-180.000	185.000	1.178	0.007	1.782	27.970	A	0.000	27.970	27.970	100.00	0.000	0.000
						B	0.000	27.970		100.00	0.000	0.000
						C	0.000	27.970		100.00	0.000	0.000
L2 180.000-160.000	170.000	1.15	0.007	1.767	65.891	A	0.000	65.891	65.891	100.00	0.000	0.000
						B	0.000	65.891		100.00	0.000	0.000
						C	0.000	65.891		100.00	0.000	5.514
L3 160.000-140.000	150.000	1.11	0.007	1.745	75.817	A	0.000	75.817	75.817	100.00	0.000	0.000
						B	0.000	75.817		100.00	0.000	0.000
						C	0.000	75.817		100.00	0.000	32.822
L4 140.000-	130.000	1.065	0.006	1.720	85.735	A	0.000	85.735	85.735	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
120.000						B	0.000	85.735		100.00	0.000	0.000
						C	0.000	85.735		100.00	0.000	32.525
L5 120.000-113.330	116.665	1.033	0.006	1.702	31.907	A	0.000	31.907	31.907	100.00	0.000	0.000
						B	0.000	31.907		100.00	0.000	0.000
						C	0.000	31.907		100.00	0.000	11.864
L6 113.330-103.917	108.624	1.012	0.006	1.690	45.009	A	0.000	45.009	45.009	100.00	0.000	0.000
						B	0.000	45.009		100.00	0.000	0.000
						C	0.000	45.009		100.00	0.000	20.238
L7 103.917-100.000	101.959	0.994	0.006	1.679	18.723	A	0.000	18.723	18.723	100.00	0.000	0.000
						B	0.000	18.723		100.00	0.000	0.000
						C	0.000	18.723		100.00	0.000	8.387
L8 100.000-89.583	94.792	0.973	0.006	1.667	54.979	A	0.000	54.979	54.979	100.00	0.000	0.000
						B	0.000	54.979		100.00	0.000	0.000
						C	0.000	54.979		100.00	0.000	23.007
L9 89.583-85.417	87.500	0.951	0.006	1.654	21.978	A	0.000	21.978	21.978	100.00	0.000	0.000
						B	0.000	21.978		100.00	0.000	0.000
						C	0.000	21.978		100.00	0.000	11.325
L10 85.417-83.917	84.667	0.942	0.006	1.648	7.912	A	0.000	7.912	7.912	100.00	0.000	0.000
						B	0.000	7.912		100.00	0.000	0.000
						C	0.000	7.912		100.00	0.000	4.773
L11 83.917-80.000	81.959	0.934	0.006	1.643	20.658	A	0.000	20.658	20.658	100.00	0.000	0.000
						B	0.000	20.658		100.00	0.000	0.000
						C	0.000	20.658		100.00	0.000	11.860
L12 80.000-60.000	70.000	0.892	0.005	1.617	105.390	A	0.000	105.390	105.390	100.00	0.000	0.000
						B	0.000	105.390		100.00	0.000	0.000
						C	0.000	105.390		100.00	0.000	47.124
L13 60.000-58.417	59.209	0.851	0.005	1.590	8.335	A	0.000	8.335	8.335	100.00	0.000	0.000
						B	0.000	8.335		100.00	0.000	0.000
						C	0.000	8.335		100.00	0.000	4.163
L14 58.417-48.417	53.417	0.826	0.005	1.574	52.623	A	0.000	52.623	52.623	100.00	0.000	0.000
						B	0.000	52.623		100.00	0.000	0.000
						C	0.000	52.623		100.00	0.000	22.245
L15 48.417-40.000	44.209	0.783	0.005	1.545	44.252	A	0.000	44.252	44.252	100.00	0.000	0.000
						B	0.000	44.252		100.00	0.000	0.000
						C	0.000	44.252		100.00	0.000	20.204
L16 40.000-31.083	35.542	0.735	0.004	1.511	46.831	A	0.000	46.831	46.831	100.00	0.000	0.000
						B	0.000	46.831		100.00	0.000	0.000
						C	0.000	46.831		100.00	0.000	20.537
L17 31.083-28.917	30.000	0.701	0.004	1.486	11.366	A	0.000	11.366	11.366	100.00	0.000	0.000
						B	0.000	11.366		100.00	0.000	0.000
						C	0.000	11.366		100.00	0.000	4.384
L18 28.917-20.000	24.459	0.7	0.004	1.456	46.748	A	0.000	46.748	46.748	100.00	0.000	0.000
						B	0.000	46.748		100.00	0.000	0.000
						C	0.000	46.748		100.00	0.000	20.531
L19 20.000-4.583	12.292	0.7	0.004	1.359	80.577	A	0.000	80.577	80.577	100.00	0.000	0.000
						B	0.000	80.577		100.00	0.000	0.000
						C	0.000	80.577		100.00	0.000	32.105
L20 4.583-0.000	2.292	0.7	0.004	1.149	23.793	A	0.000	23.793	23.793	100.00	0.000	0.000
						B	0.000	23.793		100.00	0.000	0.000
						C	0.000	23.793		100.00	0.000	8.006

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 190.000-180.000	185.000	1.178	0.009	25.000	A	0.000	25.000	25.000	100.00	0.000	0.000
					B	0.000	25.000		100.00	0.000	0.000
					C	0.000	25.000		100.00	0.000	0.000
L2 180.000-160.000	170.000	1.15	0.009	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	0.000
					C	0.000	60.000		100.00	0.000	1.980
L3 160.000-	150.000	1.11	0.009	70.000	A	0.000	70.000	70.000	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
140.000					B	0.000	70.000		100.00	0.000	0.000
					C	0.000	70.000		100.00	0.000	11.880
L4 140.000-120.000	130.000	1.065	0.008	80.000	A	0.000	80.000	80.000	100.00	0.000	0.000
					B	0.000	80.000		100.00	0.000	0.000
					C	0.000	80.000		100.00	0.000	11.880
L5 120.000-113.330	116.665	1.033	0.008	30.015	A	0.000	30.015	30.015	100.00	0.000	0.000
					B	0.000	30.015		100.00	0.000	0.000
					C	0.000	30.015		100.00	0.000	4.296
L6 113.330-103.917	108.624	1.012	0.008	42.358	A	0.000	42.358	42.358	100.00	0.000	0.000
					B	0.000	42.358		100.00	0.000	0.000
					C	0.000	42.358		100.00	0.000	7.160
L7 103.917-100.000	101.959	0.994	0.008	17.627	A	0.000	17.627	17.627	100.00	0.000	0.000
					B	0.000	17.627		100.00	0.000	0.000
					C	0.000	17.627		100.00	0.000	2.980
L8 100.000-89.583	94.792	0.973	0.008	52.085	A	0.000	52.085	52.085	100.00	0.000	0.000
					B	0.000	52.085		100.00	0.000	0.000
					C	0.000	52.085		100.00	0.000	8.174
L9 89.583-85.417	87.500	0.951	0.007	20.830	A	0.000	20.830	20.830	100.00	0.000	0.000
					B	0.000	20.830		100.00	0.000	0.000
					C	0.000	20.830		100.00	0.000	3.947
L10 85.417-83.917	84.667	0.942	0.007	7.500	A	0.000	7.500	7.500	100.00	0.000	0.000
					B	0.000	7.500		100.00	0.000	0.000
					C	0.000	7.500		100.00	0.000	1.641
L11 83.917-80.000	81.959	0.934	0.007	19.585	A	0.000	19.585	19.585	100.00	0.000	0.000
					B	0.000	19.585		100.00	0.000	0.000
					C	0.000	19.585		100.00	0.000	4.105
L12 80.000-60.000	70.000	0.892	0.007	100.000	A	0.000	100.000	100.000	100.00	0.000	0.000
					B	0.000	100.000		100.00	0.000	0.000
					C	0.000	100.000		100.00	0.000	17.057
L13 60.000-58.417	59.209	0.851	0.007	7.915	A	0.000	7.915	7.915	100.00	0.000	0.000
					B	0.000	7.915		100.00	0.000	0.000
					C	0.000	7.915		100.00	0.000	1.534
L14 58.417-48.417	53.417	0.826	0.006	50.000	A	0.000	50.000	50.000	100.00	0.000	0.000
					B	0.000	50.000		100.00	0.000	0.000
					C	0.000	50.000		100.00	0.000	8.312
L15 48.417-40.000	44.209	0.783	0.006	42.085	A	0.000	42.085	42.085	100.00	0.000	0.000
					B	0.000	42.085		100.00	0.000	0.000
					C	0.000	42.085		100.00	0.000	7.656
L16 40.000-31.083	35.542	0.735	0.006	44.585	A	0.000	44.585	44.585	100.00	0.000	0.000
					B	0.000	44.585		100.00	0.000	0.000
					C	0.000	44.585		100.00	0.000	7.918
L17 31.083-28.917	30.000	0.701	0.005	10.830	A	0.000	10.830	10.830	100.00	0.000	0.000
					B	0.000	10.830		100.00	0.000	0.000
					C	0.000	10.830		100.00	0.000	1.738
L18 28.917-20.000	24.459	0.7	0.005	44.585	A	0.000	44.585	44.585	100.00	0.000	0.000
					B	0.000	44.585		100.00	0.000	0.000
					C	0.000	44.585		100.00	0.000	8.213
L19 20.000-4.583	12.292	0.7	0.005	77.085	A	0.000	77.085	77.085	100.00	0.000	0.000
					B	0.000	77.085		100.00	0.000	0.000
					C	0.000	77.085		100.00	0.000	13.394
L20 4.583-0.000	2.292	0.7	0.005	22.915	A	0.000	22.915	22.915	100.00	0.000	0.000
					B	0.000	22.915		100.00	0.000	0.000
					C	0.000	22.915		100.00	0.000	3.677

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice

Comb. No.	Description
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	190 - 180	Pole	Max Tension	20	0.000	-0.000	0.002
			Max. Compression	26	-8.005	0.449	0.202
			Max. Mx	20	-4.075	27.149	0.158
			Max. My	14	-4.065	0.021	-28.233
			Max. Vy	20	-3.559	27.149	0.158
			Max. Vx	14	3.746	0.021	-28.233
			Max. Torque	4			0.480
L2	180 - 160	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-24.738	1.793	-0.654
			Max. Mx	20	-13.015	186.443	0.656
			Max. My	14	-12.998	-0.169	-191.647
			Max. Vy	20	-10.382	186.443	0.656
			Max. Vx	14	10.629	-0.169	-191.647
			Max. Torque	13			-1.004
L3	160 - 140	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-52.656	9.933	-5.363
			Max. Mx	20	-24.381	560.927	1.023
			Max. My	14	-24.356	-0.012	-571.439
			Max. Vy	20	-22.446	560.927	1.023
			Max. Vx	14	22.776	-0.012	-571.439

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	12			-3.728
L4	140 - 120	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-63.650	16.560	-9.781
			Max. Mx	20	-30.046	1037.379	2.134
			Max. My	14	-30.023	-0.953	-1054.560
			Max. Vy	20	-25.161	1037.379	2.134
			Max. Vx	14	25.523	-0.953	-1054.560
			Max. Torque	12			-4.960
L5	120 - 113.33	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-67.444	18.941	-11.161
			Max. Mx	20	-32.078	1208.425	2.558
			Max. My	14	-32.056	-1.259	-1227.926
			Max. Vy	20	-26.065	1208.425	2.558
			Max. Vx	14	26.427	-1.259	-1227.926
			Max. Torque	12			-5.329
L6	113.33 - 103.917	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-73.988	22.277	-13.883
			Max. Mx	20	-35.922	1462.137	2.899
			Max. My	14	-35.900	-1.694	-1485.377
			Max. Vy	20	-27.620	1462.137	2.899
			Max. Vx	14	28.014	-1.694	-1485.377
			Max. Torque	12			-6.155
L7	103.917 - 100	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-76.532	23.654	-14.681
			Max. Mx	20	-37.451	1571.527	3.151
			Max. My	14	-37.429	-1.876	-1596.253
			Max. Vy	20	-28.174	1571.527	3.151
			Max. Vx	14	28.568	-1.876	-1596.253
			Max. Torque	12			-6.401
L8	100 - 89.583	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-84.248	28.049	-16.785
			Max. Mx	20	-42.065	1875.624	3.781
			Max. My	14	-42.044	-2.156	-1904.205
			Max. Vy	20	-29.970	1875.624	3.781
			Max. Vx	14	30.364	-2.156	-1904.205
			Max. Torque	12			-7.267
L9	89.583 - 85.417	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-87.375	29.662	-17.720
			Max. Mx	20	-44.078	2002.030	4.027
			Max. My	14	-44.058	-2.313	-2032.179
			Max. Vy	20	-30.638	2002.030	4.027
			Max. Vx	14	31.032	-2.313	-2032.179
			Max. Torque	12			-7.614
L10	85.417 - 83.917	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-88.623	30.300	-18.090
			Max. Mx	20	-44.919	2048.291	4.087
			Max. My	14	-44.900	-2.320	-2078.983
			Max. Vy	20	-30.899	2048.291	4.087
			Max. Vx	14	31.294	-2.320	-2078.983
			Max. Torque	12			-7.757
L11	83.917 - 80	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-91.548	31.967	-19.056
			Max. Mx	20	-46.795	2170.862	4.242
			Max. My	14	-46.776	-2.334	-2202.972
			Max. Vy	20	-31.541	2170.862	4.242
			Max. Vx	14	31.936	-2.334	-2202.972
			Max. Torque	12			-8.111
L12	80 - 60	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-107.091	39.406	-24.183
			Max. Mx	20	-56.987	2834.164	5.080
			Max. My	14	-56.971	-2.989	-2874.615
			Max. Vy	20	-34.452	2834.164	5.080
			Max. Vx	14	34.873	-2.989	-2874.615
			Max. Torque	12			-9.811
L13	60 - 58.417	Pole	Max Tension	1	0.000	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-108.435	39.998	-24.526
			Max. Mx	20	-57.923	2888.927	5.177
			Max. My	14	-57.908	-3.053	-2930.018
			Max. Vy	20	-34.673	2888.927	5.177
			Max. Vx	14	35.095	-3.053	-2930.018
			Max. Torque	12			-9.932
L14	58.417 - 48.417	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-116.212	43.600	-26.612
			Max. Mx	20	-63.232	3241.904	5.790
			Max. My	14	-63.219	-3.470	-3287.041
			Max. Vy	20	-35.856	3241.904	5.790
			Max. Vx	14	36.276	-3.470	-3287.041
			Max. Torque	12			-10.566
L15	48.417 - 40	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-123.788	46.765	-28.444
			Max. Mx	20	-68.766	3548.356	6.188
			Max. My	14	-68.754	-3.616	-3596.802
			Max. Vy	20	-36.849	3548.356	6.188
			Max. Vx	14	37.268	-3.616	-3596.802
			Max. Torque	12			-11.120
L16	40 - 31.083	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-131.731	49.963	-30.295
			Max. Mx	20	-74.621	3881.540	6.636
			Max. My	14	-74.612	-3.817	-3933.498
			Max. Vy	20	-37.778	3881.540	6.636
			Max. Vx	14	38.196	-3.817	-3933.498
			Max. Torque	12			-11.658
L17	31.083 - 28.917	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-133.824	50.672	-30.704
			Max. Mx	20	-76.221	3963.644	6.769
			Max. My	14	-76.213	-3.909	-4016.472
			Max. Vy	20	-37.979	3963.644	6.769
			Max. Vx	14	38.397	-3.909	-4016.472
			Max. Torque	12			-11.770
L18	28.917 - 20	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-141.376	53.531	-32.357
			Max. Mx	20	-81.794	4306.272	7.311
			Max. My	14	-81.788	-4.276	-4362.660
			Max. Vy	20	-38.806	4306.272	7.311
			Max. Vx	14	39.221	-4.276	-4362.660
			Max. Torque	12			-12.302
L19	20 - 4.583	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-155.583	57.894	-34.876
			Max. Mx	20	-92.895	4915.250	8.249
			Max. My	14	-92.894	-4.920	-4977.741
			Max. Vy	20	-40.118	4915.250	8.249
			Max. Vx	14	40.529	-4.920	-4977.741
			Max. Torque	12			-13.169
L20	4.583 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-160.398	58.933	-35.476
			Max. Mx	20	-96.973	5100.069	8.528
			Max. My	14	-96.973	-5.115	-5164.360
			Max. Vy	20	-40.485	5100.069	8.528
			Max. Vx	14	40.894	-5.115	-5164.360
			Max. Torque	12			-13.407

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	160.398	-0.000	0.000
	Max. H_x	21	72.735	40.470	0.084
	Max. H_z	3	72.735	0.082	40.810

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. M_x	2	5141.191	0.082	40.810
	Max. M_z	8	5083.878	-40.469	-0.080
	Max. Torsion	24	13.068	20.336	35.365
	Min. Vert	21	72.735	40.470	0.084
	Min. H_x	9	72.735	-40.470	-0.080
	Min. H_z	15	72.735	-0.082	-40.879
	Min. M_x	14	-5164.360	-0.082	-40.878
	Min. M_z	20	-5100.069	40.469	0.084
	Min. Torsion	12	-13.407	-20.278	-35.472

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	80.817	-0.000	0.000	4.030	6.535	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	96.980	-0.082	-40.810	-5141.191	21.280	-10.913
0.9 Dead+1.6 Wind 0 deg - No Ice	72.735	-0.082	-40.810	-5104.236	19.104	-10.907
1.2 Dead+1.6 Wind 30 deg - No Ice	96.980	20.194	-35.283	-4441.472	-2532.377	-5.835
0.9 Dead+1.6 Wind 30 deg - No Ice	72.735	20.194	-35.283	-4409.709	-2515.579	-5.832
1.2 Dead+1.6 Wind 60 deg - No Ice	96.980	35.029	-20.325	-2554.846	-4399.490	0.976
0.9 Dead+1.6 Wind 60 deg - No Ice	72.735	35.030	-20.325	-2537.105	-4368.827	0.975
1.2 Dead+1.6 Wind 90 deg - No Ice	96.980	40.469	0.080	17.866	-5083.878	7.567
0.9 Dead+1.6 Wind 90 deg - No Ice	72.735	40.470	0.080	16.489	-5048.196	7.562
1.2 Dead+1.6 Wind 120 deg - No Ice	96.980	35.082	20.630	2619.369	-4406.983	12.099
0.9 Dead+1.6 Wind 120 deg - No Ice	72.735	35.082	20.630	2598.599	-4376.244	12.091
1.2 Dead+1.6 Wind 150 deg - No Ice	96.980	20.278	35.472	4485.411	-2544.011	13.407
0.9 Dead+1.6 Wind 150 deg - No Ice	72.735	20.279	35.472	4450.803	-2527.129	13.399
1.2 Dead+1.6 Wind 180 deg - No Ice	96.980	0.082	40.878	5164.360	-5.116	10.915
0.9 Dead+1.6 Wind 180 deg - No Ice	72.735	0.082	40.879	5124.731	-7.081	10.908
1.2 Dead+1.6 Wind 210 deg - No Ice	96.980	-20.136	35.390	4472.258	2537.341	5.498
0.9 Dead+1.6 Wind 210 deg - No Ice	72.735	-20.136	35.390	4437.731	2516.487	5.495
1.2 Dead+1.6 Wind 240 deg - No Ice	96.980	-35.000	20.488	2596.529	4409.982	-1.185
0.9 Dead+1.6 Wind 240 deg - No Ice	72.735	-35.000	20.488	2575.937	4375.201	-1.184
1.2 Dead+1.6 Wind 270 deg - No Ice	96.980	-40.469	-0.084	-8.529	5100.069	-7.569
0.9 Dead+1.6 Wind 270 deg - No Ice	72.735	-40.470	-0.084	-9.696	5060.239	-7.564
1.2 Dead+1.6 Wind 300 deg - No Ice	96.980	-35.112	-20.467	-2577.711	4428.861	-11.891
0.9 Dead+1.6 Wind 300 deg - No Ice	72.735	-35.112	-20.467	-2559.785	4393.947	-11.883
1.2 Dead+1.6 Wind 330 deg - No Ice	96.980	-20.336	-35.365	-4454.691	2571.412	-13.068
0.9 Dead+1.6 Wind 330 deg - No Ice	72.735	-20.336	-35.365	-4422.799	2550.278	-13.059
1.2 Dead+1.0 Ice+1.0 Temp	160.398	0.000	-0.000	35.476	58.933	-0.000
1.2 Dead+1.0 Wind 0	160.398	-0.018	-13.962	-1730.475	62.279	-4.996

