Cherundolo Consulting

1280 Route 46 West, Suite 9, Parsippany NJ, 07054

Melanie Bachman
Executive Director
CT Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Notice of Exempt Modification Application
345 North Main St, West Hartford CT

Latitude: N41.7850
Longitude: W72.7486

Dear Ms. Bachman:

Sprint currently maintains 3 existing panel antennas and 6 remote radio units at the 100' centerline level of the existing Guyed tower on the roof at 345 North Main St. Sprint proposes to swap out the existing 3 antennas with new models and add 3 panel antennas and 6 remote radio unit at 100' centerline on the tower. Sprint further proposes to add 1 hybrid cable and 30 Antenna to RRH jumper cables. Sprint is performing a new high-performance upgrade for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

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Please accept this letter as notification to the Council, pursuant to R.C.S.A. Section 16-50j-73, for construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter is being sent to Mayor Shari Cantor of the Town of West Hartford as well as Todd Dumais, Town Planner for the Town of West Hartford and Edans & Avant LLC, owner of the property.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in Sprint's operations at the site. Also included is documentation of the structural sufficiency of the tower with proposed modifications to accommodate the revised antenna configuration as well as the original approval for the site as well as the latest CSC decision, tax sheet and tax map.\

Existing Facility

CSC Summary Statement – CT03XC074 – 345 North Main St, West Harford CT 06117

The West Hartford facility is located at 345 North Main St, West Hartford CT and is owned by Edans & Avant LLC and the Site coordinates are: N41.7850, W72.7486.

The existing facility consists of a 50' Guyed Tower on the roof of the building for a total height of 100'. Sprint currently operates wireless communications equipment on a platform on a concrete slab at the facility and has 3 antennas and 6 RRU's mounted on at a centerline of 100' feet.

Statutory Considerations

The planned modifications to the facility fall within the activities explicitly provided for in R.C.S.A. 16-50j-72(b)(2)

1. The height of the overall structure will be unaffected.

2. The proposed changes will not require an extension of the property boundaries.

3. The proposed additions will not increase the noise level at the existing facility by

six decibels or more, or to levels that exceed state and/or local criteria

4. The changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the Federal Communications 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, Sprint respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A Section §16-50j-72(b)(2).

Respectfully submitted,

Ryan G Bailey
Charles Cherundolo Consulting
856-625-1596
ryan@mackenzierealtyconsulting.com

Additional Recipients:
Mayor Shari Cantor for the Town of West Hartford– Via FedEx
Todd Dumais, Town Planner for the Town of West Hartford - Via FedEx
Edans & Avant LLC, owner of the property – Via FedEx

PROJECT INFORMATION:

TOWER INFORMATION

CASCADE: CT03XC074

ADDRESS: 345 NORTH MAIN STREET
HARTFORD, CT 06117
HARTFORTD COUNTY

LAT: 41.7850°
LONG: -72.7486°
SITE TYPE: ROOFTOP

LANDLORD

BISHOP'S CORNER (E&A)
C/O EDENS & AVANT
PHONE: (617) 369-6647

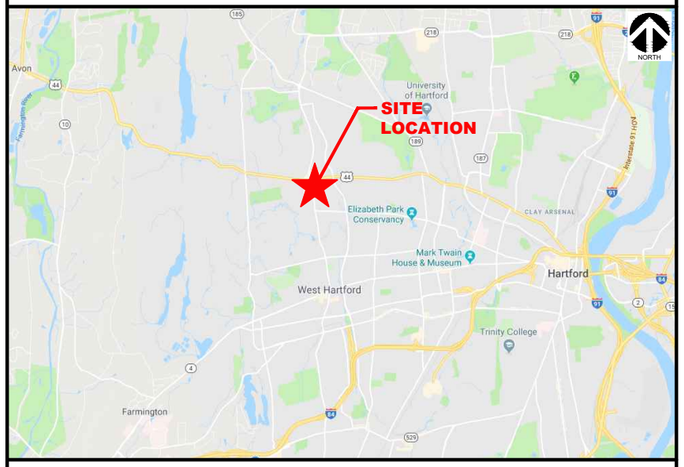
APPLICANT

SPRINT
1 INTERNATIONAL BLVD., SUITE 800
MAHWAH, NJ 07495
CONTACT: TBD
PHONE: TBD
EMAIL: TBD

A&E FIRM

RAMAKER & ASSOCIATES, INC.
CONTACT: KEITH BOHNSACK
PROJECT MANAGER
PHONE: (608) 643-4100
EMAIL: kbohnsack@ramaker.com

VICINITY MAP:



AERIAL MAP:

SHEET INDEX:

SHEET #	SHEET DESCRIPTION	REVISION
T-1	COVER SHEET & SITE PLAN	-
A-1	ANTENNA LAYOUTS & EQUIPMENT LAYOUT	-
A-2	TOWER ELEVATION	-
A-3	ANTENNA DETAILS	-
A-4	ANTENNA SCHEDULE & DETAILS	-
A-5	ANTENNA PLUMBING DIAGRAM	1
S-1	STRUCTURAL NOTES	-
S-2	GUY WIRE DETAILS	-

CODE COMPLIANCE:

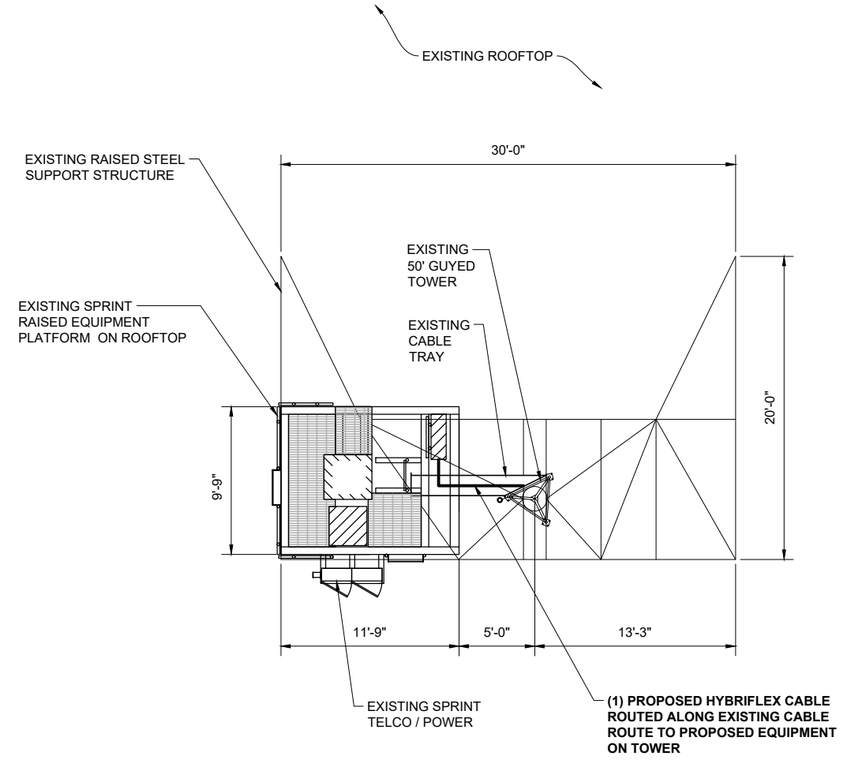
ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

1. INTERNATIONAL BUILDING CODE
2. ANSI/TIA-222 STRUCTURAL STANDARD FOR ANTENNA STRUCTURES
3. NFPA 780 - LIGHTNING PROTECTION CODE
4. NATIONAL ELECTRIC CODE

811 Know what's below. Call before you dig. www.call811.com

DO MACRO UPGRADE

SITE CASCADE:
CT03XC074



OVERALL SITE PLAN (1)
SCALE: 1" = 10'

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Woodcliff Lake, NJ • Bayamon, PR

Charles Cherundolo Consulting, Inc.
1280 RT. 46 WEST
PARSIPPANY, NJ 07054
Phone: 973-794-3633 Fax: 570-842-5592

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: James R. Skowronski Date: 4/09/2018

MARK	DATE	DESCRIPTION
1	04/09/18	ADD ANTENNA PLUMBING DIAGRAM

ISSUE PHASE: FINAL
DATE ISSUED: 04/06/2018

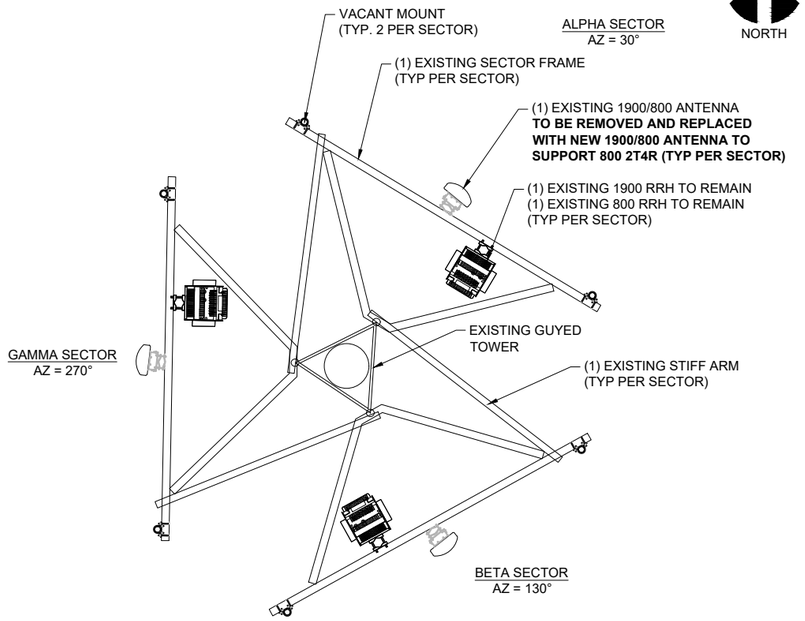
PROJECT TITLE:
CT03XC074

PROJECT INFORMATION:
345 NORTH MAIN STREET
HARTFORD, CT 06117
HARTFORTD COUNTY

SHEET TITLE:
COVER SHEET & SITE PLAN

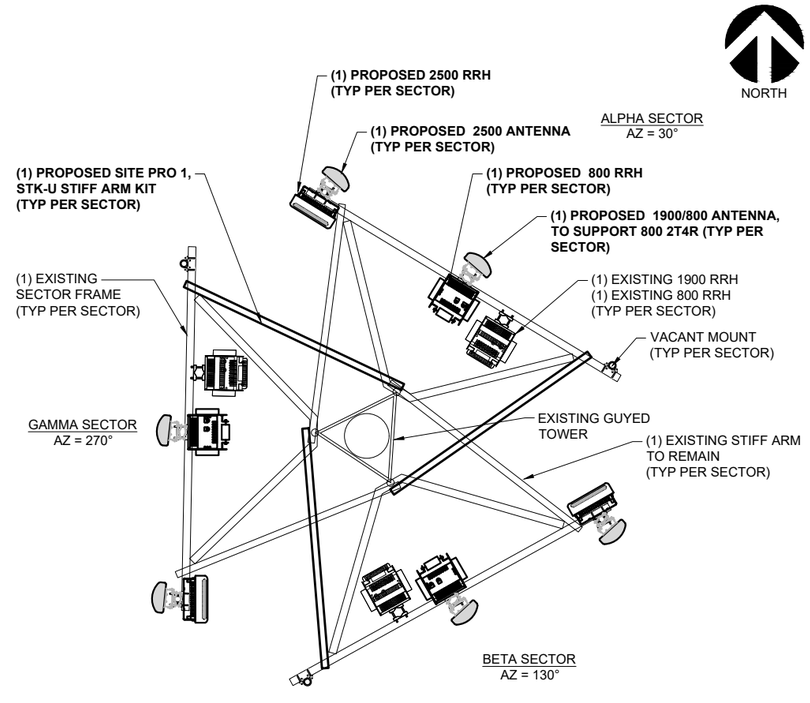
0 5' 10' 20'
11" x 17" - 1" = 10'
22" x 34" - 1" = 5'