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	160.398	6.924	-12.078	-1491.393	-815.058	-2.530
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	160.398	12.003	-6.963	-844.270	-1456.726	0.653
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	160.398	13.864	0.018	38.658	-1691.845	3.672
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	160.398	12.014	7.033	928.636	-1458.459	5.699
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	160.398	6.941	12.121	1570.809	-817.737	6.203
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	160.398	0.018	13.978	1804.914	56.025	4.995
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	160.398	-6.910	12.103	1567.683	930.625	2.449
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	160.398	-11.996	7.001	923.221	1573.638	-0.704
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	160.398	-13.864	-0.018	32.404	1810.152	-3.672
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	160.398	-12.021	-6.994	-849.687	1578.159	-5.649
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	160.398	-6.955	-12.096	-1494.521	938.779	-6.123
Dead+Wind 0 deg - Service	80.817	-0.019	-9.498	-1187.834	9.769	-0.582
Dead+Wind 30 deg - Service	80.817	4.700	-8.211	-1025.751	-581.710	-0.228
Dead+Wind 60 deg - Service	80.817	8.152	-4.730	-588.769	-1014.170	0.227
Dead+Wind 90 deg - Service	80.817	9.419	0.019	7.122	-1172.733	0.631
Dead+Wind 120 deg - Service	80.817	8.164	4.801	609.674	-1015.904	0.859
Dead+Wind 150 deg - Service	80.817	4.719	8.255	1041.894	-584.406	0.860
Dead+Wind 180 deg - Service	80.817	0.019	9.513	1199.166	3.658	0.582
Dead+Wind 210 deg - Service	80.817	-4.686	8.236	1038.838	592.540	0.148
Dead+Wind 240 deg - Service	80.817	-8.145	4.768	604.381	1026.275	-0.277
Dead+Wind 270 deg - Service	80.817	-9.418	-0.019	1.011	1186.160	-0.631
Dead+Wind 300 deg - Service	80.817	-8.171	-4.763	-594.062	1030.653	-0.809
Dead+Wind 330 deg - Service	80.817	-4.733	-8.230	-1028.807	600.430	-0.780

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-80.817	0.000	0.000	80.817	-0.000	0.000%
2	-0.082	-96.980	-40.811	0.082	96.980	40.810	0.001%
3	-0.082	-72.735	-40.811	0.082	72.735	40.810	0.001%
4	20.194	-96.980	-35.283	-20.194	96.980	35.283	0.000%
5	20.194	-72.735	-35.283	-20.194	72.735	35.283	0.000%
6	35.030	-96.980	-20.325	-35.029	96.980	20.325	0.000%
7	35.030	-72.735	-20.325	-35.030	72.735	20.325	0.000%
8	40.471	-96.980	0.080	-40.469	96.980	-0.080	0.001%
9	40.471	-72.735	0.080	-40.470	72.735	-0.080	0.001%
10	35.082	-96.980	20.631	-35.082	96.980	-20.630	0.000%
11	35.082	-72.735	20.631	-35.082	72.735	-20.630	0.000%
12	20.279	-96.980	35.472	-20.278	96.980	-35.472	0.000%
13	20.279	-72.735	35.472	-20.279	72.735	-35.472	0.000%
14	0.082	-96.980	40.879	-0.082	96.980	-40.878	0.001%
15	0.082	-72.735	40.879	-0.082	72.735	-40.879	0.001%
16	-20.137	-96.980	35.390	20.136	96.980	-35.390	0.000%
17	-20.137	-72.735	35.390	20.136	72.735	-35.390	0.000%
18	-35.000	-96.980	20.488	35.000	96.980	-20.488	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
19	-35.000	-72.735	20.488	35.000	72.735	-20.488	0.000%
20	-40.471	-96.980	-0.084	40.469	96.980	0.084	0.001%
21	-40.471	-72.735	-0.084	40.470	72.735	0.084	0.001%
22	-35.112	-96.980	-20.467	35.112	96.980	20.467	0.000%
23	-35.112	-72.735	-20.467	35.112	72.735	20.467	0.000%
24	-20.337	-96.980	-35.365	20.336	96.980	35.365	0.000%
25	-20.337	-72.735	-35.365	20.336	72.735	35.365	0.000%
26	0.000	-160.398	0.000	-0.000	160.398	0.000	0.000%
27	-0.018	-160.398	-13.962	0.018	160.398	13.962	0.000%
28	6.924	-160.398	-12.078	-6.924	160.398	12.078	0.000%
29	12.003	-160.398	-6.963	-12.003	160.398	6.963	0.000%
30	13.864	-160.398	0.018	-13.864	160.398	-0.018	0.000%
31	12.014	-160.398	7.033	-12.014	160.398	-7.033	0.000%
32	6.941	-160.398	12.121	-6.941	160.398	-12.121	0.000%
33	0.018	-160.398	13.978	-0.018	160.398	-13.978	0.000%
34	-6.910	-160.398	12.103	6.910	160.398	-12.103	0.000%
35	-11.996	-160.398	7.002	11.996	160.398	-7.001	0.000%
36	-13.864	-160.398	-0.018	13.864	160.398	0.018	0.000%
37	-12.021	-160.398	-6.994	12.021	160.398	6.994	0.000%
38	-6.955	-160.398	-12.096	6.955	160.398	12.096	0.000%
39	-0.019	-80.817	-9.499	0.019	80.817	9.498	0.002%
40	4.701	-80.817	-8.213	-4.700	80.817	8.211	0.002%
41	8.154	-80.817	-4.731	-8.152	80.817	4.730	0.002%
42	9.420	-80.817	0.019	-9.419	80.817	-0.019	0.002%
43	8.166	-80.817	4.802	-8.164	80.817	-4.801	0.002%
44	4.720	-80.817	8.257	-4.719	80.817	-8.255	0.002%
45	0.019	-80.817	9.515	-0.019	80.817	-9.513	0.002%
46	-4.687	-80.817	8.238	4.686	80.817	-8.236	0.002%
47	-8.147	-80.817	4.769	8.145	80.817	-4.768	0.002%
48	-9.420	-80.817	-0.019	9.418	80.817	0.019	0.002%
49	-8.173	-80.817	-4.764	8.171	80.817	4.763	0.002%
50	-4.734	-80.817	-8.232	4.733	80.817	8.230	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	16	0.00000001	0.00009281
3	Yes	16	0.00000001	0.00007915
4	Yes	17	0.00000001	0.00013529
5	Yes	17	0.00000001	0.00011138
6	Yes	17	0.00000001	0.00014147
7	Yes	17	0.00000001	0.00011669
8	Yes	15	0.00002863	0.00014990
9	Yes	15	0.00000001	0.00012973
10	Yes	18	0.00000001	0.00007400
11	Yes	17	0.00000001	0.00014440
12	Yes	17	0.00000001	0.00013028
13	Yes	17	0.00000001	0.00010699
14	Yes	16	0.00000001	0.00008905
15	Yes	16	0.00000001	0.00007593
16	Yes	18	0.00000001	0.00006661
17	Yes	17	0.00000001	0.00012929
18	Yes	18	0.00000001	0.00006386
19	Yes	17	0.00000001	0.00012379
20	Yes	15	0.00002862	0.00014135
21	Yes	15	0.00000001	0.00012232
22	Yes	17	0.00000001	0.00013183
23	Yes	17	0.00000001	0.00010826
24	Yes	18	0.00000001	0.00007471
25	Yes	17	0.00000001	0.00014572
26	Yes	12	0.00000001	0.00012186
27	Yes	17	0.00000001	0.00008254
28	Yes	17	0.00000001	0.00008583
29	Yes	17	0.00000001	0.00008524
30	Yes	17	0.00000001	0.00008013

31	Yes	17	0.00000001	0.00009031
32	Yes	17	0.00000001	0.00009060
33	Yes	17	0.00000001	0.00008671
34	Yes	17	0.00000001	0.00009561
35	Yes	17	0.00000001	0.00009543
36	Yes	17	0.00000001	0.00008674
37	Yes	17	0.00000001	0.00009231
38	Yes	17	0.00000001	0.00009284
39	Yes	13	0.00012296	0.00002426
40	Yes	13	0.00012291	0.00003946
41	Yes	13	0.00012291	0.00004014
42	Yes	13	0.00012294	0.00002382
43	Yes	13	0.00012292	0.00006078
44	Yes	13	0.00012292	0.00003808
45	Yes	13	0.00012296	0.00002409
46	Yes	13	0.00012293	0.00004782
47	Yes	13	0.00012292	0.00004916
48	Yes	13	0.00012295	0.00002371
49	Yes	13	0.00012292	0.00003859
50	Yes	13	0.00012292	0.00005983

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190 - 180	13.560	45	0.567	0.002
L2	180 - 160	12.373	45	0.566	0.002
L3	160 - 140	10.034	45	0.546	0.001
L4	140 - 120	7.826	45	0.501	0.001
L5	120 - 113.33	5.856	45	0.434	0.001
L6	113.33 - 103.917	5.265	45	0.411	0.001
L7	103.917 - 100	4.481	45	0.383	0.001
L8	100 - 89.583	4.171	45	0.370	0.001
L9	89.583 - 85.417	3.395	45	0.340	0.000
L10	85.417 - 83.917	3.104	45	0.329	0.000
L11	83.917 - 80	3.001	45	0.325	0.000
L12	80 - 60	2.739	45	0.312	0.000
L13	60 - 58.417	1.570	45	0.243	0.000
L14	58.417 - 48.417	1.490	45	0.238	0.000
L15	48.417 - 40	1.033	45	0.198	0.000
L16	40 - 31.083	0.711	45	0.168	0.000
L17	31.083 - 28.917	0.430	45	0.133	0.000
L18	28.917 - 20	0.371	45	0.125	0.000
L19	20 - 4.583	0.175	45	0.085	0.000
L20	4.583 - 0	0.008	45	0.017	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.000	PD201-7	45	13.323	0.567	0.002	343509
187.000	SP2-5.8	45	13.204	0.567	0.002	343509
185.000	TME-800MHz RRH	45	12.966	0.567	0.002	343509
184.000	Side Arm Mount [SO 701-1]	45	12.848	0.567	0.002	286000
179.000	458-2D	45	12.255	0.565	0.002	141301
170.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	45	11.194	0.559	0.001	61129
160.000	(2) 7770.00 w/ Mount Pipe	45	10.034	0.546	0.001	37038
150.000	(2) DB846F65ZAXY w/ Mount Pipe	45	8.907	0.527	0.001	25856
125.000	PD128-1	45	6.321	0.451	0.001	15674
110.000	PD128-1	45	4.981	0.402	0.001	18946
100.000	GPS_A	45	4.171	0.370	0.001	19053
95.000	PD128-1	45	3.791	0.355	0.001	19568
80.000	DB222	45	2.739	0.312	0.000	18416

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190 - 180	58.443	14	2.447	0.013
L2	180 - 160	53.324	14	2.439	0.013
L3	160 - 140	43.239	14	2.354	0.012
L4	140 - 120	33.722	14	2.158	0.010
L5	120 - 113.33	25.230	14	1.869	0.008
L6	113.33 - 103.917	22.685	14	1.773	0.008
L7	103.917 - 100	19.305	14	1.653	0.007
L8	100 - 89.583	17.972	14	1.595	0.007
L9	89.583 - 85.417	14.629	14	1.466	0.006
L10	85.417 - 83.917	13.371	14	1.416	0.006
L11	83.917 - 80	12.929	14	1.400	0.006
L12	80 - 60	11.802	14	1.347	0.005
L13	60 - 58.417	6.763	14	1.047	0.004
L14	58.417 - 48.417	6.419	14	1.024	0.004
L15	48.417 - 40	4.452	14	0.852	0.003
L16	40 - 31.083	3.062	14	0.722	0.003
L17	31.083 - 28.917	1.852	14	0.572	0.002
L18	28.917 - 20	1.600	14	0.539	0.002
L19	20 - 4.583	0.755	14	0.364	0.001
L20	4.583 - 0	0.036	14	0.075	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.000	PD201-7	14	57.418	2.446	0.013	79557
187.000	SP2-5.8	14	56.906	2.446	0.013	79557
185.000	TME-800MHz RRH	14	55.881	2.445	0.013	79557
184.000	Side Arm Mount [SO 701-1]	14	55.369	2.444	0.013	66237
179.000	458-2D	14	52.813	2.437	0.013	32710
170.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	14	48.239	2.410	0.012	14137
160.000	(2) 7770.00 w/ Mount Pipe	14	43.239	2.354	0.012	8566
150.000	(2) DB846F65ZAXY w/ Mount Pipe	14	38.380	2.271	0.011	5997
125.000	PD128-1	14	27.235	1.944	0.009	3640
110.000	PD128-1	14	21.461	1.731	0.007	4400
100.000	GPS_A	14	17.972	1.595	0.007	4425
95.000	PD128-1	14	16.332	1.531	0.006	4544
80.000	DB222	14	11.802	1.347	0.005	4276

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	190 - 180 (1)	30" x 0.375"	10.000	0.000	0.0	34.901	-4.065	1311.060	0.003
L2	180 - 160 (2)	36" x 0.375"	20.000	0.000	0.0	41.970	-12.998	1490.100	0.009
L3	160 - 140 (3)	42" x 0.375"	20.000	0.000	0.0	49.038	-24.356	1668.870	0.015
L4	140 - 120 (4)	P48x0.375	20.000	0.000	0.0	56.107	-30.023	1847.490	0.016
L5	120 - 113.33 (5)	54" x 0.375"	6.670	0.000	0.0	63.175	-32.056	2026.000	0.016
L6	113.33 - 103.917 (6)	RPS 54" x 0.49915"	9.413	0.000	0.0	83.896	-35.900	2803.770	0.013
L7	103.917 - 100	RPS 54" x 0.49915"	3.917	0.000	0.0	83.896	-37.429	2805.280	0.013

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L8	100 - 89.583 (8)	RPS 60" x 0.48494"	10.417	0.000	0.0	90.670	-42.044	2942.340	0.014
L9	89.583 - 85.417 (9)	RPS 60" x 0.56821"	4.166	0.000	0.0	106.091	-44.058	3532.380	0.012
L10	85.417 - 83.917 (10)	RPS 60" x 0.65218"	1.500	0.000	0.0	121.597	-44.900	4150.610	0.011
L11	83.917 - 80 (11)	RPS 60" x 0.54038"	3.917	0.000	0.0	100.942	-46.776	3331.580	0.014
L12	80 - 60 (12)	RPS 60" x 0.58339"	20.000	0.000	0.0	108.897	-56.971	3648.500	0.016
L13	60 - 58.417 (13)	RPS 60" x 0.70948"	1.583	0.000	0.0	132.152	-57.908	4580.270	0.013
L14	58.417 - 48.417 (14)	P60x5/8	10.000	0.000	0.0	116.583	-63.218	4139.150	0.015
L15	48.417 - 40 (15)	RPS 60" x 0.77929"	8.417	0.000	0.0	144.985	-68.754	5266.430	0.013
L16	40 - 31.083 (16)	RPS 60" x 0.77929"	8.917	0.000	0.0	144.985	-74.612	5266.430	0.014
L17	31.083 - 28.917 (17)	RPS 60" x 0.90145"	2.166	0.000	0.0	167.366	-76.213	5874.560	0.013
L18	28.917 - 20 (18)	RPS 60" x 0.74524"	8.917	0.000	0.0	138.730	-81.788	5064.190	0.016
L19	20 - 4.583 (19)	RPS 60" x 0.87181"	15.417	0.000	0.0	161.945	-92.894	5927.660	0.016
L20	4.583 - 0 (20)	RPS 60" x 1.10184"	4.583	0.000	0.0	203.878	-96.973	5148.730	0.019

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	190 - 180 (1)	30" x 0.375"	28.233	947.858	0.030	0.000	947.858	0.000
L2	180 - 160 (2)	36" x 0.375"	191.648	1338.808	0.143	0.000	1338.808	0.000
L3	160 - 140 (3)	42" x 0.375"	571.439	1796.558	0.318	0.000	1796.558	0.000
L4	140 - 120 (4)	P48x0.375	1054.558	2321.108	0.454	0.000	2321.108	0.000
L5	120 - 113.33 (5)	54" x 0.375"	1227.925	2912.458	0.422	0.000	2912.458	0.000
L6	113.33 - 103.917 (6)	RPS 54" x 0.49915"	1485.375	3836.633	0.387	0.000	3836.633	0.000
L7	103.917 - 100 (7)	RPS 54" x 0.49915"	1596.258	3839.133	0.416	0.000	3839.133	0.000
L8	100 - 89.583 (8)	RPS 60" x 0.48494"	1904.208	4577.992	0.416	0.000	4577.992	0.000
L9	89.583 - 85.417 (9)	RPS 60" x 0.56821"	2032.183	5336.242	0.381	0.000	5336.242	0.000
L10	85.417 - 83.917 (10)	RPS 60" x 0.65218"	2078.983	6089.733	0.341	0.000	6089.733	0.000
L11	83.917 - 80 (11)	RPS 60" x 0.54038"	2202.975	5082.142	0.433	0.000	5082.142	0.000
L12	80 - 60 (12)	RPS 60" x 0.58339"	2874.617	5484.475	0.524	0.000	5484.475	0.000
L13	60 - 58.417 (13)	RPS 60" x 0.70948"	2930.017	6622.200	0.442	0.000	6622.200	0.000
L14	58.417 - 48.417 (14)	P60x5/8	3287.042	6198.183	0.530	0.000	6198.183	0.000
L15	48.417 - 40 (15)	RPS 60" x 0.77929"	3596.808	7653.367	0.470	0.000	7653.367	0.000
L16	40 - 31.083 (16)	RPS 60" x 0.77929"	3933.500	7653.367	0.514	0.000	7653.367	0.000
L17	31.083 - 28.917 (17)	RPS 60" x 0.90145"	4016.475	8773.750	0.458	0.000	8773.750	0.000
L18	28.917 - 20 (18)	RPS 60" x 0.74524"	4362.658	7310.067	0.597	0.000	7310.067	0.000
L19	20 - 4.583 (19)	RPS 60" x 0.87181"	4977.742	8741.000	0.569	0.000	8741.000	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L20	4.583 - 0 (20)	RPS 60" x 1.10184"	5164.367	8044.917	0.642	0.000	8044.917	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	190 - 180 (1)	30" x 0.375"	3.746	655.528	0.006	0.286	1598.367	0.000
L2	180 - 160 (2)	36" x 0.375"	10.630	745.048	0.014	0.562	2189.067	0.000
L3	160 - 140 (3)	42" x 0.375"	22.776	834.437	0.027	2.924	2868.842	0.001
L4	140 - 120 (4)	P48x0.375	25.523	923.745	0.028	3.869	3637.700	0.001
L5	120 - 113.33 (5)	54" x 0.375"	26.428	1013.000	0.026	4.189	4495.625	0.001
L6	113.33 - 103.917 (6)	RPS 54" x 0.49915"	28.014	1401.890	0.020	4.710	6192.941	0.001
L7	103.917 - 100 (7)	RPS 54" x 0.49915"	28.568	1402.640	0.020	4.923	6196.275	0.001
L8	100 - 89.583 (8)	RPS 60" x 0.48494"	30.364	1471.170	0.021	5.788	7237.900	0.001
L9	89.583 - 85.417 (9)	RPS 60" x 0.56821"	31.032	1766.190	0.018	6.088	8665.250	0.001
L10	85.417 - 83.917 (10)	RPS 60" x 0.65218"	31.294	2075.300	0.015	6.212	10153.417	0.001
L11	83.917 - 80 (11)	RPS 60" x 0.54038"	31.936	1665.790	0.019	6.519	8180.283	0.001
L12	80 - 60 (12)	RPS 60" x 0.58339"	34.873	1824.250	0.019	7.801	8945.583	0.001
L13	60 - 58.417 (13)	RPS 60" x 0.70948"	35.095	2290.140	0.015	7.905	11183.083	0.001
L14	58.417 - 48.417 (14)	P60x5/8	36.276	2069.580	0.018	8.455	10134.583	0.001
L15	48.417 - 40 (15)	RPS 60" x 0.77929"	37.268	2633.210	0.014	8.934	12828.500	0.001
L16	40 - 31.083 (16)	RPS 60" x 0.77929"	38.196	2633.210	0.015	9.400	12828.500	0.001
L17	31.083 - 28.917 (17)	RPS 60" x 0.90145"	38.397	2937.280	0.013	9.498	14251.749	0.001
L18	28.917 - 20 (18)	RPS 60" x 0.74524"	39.221	2532.090	0.015	9.958	12349.833	0.001
L19	20 - 4.583 (19)	RPS 60" x 0.87181"	40.529	2963.830	0.014	10.709	14394.749	0.001
L20	4.583 - 0 (20)	RPS 60" x 1.10184"	40.895	2574.370	0.016	10.915	12407.749	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	190 - 180 (1)	0.003	0.030	0.000	0.006	0.000	0.033 ✔	1.000	4.8.2 ✔
L2	180 - 160 (2)	0.009	0.143	0.000	0.014	0.000	0.152 ✔	1.000	4.8.2 ✔
L3	160 - 140 (3)	0.015	0.318	0.000	0.027	0.001	0.333 ✔	1.000	4.8.2 ✔
L4	140 - 120 (4)	0.016	0.454	0.000	0.028	0.001	0.471 ✔	1.000	4.8.2 ✔
L5	120 - 113.33 (5)	0.016	0.422	0.000	0.026	0.001	0.438 ✔	1.000	4.8.2 ✔
L6	113.33 - 103.917 (6)	0.013	0.387	0.000	0.020	0.001	0.400 ✔	1.000	4.8.2 ✔

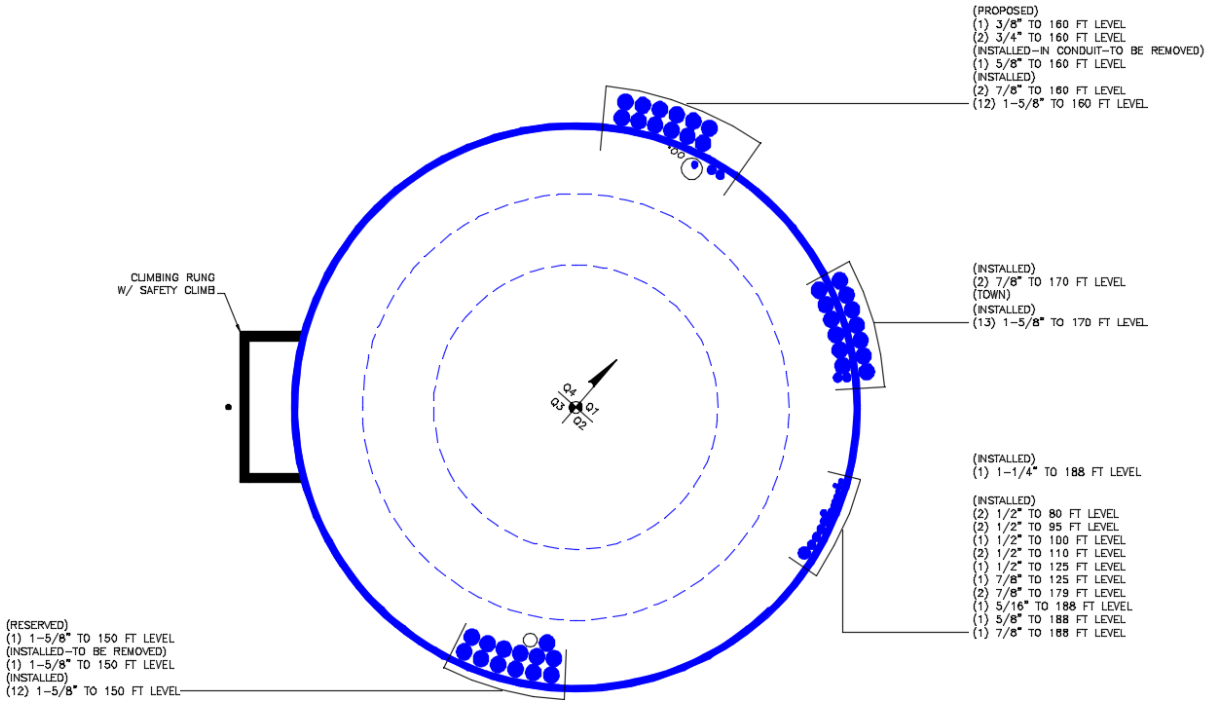
Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L7	103.917 - 100 (7)	0.013	0.416	0.000	0.020	0.001	0.430	1.000	4.8.2
L8	100 - 89.583 (8)	0.014	0.416	0.000	0.021	0.001	0.431	1.000	4.8.2
L9	89.583 - 85.417 (9)	0.012	0.381	0.000	0.018	0.001	0.394	1.000	4.8.2
L10	85.417 - 83.917 (10)	0.011	0.341	0.000	0.015	0.001	0.352	1.000	4.8.2
L11	83.917 - 80 (11)	0.014	0.433	0.000	0.019	0.001	0.448	1.000	4.8.2
L12	80 - 60 (12)	0.016	0.524	0.000	0.019	0.001	0.540	1.000	4.8.2
L13	60 - 58.417 (13)	0.013	0.442	0.000	0.015	0.001	0.455	1.000	4.8.2
L14	58.417 - 48.417 (14)	0.015	0.530	0.000	0.018	0.001	0.546	1.000	4.8.2
L15	48.417 - 40 (15)	0.013	0.470	0.000	0.014	0.001	0.483	1.000	4.8.2
L16	40 - 31.083 (16)	0.014	0.514	0.000	0.015	0.001	0.528	1.000	4.8.2
L17	31.083 - 28.917 (17)	0.013	0.458	0.000	0.013	0.001	0.471	1.000	4.8.2
L18	28.917 - 20 (18)	0.016	0.597	0.000	0.015	0.001	0.613	1.000	4.8.2
L19	20 - 4.583 (19)	0.016	0.569	0.000	0.014	0.001	0.585	1.000	4.8.2
L20	4.583 - 0 (20)	0.019	0.642	0.000	0.016	0.001	0.661	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	190 - 180	Pole	30" x 0.375"	1	-4.065	1311.060	3.3	Pass
L2	180 - 160	Pole	36" x 0.375"	2	-12.998	1490.100	15.2	Pass
L3	160 - 140	Pole	42" x 0.375"	3	-24.356	1668.870	33.3	Pass
L4	140 - 120	Pole	P48x0.375	4	-30.023	1847.490	47.1	Pass
L5	120 - 113.33	Pole	54" x 0.375"	5	-32.056	2026.000	43.8	Pass
L6	113.33 - 103.917	Pole	RPS 54" x 0.49915"	6	-35.900	2803.770	40.0	Pass
L7	103.917 - 100	Pole	RPS 54" x 0.49915"	7	-37.429	2805.280	43.0	Pass
L8	100 - 89.583	Pole	RPS 60" x 0.48494"	8	-42.044	2942.340	43.1	Pass
L9	89.583 - 85.417	Pole	RPS 60" x 0.56821"	9	-44.058	3532.380	39.4	Pass
L10	85.417 - 83.917	Pole	RPS 60" x 0.65218"	10	-44.900	4150.610	35.2	Pass
L11	83.917 - 80	Pole	RPS 60" x 0.54038"	11	-46.776	3331.580	44.8	Pass
L12	80 - 60	Pole	RPS 60" x 0.58339"	12	-56.971	3648.500	54.0	Pass
L13	60 - 58.417	Pole	RPS 60" x 0.70948"	13	-57.908	4580.270	45.5	Pass
L14	58.417 - 48.417	Pole	P60x5/8	14	-63.218	4139.150	54.6	Pass
L15	48.417 - 40	Pole	RPS 60" x 0.77929"	15	-68.754	5266.430	48.3	Pass
L16	40 - 31.083	Pole	RPS 60" x 0.77929"	16	-74.612	5266.430	52.8	Pass
L17	31.083 - 28.917	Pole	RPS 60" x 0.90145"	17	-76.213	5874.560	47.1	Pass
L18	28.917 - 20	Pole	RPS 60" x 0.74524"	18	-81.788	5064.190	61.3	Pass
L19	20 - 4.583	Pole	RPS 60" x 0.87181"	19	-92.894	5927.660	58.5	Pass
L20	4.583 - 0	Pole	RPS 60" x 1.10184"	20	-96.973	5148.730	66.1	Pass
							Summary	
						Pole (L20)	66.1	Pass
						RATING =	**66.1**	**Pass**

APPENDIX B

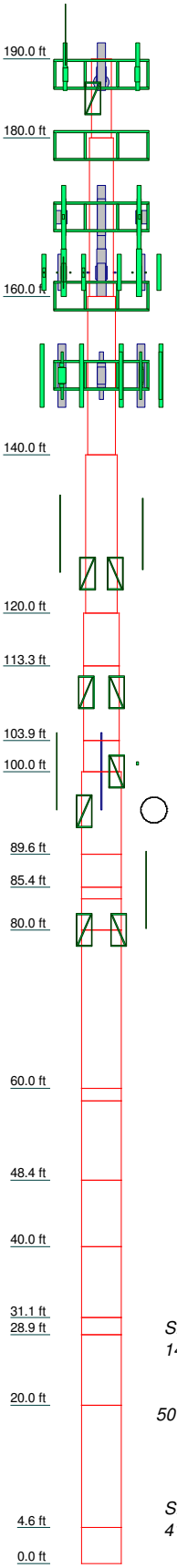
BASE LEVEL DRAWING


(PROPOSED)
(1) 3/8" TO 160 FT LEVEL
(2) 3/4" TO 160 FT LEVEL
(INSTALLED-IN CONDUIT-TO BE REMOVED)
(1) 5/8" TO 160 FT LEVEL
(INSTALLED)
(2) 7/8" TO 160 FT LEVEL
(12) 1-5/8" TO 160 FT LEVEL
(INSTALLED)
(2) 7/8" TO 170 FT LEVEL
(TOWN)
(INSTALLED)
(13) 1-5/8" TO 170 FT LEVEL
CLIMBING RUNG
W/ SAFETY CLIMB
(INSTALLED)
(1) 1-1/4" TO 188 FT LEVEL
(INSTALLED)
(2) 1/2" TO 80 FT LEVEL
(2) 1/2" TO 95 FT LEVEL
(1) 1/2" TO 100 FT LEVEL
(2) 1/2" TO 110 FT LEVEL
(1) 1/2" TO 125 FT LEVEL
(1) 7/8" TO 125 FT LEVEL
(2) 7/8" TO 179 FT LEVEL
(1) 5/16" TO 188 FT LEVEL
(1) 5/8" TO 188 FT LEVEL
(1) 7/8" TO 188 FT LEVEL
(RESERVED)
(1) 1-5/8" TO 150 FT LEVEL
(INSTALLED-TO BE REMOVED)
(1) 1-5/8" TO 150 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 150 FT LEVEL
Q1
Q2
Q3
Q4

APPENDIX C

ADDITIONAL CALCULATIONS

Section	Size	Length (ft)	Socket Length (ft)	Grade	Weight (K)
1	30" x 0.375"	10.000	5.000	A53-B-42	1.2
2	36" x 0.375"	20.000	5.000		2.9
3	42" x 0.375"	20.000	5.000		3.3
4	P48x0.375	20.000	5.000		3.8
5	48" x 0.375"	6.670	5.000		1.4
6	48" x 0.435"	9.413	5.000		2.7
7	48" x 0.500"	3.917	5.000		1.1
8	48" x 0.562"	10.417	5.000		3.2
9	48" x 0.625"	4.166	5.000		1.5
10	48" x 0.688"	2.500	5.000		0.9
11	48" x 0.750"	3.917	5.000		1.3
12	60" x 0.583"	20.000	5.000		7.4
13	60" x 0.708"	1.583	5.000		0.7
14	60" x 0.750"	10.000	5.000		4.0
15	60" x 0.779"	8.417	5.000		4.2
16	60" x 0.813"	8.917	5.000		4.4
17	60" x 0.844"	2.166	5.000		1.2
18	RPS 60" x 0.875"	8.917	5.000		4.2
19	RPS 60" x 0.871"	15.417	5.000		8.5
20	RPS 60" x 1.000"	4.583			3.2
				Reinf 28.06 ksi	60.9



ALL REACTIONS ARE FACTORED

AXIAL 160 K

SHEAR 14 K

MOMENT 1824 kip

TORQUE 6 kip-ft
50 mph WIND - 0.750 in ICE

AXIAL 97 K

SHEAR 41 K

MOMENT 5164 kip

TORQUE 13 kip-ft
REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
PD201-7	188	TT19-08BP111-001	160
APXVSPP18-C-A20 w/ Mount Pipe	188	TT19-08BP111-001	160
APXVSPP18-C-A20 w/ Mount Pipe	188	TT19-08BP111-001	160
APXVSPP18-C-A20 w/ Mount Pipe	188	DC6-48-60-18-8F	160
(2) 2.375" OD x 4' Mount Pipe	188	RRUS 32 B2	160
(2) 2.375" OD x 4' Mount Pipe	188	RRUS 32 B2	160
(2) 2.375" OD x 4' Mount Pipe	188	RRUS 32 B2	160
Platform Mount [LP 403-1]	188	Platform Mount [LP 403-1]	160
SP2-5.8	188	4' x 2" Pipe Mount	160
TME-800MHz RRH	185	4' x 2" Pipe Mount	160
TME-800MHz RRH	185	4' x 2" Pipe Mount	160
TME-1900MHZ RRH	185	(2) 7770.00 w/ Mount Pipe	160
TME-1900MHZ RRH	185	(2) DB846F65ZAXY w/ Mount Pipe	150
TME-1900MHZ RRH	185	(2) LPA-80080/6CF w/ Mount Pipe	150
Side Arm Mount [SO 102-3]	185	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	150
TME-800MHz RRH	185		
Side Arm Mount [SO 701-1]	184	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	150
458-2D	179		
Platform Mount [LP 403-1]	179	BXA-171063-12CF-EDIN-2 w/ Mount Pipe	150
(4) 6' x 2" Mount Pipe	179		
(4) 6' x 2" Mount Pipe	179	(2) FD9R6004/2C-3L	150
(4) 6' x 2" Mount Pipe	179	(2) FD9R6004/2C-3L	150
458-2D	179	(2) FD9R6004/2C-3L	150
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	170	DB-T1-6Z-8AB-0Z	150
		(2) SBNHH-1D85C w/ Mount Pipe	150
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	170	(2) SBNHH-1D85C w/ Mount Pipe	150
		(2) SBNHH-1D85C w/ Mount Pipe	150
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	170	RRH2x60-700	150
		RRH2x60-700	150
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	170	RRH2x60-700	150
		RRH4X45-AWS4 B66	150
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	170	RRH4X45-AWS4 B66	150
		RRH4X45-AWS4 B66	150
KRY 112 144/1	170	RRH2X60-1900	150
KRY 112 144/1	170	RRH2X60-1900	150
KRY 112 144/1	170	RRH2X60-1900	150
(2) RRUS 11 B12	170	DB-T1-6Z-8AB-0Z	150
RRUS 11 B12	170	Platform Mount [LP 403-1]	150
RRUS 11 B12	170	(2) DB846F65ZAXY w/ Mount Pipe	150
Platform Mount [LP 405-1]	170	PD201-1	125
PD201-7	170	Side Arm Mount [SO 701-1]	125
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	170	Side Arm Mount [SO 701-1]	125
		PD128-1	125
(2) 7770.00 w/ Mount Pipe	160	PD128-1	110
(2) 7770.00 w/ Mount Pipe	160	Side Arm Mount [SO 701-1]	110
OPA-65R-LCUU-H6 w/ Mount Pipe	160	Side Arm Mount [SO 701-1]	110
OPA-65R-LCUU-H6 w/ Mount Pipe	160	PD128-1	110
OPA-65R-LCUU-H6 w/ Mount Pipe	160	Side Arm Mount [SO 701-1]	100
(2) LGP21401	160	GPS_A	100
(2) LGP21401	160	PD128-1	95
(2) LGP21401	160	Side Arm Mount [SO 701-1]	95
RRUS-11	160	Side Arm Mount [SO 701-1]	95
RRUS-11	160	PD128-1	95
RRUS-11	160	PD128-1	80
(4) 7020.00	160	Side Arm Mount [SO 701-1]	80
(4) 7020.00	160	Side Arm Mount [SO 701-1]	80
(4) 7020.00	160	DB222	80

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi	Reinf 39.81 ksi	40 ksi	50 ksi
Reinf 40.46 ksi	40 ksi	51 ksi	Reinf 38.51 ksi	39 ksi	49 ksi
Reinf 40.49 ksi	40 ksi	51 ksi	Reinf 40.36 ksi	40 ksi	51 ksi
Reinf 40.76 ksi	41 ksi	51 ksi	Reinf 39.04 ksi	39 ksi	49 ksi
Reinf 39.88 ksi	40 ksi	50 ksi	Reinf 40.56 ksi	41 ksi	51 ksi
Reinf 38.97 ksi	39 ksi	49 ksi	Reinf 40.67 ksi	41 ksi	51 ksi
Reinf 40.16 ksi	40 ksi	51 ksi	Reinf 28.06 ksi	28 ksi	36 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 66.1%

PJF
Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: ***190' Monopole / Weston Rt-57 Norfield R***			
Project: ***PJF 37516-0710/ BU 829046***			
Client: CCI	Drawn by: Christopher Poelking		App'd:
Code: TIA-222-G	Date: 11/09/16		Scale: NTS
Path:			Dwg No. E-1

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Reactions		
Mu	28.23	ft-kips
Axial, Pu:	4.07	kips
Shear, Vu:	3.75	kips
Elevation:	180	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	24		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	33		

Plate Data		
Diam:	36	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.93	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	30	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results — Rigid

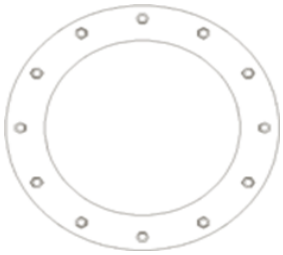
Bolt Tension Capacity, φ*Tn,**B1**:	54.54 kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.54 kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	1.54 Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.031 in	
Min PL "treq" for actual **T w/ Pry**:	0.132 in	
Min PL "t1" for actual **T w/o Pry**:	0.173 in	
T allowable w/o Prying:	54.54 kips	α'<0 case
Prying Force, q:	0.00 kips	
Total Bolt Tension=Tu+q:	1.54 kips	
Non-Prying Bolt Stress Ratio, Tu/B:	2.8% **Pass**	

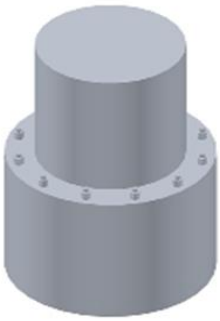
Exterior Flange Plate Results — Flexural Check — Rigid

Compression Side Plate Stress:	Rohn/Pirod, OK	TIA G
Allowable Plate Stress:	32.4 ksi	φ*Fy
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length: 13.75
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	1.1% **Pass**	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Manufacturer:	Pirod

Reactions		
Moment:	28.23	ft-kips
Axial:	4.07	kips
Shear:	3.75	kips
Exterior Flange Run, T+q:	1.54	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 180 feet

Bolt Data			
Qty:	24		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	33	in	

Plate Data		
Plate Outer Diam:	35.25	in
Plate Inner Diam:	30	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.61	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Pole OuterDiam:	36	in
Thick:	0.375	in
Pole Inner Diam:	35.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	1.5	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty)	54.5	Kips
Bolt Stress Ratio:	2.8%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	1.9	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

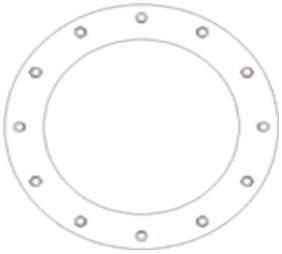
n/a

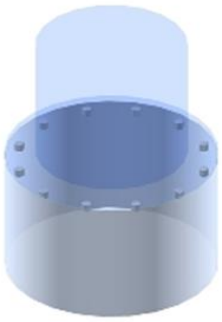
Stiffener Results N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Reactions		
Mu	191.65	ft-kips
Axial, Pu:	13	kips
Shear, Vu:	10.63	kips
Elevation:	160	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	28		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	39		

Plate Data		
Diam:	42	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.04	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results — Rigid

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.54	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	7.96	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.017	in	
Min PL "treq" for actual **T w/ Pry**:	0.295	in	
Min PL "t1" for actual **T w/o Pry**:	0.388	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	7.96	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	14.6%	**Pass**	