PROJECT NUMBER: 22995
SHEET NUMBER: T-1



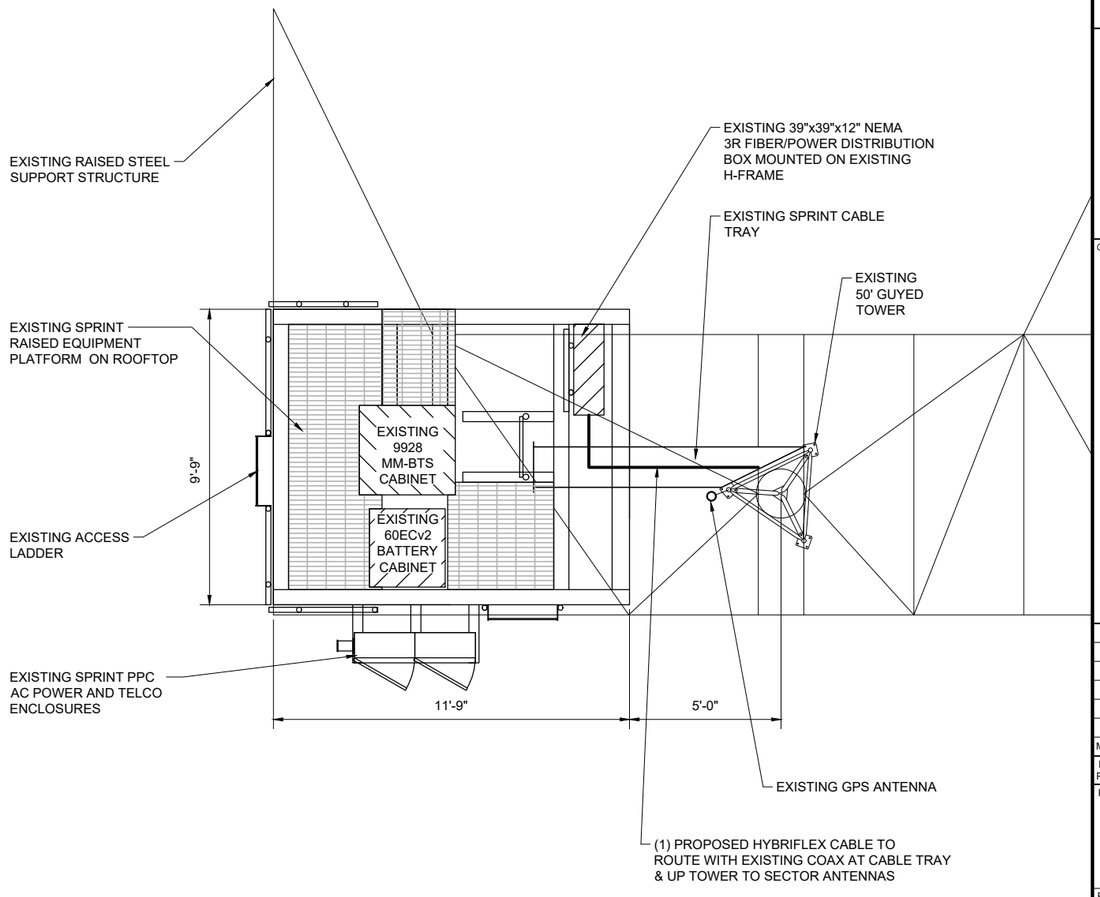
EXISTING ANTENNA PLAN 1

SCALE: NTS



PROPOSED ANTENNA PLAN 2

SCALE: NTS



EQUIPMENT PLAN 3

SCALE: 1" = 5'

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ISSUE PHASE: FINAL
DATE ISSUED: 04/06/2018

PROJECT TITLE:

CT03XC074

PROJECT INFORMATION:
345 NORTH MAIN STREET
HARTFORD, CT 06117
HARTFORTD COUNTY

SHEET TITLE:

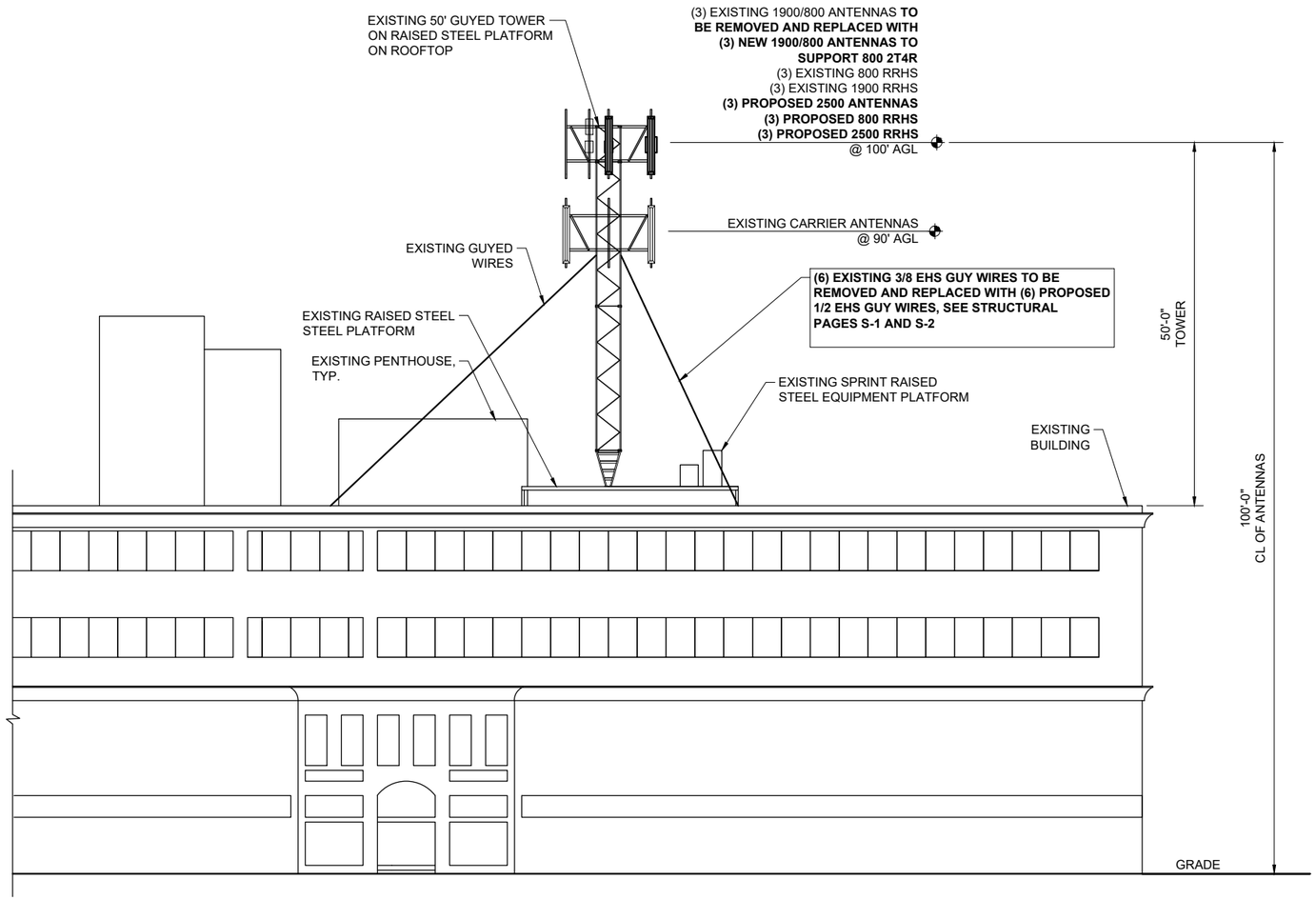
ANTENNA LAYOUTS &
EQUIPMENT LAYOUT

0 2.5' 5' 10'

11" x 17" - 1" = 5'
22" x 34" - 1" = 2.5'

PROJECT NUMBER: 22995

SHEET NUMBER: A-1



EAST TOWER ELEVATION (1)
SCALE: 1" = 20'

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ISSUE PHASE: FINAL
DATE ISSUED: 04/06/2018

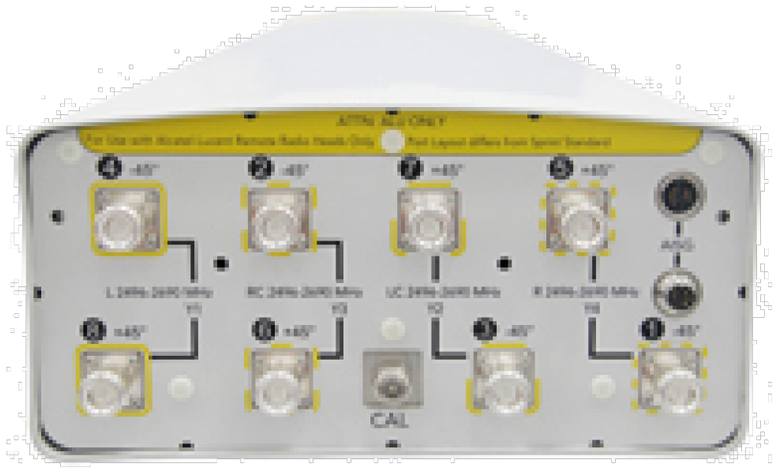
PROJECT TITLE:
CT03XC074

PROJECT INFORMATION:
345 NORTH MAIN STREET
HARTFORD, CT 06117
HARTFORTD COUNTY

SHEET TITLE:
TOWER ELEVATION

0 10' 20' 40'
11" x 17" - 1" = 20'
22" x 34" - 1" = 10'

PROJECT NUMBER: 22995
SHEET NUMBER: A-2

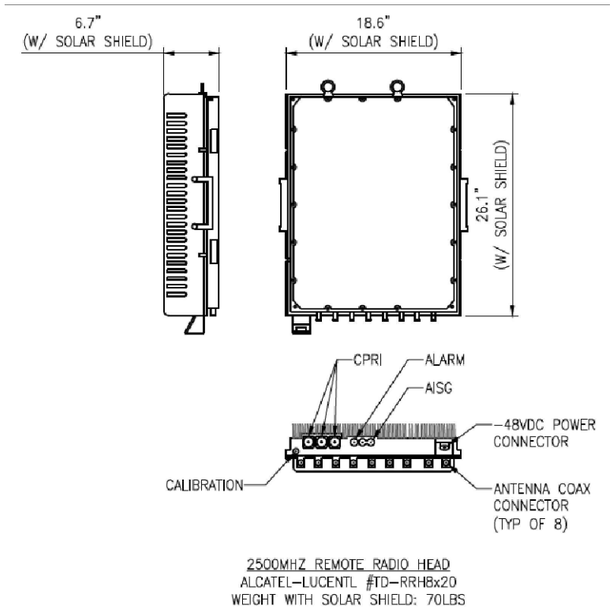


MECHANICAL	
DIMENSION (HxWxD)	56.3"x12.6"x6.3"
WEIGHT	56.2 lbs

ANTENNA MODEL: RFS #APXVTM14-ALU-I20 - ANTENNA SPECS

MECHANICAL	
DIMENSION (HxWxD)	72.0" x 19.6" x 7.8"
WEIGHT	77.4 lbs

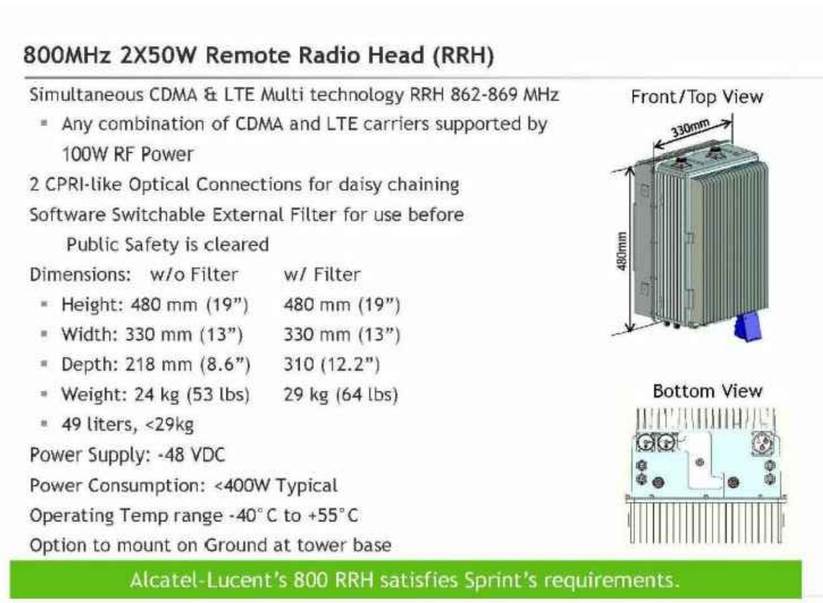
ANTENNA MODEL: COMMSCOPE #NNVV-65B-R4 - ANTENNA SPECS



2500MHZ REMOTE RADIO HEAD
ALCATEL-LUCENTL #TD-RRH8x20
WEIGHT WITH SOLAR SHIELD: 70LBS

MECHANICAL	
DIMENSION (HxWxD)	26.1"x18.6"x6.7"
WEIGHT	70 lbs

RRH MODEL: ALU #TD-RRH8X20-25 - RADIO SPECS



MECHANICAL	
DIMENSION (HxWxD)	19" x 13" x 12.2"
WEIGHT	64 lbs

RRH MODEL: ALU #800 MHz 2x50W - RADIO SPECS

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ISSUE PHASE: FINAL
DATE ISSUED: 04/06/2018