Exterior Flange Plate Results — Flexural Check — Rigid

Compression Side Plate Stress:	Rohn/Pirod,	OK	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	Rohn/Pirod,	OK	Comp. Y.L. Length:
No Prying			15.00
Tension Side Stress Ratio, (treq/t)^2:	5.6%	**Pass**	

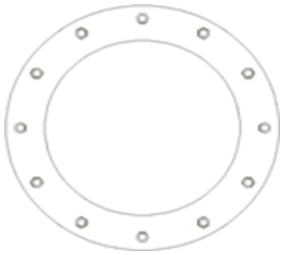
n/a

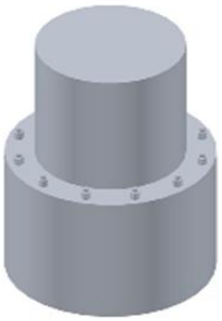
Stiffener Results — N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Manufacturer:	Pirod

Bolt Data			
Qty:	28		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	39	in	

Plate Data		
Plate Outer Diam:	41.25	in
Plate Inner Diam:	36	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.63	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Pole OuterDiam:	42	in
Thick:	0.375	in
Pole Inner Diam:	41.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Reactions		
Moment:	191.65	ft-kips
Axial:	13	kips
Shear:	10.63	kips
Exterior Flange Run, T+q:	7.96	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 160 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	8.0	Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty)	54.5	Kips
Bolt Stress Ratio:	14.6%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	8.9	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

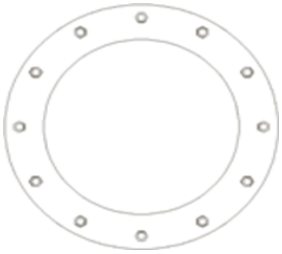
n/a

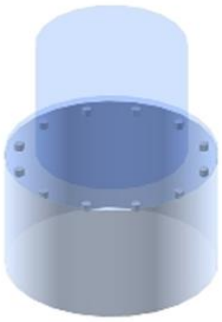
Stiffener Results N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Reactions		
Mu	571.44	ft-kips
Axial, Pu:	24.36	kips
Shear, Vu:	22.78	kips
Elevation:	140	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data				
Qty:	32			
Diameter (in.):	1	Bolt Fu:	120	
Bolt Material:	A325	Bolt Fy:	92	
N/A:	0	<-- Disregard		
N/A:	0	<-- Disregard		
Circle (in.):	45			

Plate Data		
Diam:	48	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.12	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	42	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results | Rigid

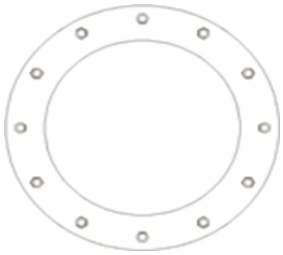
Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	18.29	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.006	in	
Min PL "treq" for actual **T w/ Pry**:	0.441	in	
Min PL "t1" for actual **T w/o Pry**:	0.583	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	18.29	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	33.5%	**Pass**	

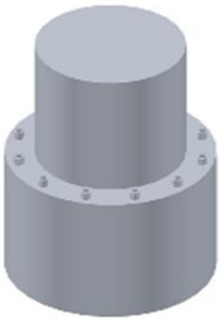
Exterior Flange Plate Results | Flexural Check | Rigid

Compression Side Plate Stress:	Rohn/Pirod, OK	TIA G
Allowable Plate Stress:	32.4 ksi	φ*Fy
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
No Prying		16.16
Tension Side Stress Ratio, (treq/t)^2:	12.5% **Pass**	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Manufacturer:	Pirod

Bolt Data			
Qty:	32		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	45	in	

Plate Data		
Plate Outer Diam:	47.25	in
Plate Inner Diam:	42	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.64	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Pole OuterDiam:	48	in
Thick:	0.375	in
Pole Inner Diam:	47.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Reactions		
Moment:	571.44	ft-kips
Axial:	24.36	kips
Shear:	22.78	kips
Exterior Flange Run, T+q:	18.29	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 140 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	18.3	Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty)	54.5	Kips
Bolt Stress Ratio:	33.5%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	19.8	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

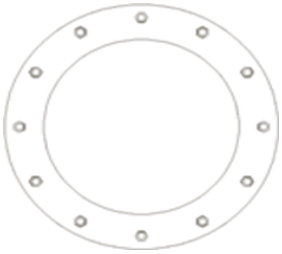
n/a

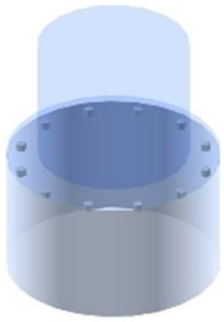
Stiffener Results N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Reactions		
Mu	1054.56	ft-kips
Axial, Pu:	30.02	kips
Shear, Vu:	25.52	kips
Elevation:	120	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	36		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	51		

Plate Data		
Diam:	54	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.19	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	48	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results | Rigid

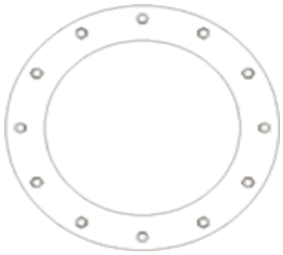
Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	26.74	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.998	in	
Min PL "treq" for actual **T w/ Pry**:	0.529	in	
Min PL "t1" for actual **T w/o Pry**:	0.699	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	26.74	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	49.0%	**Pass**	

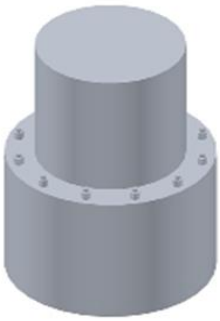
Exterior Flange Plate Results | Flexural Check | Rigid

Compression Side Plate Stress:	Rohn/Pirod, OK	TIA G
Allowable Plate Stress:	32.4 ksi	φ*Fy
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
No Prying		17.23
Tension Side Stress Ratio, (treq/t)^2:	17.9% **Pass**	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Manufacturer:	Pirod

Bolt Data			
Qty:	36		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	51	in	

Plate Data		
Plate Outer Diam:	53.25	in
Plate Inner Diam:	48	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.65	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Pole OuterDiam:	54	in
Thick:	0.375	in
Pole Inner Diam:	53.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Reactions		
Moment:	1054.56	ft-kips
Axial:	30.02	kips
Shear:	25.52	kips
Exterior Flange Run, T+q:	26.74	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 120 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	26.7	Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty)	54.5	Kips
Bolt Stress Ratio:	49.0%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	28.4	Kips, Ext. Cu=Interior Cu
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

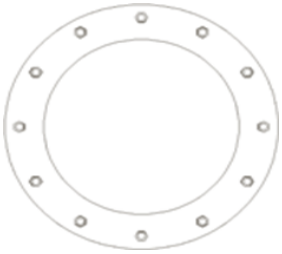
n/a

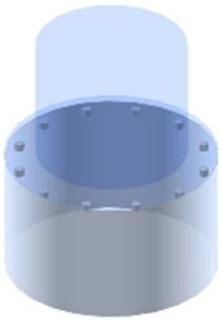
Stiffener Results N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Reactions		
Mu	1207.56	ft-kips
Axial, Pu:	37.43	kips
Shear, Vu:	28.57	kips
Elevation:	100	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer: Other

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	48		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	57		

Plate Data		
Diam:	60	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.53	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	54	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results | Stiffened

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	20.41	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	Stiffened	in	
Min PL "treq" for actual **T w/ Pry**:	Stiffened	in	
Min PL "t1" for actual **T w/o Pry**:	Stiffened	in	
T allowable	54.54	kips	<-- B, Stiffened
Prying Force, q:	0.00	kips	Stiffened
Total Bolt Tension=Tu+q:	20.41	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	37.4%	**Pass**	

Exterior Flange Plate Results Shear Check Only | Stiffened

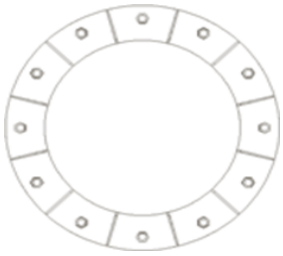
Compression Side Plate Stress:	2.9	ksi	TIA G
Allowable Plate Stress:	19.4	ksi	φ*Fy
Compression Plate Stress Ratio:	15.1%	**Pass**	Comp. Y.L. Length:
Stiffened			N/A, Roark
Tension Side Stress Ratio, (treq/t)^2:	N/A		

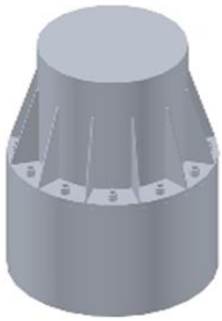
Stiffener Results

Horizontal Weld :	50.8%	**Pass**
Vertical Weld:	34.4%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	18.3%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	29.4%	**Pass**
Plate Comp. (AISC Bracket):	43.6%	**Pass**

Pole Results

Pole Punching Shear Check:	15.5%	**Pass**





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Manufacturer:	Other

Reactions		
Moment:	1207.56	ft-kips
Axial:	37.43	kips
Shear:	28.57	kips
Exterior Flange Run, T+q:	20.41	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 100 feet

Bolt Data			
Qty:	48		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	57	in	

Plate Data		
Plate Outer Diam:	59.25	in
Plate Inner Diam:	54	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	3.88	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	2	in
Height:	3.5	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.375	in
Pole Inner Diam:	59.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	20.4	Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty)	54.5	Kips
Bolt Stress Ratio:	37.4%	**Pass**

Interior Flange Plate Results Shear Check Only

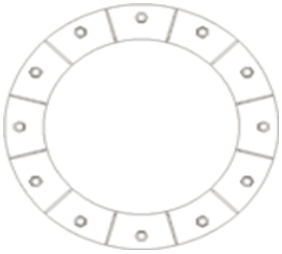
Controlling Bolt Axial Force:	22.0	Kips, Ext. Cu=Interior Cu
Plate Stress:	4.4	ksi
Allowable Plate Stress, φ*Fy:	19.4	ksi
Plate Stress Ratio:	22.6%	**Pass**

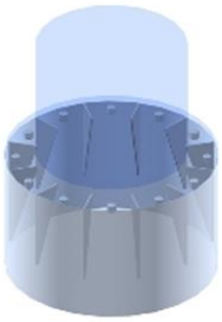
Stiffener Results

Horizontal Weld :	54.9%	**Pass**
Vertical Weld:	33.0%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	17.3%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	32.2%	**Pass**
Plate Comp. (AISC Bracket):	40.0%	**Pass**

Pole Results

Pole Punching Shear Check:	14.7%	**Pass**





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

PAUL J. FORD & COMPANY
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Phone 614.221.6679 www.pauljford.com
Effective Date: 3/21/2016 Verison 1.3

DATE:	11/9/2016
PROJECT NO:	37516-0710.004.7805
SITE NAME:	WESTON/ RT-57/ NORFIELD R
SITE NUMBER/BUN:	829046.00
DESCRIPTION:	80ft Flange
OWNER:	CCI
ENGINEER:	CP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

General Parameters & Loading

Flange Elevation:	80.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	1.00	
Moment, Muf:	1541.51	k-ft
Axial, Puf:	46.78	kips
Shear, Vf:	31.94	kips

Pole Parameters

	Upper Pole	Lower Pole	
Number of Sides	Round	Round	
Pole Diameter, Dp:	60.00	60.00	in
Pole Thickness, tp:	0.3750	0.5000	in
Pole Fy:	42	42	ksi
Pole Fu:	63	63	ksi
Flange Diameter, Df:	60.00	60.00	in
Flange Thickness, tf:	1.25	1.25	in

Flange Parameters

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	32	32	
Bolt Diameter:	1.25	1.25	in
Bolt Circle:	47.00	53.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0.00	0.00	degrees
Bolt Area, Ag:	1.2272	1.2272	in^2

	Bolt Circle 1	Bolt Circle 2	
Max. Tension:	17.26	19.46	kips
Max. Net Tension:	16.63	18.84	kips
Max. Net Compression:	17.88	20.08	kips
Moment to Bolt Circle:	540.75	687.62	k-ft
Axial to Bolt Circle:	19.96	19.96	kips
Shear to Bolt Circle:	15.97	15.97	kips
Equivalent Bolt Circle:	50.18	50.18	in

	Thickness	Width	Height
Top Flange Stiffener Parameters			
Bot. Flange Stiffener Parameters			

Shaft Reinforcing Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Condition					
Top Shaft Reinf. Designation					
Top Shaft Reinf. Thickness					in
Top Shaft Reinf. Width					in
Top Shaft Reinf. Term. Bolts					
Top Shaft Reinf. Bolt Spacing					in
Top Shaft Reinf. End Spacing					in
Bottom Condition					
Bottom Shaft Reinf. Designation					
Bottom Shaft Reinf. Thickness					in
Bottom Shaft Reinf. Width					in
Bottom Shaft Reinf. Term. Bolts					
Bottom Shaft Reinf. Bolt Spacing					in
Bottom Shaft Reinf. End Spacing					in

Bridge Stiffener Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Reference Document					
Analysis, Design, New, Ignore	Analysis				
Jump Plate Designation	CCI-045100				
Jump Plate Width Override					in
Jump Plate Thickness Override					in
Clear Distance from Flange	0.00				in
Jump Plate Fy	65				ksi
Jump Plate Fu	80				ksi
Bolt Type	EXISTING AJAX				
Bolt Tension Method	Case 2				
Top Bolt Quantity	6				
Top Bolt Spacing	3.00				in
Top Bolt Edge Distance	3.00				in
Bottom Bolt Quantity	6				
Bottom Bolt Spacing	3.00				in
Bottom Bolt Edge Distance	3.00				in
Unbraced Length	18.00	18.00			in
Unbraced Length Override					in
K	0.80				
Stiffener Circle	61.00				in
Clearance Check	OK				
Qty. Jump Plates	3				in
Location 1	58				deg
Location 2	178				deg
Location 3	298				deg
Location 4					deg
Location 5					deg
Location 6					deg

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Effective Date: 3/21/2016 Verison 1.3

DATE:	11/9/2016
PROJECT NO:	37516-0710.004.7805
SITE NAME:	WESTON/ RT-57/ NORFIELD R
SITE NUMBER/BUN:	829046.00
DESCRIPTION:	80ft Flange
OWNER:	CCI
ENGINEER:	CP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

Jump Plate Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Applied Axial Load (Pu)	84.42				kips
Hole Diameter	1.19				in
Gross Area (Ag)	4.50				in^2
Net Area (An)	3.31				in^2
b/t Ratio	4.50				
Radius of Gyration (r)	0.29				in
K L / r	41.57				
Q (Where Qa = 1.0)	1.00				
ASIF Value	1.00				
Critical Stress (Fa or Fcr)	55.15				ksi
Nominal Compressive Capacity	223.38				kips
Nominal Tensile Capacity	198.75				kips
Controlling Stress Ratio	42.5%				

Bolt Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Bolt Shear Load (Vu)	14.070				kips
Top Bolt Tension Load (Tu)	1.563				kips
Top Eccentricity (e)	0.500				in
Top Bolt Bearing Capacity (Rn)	47.581				kips
Top Bolt Shear Capacity (Vn)	37.000				kips
Top Bolt Tension Capacity (Tn)	30.000				kips
Top Connection Length Reduction	N/a				
Top Bolt Combined Stress Ratio	14.7%				

Bottom Bolt Shear Load (Vu)	14.070				kips
Bottom Bolt Tension Load (Tu)	1.563				kips
Bottom Eccentricity (e)	0.500				in
Bottom Bolt Bearing Capacity (Rn)	63.441				kips
Bottom Bolt Shear Capacity (Vn)	37.000				kips
Bottom Bolt Tension Capacity (Tn)	30.000				kips
Bottom Connection Length Reduction	N/a				
Bottom Bolt Combined Stress Ratio	14.7%				

Analysis Summary

	Generation 1	Generation 2	Generation 3	Generation 4
JUMP PLATE COMBINED STRESS RATIO	42.5%			
TOP BOLT COMBINED STRESS RATIO	14.7%			
BOTTOM BOLT COMBINED STRESS RATIO	14.7%			

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v4.4 - Effective 7-12-13

Date: 11/9/2016
PJF Project: 37516-0710.004.7805
Client Ref. # 829046
Site Name: Weston/Rt-57/Norfield R
Description: Flange @ 80'
Owner: CCI
Engineer: CP

Asymmetric Bolt Analysis

Moment =	1542	k-ft	TIA Ref.	G	Location =	Flange Plate		
Axial =	46.8	kips	ASIF =	1.0000	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	31.9	kips	Max Ratio =	105.0%	Threads =	N-Included	for FP, Rev. G	
Anchor Qty =	67							

** For Flange Plates: Prying action is not considered in the bolt loads. **

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A325	81	105	0.0	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
2	1.250	A325	81	105	11.3	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
3	1.250	A325	81	105	22.5	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
4	1.250	A325	81	105	33.8	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
5	1.250	A325	81	105	45.0	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
6	1.250	A325	81	105	56.3	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
7	1.250	A325	81	105	67.5	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
8	1.250	A325	81	105	78.8	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
9	1.250	A325	81	105	90.0	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
10	1.250	A325	81	105	101.3	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
11	1.250	A325	81	105	112.5	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
12	1.250	A325	81	105	123.8	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
13	1.250	A325	81	105	135.0	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
14	1.250	A325	81	105	146.3	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
15	1.250	A325	81	105	157.5	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
16	1.250	A325	81	105	168.8	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
17	1.250	A325	81	105	180.0	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
18	1.250	A325	81	105	191.3	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
19	1.250	A325	81	105	202.5	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
20	1.250	A325	81	105	213.8	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
21	1.250	A325	81	105	225.0	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
22	1.250	A325	81	105	236.3	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
23	1.250	A325	81	105	247.5	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
24	1.250	A325	81	105	258.8	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
25	1.250	A325	81	105	270.0	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
26	1.250	A325	81	105	281.3	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
27	1.250	A325	81	105	292.5	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
28	1.250	A325	81	105	303.8	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
29	1.250	A325	81	105	315.0	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
30	1.250	A325	81	105	326.3	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
31	1.250	A325	81	105	337.5	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
32	1.250	A325	81	105	348.8	53.00	0.00	1.23	20.08	18.84	18.84	0.00	76.31	24.7%
33	1.250	A325	81	105	0.0	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
34	1.250	A325	81	105	11.3	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
35	1.250	A325	81	105	22.5	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
36	1.250	A325	81	105	33.8	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
37	1.250	A325	81	105	45.0	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
38	1.250	A325	81	105	56.3	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
39	1.250	A325	81	105	67.5	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
40	1.250	A325	81	105	78.8	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
41	1.250	A325	81	105	90.0	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
42	1.250	A325	81	105	101.3	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
43	1.250	A325	81	105	112.5	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
44	1.250	A325	81	105	123.8	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
45	1.250	A325	81	105	135.0	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
46	1.250	A325	81	105	146.3	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
47	1.250	A325	81	105	157.5	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
48	1.250	A325	81	105	168.8	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
49	1.250	A325	81	105	180.0	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
50	1.250	A325	81	105	191.3	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
51	1.250	A325	81	105	202.5	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
52	1.250	A325	81	105	213.8	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
53	1.250	A325	81	105	225.0	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
54	1.250	A325	81	105	236.3	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
55	1.250	A325	81	105	247.5	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
56	1.250	A325	81	105	258.8	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
57	1.250	A325	81	105	270.0	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
58	1.250	A325	81	105	281.3	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
59	1.250	A325	81	105	292.5	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
60	1.250	A325	81	105	303.8	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
61	1.250	A325	81	105	315.0	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
62	1.250	A325	81	105	326.3	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%

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v4.4 - Effective 7-12-13

Date: 11/9/2016
PJF Project: 37516-0710.004.7805
Client Ref. # 829046
Site Name: Weston/Rt-57/Norfield R
Description: Flange @ 80'
Owner: CCI
Engineer: CP

Asymmetric Bolt Analysis

Moment =	1542	k-ft	TIA Ref.	G	Location =	Flange Plate		
Axial =	46.8	kips	ASIF =	1.0000	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	31.9	kips	Max Ratio =	105.0%	Threads =	N-Included	for FP, Rev. G	
Anchor Qty =	67							

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

63	1.250	A325	81	105	337.5	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
64	1.250	A325	81	105	348.8	47.00	0.00	1.23	17.88	16.63	16.63	0.00	76.31	21.8%
65	0.000	Sabre 4.5 x 1	65	80	58.0	61.00	4.50	4.50	84.42	79.85	84.42	192.98	192.98	43.7%
66	0.000	Sabre 4.5 x 1	65	80	178.0	61.00	4.50	4.50	84.42	79.85	84.42	192.98	192.98	43.7%
67	0.000	Sabre 4.5 x 1	65	80	298.0	61.00	4.50	4.50	84.42	79.85	84.42	192.98	192.98	43.7%
								92.04						

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Manufacturer:	Other

Reactions		
Moment:	1228.3	ft-kips
Axial:	40	kips
Shear:	31.9	kips
Exterior Flange Run, T+q:		kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 80 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	50	in	

Plate Data		
Plate Outer Diam:	59.25	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.82	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.375	in
Pole Inner Diam:	59.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Bolt Results
Maximum Bolt Tension, Tu: 35.6 Kips, Ext. Tu=Interior Tu

FLANGE PLATE ANALYSIS ONLY

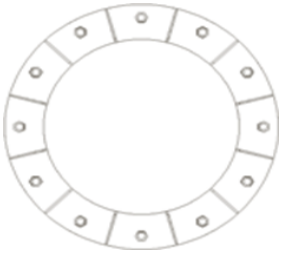
Interior Flange Plate Results	Flexural Check	
Controlling Bolt Axial Force:	38.1	Kips, Ext. Cu=Interior Cu
Plate Stress:	10.3	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	31.9%	**Pass**

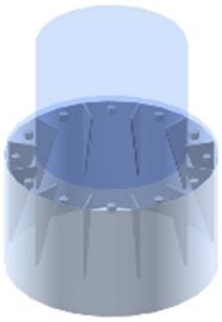
Stiffener Results

Horizontal Weld :	34.0%	**Pass**
Vertical Weld:	29.7%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	15.4%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	18.6%	**Pass**
Plate Comp. (AISC Bracket):	39.2%	**Pass**

Pole Results

Pole Punching Shear Check:	14.2%	**Pass**





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Manufacturer:	Other

Reactions		
Moment:	1228.3	ft-kips
Axial:	40	kips
Shear:	31.9	kips
Exterior Flange Run, T+q:	0	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 80 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	50	in	

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Bolt Results
Maximum Bolt Tension, Tu: 35.6 Kips, Ext. Tu=Interior Tu

FLANGE PLATE ANALYSIS ONLY

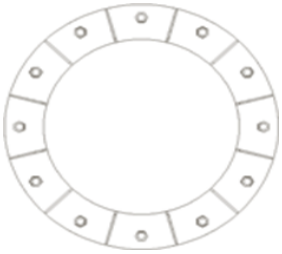
Interior Flange Plate Results	Flexural Check	
Controlling Bolt Axial Force:	38.1	Kips, Ext. Cu=Interior Cu
Plate Stress:	10.3	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	31.9%	**Pass**

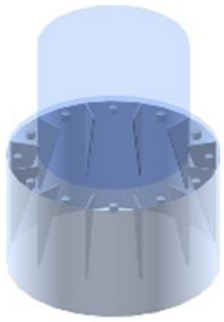
Stiffener Results

Horizontal Weld :	30.0%	**Pass**
Vertical Weld:	26.2%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	13.2%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	16.2%	**Pass**
Plate Comp. (AISC Bracket):	34.6%	**Pass**

Pole Results

Pole Punching Shear Check:	9.4%	**Pass**





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

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Effective Date: 3/21/2016 Verison 1.3

DATE:	11/9/2016
PROJECT NO:	37516-0710.004.7805
SITE NAME:	WESTON/ RT-57/ NORFIELD R
SITE NUMBER/BUN:	829046.00
DESCRIPTION:	60ft Flange
OWNER:	CCI
ENGINEER:	CP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

General Parameters & Loading

Flange Elevation:	60.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	1.00	
Moment, Muf:	2474.04	k-ft
Axial, Puf:	56.97	kips
Shear, Vf:	34.87	kips

Pole Parameters

	Upper Pole	Lower Pole	
Number of Sides	Round	Round	
Pole Diameter, Dp:	60.00	60.00	in
Pole Thickness, tp:	0.5000	0.6250	in
Pole Fy:	42	42	ksi
Pole Fu:	63	63	ksi
Flange Diameter, Df:	60.00	60.00	in
Flange Thickness, tf:	1.25	1.25	in

Flange Parameters

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	32	32	
Bolt Diameter:	1.25	1.25	in
Bolt Circle:	47.00	53.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0.00	0.00	degrees
Bolt Area, Ag:	1.2272	1.2272	in^2

	Bolt Circle 1	Bolt Circle 2	
Max. Tension:	23.74	26.77	kips
Max. Net Tension:	23.06	26.09	kips
Max. Net Compression:	24.42	27.45	kips
Moment to Bolt Circle:	743.90	945.96	k-ft
Axial to Bolt Circle:	21.74	21.74	kips
Shear to Bolt Circle:	17.44	17.44	kips
Equivalent Bolt Circle:	50.18	50.18	in

	Thickness	Width	Height
Top Flange Stiffener Parameters			
Bot. Flange Stiffener Parameters			

Shaft Reinforcing Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Condition					
Top Shaft Reinf. Designation					
Top Shaft Reinf. Thickness					in
Top Shaft Reinf. Width					in
Top Shaft Reinf. Term. Bolts					
Top Shaft Reinf. Bolt Spacing					in
Top Shaft Reinf. End Spacing					in
Bottom Condition					
Bottom Shaft Reinf. Designation					
Bottom Shaft Reinf. Thickness					in
Bottom Shaft Reinf. Width					in
Bottom Shaft Reinf. Term. Bolts					
Bottom Shaft Reinf. Bolt Spacing					in
Bottom Shaft Reinf. End Spacing					in

Bridge Stiffener Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Reference Document					
Analysis, Design, New, Ignore	Analysis				
Jump Plate Designation	CCI-065125				
Jump Plate Width Override					in
Jump Plate Thickness Override					in
Clear Distance from Flange	0.00				in
Jump Plate Fy	65				ksi
Jump Plate Fu	80				ksi
Bolt Type	EXISTING AJAX				
Bolt Tension Method	Case 2				
Top Bolt Quantity	11				
Top Bolt Spacing	3.00				in
Top Bolt Edge Distance	3.00				in
Bottom Bolt Quantity	11				
Bottom Bolt Spacing	3.00				in
Bottom Bolt Edge Distance	3.00				in
Unbraced Length	18.00	18.00			in
Unbraced Length Override					in
K	0.80				
Stiffener Circle	61.25				in
Clearance Check	OK				
Qty. Jump Plates	3				in
Location 1	0				deg
Location 2	120				deg
Location 3	240				deg
Location 4					deg
Location 5					deg
Location 6					deg

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Effective Date: 3/21/2016 Verison 1.3

DATE:	11/9/2016
PROJECT NO:	37516-0710.004.7805
SITE NAME:	WESTON/ RT-57/ NORFIELD R
SITE NUMBER/BUN:	829046.00
DESCRIPTION:	60ft Flange
OWNER:	CCI
ENGINEER:	CP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

Jump Plate Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Applied Axial Load (Pu)	209.35				kips
Hole Diameter	1.19				in
Gross Area (Ag)	8.13				in^2
Net Area (An)	6.64				in^2
b/t Ratio	5.20				
Radius of Gyration (r)	0.36				in
K L / r	33.26				
Q (Where Qa = 1.0)	1.00				
ASIF Value	1.00				
Critical Stress (Fa or Fcr)	58.51				ksi
Nominal Compressive Capacity	427.88				kips
Nominal Tensile Capacity	398.44				kips
Controlling Stress Ratio	52.5%				

Bolt Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Bolt Shear Load (Vu)	19.031				kips
Top Bolt Tension Load (Tu)	1.454				kips
Top Eccentricity (e)	0.625				in
Top Bolt Bearing Capacity (Rn)	63.441				kips
Top Bolt Shear Capacity (Vn)	37.000				kips
Top Bolt Tension Capacity (Tn)	30.000				kips
Top Connection Length Reduction	N/a				
Top Bolt Combined Stress Ratio	26.7%				

Bottom Bolt Shear Load (Vu)	19.031				kips
Bottom Bolt Tension Load (Tu)	1.454				kips
Bottom Eccentricity (e)	0.625				in
Bottom Bolt Bearing Capacity (Rn)	79.302				kips
Bottom Bolt Shear Capacity (Vn)	37.000				kips
Bottom Bolt Tension Capacity (Tn)	30.000				kips
Bottom Connection Length Reduction	N/a				
Bottom Bolt Combined Stress Ratio	26.7%				

Analysis Summary

	Generation 1	Generation 2	Generation 3	Generation 4
JUMP PLATE COMBINED STRESS RATIO	52.5%			
TOP BOLT COMBINED STRESS RATIO	26.7%			
BOTTOM BOLT COMBINED STRESS RATIO	26.7%			

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v4.4 - Effective 7-12-13

Date: 11/9/2016
PJF Project: 37516-0710.004.7805
Client Ref. # 829046
Site Name: Weston/Rt-57/Norfield R
Description: Flange @ 60'
Owner: CCI
Engineer: CP

Asymmetric Bolt Analysis

Moment =	2474	k-ft	TIA Ref.	G	Location =	Flange Plate		
Axial =	57.0	kips	ASIF =	1.0000	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	34.9	kips	Max Ratio =	105.0%	Threads =	N-Included	for FP, Rev. G	
Anchor Qty =	67							

** For Flange Plates: Prying action is not considered in the bolt loads. **

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A325	81	105	0.0	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
2	1.250	A325	81	105	11.3	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
3	1.250	A325	81	105	22.5	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
4	1.250	A325	81	105	33.8	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
5	1.250	A325	81	105	45.0	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
6	1.250	A325	81	105	56.3	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
7	1.250	A325	81	105	67.5	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
8	1.250	A325	81	105	78.8	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
9	1.250	A325	81	105	90.0	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
10	1.250	A325	81	105	101.3	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
11	1.250	A325	81	105	112.5	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
12	1.250	A325	81	105	123.8	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
13	1.250	A325	81	105	135.0	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
14	1.250	A325	81	105	146.3	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
15	1.250	A325	81	105	157.5	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
16	1.250	A325	81	105	168.8	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
17	1.250	A325	81	105	180.0	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
18	1.250	A325	81	105	191.3	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
19	1.250	A325	81	105	202.5	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
20	1.250	A325	81	105	213.8	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
21	1.250	A325	81	105	225.0	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
22	1.250	A325	81	105	236.3	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
23	1.250	A325	81	105	247.5	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
24	1.250	A325	81	105	258.8	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
25	1.250	A325	81	105	270.0	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
26	1.250	A325	81	105	281.3	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
27	1.250	A325	81	105	292.5	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
28	1.250	A325	81	105	303.8	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
29	1.250	A325	81	105	315.0	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
30	1.250	A325	81	105	326.3	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
31	1.250	A325	81	105	337.5	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
32	1.250	A325	81	105	348.8	53.00	0.00	1.23	27.45	26.09	26.09	0.00	76.31	34.2%
33	1.250	A325	81	105	0.0	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
34	1.250	A325	81	105	11.3	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
35	1.250	A325	81	105	22.5	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
36	1.250	A325	81	105	33.8	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
37	1.250	A325	81	105	45.0	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
38	1.250	A325	81	105	56.3	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
39	1.250	A325	81	105	67.5	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
40	1.250	A325	81	105	78.8	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
41	1.250	A325	81	105	90.0	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
42	1.250	A325	81	105	101.3	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
43	1.250	A325	81	105	112.5	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
44	1.250	A325	81	105	123.8	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
45	1.250	A325	81	105	135.0	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
46	1.250	A325	81	105	146.3	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
47	1.250	A325	81	105	157.5	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
48	1.250	A325	81	105	168.8	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
49	1.250	A325	81	105	180.0	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
50	1.250	A325	81	105	191.3	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
51	1.250	A325	81	105	202.5	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
52	1.250	A325	81	105	213.8	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
53	1.250	A325	81	105	225.0	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
54	1.250	A325	81	105	236.3	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
55	1.250	A325	81	105	247.5	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
56	1.250	A325	81	105	258.8	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
57	1.250	A325	81	105	270.0	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
58	1.250	A325	81	105	281.3	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
59	1.250	A325	81	105	292.5	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
60	1.250	A325	81	105	303.8	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
61	1.250	A325	81	105	315.0	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
62	1.250	A325	81	105	326.3	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%

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v4.4 - Effective 7-12-13

Date: 11/9/2016
PJF Project: 37516-0710.004.7805
Client Ref. # 829046
Site Name: Weston/Rt-57/Norfield R
Description: Flange @ 60'
Owner: CCI
Engineer: CP

Asymmetric Bolt Analysis

Moment =	2474	k-ft	TIA Ref.	G	Location =	Flange Plate		
Axial =	57.0	kips	ASIF =	1.0000	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	34.9	kips	Max Ratio =	105.0%	Threads =	N-Included	for FP, Rev. G	
Anchor Qty =	67							

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

63	1.250	A325	81	105	337.5	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
64	1.250	A325	81	105	348.8	47.00	0.00	1.23	24.42	23.06	23.06	0.00	76.31	30.2%
65	0.000	Sabre 6.5 x 1.25	65	80	58.0	61.25	8.13	8.13	209.35	200.35	209.35	391.41	391.41	53.5%
66	0.000	Sabre 6.5 x 1.25	65	80	178.0	61.25	8.13	8.13	209.35	200.35	209.35	391.41	391.41	53.5%
67	0.000	Sabre 6.5 x 1.25	65	80	298.0	61.25	8.13	8.13	209.35	200.35	209.35	391.41	391.41	53.5%
								102.91						

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Manufacturer:	Other

Reactions		
Moment:	1689.9	ft-kips
Axial:	43.4	kips
Shear:	34.9	kips
Exterior Flange Run, T+q:		kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 60 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	50	in	

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Bolt Results
Maximum Bolt Tension, Tu: 49.3 Kips, Ext. Tu=Interior Tu

FLANGE PLATE ANALYSIS ONLY

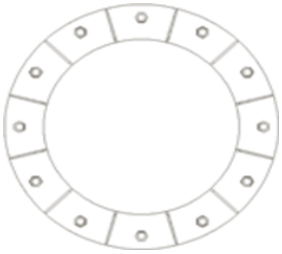
Interior Flange Plate Results	Flexural Check	
Controlling Bolt Axial Force:	52.1	Kips, Ext. Cu=Interior Cu
Plate Stress:	14.1	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	43.6%	**Pass**

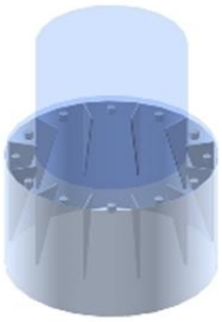
Stiffener Results

Horizontal Weld :	40.9%	**Pass**
Vertical Weld:	35.7%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	19.4%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	23.0%	**Pass**
Plate Comp. (AISC Bracket):	47.2%	**Pass**

Pole Results

Pole Punching Shear Check:	12.8%	**Pass**





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Manufacturer:	Other

Reactions		
Moment:	1689.9	ft-kips
Axial:	43.4	kips
Shear:	34.9	kips
Exterior Flange Run, T+q:	0	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 60 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	50	in	

Plate Data		
Plate Outer Diam:	58.75	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.77	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.625	in
Pole Inner Diam:	58.75	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

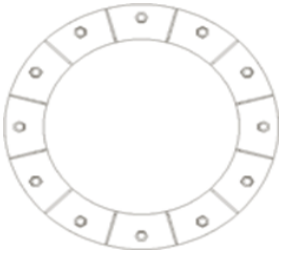
Interior Flange Bolt Results
Maximum Bolt Tension, Tu: 49.3 Kips, Ext. Tu=Interior Tu

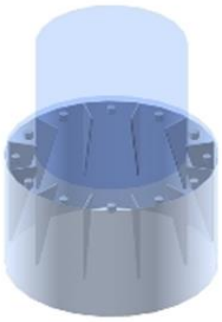
FLANGE PLATE ANALYSIS ONLY

Interior Flange Plate Results Flexural Check
Controlling Bolt Axial Force: 52.1 Kips, Ext. Cu=Interior Cu
Plate Stress: 14.1 ksi
Allowable Plate Stress, φ*Fy: 32.4 ksi
Plate Stress Ratio: 43.6% **Pass**

Stiffener Results
Horizontal Weld : 36.6% **Pass**
Vertical Weld: 32.0% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2: 16.8% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2: 20.2% **Pass**
Plate Comp. (AISC Bracket): 42.2% **Pass**

Pole Results
Pole Punching Shear Check: 9.2% **Pass**





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

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Effective Date: 3/21/2016 Verison 1.3

DATE:	11/9/2016
PROJECT NO:	37516-0710.004.7805
SITE NAME:	WESTON/ RT-57/ NORFIELD R
SITE NUMBER/BUN:	829046.00
DESCRIPTION:	40ft Flange
OWNER:	CCI
ENGINEER:	CP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

General Parameters & Loading

Flange Elevation:	40.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	1.00	
Moment, Muf:	2907.12	k-ft
Axial, Puf:	68.75	kips
Shear, Vf:	37.27	kips

Pole Parameters

	Upper Pole	Lower Pole	
Number of Sides	Round	Round	
Pole Diameter, Dp:	60.00	60.00	in
Pole Thickness, tp:	0.6250	0.6250	in
Pole Fy:	42	42	ksi
Pole Fu:	63	63	ksi
Flange Diameter, Df:	60.00	60.00	in
Flange Thickness, tf:	1.25	1.25	in

Flange Parameters

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	32	32	
Bolt Diameter:	1.25	1.25	in
Bolt Circle:	47.00	53.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0.00	0.00	degrees
Bolt Area, Ag:	1.2272	1.2272	in^2

	Bolt Circle 1	Bolt Circle 2	
Max. Tension:	24.31	27.42	kips
Max. Net Tension:	23.58	26.68	kips
Max. Net Compression:	25.05	28.16	kips
Moment to Bolt Circle:	761.86	968.79	k-ft
Axial to Bolt Circle:	23.57	23.57	kips
Shear to Bolt Circle:	18.63	18.63	kips
Equivalent Bolt Circle:	50.18	50.18	in

	Thickness	Width	Height
Top Flange Stiffener Parameters			
Bot. Flange Stiffener Parameters			

Shaft Reinforcing Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Condition					
Top Shaft Reinf. Designation					
Top Shaft Reinf. Thickness					in
Top Shaft Reinf. Width					in
Top Shaft Reinf. Term. Bolts					
Top Shaft Reinf. Bolt Spacing					in
Top Shaft Reinf. End Spacing					in
Bottom Condition					
Bottom Shaft Reinf. Designation					
Bottom Shaft Reinf. Thickness					in
Bottom Shaft Reinf. Width					in
Bottom Shaft Reinf. Term. Bolts					
Bottom Shaft Reinf. Bolt Spacing					in
Bottom Shaft Reinf. End Spacing					in

Bridge Stiffener Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Reference Document					
Analysis, Design, New, Ignore	Analysis				
Jump Plate Designation	CCI-060100				
Jump Plate Width Override					in
Jump Plate Thickness Override					in
Clear Distance from Flange	0.00				in
Jump Plate Fy	65				ksi
Jump Plate Fu	80				ksi
Bolt Type	EXISTING AJAX				
Bolt Tension Method	Case 2				
Top Bolt Quantity	8				
Top Bolt Spacing	3.00				in
Top Bolt Edge Distance	3.00				in
Bottom Bolt Quantity	8				
Bottom Bolt Spacing	3.00				in
Bottom Bolt Edge Distance	3.00				in
Unbraced Length	18.00	18.00			in
Unbraced Length Override					in
K	0.80				
Stiffener Circle	61.00				in
Clearance Check	OK				
Qty. Jump Plates	6				in
Location 1	38				deg
Location 2	95				deg
Location 3	158				deg
Location 4	215				deg
Location 5	278				deg
Location 6	335				deg

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Effective Date: 3/21/2016 Verison 1.3

DATE:	11/9/2016
PROJECT NO:	37516-0710.004.7805
SITE NAME:	WESTON/ RT-57/ NORFIELD R
SITE NUMBER/BUN:	829046.00
DESCRIPTION:	40ft Flange
OWNER:	CCI
ENGINEER:	CP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