PROJECT TITLE:
CT03XC074

PROJECT INFORMATION:
345 NORTH MAIN STREET
HARTFORD, CT 06117
HARTFORTD COUNTY

SHEET TITLE:
ANTENNA DETAILS

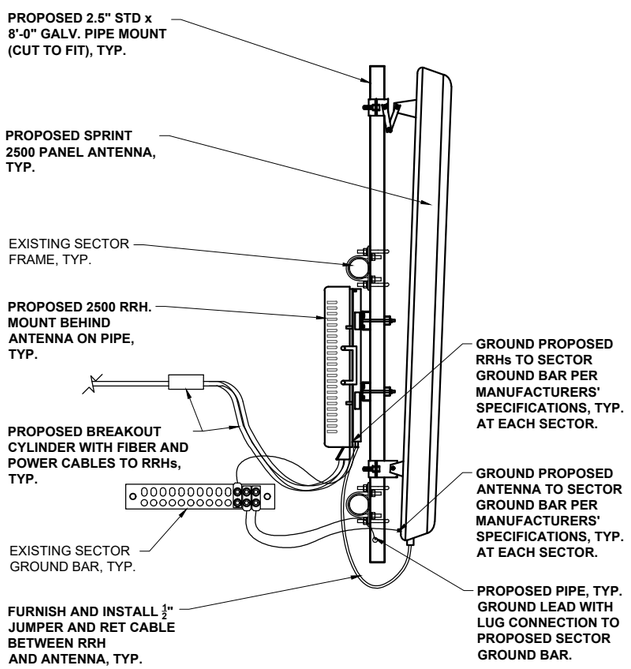
SCALE: NONE

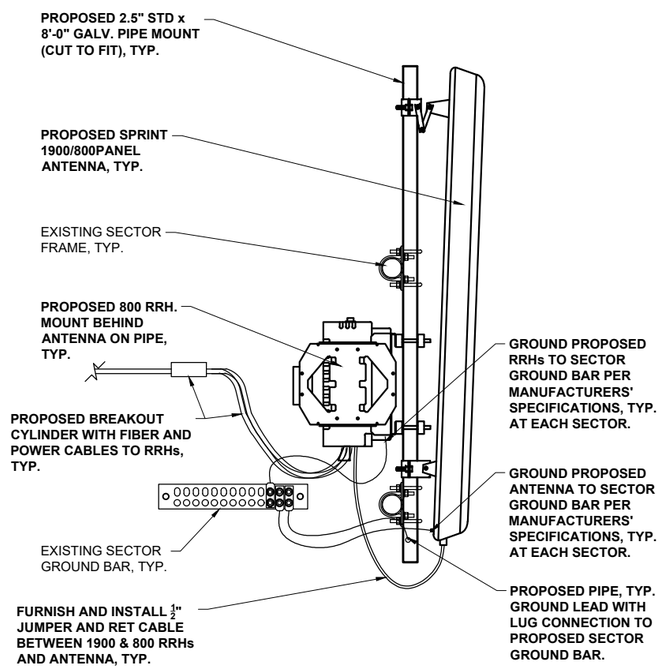
PROJECT NUMBER: 22995
SHEET NUMBER: A-3

800/1900/2.5 EQUIPMENT SCHEDULE

SECTOR	POSITION	ANTENNA MAKE/MODEL	AZIMUTH	CENTERLINE	RRH	CABLE TYPE	CABLE LENGTH	JUMPER TYPE
ALPHA	1	PROPOSED 2500 PANEL ANTENNA (RFS APXVTM14-ALU-120)	30°	100'-0"	(1) PROPOSED 2.5 (TD-RRH8x20-25)	(1) PROPOSED HYBRIFLEX	90'	8' HYBRID
	2	PROPOSED 1900/800 PANEL ANTENNA (COMMSCOPE NNVV-65B-R4)	30°	100'-0"	(1) PROPOSED RRH 800 MHz 2x50W			
	3	-	-	100'-0"	(1) EXISTING RRH 1900 4X45 65 MHz (1) EXISTING RRH 800 MHz 2x50W	EXISTING HYBRIFLEX	90'	EXISTING JUMPER
	4	VACANT MOUNT	-	-	-	-	-	-
BETA	1	PROPOSED 2500 PANEL ANTENNA (RFS APXVTM14-ALU-120)	130°	100'-0"	(1) PROPOSED 2.5 (TD-RRH8x20-25)	SHARED WITH ALPHA	90'	8' HYBRID
	2	PROPOSED 1900/800 PANEL ANTENNA (COMMSCOPE NNVV-65B-R4)	130°	100'-0"	(1) PROPOSED RRH 800 MHz 2x50W			
	3	-	-	100'-0"	(1) EXISTING RRH 1900 4X45 65 MHz (1) EXISTING RRH 800 MHz 2x50W	EXISTING HYBRIFLEX	90'	EXISTING JUMPER
	4	VACANT MOUNT	-	-	-	-	-	-
GAMMA	1	PROPOSED 2500 PANEL ANTENNA (RFS APXVTM14-ALU-120)	270°	100'-0"	(1) PROPOSED 2.5 (TD-RRH8x20-25)	SHARED WITH ALPHA	90'	8' HYBRID
	2	PROPOSED 1900/800 PANEL ANTENNA (COMMSCOPE NNVV-65B-R4)	270°	100'-0"	(1) PROPOSED RRH 800 MHz 2x50W			
	3	-	-	100'-0"	(1) EXISTING RRH 1900 4X45 65 MHz (1) EXISTING RRH 800 MHz 2x50W	EXISTING HYBRIFLEX	90'	EXISTING JUMPER
	4	VACANT MOUNT	-	-	-	-	-	-

EQUIPMENT & CABLE SCHEDULE (1)
SCALE: NTS





ANTENNA & RRH MOUNTING DETAIL (2)
SCALE: NTS

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STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: James R Skowronski Date: 4/09/2018

MARK	DATE	DESCRIPTION
1	04/09/18	ADD ANTENNA PLUMBING DIAGRAM

ISSUE PHASE: FINAL
DATE ISSUED: 04/06/2018

PROJECT TITLE:
CT03XC074

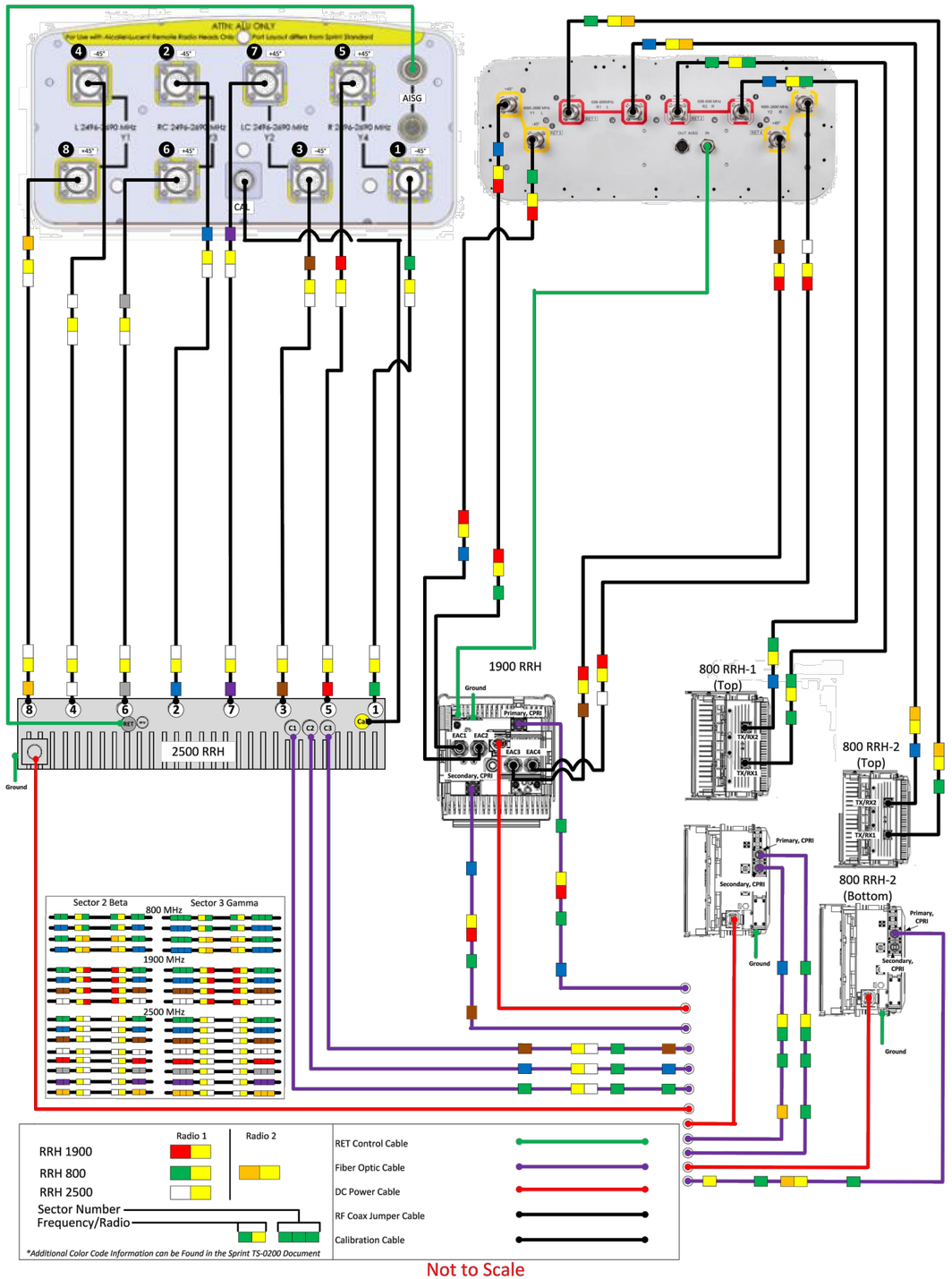
PROJECT INFORMATION:
345 NORTH MAIN STREET
HARTFORD, CT 06117
HARTFORTD COUNTY

SHEET TITLE:
ANTENNA SCHEDULE & DETAIL

SCALE: NONE

PROJECT NUMBER: 22995
SHEET NUMBER: A-4

ALU 211 APXVTM14-ALU-I20 & NNVV-65B-R4 wo Filters



Not to Scale

ANTENNA PLUMBING DIAGRAM
SCALE: NTS
1

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ISSUE PHASE: FINAL
DATE ISSUED: 04/06/2018

PROJECT TITLE:
CT03XC074

PROJECT INFORMATION:
345 NORTH MAIN STREET
HARTFORD, CT 06117
HARTFORTD COUNTY

SHEET TITLE:
ANTENNA PLUMBING DIAGRAM

SCALE: NONE

PROJECT NUMBER: 22995
SHEET NUMBER: A-5

GENERAL NOTES:

1. ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST HAVE CONSIDERABLE EXPERIENCE IN PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED AND PROPERLY REGISTERED TO DO THIS WORK IN THE STATE.

2. WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE CURRENT STATE BUILDING CODE.

3. UNLESS SHOWN OR NOTED OTHERWISE ON THE CONTRACT DRAWINGS, OR IN THE SPECIFICATIONS, THE FOLLOWING NOTES SHALL APPLY TO THE MATERIALS LISTED HEREIN, AND TO THE PROCEDURES TO BE USED ON THIS PROJECT.

4. ALL HARDWARE ASSEMBLY MANUFACTURER'S INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERSEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.

5. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE THE ERECTION PROCEDURE AND SEQUENCE TO INSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION AND/OR FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF TEMPORARY BRACING, GUYS, OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.