Jump Plate Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Applied Axial Load (Pu)	157.89				kips
Hole Diameter	1.19				in
Gross Area (Ag)	6.00				in^2
Net Area (An)	4.81				in^2
b/t Ratio	6.00				
Radius of Gyration (r)	0.29				in
K L / r	41.57				
Q (Where Qa = 1.0)	1.00				
ASIF Value	1.00				
Critical Stress (Fa or Fcr)	55.15				ksi
Nominal Compressive Capacity	297.83				kips
Nominal Tensile Capacity	288.75				kips
Controlling Stress Ratio	54.7%				

Bolt Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Bolt Shear Load (Vu)	19.737				kips
Top Bolt Tension Load (Tu)	1.645				kips
Top Eccentricity (e)	0.500				in
Top Bolt Bearing Capacity (Rn)	79.302				kips
Top Bolt Shear Capacity (Vn)	37.000				kips
Top Bolt Tension Capacity (Tn)	30.000				kips
Top Connection Length Reduction	N/a				
Top Bolt Combined Stress Ratio	28.8%				

Bottom Bolt Shear Load (Vu)	19.737				kips
Bottom Bolt Tension Load (Tu)	1.645				kips
Bottom Eccentricity (e)	0.500				in
Bottom Bolt Bearing Capacity (Rn)	79.302				kips
Bottom Bolt Shear Capacity (Vn)	37.000				kips
Bottom Bolt Tension Capacity (Tn)	30.000				kips
Bottom Connection Length Reduction	N/a				
Bottom Bolt Combined Stress Ratio	28.8%				

Analysis Summary

	Generation 1	Generation 2	Generation 3	Generation 4
JUMP PLATE COMBINED STRESS RATIO	54.7%			
TOP BOLT COMBINED STRESS RATIO	28.8%			
BOTTOM BOLT COMBINED STRESS RATIO	28.8%			

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v4.4 - Effective 7-12-13

Date: 11/9/2016
PJF Project: 37516-0710.004.7805
Client Ref. # 829046
Site Name: Weston/Rt-57/Norfield R
Description: Flange @ 40'
Owner: CCI
Engineer: CP

Asymmetric Bolt Analysis

Moment =	2907	k-ft	TIA Ref.	G	Location =	Flange Plate		
Axial =	68.8	kips	ASIF =	1.0000	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	37.3	kips	Max Ratio =	105.0%	Threads =	N-Included	for FP, Rev. G	
Anchor Qty =	70							

** For Flange Plates: Prying action is not considered in the bolt loads. **

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A325	81	105	0.0	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
2	1.250	A325	81	105	11.3	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
3	1.250	A325	81	105	22.5	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
4	1.250	A325	81	105	33.8	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
5	1.250	A325	81	105	45.0	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
6	1.250	A325	81	105	56.3	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
7	1.250	A325	81	105	67.5	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
8	1.250	A325	81	105	78.8	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
9	1.250	A325	81	105	90.0	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
10	1.250	A325	81	105	101.3	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
11	1.250	A325	81	105	112.5	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
12	1.250	A325	81	105	123.8	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
13	1.250	A325	81	105	135.0	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
14	1.250	A325	81	105	146.3	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
15	1.250	A325	81	105	157.5	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
16	1.250	A325	81	105	168.8	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
17	1.250	A325	81	105	180.0	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
18	1.250	A325	81	105	191.3	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
19	1.250	A325	81	105	202.5	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
20	1.250	A325	81	105	213.8	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
21	1.250	A325	81	105	225.0	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
22	1.250	A325	81	105	236.3	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
23	1.250	A325	81	105	247.5	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
24	1.250	A325	81	105	258.8	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
25	1.250	A325	81	105	270.0	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
26	1.250	A325	81	105	281.3	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
27	1.250	A325	81	105	292.5	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
28	1.250	A325	81	105	303.8	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
29	1.250	A325	81	105	315.0	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
30	1.250	A325	81	105	326.3	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
31	1.250	A325	81	105	337.5	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
32	1.250	A325	81	105	348.8	53.00	0.00	1.23	28.16	26.68	26.68	0.00	76.31	35.0%
33	1.250	A325	81	105	0.0	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
34	1.250	A325	81	105	11.3	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
35	1.250	A325	81	105	22.5	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
36	1.250	A325	81	105	33.8	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
37	1.250	A325	81	105	45.0	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
38	1.250	A325	81	105	56.3	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
39	1.250	A325	81	105	67.5	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
40	1.250	A325	81	105	78.8	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
41	1.250	A325	81	105	90.0	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
42	1.250	A325	81	105	101.3	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
43	1.250	A325	81	105	112.5	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
44	1.250	A325	81	105	123.8	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
45	1.250	A325	81	105	135.0	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
46	1.250	A325	81	105	146.3	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
47	1.250	A325	81	105	157.5	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
48	1.250	A325	81	105	168.8	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
49	1.250	A325	81	105	180.0	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
50	1.250	A325	81	105	191.3	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
51	1.250	A325	81	105	202.5	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
52	1.250	A325	81	105	213.8	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
53	1.250	A325	81	105	225.0	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
54	1.250	A325	81	105	236.3	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
55	1.250	A325	81	105	247.5	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
56	1.250	A325	81	105	258.8	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
57	1.250	A325	81	105	270.0	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
58	1.250	A325	81	105	281.3	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
59	1.250	A325	81	105	292.5	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
60	1.250	A325	81	105	303.8	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
61	1.250	A325	81	105	315.0	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
62	1.250	A325	81	105	326.3	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%

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v4.4 - Effective 7-12-13

Date: 11/9/2016
PJF Project: 37516-0710.004.7805
Client Ref. # 829046
Site Name: Weston/Rt-57/Norfield R
Description: Flange @ 40'
Owner: CCI
Engineer: CP

Asymmetric Bolt Analysis

Moment =	2907	k-ft	TIA Ref.	G	Location =	Flange Plate		
Axial =	68.8	kips	ASIF =	1.0000	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	37.3	kips	Max Ratio =	105.0%	Threads =	N-Included	for FP, Rev. G	
Anchor Qty =	70							

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

63	1.250	A325	81	105	337.5	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
64	1.250	A325	81	105	348.8	47.00	0.00	1.23	25.05	23.58	23.58	0.00	76.31	30.9%
65	0.000	Sabre 6 x 1	65	80	38.0	61.00	6.00	6.00	157.89	150.69	157.89	283.13	283.13	55.8%
66	0.000	Sabre 6 x 1	65	80	95.0	61.00	6.00	6.00	157.89	150.69	157.89	283.13	283.13	55.8%
67	0.000	Sabre 6 x 1	65	80	158.0	61.00	6.00	6.00	157.89	150.69	157.89	283.13	283.13	55.8%
68	0.000	Sabre 6 x 1	65	80	215.0	61.00	6.00	6.00	157.89	150.69	157.89	283.13	283.13	55.8%
69	0.000	Sabre 6 x 1	65	80	278.0	61.00	6.00	6.00	157.89	150.69	157.89	283.13	283.13	55.8%
70	0.000	Sabre 6 x 1	65	80	335.0	61.00	6.00	6.00	157.89	150.69	157.89	283.13	283.13	55.8%
								114.54						

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Manufacturer:	Other

Reactions		
Moment:	1730.7	ft-kips
Axial:	47.2	kips
Shear:	37.3	kips
Exterior Flange Run, T+q:		kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 40 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	50	in	

Plate Data		
Plate Outer Diam:	58.75	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.77	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.625	in
Pole Inner Diam:	58.75	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Bolt Results
Maximum Bolt Tension, Tu: 50.4 Kips, Ext. Tu=Interior Tu

FLANGE PLATE ANALYSIS ONLY

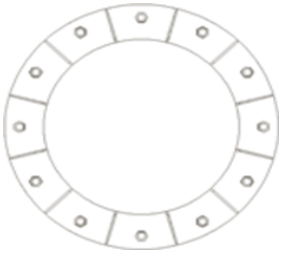
Interior Flange Plate Results	Flexural Check	
Controlling Bolt Axial Force:	53.4	Kips, Ext. Cu=Interior Cu
Plate Stress:	14.5	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	44.7%	**Pass**

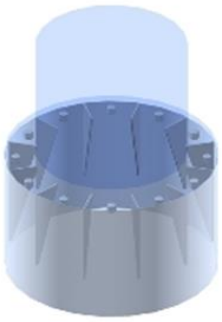
Stiffener Results

Horizontal Weld :	37.6%	**Pass**
Vertical Weld:	32.8%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	17.4%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	20.8%	**Pass**
Plate Comp. (AISC Bracket):	43.3%	**Pass**

Pole Results

Pole Punching Shear Check:	9.4%	**Pass**





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Manufacturer:	Other

Reactions		
Moment:	1730.7	ft-kips
Axial:	47.2	kips
Shear:	37.3	kips
Exterior Flange Run, T+q:	0	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 40 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	50	in	

Plate Data		
Plate Outer Diam:	58.75	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.77	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.625	in
Pole Inner Diam:	58.75	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

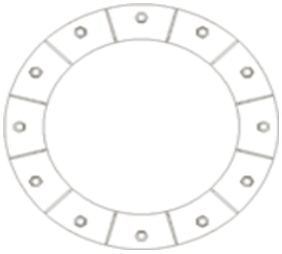
Interior Flange Bolt Results
Maximum Bolt Tension, Tu: 50.4 Kips, Ext. Tu=Interior Tu

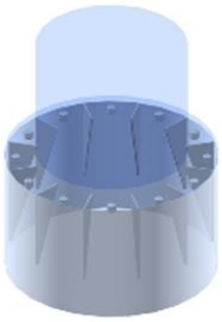
FLANGE PLATE ANALYSIS ONLY

Interior Flange Plate Results Flexural Check
Controlling Bolt Axial Force: 53.4 Kips, Ext. Cu=Interior Cu
Plate Stress: 14.5 ksi
Allowable Plate Stress, φ*Fy: 32.4 ksi
Plate Stress Ratio: 44.7% **Pass**

Stiffener Results
Horizontal Weld : 37.6% **Pass**
Vertical Weld: 32.8% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2: 17.4% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2: 20.8% **Pass**
Plate Comp. (AISC Bracket): 43.3% **Pass**

Pole Results
Pole Punching Shear Check: 9.4% **Pass**





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

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Effective Date: 3/21/2016 Verison 1.3

DATE:	11/9/2016
PROJECT NO:	37516-0710.004.7805
SITE NAME:	WESTON/ RT-57/ NORFIELD R
SITE NUMBER/BUN:	829046.00
DESCRIPTION:	20ft Flange
OWNER:	CCI
ENGINEER:	CP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

General Parameters & Loading

Flange Elevation:	20.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	1.00	
Moment, Muf:	3680.92	k-ft
Axial, Puf:	81.79	kips
Shear, Vf:	39.22	kips

Pole Parameters

	Upper Pole	Lower Pole	
Number of Sides	Round	Round	
Pole Diameter, Dp:	60.00	60.00	in
Pole Thickness, tp:	0.6250	0.7500	in
Pole Fy:	42	42	ksi
Pole Fu:	63	63	ksi
Flange Diameter, Df:	60.00	60.00	in
Flange Thickness, tf:	1.25	1.25	in

Flange Parameters

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	32	32	
Bolt Diameter:	1.25	1.25	in
Bolt Circle:	47.00	53.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0.00	0.00	degrees
Bolt Area, Ag:	1.2272	1.2272	in^2

	Bolt Circle 1	Bolt Circle 2	
Max. Tension:	29.29	32.94	kips
Max. Net Tension:	28.50	32.15	kips
Max. Net Compression:	30.08	33.73	kips
Moment to Bolt Circle:	917.83	1163.81	k-ft
Axial to Bolt Circle:	25.23	25.23	kips
Shear to Bolt Circle:	19.61	19.61	kips
Equivalent Bolt Circle:	50.18	50.18	in

	Thickness	Width	Height
Top Flange Stiffener Parameters			
Bot. Flange Stiffener Parameters			

Shaft Reinforcing Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Condition					
Top Shaft Reinf. Designation					
Top Shaft Reinf. Thickness					in
Top Shaft Reinf. Width					in
Top Shaft Reinf. Term. Bolts					
Top Shaft Reinf. Bolt Spacing					in
Top Shaft Reinf. End Spacing					in
Bottom Condition					
Bottom Shaft Reinf. Designation					
Bottom Shaft Reinf. Thickness					in
Bottom Shaft Reinf. Width					in
Bottom Shaft Reinf. Term. Bolts					
Bottom Shaft Reinf. Bolt Spacing					in
Bottom Shaft Reinf. End Spacing					in

Bridge Stiffener Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Reference Document					
Analysis, Design, New, Ignore	Analysis				
Jump Plate Designation	CCI-065125				
Jump Plate Width Override					in
Jump Plate Thickness Override					in
Clear Distance from Flange	0.00				in
Jump Plate Fy	65				ksi
Jump Plate Fu	80				ksi
Bolt Type	EXISTING AJAX				
Bolt Tension Method	Case 2				
Top Bolt Quantity	11				
Top Bolt Spacing	3.00				in
Top Bolt Edge Distance	3.00				in
Bottom Bolt Quantity	11				
Bottom Bolt Spacing	3.00				in
Bottom Bolt Edge Distance	3.00				in
Unbraced Length	18.00	18.00			in
Unbraced Length Override					in
K	0.80				
Stiffener Circle	61.25				in
Clearance Check	OK				
Qty. Jump Plates	6				in
Location 1	28				deg
Location 2	100				deg
Location 3	166				deg
Location 4	193				deg
Location 5	266				deg
Location 6	323				deg

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Effective Date: 3/21/2016 Verison 1.3

DATE:	11/9/2016
PROJECT NO:	37516-0710.004.7805
SITE NAME:	WESTON/ RT-57/ NORFIELD R
SITE NUMBER/BUN:	829046.00
DESCRIPTION:	20ft Flange
OWNER:	CCI
ENGINEER:	CP

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

Jump Plate Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Applied Axial Load (Pu)	248.89				kips
Hole Diameter	1.19				in
Gross Area (Ag)	8.13				in^2
Net Area (An)	6.64				in^2
b/t Ratio	5.20				
Radius of Gyration (r)	0.36				in
K L / r	33.26				
Q (Where Qa = 1.0)	1.00				
ASIF Value	1.00				
Critical Stress (Fa or Fcr)	58.51				ksi
Nominal Compressive Capacity	427.88				kips
Nominal Tensile Capacity	398.44				kips
Controlling Stress Ratio	62.5%				

Bolt Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Bolt Shear Load (Vu)	22.627				kips
Top Bolt Tension Load (Tu)	1.728				kips
Top Eccentricity (e)	0.625				in
Top Bolt Bearing Capacity (Rn)	79.302				kips
Top Bolt Shear Capacity (Vn)	37.000				kips
Top Bolt Tension Capacity (Tn)	30.000				kips
Top Connection Length Reduction	N/a				
Top Bolt Combined Stress Ratio	37.7%				

Bottom Bolt Shear Load (Vu)	22.627				kips
Bottom Bolt Tension Load (Tu)	1.728				kips
Bottom Eccentricity (e)	0.625				in
Bottom Bolt Bearing Capacity (Rn)	95.162				kips
Bottom Bolt Shear Capacity (Vn)	37.000				kips
Bottom Bolt Tension Capacity (Tn)	30.000				kips
Bottom Connection Length Reduction	N/a				
Bottom Bolt Combined Stress Ratio	37.7%				

Analysis Summary

	Generation 1	Generation 2	Generation 3	Generation 4
JUMP PLATE COMBINED STRESS RATIO	62.5%			
TOP BOLT COMBINED STRESS RATIO	37.7%			
BOTTOM BOLT COMBINED STRESS RATIO	37.7%			

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v4.4 - Effective 7-12-13

Date: 11/9/2016
PJF Project: 37516-0710.004.7805
Client Ref. # 829046
Site Name: Weston/Rt-57/Norfield R
Description: Flange @ 20'
Owner: CCI
Engineer: CP

Asymmetric Bolt Analysis

Moment =	3681	k-ft	TIA Ref.	G	Location =	Flange Plate		
Axial =	81.8	kips	ASIF =	1.0000	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	39.2	kips	Max Ratio =	105.0%	Threads =	N-Included	for FP, Rev. G	
Anchor Qty =	70							

** For Flange Plates: Prying action is not considered in the bolt loads. **

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A325	81	105	0.0	53.00	0.00	1.23	30.66	29.09	29.09	0.00	76.31	38.1%
2	1.250	A325	81	105	11.3	53.00	0.00	1.23	31.20	29.62	29.62	0.00	76.31	38.8%
3	1.250	A325	81	105	22.5	53.00	0.00	1.23	31.86	30.28	30.28	0.00	76.31	39.7%
4	1.250	A325	81	105	33.8	53.00	0.00	1.23	32.54	30.96	30.96	0.00	76.31	40.6%
5	1.250	A325	81	105	45.0	53.00	0.00	1.23	33.13	31.55	31.55	0.00	76.31	41.4%
6	1.250	A325	81	105	56.3	53.00	0.00	1.23	33.55	31.97	31.97	0.00	76.31	41.9%
7	1.250	A325	81	105	67.5	53.00	0.00	1.23	33.73	32.15	32.15	0.00	76.31	42.1%
8	1.250	A325	81	105	78.8	53.00	0.00	1.23	33.62	32.04	32.04	0.00	76.31	42.0%
9	1.250	A325	81	105	90.0	53.00	0.00	1.23	33.23	31.65	31.65	0.00	76.31	41.5%
10	1.250	A325	81	105	101.3	53.00	0.00	1.23	32.58	31.01	31.01	0.00	76.31	40.6%
11	1.250	A325	81	105	112.5	53.00	0.00	1.23	31.74	30.16	30.16	0.00	76.31	39.5%
12	1.250	A325	81	105	123.8	53.00	0.00	1.23	30.80	29.22	29.22	0.00	76.31	38.3%
13	1.250	A325	81	105	135.0	53.00	0.00	1.23	29.87	28.29	28.29	0.00	76.31	37.1%
14	1.250	A325	81	105	146.3	53.00	0.00	1.23	29.08	27.50	27.50	0.00	76.31	36.0%
15	1.250	A325	81	105	157.5	53.00	0.00	1.23	28.54	26.96	26.96	0.00	76.31	35.3%
16	1.250	A325	81	105	168.8	53.00	0.00	1.23	28.33	26.76	26.76	0.00	76.31	35.1%
17	1.250	A325	81	105	180.0	53.00	0.00	1.23	28.48	26.90	26.90	0.00	76.31	35.3%
18	1.250	A325	81	105	191.3	53.00	0.00	1.23	28.93	27.35	27.35	0.00	76.31	35.8%
19	1.250	A325	81	105	202.5	53.00	0.00	1.23	29.61	28.04	28.04	0.00	76.31	36.7%
20	1.250	A325	81	105	213.8	53.00	0.00	1.23	30.40	28.83	28.83	0.00	76.31	37.8%
21	1.250	A325	81	105	225.0	53.00	0.00	1.23	31.18	29.60	29.60	0.00	76.31	38.8%
22	1.250	A325	81	105	236.3	53.00	0.00	1.23	31.84	30.26	30.26	0.00	76.31	39.7%
23	1.250	A325	81	105	247.5	53.00	0.00	1.23	32.30	30.73	30.73	0.00	76.31	40.3%
24	1.250	A325	81	105	258.8	53.00	0.00	1.23	32.52	30.95	30.95	0.00	76.31	40.6%
25	1.250	A325	81	105	270.0	53.00	0.00	1.23	32.50	30.92	30.92	0.00	76.31	40.5%
26	1.250	A325	81	105	281.3	53.00	0.00	1.23	32.24	30.66	30.66	0.00	76.31	40.2%
27	1.250	A325	81	105	292.5	53.00	0.00	1.23	31.82	30.24	30.24	0.00	76.31	39.6%
28	1.250	A325	81	105	303.8	53.00	0.00	1.23	31.31	29.73	29.73	0.00	76.31	39.0%
29	1.250	A325	81	105	315.0	53.00	0.00	1.23	30.81	29.24	29.24	0.00	76.31	38.3%
30	1.250	A325	81	105	326.3	53.00	0.00	1.23	30.43	28.86	28.86	0.00	76.31	37.8%
31	1.250	A325	81	105	337.5	53.00	0.00	1.23	30.26	28.68	28.68	0.00	76.31	37.6%
32	1.250	A325	81	105	348.8	53.00	0.00	1.23	30.33	28.76	28.76	0.00	76.31	37.7%
33	1.250	A325	81	105	0.0	47.00	0.00	1.23	27.40	25.83	25.83	0.00	76.31	33.8%
34	1.250	A325	81	105	11.3	47.00	0.00	1.23	27.88	26.31	26.31	0.00	76.31	34.5%
35	1.250	A325	81	105	22.5	47.00	0.00	1.23	28.47	26.89	26.89	0.00	76.31	35.2%
36	1.250	A325	81	105	33.8	47.00	0.00	1.23	29.06	27.49	27.49	0.00	76.31	36.0%
37	1.250	A325	81	105	45.0	47.00	0.00	1.23	29.58	28.00	28.00	0.00	76.31	36.7%
38	1.250	A325	81	105	56.3	47.00	0.00	1.23	29.94	28.36	28.36	0.00	76.31	37.2%
39	1.250	A325	81	105	67.5	47.00	0.00	1.23	30.08	28.50	28.50	0.00	76.31	37.4%
40	1.250	A325	81	105	78.8	47.00	0.00	1.23	29.97	28.39	28.39	0.00	76.31	37.2%
41	1.250	A325	81	105	90.0	47.00	0.00	1.23	29.60	28.03	28.03	0.00	76.31	36.7%
42	1.250	A325	81	105	101.3	47.00	0.00	1.23	29.01	27.43	27.43	0.00	76.31	35.9%
43	1.250	A325	81	105	112.5	47.00	0.00	1.23	28.24	26.66	26.66	0.00	76.31	34.9%
44	1.250	A325	81	105	123.8	47.00	0.00	1.23	27.38	25.80	25.80	0.00	76.31	33.8%
45	1.250	A325	81	105	135.0	47.00	0.00	1.23	26.53	24.95	24.95	0.00	76.31	32.7%
46	1.250	A325	81	105	146.3	47.00	0.00	1.23	25.80	24.23	24.23	0.00	76.31	31.8%
47	1.250	A325	81	105	157.5	47.00	0.00	1.23	25.31	23.73	23.73	0.00	76.31	31.1%
48	1.250	A325	81	105	168.8	47.00	0.00	1.23	25.10	23.53	23.53	0.00	76.31	30.8%
49	1.250	A325	81	105	180.0	47.00	0.00	1.23	25.22	23.64	23.64	0.00	76.31	31.0%
50	1.250	A325	81	105	191.3	47.00	0.00	1.23	25.62	24.04	24.04	0.00	76.31	31.5%
51	1.250	A325	81	105	202.5	47.00	0.00	1.23	26.22	24.65	24.65	0.00	76.31	32.3%
52	1.250	A325	81	105	213.8	47.00	0.00	1.23	26.93	25.35	25.35	0.00	76.31	33.2%
53	1.250	A325	81	105	225.0	47.00	0.00	1.23	27.63	26.05	26.05	0.00	76.31	34.1%
54	1.250	A325	81	105	236.3	47.00	0.00	1.23	28.23	26.65	26.65	0.00	76.31	34.9%
55	1.250	A325	81	105	247.5	47.00	0.00	1.23	28.66	27.08	27.08	0.00	76.31	35.5%
56	1.250	A325	81	105	258.8	47.00	0.00	1.23	28.87	27.30	27.30	0.00	76.31	35.8%
57	1.250	A325	81	105	270.0	47.00	0.00	1.23	28.87	27.29	27.29	0.00	76.31	35.8%
58	1.250	A325	81	105	281.3	47.00	0.00	1.23	28.66	27.09	27.09	0.00	76.31	35.5%
59	1.250	A325	81	105	292.5	47.00	0.00	1.23	28.31	26.74	26.74	0.00	76.31	35.0%
60	1.250	A325	81	105	303.8	47.00	0.00	1.23	27.89	26.31	26.31	0.00	76.31	34.5%
61	1.250	A325	81	105	315.0	47.00	0.00	1.23	27.47	25.89	25.89	0.00	76.31	33.9%
62	1.250	A325	81	105	326.3	47.00	0.00	1.23	27.16	25.58	25.58	0.00	76.31	33.5%

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v4.4 - Effective 7-12-13

Date: 11/9/2016
PJF Project: 37516-0710.004.7805
Client Ref. # 829046
Site Name: Weston/Rt-57/Norfield R
Description: Flange @ 20'
Owner: CCI
Engineer: CP

Asymmetric Bolt Analysis

Moment =	3681	k-ft	TIA Ref.	G	
Axial =	81.8	kips	ASIF =	1.0000	
Shear =	39.2	kips	Max Ratio =	105.0%	
Anchor Qty =	70				

Location =	Flange Plate													
η =	0.50	for BP, Rev. G Sect. 4.9.9												
Threads =	N-Included	for FP, Rev. G												

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

63	1.250	A325	81	105	337.5	47.00	0.00	1.23	27.02	25.45	25.45	0.00	76.31	33.3%
64	1.250	A325	81	105	348.8	47.00	0.00	1.23	27.10	25.53	25.53	0.00	76.31	33.5%
65	0.000	Sabre 6.5 x 1.25	65	80	28.0	61.25	8.13	8.13	244.37	233.93	244.37	391.41	391.41	62.4%
66	0.000	Sabre 6.5 x 1.25	65	80	100.0	61.25	8.13	8.13	248.89	238.45	248.89	391.41	391.41	63.6%
67	0.000	Sabre 6.5 x 1.25	65	80	166.0	61.25	8.13	8.13	217.10	206.66	217.10	391.41	391.41	55.5%
68	0.000	Sabre 6.5 x 1.25	65	80	193.0	61.25	8.13	8.13	222.45	212.00	222.45	391.41	391.41	56.8%
69	0.000	Sabre 6.5 x 1.25	65	80	266.0	61.25	8.13	8.13	248.53	238.09	248.53	391.41	391.41	63.5%
70	0.000	Sabre 6.5 x 1.25	65	80	323.0	61.25	8.13	8.13	232.09	221.65	232.09	391.41	391.41	59.3%
								127.29						

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Manufacturer:	Other

Reactions		
Moment:	2081.6	ft-kips
Axial:	50.4	kips
Shear:	39.2	kips
Exterior Flange Run, T+q:		kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 20 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	50	in	

Plate Data		
Plate Outer Diam:	58.75	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.77	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.625	in
Pole Inner Diam:	58.75	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Bolt Results
Maximum Bolt Tension, Tu: 60.9 Kips, Ext. Tu=Interior Tu

FLANGE PLATE ANALYSIS ONLY

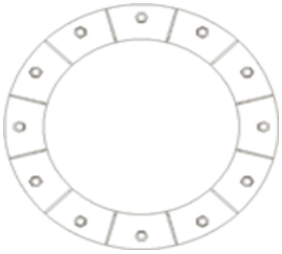
Interior Flange Plate Results	Flexural Check	
Controlling Bolt Axial Force:	64.0	Kips, Ext. Cu=Interior Cu
Plate Stress:	17.4	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	53.7%	**Pass**

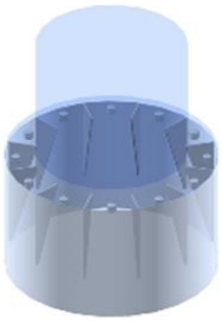
Stiffener Results

Horizontal Weld :	45.0%	**Pass**
Vertical Weld:	39.3%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	21.8%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	25.7%	**Pass**
Plate Comp. (AISC Bracket):	51.8%	**Pass**

Pole Results

Pole Punching Shear Check:	11.3%	**Pass**





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *829046*
Site Name: *Weston/ Rt-57 / Norfield R*
App #:

Manufacturer:	Other

Reactions		
Moment:	2081.6	ft-kips
Axial:	50.4	kips
Shear:	39.2	kips
Exterior Flange Run, T+q:	0	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 20 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	50	in	

Plate Data		
Plate Outer Diam:	58.5	in
Plate Inner Diam:	41	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.74	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0	<-- Disregard
Groove Angle:	0	<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	7	in
Height:	10	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.75	in
Pole Inner Diam:	58.5	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Bolt Results
Maximum Bolt Tension, Tu: 60.9 Kips, Ext. Tu=Interior Tu

FLANGE PLATE ANALYSIS ONLY

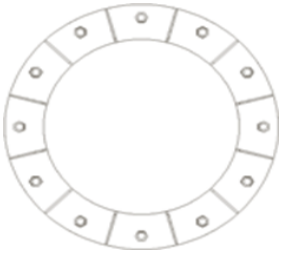
Interior Flange Plate Results	Flexural Check	
Controlling Bolt Axial Force:	64.0	Kips, Ext. Cu=Interior Cu
Plate Stress:	17.4	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	53.7%	**Pass**

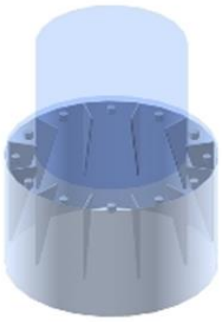
Stiffener Results

Horizontal Weld :	40.7%	**Pass**
Vertical Weld:	35.6%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	19.2%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	22.9%	**Pass**
Plate Comp. (AISC Bracket):	46.9%	**Pass**

Pole Results

Pole Punching Shear Check:	8.5%	**Pass**





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

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v4.4 - Effective 7-12-13

Date: 11/9/2016
PJF Project: 37516-0710.004.7805
Client Ref. # 829046
Site Name: Weston/ Rt-57/Norfield R
Description: 190' Monopole
Owner: CCI
Engineer: CP

Asymmetric Anchor Rod Analysis

Moment =	5164	k-ft	TIA Ref.	G	Location =	Base Plate		
Axial =	97.0	kips	ASIF =	1.0000	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	41.0	kips	Max Ratio =	105.0%	Threads =	N-Included	for FP, Rev. G	
Anchor Qty =	60							

** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. **

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.250	A687	105	150	0.0	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
2	1.250	A687	105	150	6.9	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
3	1.250	A687	105	150	13.8	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
4	1.250	A687	105	150	20.8	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
5	1.250	A687	105	150	27.7	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
6	1.250	A687	105	150	34.6	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
7	1.250	A687	105	150	41.5	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
8	1.250	A687	105	150	48.5	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
9	1.250	A687	105	150	55.4	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
10	1.250	A687	105	150	62.3	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
11	1.250	A687	105	150	69.2	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
12	1.250	A687	105	150	76.2	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
13	1.250	A687	105	150	83.1	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
14	1.250	A687	105	150	90.0	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
15	1.250	A687	105	150	96.9	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
16	1.250	A687	105	150	103.8	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
17	1.250	A687	105	150	110.8	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
18	1.250	A687	105	150	117.7	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
19	1.250	A687	105	150	124.6	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
20	1.250	A687	105	150	131.5	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
21	1.250	A687	105	150	138.5	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
22	1.250	A687	105	150	145.4	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
23	1.250	A687	105	150	152.3	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
24	1.250	A687	105	150	159.2	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
25	1.250	A687	105	150	166.2	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
26	1.250	A687	105	150	173.1	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
27	1.250	A687	105	150	180.0	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
28	1.250	A687	105	150	186.9	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
29	1.250	A687	105	150	193.8	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
30	1.250	A687	105	150	200.8	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
31	1.250	A687	105	150	207.7	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
32	1.250	A687	105	150	214.6	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
33	1.250	A687	105	150	221.5	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
34	1.250	A687	105	150	228.5	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
35	1.250	A687	105	150	235.4	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
36	1.250	A687	105	150	242.3	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
37	1.250	A687	105	150	249.2	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
38	1.250	A687	105	150	256.2	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
39	1.250	A687	105	150	263.1	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
40	1.250	A687	105	150	270.0	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
41	1.250	A687	105	150	276.9	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
42	1.250	A687	105	150	283.8	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
43	1.250	A687	105	150	290.8	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
44	1.250	A687	105	150	297.7	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
45	1.250	A687	105	150	304.6	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
46	1.250	A687	105	150	311.5	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
47	1.250	A687	105	150	318.5	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
48	1.250	A687	105	150	325.4	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
49	1.250	A687	105	150	332.3	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
50	1.250	A687	105	150	339.2	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
51	1.250	A687	105	150	346.2	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
52	1.250	A687	105	150	353.1	67.00	0.00	1.23	44.59	42.10	45.64	0.00	116.28	39.3%
53	2.250	F1554 Gr 105	105	125	3.5	76.00	0.00	3.98	163.34	155.27	166.75	232.00	232.00	71.9%
54	2.250	F1554 Gr 105	105	125	51.9	76.00	0.00	3.98	163.34	155.27	166.75	232.00	232.00	71.9%
55	2.250	F1554 Gr 105	105	125	93.5	76.00	0.00	3.98	163.34	155.27	166.75	232.00	232.00	71.9%
56	2.250	F1554 Gr 105	105	125	141.9	76.00	0.00	3.98	163.34	155.27	166.75	232.00	232.00	71.9%
57	2.250	F1554 Gr 105	105	125	183.5	76.00	0.00	3.98	163.34	155.27	166.75	232.00	232.00	71.9%
58	2.250	F1554 Gr 105	105	125	231.9	76.00	0.00	3.98	163.34	155.27	166.75	232.00	232.00	71.9%
59	2.250	F1554 Gr 105	105	125	273.5	76.00	0.00	3.98	163.34	155.27	166.75	232.00	232.00	71.9%
60	2.250	F1554 Gr 105	105	125	321.9	76.00	0.00	3.98	163.34	155.27	166.75	232.00	232.00	71.9%
										95.62				

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev G

Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#:	*829046*
Site Name:	*Weston/Rt-57/Norfield R*
App #:	
Pole Manufacturer:	*Other*

Anchor Rod Data		
Qty:	52	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	105	ksi
Bolt Circle:	67	in

Plate Data		
Diam:	70	in
Thick:	1.25	in
Grade:	36	ksi
Single-Rod B-eff:	3.62	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.25	in
Fillet V. Weld:	0.25	in
Width:	4.5	in
Height:	8	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	60	in
Thick:	0.75	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions			
Mu:	3146.2	ft-kips	**Reactions adjusted to account for post installed anchor rods.**
Axial, Pu:	64.7	kips	
Shear, Vu:	27.4	kips	
Eta Factor, η	0.5	TIA G (Fig. 4-4)	

If No stiffeners, Criteria: AISC LRFD <-Only Applcable to Unstiffened Cases

Anchor Rod Results

		Stiffened
Max Rod (Cu+ Vu/ń):	45.6 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	96.9 Kips	φ*Tn
Anchor Rod Stress Ratio:	47.1% **Pass**	

Base Plate Results Shear Check Only

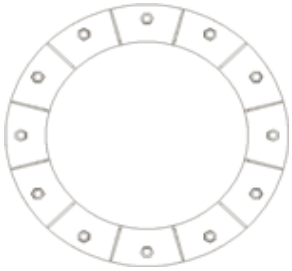
		Stiffened
Base Plate Stress:	4.0 ksi	AISC LRFD
Allowable Plate Stress:	19.4 ksi	φ*Fy
Base Plate Stress Ratio:	20.4% **Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	59.9% **Pass**
Vertical Weld:	38.6% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	21.1% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2	35.3% **Pass**
Plate Comp. (AISC Bracket):	52.1% **Pass**

Pole Results

Pole Punching Shear Check:	8.3% **Pass**



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Moment Capacity of Rock Anchored Foundation - Wind into Corner

Determination of effective rock compression area (for moment loads)

Controlling foundation % Capacity = **34.5%** **OK**

Elevation = **0** feet Total pole plus soil & fdn weight = **268.59** kips
Diagonal dimension = **305.40** in 1/2 x diagonal dimension = **152.70** in
Neutral axis location = **102.87** in (Measured from max. compression fiber)
Therefore c= **102.87** inches and a = β_1 x c = **87.44** inches β_1 = **0.85**

Load Case: 0.9D + 1.6W

Area of fdn-rock contact, Afr = **7645.7** square inches Net area of Afr = **7529.5** square inches

Centroid of Afr located **247.11** inches from maximum tension fiber of cross-section

Check fdn-rock contact area compression capacity versus actual rock compressive stress

Rock f'c = **277** psi Gross area of rock, Ac = **######** sq. in. ΣT -ΣC = **0.0**

Total rock anchor load, T_L, on annulus area, ΣT = **1504.2** kips

Usable rock and rock anchor compression capacity, SC = **1772.8** kips
Rock contribution to Mn = **6585.6** ft-kips
Pole / foundation / soil wt contribution to Mn = **1115.3** ft-kips

Cross-section Moment Cap.		
M_{ult} =	21138.4	ft-kips
M_{cap} =	15853.8	ft-kips

phi= **0.75**
(Mcap = ϕMult)

M_{actual} = **5471.5** ft-kips (At bottom of pad)
Mact / Mcap = **34.5%**

Strand information

No. of strands, Ns = **4** Number of strand group locations = **3** No. of strands per group location = **1**

Separation angle between strand groups = **90** degrees Strand diameter = **2** in

Strand edge distance = **44.563** inches (measured to center of strand group) Strand yield = **127.7** ksi

Modulus of elasticity of strand, E_s = **29000** ksi Area of strand = **2.6** sq. in.

Effective prestress = R x Initial prestress = **0** kips (Where R varies between 0.75 and 0.90)

Strand strain calculations

Strand strain due to effective prestress, ε_{se} = Eff. prestress of strand / (area of strand x E_s) = **0.00000**

rock strain due to effective prestress, ece = Total eff. prestress of strands / (Ac x Es) = **0.00000**

Assumed rock strain = **0.003**

Location	No. of strand groups	Dist. to neutral axis	Bending Strain	Total Strain	Strain Factor	Adjust
1	1	157.97	0.0046	0.0046	1.00	0
2	2	49.83	0.0015	0.0015	1.00	
3	1	-58.31	0.0000	0.0000	1.00	
4	0	- - -	- - -	- - -	1.00	
5	0	- - -	- - -	- - -	1.00	
6	0	- - -	- - -	- - -	- - -	
7	0	- - -	- - -	- - -	- - -	
8	0	- - -	- - -	- - -	- - -	
9	0	- - -	- - -	- - -	- - -	
10	0	- - -	- - -	- - -	- - -	
11	0	- - -	- - -	- - -	- - -	
12	0	- - -	- - -	- - -	- - -	
13	0	- - -	- - -	- - -	- - -	
14	0	- - -	- - -	- - -	- - -	
15	0	- - -	- - -	- - -	- - -	
16	0	- - -	- - -	- - -	- - -	
17	0	- - -	- - -	- - -	- - -	
18	0	- - -	- - -	- - -	- - -	
19	0	- - -	- - -	- - -	- - -	
20	0	- - -	- - -	- - -	- - -	
21	0	- - -	- - -	- - -	- - -	
22	0	- - -	- - -	- - -	- - -	
23	0	- - -	- - -	- - -	- - -	
24	0	- - -	- - -	- - -	- - -	
25	0	- - -	- - -	- - -	- - -	
26	0	- - -	- - -	- - -	- - -	
27	0	- - -	- - -	- - -	- - -	
28	0	- - -	- - -	- - -	- - -	
29	0	- - -	- - -	- - -	- - -	
30	0	- - -	- - -	- - -	- - -	
31	0	- - -	- - -	- - -	- - -	

Determination of strand contribution to ultimate moment capacity

Location	Group Strand Tension Load	Total Strand Tension Load Per Location, T_L	Contribution to Mn	Area Occupied by Strands
1	332.0	332.0	4370.7	- - -
2	109.6	219.1	910.0	- - -
3	0.0	0.0	0.0	3.14
4	- - -	- - -	- - -	- - -
5	- - -	- - -	- - -	- - -
6	- - -	- - -	- - -	- - -
7	- - -	- - -	- - -	- - -
8	- - -	- - -	- - -	- - -
9	- - -	- - -	- - -	- - -
10	- - -	- - -	- - -	- - -
11	- - -	- - -	- - -	- - -
12	- - -	- - -	- - -	- - -
13	- - -	- - -	- - -	- - -
14	- - -	- - -	- - -	- - -
15	- - -	- - -	- - -	- - -
16	- - -	- - -	- - -	- - -
17	- - -	- - -	- - -	- - -
18	- - -	- - -	- - -	- - -
19	- - -	- - -	- - -	- - -
20	- - -	- - -	- - -	- - -
21	- - -	- - -	- - -	- - -
22	- - -	- - -	- - -	- - -
23	- - -	- - -	- - -	- - -
24	- - -	- - -	- - -	- - -
25	- - -	- - -	- - -	- - -
26	- - -	- - -	- - -	- - -
27	- - -	- - -	- - -	- - -
28	- - -	- - -	- - -	- - -
29	- - -	- - -	- - -	- - -
30	- - -	- - -	- - -	- - -
31	- - -	- - -	- - -	- - -

$M_n = \Sigma$ (Tension in strand groups x strand group distance to N.A.) = **5280.7** ft-kips

$M_u = \phi M_n = 0.9 \times M_n =$ **4752.6** ft-kips

Tendon yield strength = **332.020** kips

Additional bar reinforcement information

PJF job no. 37516-0710.004

No. of bars, Nb = 12 Number of bar group locations = 7 No. of bars per group location = 1

Separation angle between bar groups = 30 degrees Area of bar = 2.6 sq. in.