6. ALL DIMENSIONS, ELEVATIONS, AND EXISTING CONDITIONS SHOWN ON THE DRAWINGS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO BEGINNING ANY MATERIALS ORDERING, FABRICATION, OR CONSTRUCTION WORK ON THIS PROJECT. CONTRACTOR SHALL NOT SCALE CONTRACT DRAWINGS IN LIEU OF FIELD VERIFICATIONS. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND THE OWNER'S ENGINEER. THE DISCREPANCIES MUST BE RESOLVED BEFORE THE CONTRACTOR IS TO PROCEED WITH THE WORK. THE CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTION OF THE PROTECTIVE MEASURES OR THE PROCEDURES.

7. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS, AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.

8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK.

9. THE CONTRACTOR SHALL COORDINATE ACCESS AND CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIALS ACCESS, WITH THE LEASING AGENT FOR APPROVAL.

10. ALL PERMITS THAT MUST BE OBTAINED ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.

11. 24 HOURS PRIOR TO THE BEGINNING OF ANY CONSTRUCTION, THE CONTRACTOR MUST NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY, OR CITY) ENGINEER.

12. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR ONE YEAR FROM ACCEPTANCE DATE.

13. ALL TOWER DIMENSIONS SHALL BE VERIFIED WITH THE PLANS (LATEST REVISION) PRIOR TO COMMENCING CONSTRUCTION. NOTIFY THE ENGINEER IMMEDIATELY IF ANY DISCREPANCIES ARE DISCOVERED. THE OWNER SHALL HAVE A SET OF APPROVED PLANS AVAILABLE AT THE SITE AT ALL TIMES WHILE WORK IS BEING PERFORMED. A DESIGNATED RESPONSIBLE EMPLOYEE SHALL BE AVAILABLE FOR CONTACT BY THE GOVERNING AGENCY INSPECTORS.

14. ALL TOWER MODIFICATION WORK SHALL BE IN ACCORDANCE WITH TIA-1019-A-2012, "STANDARD FOR INSTALLATION, ALTERATION AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."

15. THE CLIMBING FACILITIES, SAFETY CLIMB, AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED, OR ALTERED WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE TOWER OWNER OR ENGINEER OF RECORD.

16. ALL CONSTRUCTION MEANS AND METHODS, INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET THE ANSI/TIA-1019-A, OSHA, AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/TIA-1019-A, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.

17. ANTENNAS AND OTHER APPURTENANCES MAY NEED TO BE TEMPORARILY RELOCATED DURING THE INSTALLATION OF MODIFICATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.

STRUCTURAL STEEL NOTES:

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE AISC SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, THE RCSC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS, AND THE CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES.

2. UNLESS OTHERWISE NOTED, ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:
   - A. ANGLE: ASTM A36
   - B. PIPE/TUBE: ASTM A500-46
   - C. PLATE: ASTM A36 (SELF-SUPPORTING AND GUYED TOWERS)
   - D. PLATE: ASTM A572-65 (MONOPOLES)
   - E. BOLTS: ASTM A325 TYPE 1 GALVANIZED HIGH STRENGTH BOLTS
   - F. U-BOLTS: ASTM A193 GRADE B7
   - G. NUTS: ASTM A563 CARBON AND ALLOY STEEL NUTS
   - H. WASHERS: ASTM F436 HARDENED STEEL WASHERS

3. ALL CONNECTIONS NOT FULLY DETAILED IN THESE PLANS SHALL BE DETAILED BY THE STEEL FABRICATOR IN ACCORDANCE WITH THE LATEST AISC STEEL CONSTRUCTION MANUAL.

4. HOLES SHALL NOT BE FLAME CUT THROUGH STEEL UNLESS APPROVED BY THE ENGINEER.

5. HOT-DIP GALVANIZE ALL ITEMS UNLESS OTHERWISE NOTED, AFTER FABRICATION WHERE PRACTICABLE. GALVANIZING: ASTM A123, ASTM, A153/A153M OR ASTM A653/A653M, G90, AS APPLICABLE. ADDITIONALLY, ALL NEW STEEL SHALL BE PAINTED TO MATCH EXISTING STEEL. CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION TO PROTECT STEEL BY ANY OTHER MEANS.

6. REPAIR DAMAGED SURFACES WITH GALVANIZING REPAIR METHOD AND PAINT CONFORMING TO ASTM A780 OR BY APPLICATION OF STICK OR THICK PASTED MATERIAL SPECIFICALLY DESIGNED FOR REPAIR OF GALVANIZING. CLEAN AREAS TO BE REPAIRED AND REMOVE SLAG FROM WELDS. HEAT SURFACES TO WHICH STICK OR PASTE MATERIAL IS APPLIED. WITH A TORCH TO A TEMPERATURE SUFFICIENT TO MELT THE METALLICS IN STICK OR PASTED; SPREAD MOLTEN MATERIAL UNIFORMLY OVER SURFACES TO BE COATED AND WIPE OFF EXCESS MATERIAL. AFTER REPAIR, STEEL SHALL BE REPAINTED TO MATCH EXISTING FINISH (IF APPLICABLE).

7. A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED BOLTS. GALVANIZED ASTM A325 BOLTS SHALL NOT BE REUSED.

8. ALL PROPOSED AND /OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.

Sprint

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MAHWAH, NJ 07495

RAMAKER & ASSOCIATES, INC.
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608-643-4100 www.Ramaker.com
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Woodcliff Lake, NJ • Bayamon, PR

Charles Cherundolo Consulting, Inc.
1280 RT. 46 WEST
PARSIPPANY, NJ 07054
Phone: 973-794-3633 Fax: 570-842-5592

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: James R. Skowronski Date: 4/09/2018

MARK	DATE	DESCRIPTION
1	04/09/18	ADD ANTENNA PLUMBING DIAGRAM

ISSUE PHASE: FINAL
DATE ISSUED: 04/06/2018

PROJECT TITLE:
CT03XC074

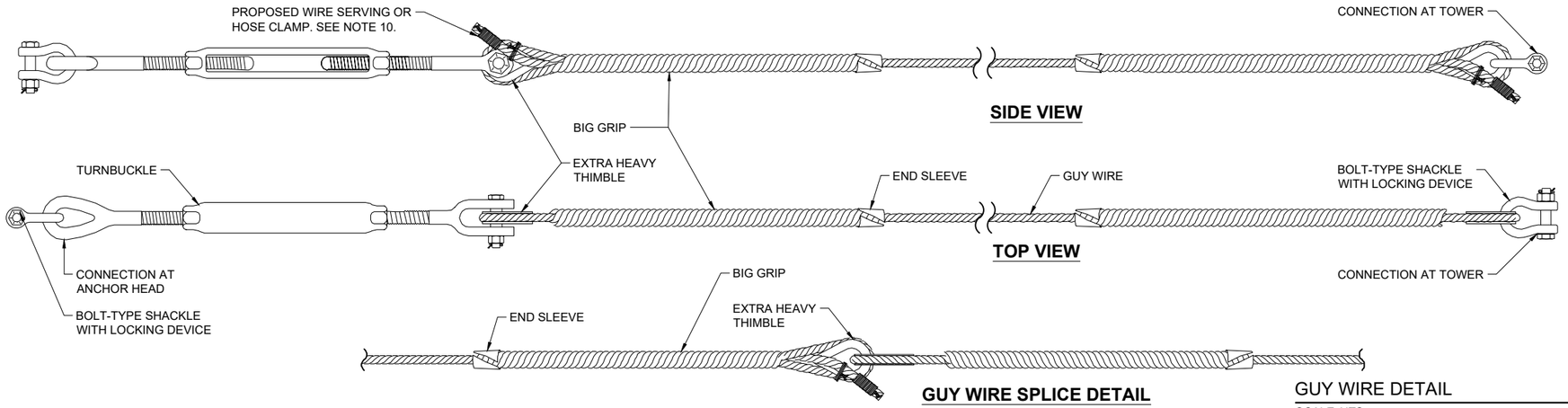
PROJECT INFORMATION:
345 NORTH MAIN STREET
HARTFORD, CT 06117
HARTFORTD COUNTY

SHEET TITLE:
STRUCTURAL NOTES

SCALE: NONE

PROJECT NUMBER: 22995
SHEET NUMBER: S-1

C:\Users\steves\appdata\local\temp\AcPublish_10956\22995_CT03XC074_DO Macro Upgrade Preliminary CDs.dwg Printed by: steves on Apr 09, 2018 - 6:55am



GUY WIRE DETAIL (1)
SCALE: NTS

PARTS SCHEDULE

WIRE PROPERTIES			TURNBUCKLE		SHACKLE		EXTRA HEAVY THIMBLE		END SLEEVE	BIG GRIP
SIZE	# OF WIRES IN STRAND	MIN. BREAKING STRENGTH (KIPS)	SIZE	CROSBY PART #	SIZE	CROSBY PART #	SIZE	CROSBY PART #	SIZE	SIZE
5/16" EHS	7	11.20	3/4"x18"	1035334	1/2"	1019472	1/2"	1037719	5/16"	5/16"
3/8" EHS	7	15.40	3/4"x18"	1035334	1/2"	1019472	1/2"	1037719	3/8"	3/8"
7/16" EHS	7	2.80	3/4"x18"	1035334	5/8"	1019490	1/2"	1037719	7/16"	7/16"
1/2" EHS	7	26.90	7/8"x18"	1035352	5/8"	1019490	5/8"	1037755	1/2"	1/2"
9/16" EHS	7	35.00	1"x18"	1035389	3/4"	1019515	5/8"	1037755	9/16"	9/16"
5/8" EHS	7	42.40	1"x18"	1035389	3/4"	1019515	3/4"	1037773	5/8"	5/8"
11/16" EHS	19	50.00	1-1/4"x18"	1035414	7/8"	1019533	7/8"	1037791	3/4"	3/4"
3/4" EHS	19	58.30	1-1/4"x18"	1035414	7/8"	1019533	7/8"	1037791	3/4"	3/4"
7/8" EHS	19	79.70	1-1/2"x18"	1035441	1"	1019551	1-1/8"	1037835	7/8"	7/8"
1" EHS	19	104.5	1-1/2"x18"	1035441	1-1/4"	1019597	1-1/8"	1037835	1"	1"

GUY DATA

GUY ELEVATION ft	GUY GRADE		GUY SIZE	INITIAL TENSION	%	GUY MODULUS ksi	GUY WEIGHT plf	LU ft	ANCHOR RADIUS ft	ANCHOR AZIMUTH ADJ. °	ANCHOR ELEVATION ft	END FITTING EFFICIENCY %
86.007	EHS	A	1/2	2690.00	10%	21000	0.517	51.76	40.00	0.0000	51.00	100%
		B	1/2	2690.00	10%	21000	0.517	53.99	43.00	0.0000	51.00	100%
		C	1/2	2690.00	10%	21000	0.517	44.32	29.00	0.0000	51.00	100%

GUY HARDWARE NOTES

1. BIG GRIPS SHALL BE PURCHASED FROM PREFORMED LINE PRODUCTS (PLP) AT WWW.PREFORMED.COM OR (440) 461-5200.
2. GALVANIZED STEEL GUY STRAND SHALL CONFORM TO THE MINIMUM REQUIREMENTS OF ASTM STANDARD A475 EXTRA HIGH STRENGTH (EHS) OR EQUIVALENT RECOGNIZED STANDARD WITH EOR APPROVAL.
3. SHACKLES AND TURNBUCKLE ASSEMBLIES SHALL BE FORGED AISI GRADE 1030, 1035. OR 1045 STEEL OR EQUIVALENT AND SUITABLY HEAT-TREATED (QUENCHED & TEMPERED, NORMALIZED, OR ANNEALED)
4. SHACKLES AND TURNBUCKLES SUPPLIED BY CROSBY GROUP ARE PRE-APPROVED. OTHERS REQUIRE APPROVAL BY THE EOR PRIOR TO INSTALLATION. INSTALLATION OF NON-APPROVED HARDWARE IS CAUSE FOR AUTOMATIC REJECTION.
5. PINS SHALL CONSIST OF A BOLT, NUT, AND STAINLESS STEEL COTTER PIN.
6. TURNBUCKLES SHALL BE ADJUSTED BY A PROPERLY SIZED SMOOTH JAWED WRENCH. USE OF PLIERS AND CHANNEL LOCKS ARE PROHIBITED.
7. ALL EXISTING SCREW TYPE SHACKLES AT THE ANCHOR HEAD SHALL HAVE MOUSING INSTALLED AS PART OF THE MODIFICATION. MOUSING SHALL CONSIST OF AT LEAST 4 WRAPS OF WIRE MEASURING BETWEEN 0.06" AND 0.08" IN DIAMETER.
8. GUY HARDWARE LISTED ARE MINIMUM DIMENSIONS. LARGER SIZES ARE PERMITTED WITH EOR APPROVAL. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY FIT -UP AT THE PRE-CONSTRUCTION SITE WALK.
9. CERTIFICATION/VERIFICATION DOCUMENTATION FOR THE GUY WIRE, TURNBUCKLES, SHACKLES, AND BIG GRIPS SHALL BE SUPPLIED TO THE MODIFICATION INSPECTOR TO BE INCLUDED IN THE CLOSEOUT REPORT.
10. PROPOSED WIRE SERVING TO BE INSTALLED AT CUT ENDS OF GUY WIRES FOR A LENGTH EQUAL TO THREE TIMES THE DIAMETER OF THE GUY WIRE. SERVING SHALL BE GALVANIZED ANNEALED IRON WIRE MEASURING BETWEEN 0.06" AND 0.08" IN DIAMETER.