Bar edge distance = 72.094 inches (measured to center of bar group) Modulus of elasticity of bar, E_b = 29000 ksi

Bar strain calculations

Assumed rock strain = 0.003

Location	No. of bar groups, N_{BG}	Dist. to neutral axis	ε (Tension)	Tension per bar, T_B	$T_L = N_{BG} \times T_B$	Mn Contribution
1	0	130.44	0.0038	284.0	0.0	0.0
2	2	119.64	0.0035	260.2	520.5	5188.9
3	2	90.13	0.0026	195.4	390.7	2934.7
4	0	49.83	0.0015	109.6	0.0	0.0
5	2	9.53	0.0003	20.9	41.9	33.3
6	2	-19.98	0.0000	0.0	0.0	0.0
7	0	-30.78	0.0000	0.0	0.0	0.0
8	0	- - -	- - -	- - -	- - -	- - -
9	0	- - -	- - -	- - -	- - -	- - -
10	0	- - -	- - -	- - -	- - -	- - -

Determination of bar contribution to ultimate moment capacity

PJF job no. 37516-0710.004

Location	No. of bar groups, N_{BG}	ε (C)	Comp. per bar, C_B	$C_L = N_{BG} \times C_B$	Mn Contribution	Area Occupied by Bar
1	0	0.0000	0.0	0.0	0.0	- - -
2	2	0.0000	0.0	0.0	0.0	- - -
3	2	0.0000	0.0	0.0	0.0	- - -
4	0	0.0000	0.0	0.0	0.0	- - -
5	2	0.0000	0.0	0.0	0.0	- - -
6	2	-0.0006	-43.9	0.0	0.0	28.27
7	0	-0.0009	-67.7	0.0	0.0	28.27
8	0	- - -	- - -	- - -	- - -	- - -
9	0	- - -	- - -	- - -	- - -	- - -
10	0	- - -	- - -	- - -	- - -	- - -

$M_n = \Sigma$ (Load in bar groups x bar group distance to N.A.) = 8156.8 ft-kips

$M_u = \phi M_n = 0.75 \times M_n$ = 6117.6 ft-kips

Bar yield strength = 332.020 kips

Rock Anchored Foundation Structural and Overturning Checks

Beam Shear, Tension Side - Wind into corner

b =	206.19	in	(Critical section at distance of d away from center of anchor, towards face of pier)
d=	31	in	
f'c=	5000	psi	
Vu=	111.7	kips	
ϕ=	0.85		
ϕVc=	768.3	kips	
% Cap=	5.0%	OK	(Vu adjusted for actual rock bolt load)

Beam Shear, Compression Side - Wind into corner

b =	260.9	in	(Critical section at distance of a plus d away from corner of foundation)
d=	43	in	
f'c=	5000	psi	
Vu=	458.9	kips	(SC, adjusted for overall foundation % Capacity and phi)
ϕ=	0.85		
ϕVc=	1348.5	kips	
% Cap=	34.0%	OK	

Punching Shear, Tension Side - Wind into corner

b =	94	in	(Critical section at anchor location)
d=	31	in	
f'c=	5000	psi	
Vu=	111.7	kips	
ϕ=	0.85		
ϕVc=	700.6	kips	
% Cap=	5.5%	OK	(Adjusted for actual rock bolt load)

Moment Capacity of Rock Anchored Foundation - Wind into Side

PJF job no. 37516-0710.004

Determination of effective rock compression area (for moment loads)

Controlling foundation % Capacity = **45.2%** **OK**

Elevation = **0** feet Total pole plus soil & fdn weight = **268.59** kips Pier diameter / square dim = **7.5** feet

Side dimension = **216.00** in 1/2 x diagonal dimension = **108.00** in (Or if mat, bolt circle or pole diameter if direct emb)

Neutral axis location = **56.78** in (Measured from max. compression fiber)

Therefore c= **56.78** inches and a = β_1 x c = **48.26** inches β_1 = **0.85**

Load Case: 0.9D + 1.6W

Area of fdn-rock contact, Afr = **10424.2** square inches Net area of Afr = **10248.3** square inches

Centroid of Afr located **191.87** inches from maximum tension fiber of cross-section

Check fdn-rock contact area compression capacity versus actual rock compressive stress

Rock f'c = **277** psi Gross area of rock, Ac = **######** sq. in. $\Sigma T - \Sigma C$ = **0.0**

Total rock anchor load, T_L, on annulus area, ΣT = **2144.4** kips

Usable rock and rock anchor compression capacity, SC = **2413.0** kips

Rock contribution to Mn = **6564.6** ft-kips

Pole / foundation / soil wt contribution to Mn = **1146.5** ft-kips

Cross-section Moment Cap.		
M_{ult} =	26163.5	ft-kips
M_{cap} =	19622.6	ft-kips

phi= **0.75** (Mcap = ϕMult)

M_{actual} = **5471.5** ft-kips (At bottom of pad)

Mact / Mcap = **27.9%**

Strand information

No. of strands, Ns = **8** Number of strand group locations = **5** No. of strands per group location = **1**

Separation angle between strand groups = **45** degrees Strand diameter = **2** in

Strand edge distance = **-0.187** inches (measured to center of strand group) Strand yield = **127.7** ksi

Modulus of elasticity of strand, E_s = **29000** ksi Area of strand = **2.6** sq. in.

Effective prestress = R x Initial prestress = **0** kips (Where R varies between 0.75 and 0.90)

Strand strain calculations

Strand strain due to effective prestress, ε_{se} = Eff. prestress of strand / (area of strand x E_s) = **0.00000**

rock strain due to effective prestress, ece = Total eff. prestress of strands / (Ac x Es) = **0.00000**

Assumed rock strain = **0.003**

Location	No. of strand groups	Dist. to neutral axis	Bending Strain	Total Strain	Strain Factor
1	0	159.41	0.0084	0.0084	1.00
2	2	127.72	0.0067	0.0067	1.00
3	0	51.22	0.0027	0.0027	1.00
4	2	-25.28	0.0000	0.0000	1.00
5	0	-56.96	0.0000	0.0000	1.00
6	0	- - -	- - -	- - -	- - -
7	0	- - -	- - -	- - -	- - -
8	0	- - -	- - -	- - -	- - -
9	0	- - -	- - -	- - -	- - -
10	0	- - -	- - -	- - -	- - -
11	0	- - -	- - -	- - -	- - -
12	0	- - -	- - -	- - -	- - -
13	0	- - -	- - -	- - -	- - -
14	0	- - -	- - -	- - -	- - -
15	0	- - -	- - -	- - -	- - -
16	0	- - -	- - -	- - -	- - -
17	0	- - -	- - -	- - -	- - -
18	0	- - -	- - -	- - -	- - -
19	0	- - -	- - -	- - -	- - -
20	0	- - -	- - -	- - -	- - -
21	0	- - -	- - -	- - -	- - -
22	0	- - -	- - -	- - -	- - -
23	0	- - -	- - -	- - -	- - -
24	0	- - -	- - -	- - -	- - -
25	0	- - -	- - -	- - -	- - -
26	0	- - -	- - -	- - -	- - -
27	0	- - -	- - -	- - -	- - -
28	0	- - -	- - -	- - -	- - -
29	0	- - -	- - -	- - -	- - -
30	0	- - -	- - -	- - -	- - -
31	0	- - -	- - -	- - -	- - -

Determination of strand contribution to ultimate moment capacity

Location	Group Strand Tension Load	Total Strand Tension Load Per Location, T_L	Contribution to Mn	Area Occupied by Strands
1	332.0	0.0	0.0	- - -
2	332.0	664.0	7067.8	- - -
3	204.1	0.0	0.0	- - -
4	0.0	0.0	0.0	6.28
5	0.0	0.0	0.0	0.00
6	- - -	- - -	- - -	- - -
7	- - -	- - -	- - -	- - -
8	- - -	- - -	- - -	- - -
9	- - -	- - -	- - -	- - -
10	- - -	- - -	- - -	- - -
11	- - -	- - -	- - -	- - -
12	- - -	- - -	- - -	- - -
13	- - -	- - -	- - -	- - -
14	- - -	- - -	- - -	- - -
15	- - -	- - -	- - -	- - -
16	- - -	- - -	- - -	- - -
17	- - -	- - -	- - -	- - -
18	- - -	- - -	- - -	- - -
19	- - -	- - -	- - -	- - -
20	- - -	- - -	- - -	- - -
21	- - -	- - -	- - -	- - -
22	- - -	- - -	- - -	- - -
23	- - -	- - -	- - -	- - -
24	- - -	- - -	- - -	- - -
25	- - -	- - -	- - -	- - -
26	- - -	- - -	- - -	- - -
27	- - -	- - -	- - -	- - -
28	- - -	- - -	- - -	- - -
29	- - -	- - -	- - -	- - -
30	- - -	- - -	- - -	- - -
31	- - -	- - -	- - -	- - -

$M_n = \Sigma$ (Tension in strand groups x strand group distance to N.A.) = **7067.8** ft-kips

$M_u = \phi M_n = 0.9 \times M_n =$ **6361.0** ft-kips

Tendon yield strength = **332.020** kips

Additional bar reinforcement information

No. of bars, Nb = 20 Number of bar group locations = 11 No. of bars per group location = 1

Separation angle between bar groups = 18 degrees Area of bar = 2.6 sq. in.

Bar edge distance = 27.4 inches (measured to center of bar group) Modulus of elasticity of bar, E_b = 29000 ksi

Bar strain calculations

Assumed rock strain = 0.003

Location	No. of bar groups, N_{BG}	Dist. to neutral axis	ε (Tension)	Tension per bar, T_B	$T_L = N_{BG} \times T_B$	Mn Contribution
1	0	131.82	0.0069	332.0	0.0	0.0
2	2	127.88	0.0067	332.0	664.0	7076.4
3	0	116.43	0.0061	332.0	0.0	0.0
4	0	98.60	0.0052	332.0	0.0	0.0
5	2	76.13	0.0040	303.3	606.6	3848.4
6	0	51.22	0.0027	204.1	0.0	0.0
7	2	26.32	0.0014	104.8	209.7	459.9
8	0	3.85	0.0002	15.3	0.0	0.0
9	0	-13.98	0.0000	0.0	0.0	0.0
10	2	-25.43	0.0000	0.0	0.0	0.0
11	0	-29.38	0.0000	0.0	0.0	0.0
12	0	- - -	- - -	- - -	- - -	- - -
13	0	- - -	- - -	- - -	- - -	- - -
14	0	- - -	- - -	- - -	- - -	- - -
15	0	- - -	- - -	- - -	- - -	- - -
16	0	- - -	- - -	- - -	- - -	- - -
17	0	- - -	- - -	- - -	- - -	- - -
18	0	- - -	- - -	- - -	- - -	- - -
19	0	- - -	- - -	- - -	- - -	- - -
20	0	- - -	- - -	- - -	- - -	- - -
21	0	- - -	- - -	- - -	- - -	- - -
22	0	- - -	- - -	- - -	- - -	- - -
23	0	- - -	- - -	- - -	- - -	- - -
24	0	- - -	- - -	- - -	- - -	- - -
25	0	- - -	- - -	- - -	- - -	- - -
26	0	- - -	- - -	- - -	- - -	- - -
27	0	- - -	- - -	- - -	- - -	- - -
28	0	- - -	- - -	- - -	- - -	- - -
29	0	- - -	- - -	- - -	- - -	- - -
30	0	- - -	- - -	- - -	- - -	- - -
31	0	- - -	- - -	- - -	- - -	- - -

Determination of bar contribution to ultimate moment capacity

Location	No. of bar groups, N_{BG}	ε (C)	Comp. per bar, C_B	$C_L = N_{BG} \times C_B$	Mn Contribution	Area Occupied by Bar
1	0	0.0000	0.0	0.0	0.0	- - -
2	2	0.0000	0.0	0.0	0.0	- - -
3	0	0.0000	0.0	0.0	0.0	- - -
4	0	0.0000	0.0	0.0	0.0	- - -
5	2	0.0000	0.0	0.0	0.0	- - -
6	0	0.0000	0.0	0.0	0.0	- - -
7	2	0.0000	0.0	0.0	0.0	- - -
8	0	0.0000	0.0	0.0	0.0	- - -
9	0	-0.0007	-55.7	0.0	0.0	28.27
10	2	-0.0013	-101.3	0.0	0.0	28.27
11	0	-0.0016	-117.0	0.0	0.0	28.27
12	0	- - -	- - -	- - -	- - -	- - -
13	0	- - -	- - -	- - -	- - -	- - -
14	0	- - -	- - -	- - -	- - -	- - -
15	0	- - -	- - -	- - -	- - -	- - -
16	0	- - -	- - -	- - -	- - -	- - -
17	0	- - -	- - -	- - -	- - -	- - -
18	0	- - -	- - -	- - -	- - -	- - -
19	0	- - -	- - -	- - -	- - -	- - -
20	0	- - -	- - -	- - -	- - -	- - -
21	0	- - -	- - -	- - -	- - -	- - -
22	0	- - -	- - -	- - -	- - -	- - -
23	0	- - -	- - -	- - -	- - -	- - -
24	0	- - -	- - -	- - -	- - -	- - -
25	0	- - -	- - -	- - -	- - -	- - -
26	0	- - -	- - -	- - -	- - -	- - -
27	0	- - -	- - -	- - -	- - -	- - -
28	0	- - -	- - -	- - -	- - -	- - -
29	0	- - -	- - -	- - -	- - -	- - -
30	0	- - -	- - -	- - -	- - -	- - -
31	0	- - -	- - -	- - -	- - -	- - -

$M_n = \Sigma$ (Load in bar groups x bar group distance to N.A.) = **11384.6** ft-kips

$M_u = \phi M_n = 0.75 \times M_n =$ **8538.5** ft-kips

Bar yield strength = **332.020** kips

Rock Anchored Foundation Structural and Overturning Checks

Beam Shear, Tension Side - Wind into Side

b =	216.00	in	(Equal to width of mat)
d=	31	in	
f'c=	5000	psi	
Vu=	180.5	kips	
ϕ=	0.85		
ϕVc=	804.9	kips	
% Cap=	22.4%	OK	

Beam Shear, Compression Side - Wind into Side

b =	216.0	in	(Equal to width of mat)
d=	43	in	
f'c=	5000	psi	
Vu=	504.6	kips	(SC, adjusted for overall foundation % Capacity and phi)
ϕ=	0.85		
ϕVc=	1116.5	kips	
% Cap=	45.2%	OK	

Punching Shear, Tension Side - Wind into Side

b =	94	in	(Critical section at anchor location)
d=	31	in	
f'c=	5000	psi	
Vu=	90.3	kips	
ϕ=	0.85		
ϕVc=	700.6	kips	
% Cap=	3.6%	OK	(Adjusted for actual rock bolt load)

Internal Pad Bending - Wind into Side

Moment at face of pier, Mu =	**1634.5**	ft-k	Load factor = **1**
Fact. Nom. moment cap, ϕMn =	**5601**	ft-k	From PJF Mat or Spread Footing Spreadsheet or other (spColumn, etc)
% Capacity =	**29.2%**	**OK**	

Overturning / Stability - Worst case assumed to be wind into the side

Rock anchor proof load, PL =	**259**	kips	(Assumed to be ultimate anchor capacity)
# of anchors in Line 1, N1 =	**4**		
Line 1 distance to rotation pt, d1 =	**15.375**	feet	
# of anchors in Line 2, N2 =	**0**		(Combined anchors on either side of foundation centerline)
Line 2 distance to rotation pt, d2 =	**0**	feet	
Foundation / pole / soil wt, W =	**268.59**	kips	
Distance to rotation pt, dw =	**9**	feet	
Foundation actual OTM, Mo =	**5471.5**	ft-k	(At bottom of foundation)
Overturning resistance, Mr =	**18346**	ft-k	(N1 x d1 x PL + N2 x d2 x [d2/d1 x PL] + W x dw)
% Cap = Mo / ϕMr =	**29.8%**	**OK**	ϕ = **1** (Defaults: 0.5 if TIA-F; 1 if TIA-G)

Note - Overturning % Cap conservative due to:

1) Line of anchors closest to point of overturning not included in calculation
2) Ultimate / maximum anchor capacity likely greater than proof load applied to anchor during installation

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

AT&T Existing Facility

Site ID: CT2099

Weston DT
56 Norfield Road
Weston, CT 06883

November 15, 2016

EBI Project Number: 6216005193

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	7.98 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

November 15, 2016

AT&T Mobility – New England
Attn: Cameron Syme, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT2099 – Weston DT**

EBI Consulting was directed to analyze the proposed AT&T facility located at **56 Norfield Road, Weston, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at **56 Norfield Road, Weston, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 GSM channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

7) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **Powerwave 7770 and the CCI OPA-65R-LCUU-H6** for transmission in the 700 MHz, 850 MHz and 1900 MHz (PCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerlines of the proposed antennas are **160 feet** above ground level (AGL) for **Sector A**, **160 feet** above ground level (AGL) for **Sector B** and **160 feet** above ground level (AGL) for Sector C.

10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.

AT&T Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	**160 feet**	Height (AGL):	**160 feet**	Height (AGL):	**160 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A1 MPE%	**0.42 %**	Antenna B1 MPE%	**0.42 %**	Antenna C1 MPE%	**0.42 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6
Gain:	11.65 / 14.85 dBd	Gain:	11.65 / 14.85 dBd	Gain:	11.65 / 14.85 dBd
Height (AGL):	**160 feet**	Height (AGL):	**160 feet**	Height (AGL):	**160 feet**
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts
ERP (W):	5,420.52	ERP (W):	5,420.52	ERP (W):	5,420.52
Antenna A2 MPE%	**1.13 %**	Antenna B2 MPE%	**1.13 %**	Antenna C2 MPE%	**1.13 %**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 dBd	Gain:	11.4 dBd	Gain:	11.4 dBd
Height (AGL):	**160 feet**	Height (AGL):	**160 feet**	Height (AGL):	**160 feet**
Frequency Bands	850 MHz	Frequency Bands	850 MHz	Frequency Bands	850 MHz
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	60 Watts	Total TX Power(W):	60 Watts	Total TX Power(W):	60 Watts
ERP (W):	828.23	ERP (W):	828.23	ERP (W):	828.23
Antenna A3 MPE%	**0.22 %**	Antenna B3 MPE%	**0.22 %**	Antenna C3 MPE%	**0.22 %**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**1.77 %**
Town Fire Dept	0.44 %
Town of Weston	0.63 %
EMS	0.04 %
Sprint	0.37 %
Verizon	2.64 %
T-Mobile	2.09 %
Site Total MPE %:	**7.98 %**

AT&T Sector A Total:	1.77 %
AT&T Sector B Total:	1.77 %
AT&T Sector C Total:	1.77 %
Site Total:	7.98 %

AT&T _ Frequency Band / Technology Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	160	1.26	850 MHz	567	0.22%
AT&T 1900 MHz (PCS) UMTS	2	656.33	160	1.99	1900 MHz (PCS)	1000	0.20%
AT&T 700 MHz LTE	2	877.31	160	2.66	700 MHz	467	0.57%
AT&T 1900 MHz (PCS) LTE	2	1,832.95	160	5.56	1900 MHz (PCS)	1000	0.56%
AT&T 850 MHz GSM	2	414.12	160	1.26	850 MHz	567	0.22%
						Total:	1.77%

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the AT&T facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector A:	1.77 %
Sector B:	1.77 %
Sector C:	1.77 %
AT&T Maximum Total (per sector):	1.77 %
Site Total:	7.98 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **7.98 %** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.