GUY-TENSIONING INFORMATION

TEMPERATURE AT TIME OF TENSIONING

				0 F		20 F		40 F		60 F		80 F		100 F		120 F	
GUY ELEVATION ft		H ft	V ft	INITIAL TENSION lb	INTERCEPT ft	INITIAL TENSION lb	INTERCEPT ft	INITIAL TENSION lb	INTERCEPT ft	INITIAL TENSION lb	INTERCEPT ft	INITIAL TENSION lb	INTERCEPT ft	INITIAL TENSION lb	INTERCEPT ft	INITIAL TENSION lb	INTERCEPT ft
217.341	A	38.18	35.01	3355	0.21	3133	0.22	2911	0.24	2690	0.26	2469	0.28	2249	0.31	2029	0.34
	B	41.17	35.01	3399	0.22	3163	0.24	2926	0.26	2690	0.28	2454	0.31	2219	0.34	1985	0.38
	C	27.24	35.01	3152	0.16	2998	0.17	2844	0.18	2690	0.19	2536	0.20	2383	0.21	2229	0.23

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PARSIPPANY, NJ 07054
Phone: 973-794-3633 Fax: 570-842-5592

Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.

STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: James R. Skowronski Date: 4/09/2018

MARK	DATE	DESCRIPTION
1	04/09/18	ADD ANTENNA PLUMBING DIAGRAM

ISSUE PHASE: FINAL
DATE ISSUED: 04/06/2018

PROJECT TITLE:
CT03XC074

PROJECT INFORMATION:
345 NORTH MAIN STREET
HARTFORD, CT 06117
HARTFORTD COUNTY

SHEET TITLE:
GUY WIRE DETAILS

SCALE: NONE

PROJECT NUMBER: 22995
SHEET NUMBER: S-2

RAMAKER & ASSOCIATES, INC.

April 5, 2018

Mike Kithcart
Transcend Wireless
10 Industrial Avenue, Suite 3
Mahwah, NJ 07430

Ramaker & Associates, Inc.
855 Community Drive
Sauk City, WI 53583

SUBJECT: **STRUCTURAL ASSESSMENT**
50-FOOT GUYED TOWER

CARRIER: **SPRINT**

SITE: **CT03XC074**
345 NORTH MAIN STREET
HARTFORD, HARTFORD COUNTY, CONNECTICUT 06117
RAMAKER & ASSOCIATES PROJECT NUMBER: 22995

RESULTS:	**TOWER:**	**78.3%**	**PASS WITH PREVIOUSLY PROPOSED MODS (ATTACHED)**
	PLATFORM:	**70.9%**	**PASS**
	BUILDING:		**PASS**

Dear Mike Kithcart:

Ramaker & Associates, Inc. (RAMAKER) respectfully submits this structural assessment for the above-mentioned site. The purpose of this report is to determine the structural integrity of the existing structure with the existing and proposed loading. Engineering recommendations regarding the analysis results are provided in the following pages.

RAMAKER developed a finite element model of the tower using tnxTower analysis software. All information contained herein is valid only for the described structure configuration and loading conditions. RAMAKER reserves the right to modify our recommendations should alterations to the tower loading occur.

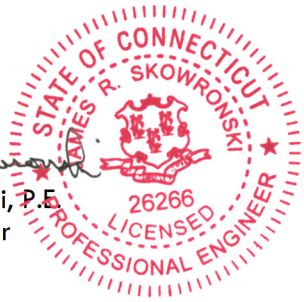
If you have any questions or comments, please do not hesitate to contact our office.

Sincerely,

RAMAKER & ASSOCIATES, INC.

Ryan J. Nelson
Project Engineer

James R. Skowronski, P.E.
Supervising Engineer



ANALYSIS CRITERIA

State Building Code	2016 CT State Building Code
Adopted Building Code	2012 IBC
Referenced Standard	TIA-222-G
Risk Category	II
Ultimate Design Wind Speed, V_{ult}	125 mph (3 sec. gust)
Nominal Design Wind Speed, V_{asd}	97 mph (3 sec. gust)
Design Wind Speed w/ Ice	50 mph (3 sec. gust)
Ice Thickness	1 inch
Exposure Category	C
Topographic Category	1
Crest Height	N/A

SUPPORTING DOCUMENTATION

- Tower drawings by Rohn, engineering file number 34599SW, dated July 28, 1997
- Structural analysis by Semaan Engineering Solutions, job number CT03XC074, dated October 20, 2014
- Modification package by Semaan Engineering Solutions, job number CT03XC074, dated October 20, 2014
- Structural analysis by RAMAKER, job number 22995, dated December 09, 2013
- Construction drawings by RAMAKER, project number 22995
- Site visit(s) conducted by RAMAKER
- Other pertinent data procured or assumed by RAMAKER during site due diligence activities

TOWER LOADING

RAMAKER understands that the loading to be used for this analysis will consist of the antenna equipment, mount, and cable configurations as shown in the following chart:

Elevation	Appurtenance	Mount	Coax	Owner	Status
104	(1) 6' Lightning Rod	Top Mount	--	--	Existing
100	**(2) RFS APXVSPP18-C-A20**	(3) Sector Frame	(3) 1-1/4 Hybrid **(1) 1-1/4 Hybrid**	Sprint	**Remove**
	(1) RFS APXV9ERR18-C-A20				
	(3) ALU 1900MHz 4x40W RRH				Existing
	(3) ALU 800MHz 2x50W RRH				
	(3) Commscope NNVV-65B-R4				**Proposed**
	(3) RFS APXVTM14-ALU-I20				
	(3) ALU 800MHz 2x50W RRH				
	(3) ALU TD-RRH8x20-25				
89	(6) Powerwave 7770.00	(3) T-Frame	(12) 1-5/8 (2) Conduit (1) RET	AT&T	Existing
	(2) Powerwave P65-17-XLH-RR				
	(1) KMW AM-X-CD-16-65-00T				
	(6) Powerwave TT19-08BP111-001				
	(6) Ericsson RRUS-11				
	(1) Raycap DC6-48-60-18-8F				
67	(1) GPS	Leg Mounted	(1) 1/2	Unknown	Existing

TOWER RESULTS

The maximum tower member stress capacities under the loading conditions previously described are as follows:

Component Type	Percent Capacity	Pass/Fail
Leg	25.4	Pass
Diagonal	57.2	Pass
Horizontal	16.5	Pass
Torque Arm	75.7	Pass
Guy Line	66.8	Fail
Bolt	78.3	Pass
RATING	**78.3**	**PASS**

Note: A rating of 105% or less is within engineering tolerances and considered acceptable.

Results of the analysis show that the existing tower will be stressed to a maximum of 78.3 percent of capacity. Therefore, the existing tower will pass the TIA-222-G analysis requirements under proposed loading conditions, **provided that the modifications proposed in the above-referenced modification package are completed prior to installation of the proposed equipment.**

BASE REACTIONS

The maximum tower reactions are as follows:

Load Type	ASD Design	Modified ASD	Proposed Model
Axial (k)	23.0	31.1	52.3
Shear (k)	--	--	0.6
Anchor Uplift (k)	10.7	14.4	16.8
Anchor Lateral (k)	8.6	11.6	13.1

The TIA-222-G code in Section 15.5.1 allows the original ASD design reactions to be multiplied by 1.35 when comparing them with reactions determined using the TIA-222-G code. All proposed model foundation reactions were found to be greater than the modified ASD design reactions.

The supporting platform and building were analyzed under proposed loading conditions. The existing platform is at 70.9 percent of capacity. The existing platform and building will provide adequate strength under proposed loading conditions.

LIMITATIONS

The recommendations contained within this report were developed using the supporting documentation as previously described. All recommendations pertain only to the proposed antenna installation activities as described in this report. RAMAKER assumes no responsibility for failures caused by factors beyond our control. These include but are not limited to the following:

- Missing, corroding, and/or deteriorating members
- Improper manufacturing and/or construction
- Improper maintenance

RAMAKER assumes no responsibility for modifications completed prior to or hereafter in which RAMAKER was not directly involved. These modifications include but are not limited to the following:

- Replacing or strengthening bracing members
- Reinforcing or extending vertical members
- Installing or removing antenna mounting gates or side arms
- Changing loading configurations

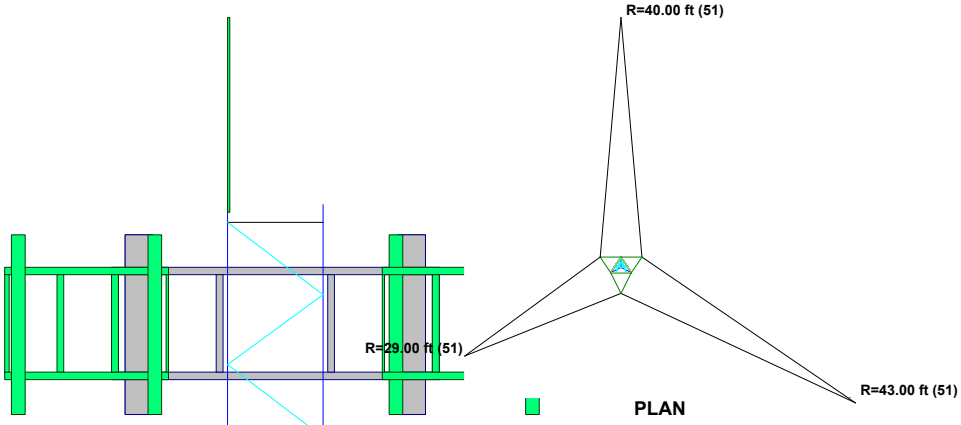
The tower owner is responsible for verifying that the existing loading on the structure is consistent with the loading applied to the structure within this report. If there is any information contrary to that contained herein, or if there are any defects arising from the original design, material, fabrication and erection deficiencies, this report should be disregarded and RAMAKER should be contacted immediately. RAMAKER is not liable for any representation, recommendation, or conclusion not expressly stated herein.

ATTACHMENTS

- Analysis Figures
- Analysis Calculations

Section	T4	T3	T2	T1
Legs		ROHN 2.5 X-STR	ROHN 2.5 EH	ROHN 2.5 X-STR
Leg Grade		A572-50		
Diagonals	N.A.	ROHN TS1.5x16 GA	ROHN TS1.5x16 GA	ROHN TS1.5x11 GA
Diagonal Grade	N.A.	A53-B-42		
Top Girts	N.A.	ROHN TS1.5x16 GA	ROHN TS1.5x16 GA	ROHN TS1.5x11 GA
Bottom Girts	N.A.	ROHN TS1.5x16 GA	ROHN TS1.5x16 GA	ROHN TS1.5x11 GA
Horizontals	L4x4x1/4	N.A.		
Top Guy Pull-Offs		N.A.	2L2x2x1/4x3/8	N.A.
Face Width (ft)				3.41667
# Panels @ (ft)	5 @ 1.08333		18 @ 2.37847	
Weight (lb)	302.7	451.9	919.8	539.7
2214.2				

104.0 ft
89.0 ft
86.0 ft
74.0 ft
59.0 ft
54.0 ft



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 1"x6.5'	104	800MHz 2x50W RRH	100
NNVV-65B-R4 w/Mount Pipe	100	Sector Mount [SM 502-3]	100
NNVV-65B-R4 w/Mount Pipe	100	(2) 7770.00 w/Mount Pipe	90
NNVV-65B-R4 w/Mount Pipe	100	(2) 7770.00 w/Mount Pipe	90
TD-RRH8x20-25	100	(2) 7770.00 w/Mount Pipe	90
TD-RRH8x20-25	100	AM-X-CD-16-65-00T-RET w/Mount Pipe	90
TD-RRH8x20-25	100		
800MHz 2x50W RRH	100	P65-17-XLH-RR w/Mount Pipe	90
800MHz 2x50W RRH	100	P65-17-XLH-RR w/Mount Pipe	90
800MHz 2x50W RRH	100	(2) TT19-08BP111-001	90
APXVTM14-ALU-120 w/Mount Pipe	100	(2) TT19-08BP111-001	90
APXVTM14-ALU-120 w/Mount Pipe	100	(2) TT19-08BP111-001	90
APXVTM14-ALU-120 w/Mount Pipe	100	(2) RRUS-11	90
1900MHz 4x45W RRH	100	(2) RRUS-11	90
1900MHz 4x45W RRH	100	(2) RRUS-11	90
1900MHz 4x45W RRH	100	DC6-48-60-18-8F	90
800MHz 2x50W RRH	100	Sector Mount [SM 104-3]	90
800MHz 2x50W RRH	100	GPS	67

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A53-B-42	42 ksi	63 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 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 0.00 ft
8. TOWER RATING: 78.3%

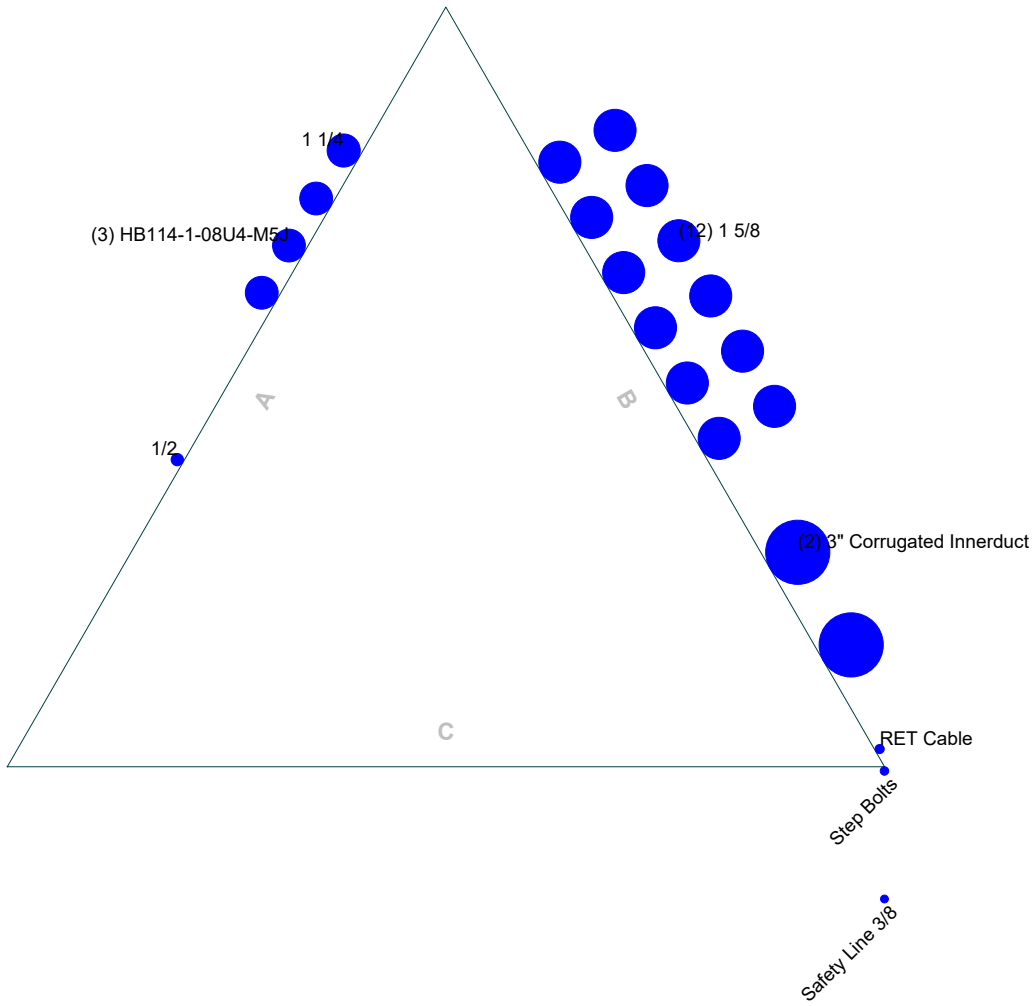
ALL REACTIONS ARE FACTORED

Ramaker & Associates, Inc.
855 Community Drive
Sauk City, WI 53583
Phone: (608) 643-4100
FAX: (608) 643-7999

Job: ***West Hartford Bishops (CT03XC074)***			
Project: ***22995***			
Client: Sprint / Alcatel-Lucent	Drawn by: TEM	App'd:	
Code: TIA-222-G	Date: 04/05/18	Scale: NTS	
Path: I:\22900\22995\Structural\Risa\22995 rev4.eri		Dwg No. E-1	

Feed Line Plan

Round Flat App In Face App Out Face



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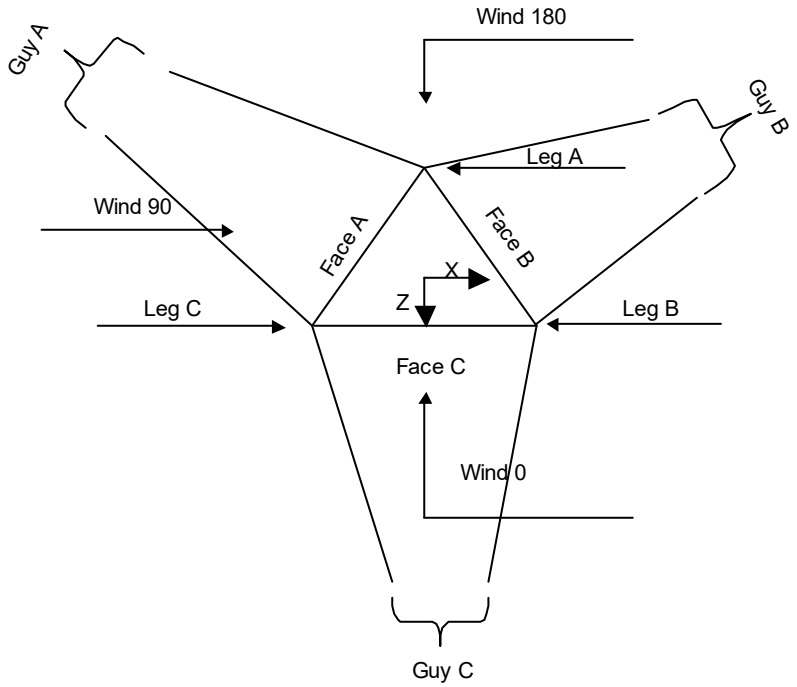
Client: Sprint / Alcatel-Lucent	Drawn by: TEM	App'd:	
Code: TIA-222-G	Date: 04/05/18	Scale: NTS	
Path: I:\22900\22995\Structural\Risa\22995 rev4.eri		Dwg No. E-7	

Tower Input Data

The main tower is a 3x guyed tower with an overall height of 104.00 ft above the ground line.
The base of the tower is set at an elevation of 54.00 ft above the ground line.
The face width of the tower is 3.42 ft at the top and tapered at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

- Tower is located in Hartford County, Connecticut.
- ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
- Basic wind speed of 97 mph.
- Structure Class II.
- Exposure Category C.
- Topographic Category 1.
- Crest Height 0.00 ft.
- Nominal ice thickness of 1.0000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- Pressures are calculated at each section.
- Safety factor used in guy design is 1.
- Stress ratio used in tower member design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.



Face Guyed

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	104.00-89.00			3.42	1	15.00
T2	89.00-74.00			3.42	1	15.00
T3	74.00-59.00			3.42	1	15.00
T4	59.00-54.00			3.42	1	5.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	104.00-89.00	2.38	K Brace Left	No	No	7.3750	1.3750

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T2	89.00-74.00	2.38	CX Brace	No	No	7.3750	1.3750
T3	74.00-59.00	2.38	K Brace Left	No	No	7.3750	1.3750
T4	59.00-54.00	1.08	CX Brace	No	Yes	4.0000	4.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 104.00-89.00	Pipe	ROHN 2.5 X-STR	A572-50 (50 ksi)	Pipe	ROHN TS1.5x11 GA	A53-B-42 (42 ksi)
T2 89.00-74.00	Pipe	ROHN 2.5 EH	A572-50 (50 ksi)	Pipe	ROHN TS1.5x16 GA	A53-B-42 (42 ksi)
T3 74.00-59.00	Pipe	ROHN 2.5 X-STR	A572-50 (50 ksi)	Pipe	ROHN TS1.5x16 GA	A53-B-42 (42 ksi)
T4 59.00-54.00	Pipe	ROHN 2.5 X-STR	A572-50 (50 ksi)	Pipe		A53-B-42 (42 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 104.00-89.00	Pipe	ROHN TS1.5x11 GA	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x11 GA	A53-B-42 (42 ksi)
T2 89.00-74.00	Pipe	ROHN TS1.5x16 GA	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x16 GA	A53-B-42 (42 ksi)
T3 74.00-59.00	Pipe	ROHN TS1.5x16 GA	A53-B-42 (42 ksi)	Pipe	ROHN TS1.5x16 GA	A53-B-42 (42 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T4 59.00-54.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L4x4x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

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
T1 104.00-89.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T2 89.00-74.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T3 74.00-59.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T4 59.00-54.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 104.00-89.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T2 89.00-74.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T3 74.00-59.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T4 59.00-54.00	No	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 104.00-89.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 89.00-74.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 74.00-59.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 59.00-54.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1 104.00-89.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T2 89.00-74.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T3 74.00-59.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0
T4 59.00-54.00	Flange	0.7500 A325N	4	0.5000 A325N	0	0.5000 A325N	0	0.5000 A325N	0	0.6250 A325N	0	0.5000 A325N	0	0.6250 A325N	0

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension lb	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
86.0069	EHS	A	1/2	2690.00	10%	21000	0.517	51.76	40.00	0.0000	51.00	100%
		B	1/2	2690.00	10%	21000	0.517	53.99	43.00	0.0000	51.00	100%
		C	1/2	2690.00	10%	21000	0.517	44.32	29.00	0.0000	51.00	100%

Guy Data *(cont'd)*

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
86.0069	Torque Arm	6.83	0.0000	Channel	A36 (36 ksi)	Channel	C10x15.3

Guy Data *(cont'd)*

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
86.01	A572-50 (50 ksi)	Solid Round			No	A36 (36 ksi)	Double Equal Angle	2L2x2x1/4x3/8

Guy Data *(cont'd)*

Guy Elevation ft	Cable Weight A lb	Cable Weight B lb	Cable Weight C lb	Cable Weight D lb	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
86.0069	26.76	27.92	22.91		0.26 0.9 sec/pulse	0.28 0.9 sec/pulse	0.19 0.7 sec/pulse	

Guy Data *(cont'd)*

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
86.0069	No	No	1	1	1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
86.0069	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
86.0069	A	68.50	24	6	2.1515
	B	68.50	24	6	2.1515
	C	68.50	24	6	2.1515

Guy-Tensioning Information

Guy Elevation ft		H ft	V ft	Temperature At Time Of Tensioning: 0 F Initial Tension lb	0 F Intercept ft	20 F Initial Tension lb	20 F Intercept ft	40 F Initial Tension lb	40 F Intercept ft	60 F Initial Tension lb	60 F Intercept ft	80 F Initial Tension lb	80 F Intercept ft	100 F Initial Tension lb	100 F Intercept ft	120 F Initial Tension lb	120 F Intercept ft
86.0069	A	38.18	35.01	3355	0.21	3133	0.22	2911	0.24	2690	0.26	2469	0.28	2249	0.31	2029	0.34
	B	41.17	35.01	3399	0.22	3163	0.24	2926	0.26	2690	0.28	2454	0.31	2219	0.34	1985	0.38
	C	27.24	35.01	3152	0.16	2998	0.17	2844	0.18	2690	0.19	2536	0.20	2383	0.21	2229	0.23

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
**********												
Safety Line 3/8	C	No	Ar (CaAa)	104.00 - 59.00	6.0000	-0.5	1	1	0.3750	0.3750		0.22
Step Bolts	C	No	Ar (CaAa)	104.00 - 59.00	0.0000	-0.5	1	1	0.2920	0.4000		1.00
**********												
HB114-1-08U4-M5J	A	No	Ar (CaAa)	100.00 - 59.00	0.0000	0.175	3	3	1.0000	1.5400		1.08
1 1/4	A	No	Ar (CaAa)	100.00 - 59.00	0.0000	0.3	1	1	1.5500	1.5500		0.66
**********												
1 5/8	B	No	Ar (CaAa)	90.00 - 59.00	0.0000	-0.1	12	6	1.0000	1.9800		1.04
3" Corrugated Innerduct	B	No	Ar (CaAa)	90.00 - 59.00	0.0000	0.3	2	2	2.0000	3.0000		0.30
RET Cable	B	No	Ar (CaAa)	90.00 - 59.00	0.0000	0.48	1	1	0.4400	0.4400		0.08
**********												
1/2	A	No	Ar (CaAa)	66.00 - 59.00	0.0000	-0.1	1	1	0.5800	0.5800		0.25
**********												

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 plf
**********							

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 lb
T1	104.00-89.00	A	0.000	0.000	6.787	0.000	42.90
		B	0.000	0.000	3.020	0.000	13.16
		C	0.000	0.000	1.163	0.000	18.30
T2	89.00-74.00	A	0.000	0.000	9.255	0.000	58.50
		B	0.000	0.000	45.300	0.000	197.40
		C	0.000	0.000	1.163	0.000	18.30
T3	74.00-59.00	A	0.000	0.000	9.661	0.000	60.25
		B	0.000	0.000	45.300	0.000	197.40
		C	0.000	0.000	1.163	0.000	18.30
T4	59.00-54.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

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 lb
T1	104.00-89.00	A	2.227	0.000	0.000	23.916	0.000	382.91
		B		0.000	0.000	5.218	0.000	106.64
		C		0.000	0.000	14.522	0.000	231.62
T2	89.00-74.00	A	2.189	0.000	0.000	32.311	0.000	511.79
		B		0.000	0.000	77.784	0.000	1576.95
		C		0.000	0.000	14.298	0.000	225.06
T3	74.00-59.00	A	2.145	0.000	0.000	34.930	0.000	551.42

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 lb
		B		0.000	0.000	77.207	0.000	1550.30
		C		0.000	0.000	14.033	0.000	217.43
T4	59.00-54.00	A	2.110	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	104.00-89.00	0.9571	-8.7981	6.9572	-1.9631
T2	89.00-74.00	8.7566	-7.4722	9.9050	-3.5510
T3	74.00-59.00	8.4919	-7.4290	9.1113	-3.5563
T4	59.00-54.00	0.0000	0.0000	0.0000	0.0000

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	Safety Line 3/8	89.00 - 104.00	0.6000	0.4538
T1	3	Step Bolts	89.00 - 104.00	0.6000	0.4538
T1	5	HB114-1-08U4-M5J	89.00 - 100.00	0.6000	0.4538
T1	6	1 1/4	89.00 - 100.00	0.6000	0.4538
T1	8	1 5/8	89.00 - 90.00	0.6000	0.4538
T1	9	3" Corrugated Innerduct	89.00 - 90.00	0.6000	0.4538
T1	10	RET Cable	89.00 - 90.00	0.6000	0.4538
T2	2	Safety Line 3/8	74.00 - 89.00	0.6000	0.2425
T2	3	Step Bolts	74.00 - 89.00	0.6000	0.2425
T2	5	HB114-1-08U4-M5J	74.00 - 89.00	0.6000	0.2425
T2	6	1 1/4	74.00 - 89.00	0.6000	0.2425
T2	8	1 5/8	74.00 - 89.00	0.6000	0.2425
T2	9	3" Corrugated Innerduct	74.00 - 89.00	0.6000	0.2425
T2	10	RET Cable	74.00 - 89.00	0.6000	0.2425
T3	2	Safety Line 3/8	59.00 - 74.00	0.6000	0.4654
T3	3	Step Bolts	59.00 - 74.00	0.6000	0.4654
T3	5	HB114-1-08U4-M5J	59.00 - 74.00	0.6000	0.4654
T3	6	1 1/4	59.00 - 74.00	0.6000	0.4654
T3	8	1 5/8	59.00 - 74.00	0.6000	0.4654
T3	9	3" Corrugated Innerduct	59.00 - 74.00	0.6000	0.4654
T3	10	RET Cable	59.00 - 74.00	0.6000	0.4654
T3	12	1/2	59.00 - 66.00	0.6000	0.4654

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
**********									
Lightning Rod 1"x6.5'	C	From Leg	0.00	0.0000	104.00	No Ice	0.65	0.65	50.00
			0.00			1/2" Ice	1.32	1.32	56.06
			3.00			1" Ice	2.00	2.00	66.34
**********									
NNVV-65B-R4 w/Mount Pipe	A	From Leg	4.00	0.0000	100.00	No Ice	12.51	7.41	102.95
			-2.00			1/2" Ice	13.11	8.60	193.58
			0.00			1" Ice	13.67	9.50	292.74
NNVV-65B-R4 w/Mount Pipe	B	From Leg	4.00	0.0000	100.00	No Ice	12.51	7.41	102.95
			-2.00			1/2" Ice	13.11	8.60	193.58
			0.00			1" Ice	13.67	9.50	292.74
NNVV-65B-R4 w/Mount Pipe	C	From Leg	4.00	0.0000	100.00	No Ice	12.51	7.41	102.95
			-2.00			1/2" Ice	13.11	8.60	193.58
			0.00			1" Ice	13.67	9.50	292.74
TD-RRH8x20-25	A	From Leg	4.00	0.0000	100.00	No Ice	4.05	1.53	70.00
			-6.00			1/2" Ice	4.30	1.71	97.14
			0.00			1" Ice	4.56	1.90	127.80
TD-RRH8x20-25	B	From Leg	4.00	0.0000	100.00	No Ice	4.05	1.53	70.00
			-6.00			1/2" Ice	4.30	1.71	97.14
			0.00			1" Ice	4.56	1.90	127.80
TD-RRH8x20-25	C	From Leg	4.00	0.0000	100.00	No Ice	4.05	1.53	70.00
			-6.00			1/2" Ice	4.30	1.71	97.14
			0.00			1" Ice	4.56	1.90	127.80
800MHz 2x50W RRH	A	From Leg	4.00	0.0000	100.00	No Ice	2.06	1.93	64.00
			-2.00			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
800MHz 2x50W RRH	B	From Leg	4.00	0.0000	100.00	No Ice	2.06	1.93	64.00
			-2.00			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
800MHz 2x50W RRH	C	From Leg	4.00	0.0000	100.00	No Ice	2.06	1.93	64.00
			-2.00			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
APXVTM14-ALU-120 w/Mount Pipe	A	From Leg	4.00	0.0000	100.00	No Ice	6.53	4.91	87.78
			-6.00			1/2" Ice	6.97	5.67	141.88
			0.00			1" Ice	7.40	6.38	202.64
APXVTM14-ALU-120 w/Mount Pipe	B	From Leg	4.00	0.0000	100.00	No Ice	6.53	4.91	87.78
			-6.00			1/2" Ice	6.97	5.67	141.88
			0.00			1" Ice	7.40	6.38	202.64
APXVTM14-ALU-120 w/Mount Pipe	C	From Leg	4.00	0.0000	100.00	No Ice	6.53	4.91	87.78
			-6.00			1/2" Ice	6.97	5.67	141.88
			0.00			1" Ice	7.40	6.38	202.64
1900MHz 4x45W RRH	A	From Leg	4.00	0.0000	100.00	No Ice	2.32	2.24	59.50
			2.00			1/2" Ice	2.53	2.44	82.62
			0.00			1" Ice	2.74	2.65	108.98
1900MHz 4x45W RRH	B	From Leg	4.00	0.0000	100.00	No Ice	2.32	2.24	59.50
			2.00			1/2" Ice	2.53	2.44	82.62
			0.00			1" Ice	2.74	2.65	108.98
1900MHz 4x45W RRH	C	From Leg	4.00	0.0000	100.00	No Ice	2.32	2.24	59.50
			2.00			1/2" Ice	2.53	2.44	82.62
			0.00			1" Ice	2.74	2.65	108.98
800MHz 2x50W RRH	A	From Leg	4.00	0.0000	100.00	No Ice	2.06	1.93	64.00
			2.00			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
800MHz 2x50W RRH	B	From Leg	4.00	0.0000	100.00	No Ice	2.06	1.93	64.00
			2.00			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
800MHz 2x50W RRH	C	From Leg	4.00	0.0000	100.00	No Ice	2.06	1.93	64.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			2.00			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
Sector Mount [SM 502-3]	C	None		0.0000	100.00	No Ice	33.02	33.02	1673.10
						1/2" Ice	47.36	47.36	2223.90
						1" Ice	61.70	61.70	2774.70
**********									
(2) 7770.00 w/Mount Pipe	A	From Leg	0.00	0.0000	90.00	No Ice	5.66	4.11	30.35
			0.00			1/2" Ice	6.04	4.76	76.38
			0.00			1" Ice	6.44	5.43	128.70
(2) 7770.00 w/Mount Pipe	B	From Leg	0.00	0.0000	90.00	No Ice	5.66	4.11	30.35
			0.00			1/2" Ice	6.04	4.76	76.38
			0.00			1" Ice	6.44	5.43	128.70
(2) 7770.00 w/Mount Pipe	C	From Leg	0.00	0.0000	90.00	No Ice	5.66	4.11	30.35
			0.00			1/2" Ice	6.04	4.76	76.38
			0.00			1" Ice	6.44	5.43	128.70
AM-X-CD-16-65-00T-RET w/Mount Pipe	A	From Leg	0.00	0.0000	90.00	No Ice	8.26	6.30	74.05
			0.00			1/2" Ice	8.82	7.48	139.04
			0.00			1" Ice	9.35	8.37	211.91
P65-17-XLH-RR w/Mount Pipe	B	From Leg	0.00	0.0000	90.00	No Ice	11.70	8.94	102.85
			0.00			1/2" Ice	12.42	10.45	188.61
			0.00			1" Ice	13.15	11.99	284.25
P65-17-XLH-RR w/Mount Pipe	C	From Leg	0.00	0.0000	90.00	No Ice	11.70	8.94	102.85
			0.00			1/2" Ice	12.42	10.45	188.61
			0.00			1" Ice	13.15	11.99	284.25
(2) TT19-08BP111-001	A	From Leg	0.00	0.0000	90.00	No Ice	0.55	0.45	16.00
			0.00			1/2" Ice	0.65	0.53	21.80
			0.00			1" Ice	0.75	0.63	29.22
(2) TT19-08BP111-001	B	From Leg	0.00	0.0000	90.00	No Ice	0.55	0.45	16.00
			0.00			1/2" Ice	0.65	0.53	21.80
			0.00			1" Ice	0.75	0.63	29.22
(2) TT19-08BP111-001	C	From Leg	0.00	0.0000	90.00	No Ice	0.55	0.45	16.00
			0.00			1/2" Ice	0.65	0.53	21.80
			0.00			1" Ice	0.75	0.63	29.22
(2) RRUS-11	A	From Leg	0.00	0.0000	90.00	No Ice	2.78	1.19	50.71
			0.00			1/2" Ice	2.99	1.33	71.49
			0.00			1" Ice	3.21	1.49	95.32
(2) RRUS-11	B	From Leg	0.00	0.0000	90.00	No Ice	2.78	1.19	50.71
			0.00			1/2" Ice	2.99	1.33	71.49
			0.00			1" Ice	3.21	1.49	95.32
(2) RRUS-11	C	From Leg	0.00	0.0000	90.00	No Ice	2.78	1.19	50.71
			0.00			1/2" Ice	2.99	1.33	71.49
			0.00			1" Ice	3.21	1.49	95.32
DC6-48-60-18-8F	C	None		0.0000	90.00	No Ice	0.92	0.92	32.80
						1/2" Ice	1.46	1.46	50.52
						1" Ice	1.64	1.64	70.72
Sector Mount [SM 104-3]	C	None		0.0000	90.00	No Ice	30.02	30.02	952.50
						1/2" Ice	40.48	40.48	1404.60
						1" Ice	50.94	50.94	1856.70
**********									
GPS	C	From Leg	1.00	0.0000	67.00	No Ice	1.00	1.00	10.00
			0.00			1/2" Ice	1.50	1.50	15.00
			0.00			1" Ice	2.00	2.00	20.00
**********									

Force Totals (Does not include forces on guys)

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Torques lb-ft
Leg Weight	1216.82			
Bracing Weight	997.35			
Total Member Self-Weight	2214.17			
Guy Weight	155.17			
Total Weight	7919.05			
Wind 0 deg - No Ice		0.00	-6470.25	510.31
Wind 30 deg - No Ice		3348.96	-5788.49	466.47
Wind 60 deg - No Ice		5990.61	-3451.71	-186.71
Wind 90 deg - No Ice		6837.00	0.00	-678.56
Wind 120 deg - No Ice		5664.97	3263.70	-611.35
Wind 150 deg - No Ice		3160.13	5461.44	-389.56
Wind 180 deg - No Ice		0.00	6446.83	-510.31
Wind 210 deg - No Ice		-3348.96	5788.49	-466.47
Wind 240 deg - No Ice		-6010.90	3463.42	186.71
Wind 270 deg - No Ice		-6837.00	0.00	678.56
Wind 300 deg - No Ice		-5644.69	-3251.99	611.35
Wind 330 deg - No Ice		-3160.13	-5461.44	389.56
Member Ice	6959.68			
Guy Ice	2091.94			
Total Weight Ice	34207.70			
Wind 0 deg - Ice		0.00	-3538.02	232.28
Wind 30 deg - Ice		1791.55	-3103.41	260.23
Wind 60 deg - Ice		3141.35	-1813.86	128.58
Wind 90 deg - Ice		3624.48	0.00	-55.25
Wind 120 deg - Ice		3099.50	1789.70	-134.41
Wind 150 deg - Ice		1764.24	3056.10	-159.82
Wind 180 deg - Ice		0.00	3531.73	-232.28
Wind 210 deg - Ice		-1791.55	3103.41	-260.23
Wind 240 deg - Ice		-3146.80	1817.00	-128.58
Wind 270 deg - Ice		-3624.48	0.00	55.25
Wind 300 deg - Ice		-3094.05	-1786.55	134.41
Wind 330 deg - Ice		-1764.24	-3056.10	159.82
Total Weight	7919.05			
Wind 0 deg - Service		0.00	-2475.60	195.25
Wind 30 deg - Service		1281.35	-2214.75	178.48
Wind 60 deg - Service		2292.08	-1320.67	-71.44
Wind 90 deg - Service		2615.92	0.00	-259.63
Wind 120 deg - Service		2167.49	1248.73	-233.91
Wind 150 deg - Service		1209.11	2089.61	-149.05
Wind 180 deg - Service		0.00	2466.64	-195.25
Wind 210 deg - Service		-1281.35	2214.75	-178.48
Wind 240 deg - Service		-2299.84	1325.15	71.44
Wind 270 deg - Service		-2615.92	0.00	259.63
Wind 300 deg - Service		-2159.73	-1244.25	233.91
Wind 330 deg - Service		-1209.11	-2089.61	149.05

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy
3	1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy
4	1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy
5	1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy
6	1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy
7	1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy
8	1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy
9	1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy
10	1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy
11	1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy
12	1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy
13	1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy
14	1.2 Dead+1.0 Ice+1.0 Temp+Guy
15	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy
16	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy
17	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy
18	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy
19	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy
20	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy
21	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy
22	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy
23	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy
24	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy
25	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy
26	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy
27	Dead+Wind 0 deg - Service+Guy
28	Dead+Wind 30 deg - Service+Guy
29	Dead+Wind 60 deg - Service+Guy
30	Dead+Wind 90 deg - Service+Guy
31	Dead+Wind 120 deg - Service+Guy
32	Dead+Wind 150 deg - Service+Guy
33	Dead+Wind 180 deg - Service+Guy
34	Dead+Wind 210 deg - Service+Guy
35	Dead+Wind 240 deg - Service+Guy
36	Dead+Wind 270 deg - Service+Guy
37	Dead+Wind 300 deg - Service+Guy
38	Dead+Wind 330 deg - Service+Guy

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
T1	104 - 89	Leg	Max Tension	12	13456.80	-832.86	-227.04
			Max. Compression	10	-17908.39	-284.65	427.25
			Max. Mx	5	8766.54	1063.80	-316.07
			Max. My	2	-15467.70	-202.59	-1082.59
			Max. Vy	11	-2854.18	-583.90	-4.08
			Max. Vx	8	3091.61	214.30	474.07
		Diagonal	Max Tension	5	4683.86	0.00	0.00
			Max. Compression	7	-4669.15	0.00	0.00
			Max. Mx	18	1094.56	22.04	0.00
			Max. My	17	-95.83	0.00	-0.03
			Max. Vy	18	-21.17	0.00	0.00
			Max. Vx	17	0.03	0.00	0.00
		Top Girt	Max Tension	8	165.16	0.00	0.00
			Max. Compression	2	-168.51	0.00	0.00
			Max. Mx	23	26.80	18.05	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. My	11	137.69	0.00	-0.00
			Max. Vy	23	-21.13	0.00	0.00
			Max. Vx	11	0.00	0.00	0.00
		Bottom Girt	Max Tension	3	2368.54	0.00	0.00
			Max. Compression	13	-2238.22	0.00	0.00
			Max. Mx	23	20.82	18.05	0.00
			Max. My	11	2354.81	0.00	-0.00
			Max. Vy	23	-21.13	0.00	0.00
			Max. Vx	11	0.00	0.00	0.00
T2	89 - 74	Leg	Max Tension	12	16702.72	1165.82	846.44
			Max. Compression	6	-24068.76	-41.20	0.12
			Max. Mx	5	11433.07	-1436.95	185.90
			Max. My	2	-17796.01	-130.08	1428.31
			Max. Vy	11	-2855.64	1170.25	353.96
			Max. Vx	8	3097.12	162.98	-1427.90
		Diagonal	Max Tension	11	3260.72	0.00	0.00
			Max. Compression	11	-3411.90	0.00	0.00
			Max. Mx	18	869.79	19.59	0.00
			Max. My	17	-243.79	0.00	-0.02
			Max. Vy	18	-18.82	0.00	0.00
			Max. Vx	17	-0.02	0.00	0.00
		Top Girt	Max Tension	10	299.03	0.00	0.00
			Max. Compression	12	-265.77	0.00	0.00
			Max. Mx	23	225.67	16.04	0.00
			Max. My	11	26.82	0.00	-0.00
			Max. Vy	23	-18.78	0.00	0.00
			Max. Vx	11	0.00	0.00	0.00
		Bottom Girt	Max Tension	13	243.43	0.00	0.00
			Max. Compression	11	-98.81	0.00	0.00
			Max. Mx	26	189.70	16.04	0.00
			Max. My	5	-8.02	0.00	-0.00
			Max. Vy	26	-18.78	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Guy A	Bottom Tension	9	8970.64		
			Top Tension	9	8988.54		
			Top Cable Vert	9	6085.93		
			Top Cable Norm	9	6614.77		
			Top Cable Tan	9	3.50		
			Bot Cable Vert	9	-6031.81		
			Bot Cable Norm	9	6639.87		
			Bot Cable Tan	9	42.16		
		Guy B	Bottom Tension	11	8870.66		
			Top Tension	11	8888.57		
			Top Cable Vert	11	5771.06		
			Top Cable Norm	11	6760.29		
			Top Cable Tan	11	2.58		
			Bot Cable Vert	11	-5715.37		
			Bot Cable Norm	11	6783.91		
			Bot Cable Tan	11	41.65		
		Guy C	Bottom Tension	5	10766.57		
			Top Tension	5	10784.36		
			Top Cable Vert	5	8509.87		
			Top Cable Norm	5	6624.50		
			Top Cable Tan	5	23.01		
			Bot Cable Vert	5	-8462.68		
			Bot Cable Norm	5	6655.70		
			Bot Cable Tan	5	61.04		
		Top Guy Pull-Off	Max Tension	4	6478.56	0.00	0.00
			Max. Compression	10	-6284.95	0.00	0.00
			Max. Mx	23	-1751.74	37.35	0.00
			Max. My	11	-34.95	0.00	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Vy	23	43.73	0.00	0.00
			Max. Vx	11	0.00	0.00	0.00
		Torque Arm Top	Max Tension	11	7491.95	0.00	0.00
			Max. Compression	5	-4386.39	0.00	0.00
			Max. Mx	5	-824.41	-27477.83	0.00
			Max. My	11	-4171.08	-18254.48	0.00
			Max. Vy	5	8075.19	-27477.83	0.00
			Max. Vx	11	0.00	-18254.48	0.00
T3	74 - 59	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	19	-17188.01	-2.48	33.13
			Max. Mx	18	-17111.23	538.18	250.36
			Max. My	15	-17035.75	-56.16	-590.68
			Max. Vy	19	-2390.23	264.09	84.36
			Max. Vx	16	2760.79	-62.53	-266.72
		Diagonal	Max Tension	13	1474.26	0.00	0.00
			Max. Compression	7	-1503.22	0.00	0.00
			Max. Mx	18	45.48	19.02	0.00
			Max. My	17	-37.54	0.00	-0.02
			Max. Vy	18	-18.28	0.00	0.00
			Max. Vx	17	0.02	0.00	0.00
		Top Girt	Max Tension	6	559.91	0.00	0.00
			Max. Compression	13	-541.26	0.00	0.00
			Max. Mx	26	101.52	15.58	0.00
			Max. My	5	-403.33	0.00	-0.00
			Max. Vy	26	-18.24	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	19	1464.18	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	20	1444.38	15.58	0.00
			Max. My	16	1432.13	0.00	-0.00
			Max. Vy	20	-18.24	0.00	0.00
			Max. Vx	16	0.00	0.00	0.00
T4	59 - 54	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	19	-18745.89	62.54	-15.91
			Max. Mx	19	-16797.52	-767.79	-47.52
			Max. My	11	-9392.77	-64.88	132.05
			Max. Vy	19	3777.02	-766.77	-49.37
			Max. Vx	12	-161.34	259.52	-27.27
		Horizontal	Max Tension	19	2640.95	232.47	-71.09
			Max. Compression	18	-331.05	24.35	-0.55
			Max. Mx	19	2640.95	232.47	-71.09
			Max. My	18	2601.65	184.62	-85.28
			Max. Vy	11	212.17	147.33	-3.58
			Max. Vx	6	-57.46	106.22	-2.61

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Mast	Max. Vert	18	52306.26	79.52	5.43
	Max. H_x	6	33716.69	277.01	339.68
	Max. H_z	7	29460.69	224.66	529.18
	Max. M_x	1	0.00	-64.57	19.20
	Max. M_z	1	0.00	-64.57	19.20
	Max. Torsion	5	206.54	105.85	158.76
	Min. Vert	35	19020.34	-56.04	10.48

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
	Min. H_x	13	28658.25	-393.27	-483.04
	Min. H_z	13	28658.25	-393.27	-483.04
	Min. M_x	1	0.00	-64.57	19.20
	Min. M_z	1	0.00	-64.57	19.20
	Min. Torsion	11	-343.95	-289.94	-14.10
Guy C @ 29 ft Elev 51 ft Azimuth 240 deg	Max. Vert	10	-207.19	-104.14	60.04
	Max. H_x	10	-207.19	-104.14	60.04
	Max. H_z	3	-16503.38	-11123.95	6523.89
	Min. Vert	5	-16770.00	-11393.50	6475.13
	Min. H_x	5	-16770.00	-11393.50	6475.13
	Min. H_z	10	-207.19	-104.14	60.04
Guy B @ 43 ft Elev 51 ft Azimuth 120 deg	Max. Vert	6	-81.18	61.75	35.72
	Max. H_x	11	-11286.25	11599.97	6628.51
	Max. H_z	11	-11286.25	11599.97	6628.51
	Min. Vert	11	-11286.25	11599.97	6628.51
	Min. H_x	6	-81.18	61.75	35.72
	Min. H_z	6	-81.18	61.75	35.72
Guy A @ 40 ft Elev 51 ft Azimuth 0 deg	Max. Vert	2	-102.74	-0.12	-84.00
	Max. H_x	24	-4513.27	136.89	-5320.53
	Max. H_z	2	-102.74	-0.12	-84.00
	Min. Vert	9	-11933.70	61.36	-13094.58
	Min. H_x	18	-4614.51	-151.34	-5431.10
	Min. H_z	9	-11933.70	61.36	-13094.58

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	19321.55	64.57	-19.20	0.00	0.00	25.09
1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy	32894.21	199.50	446.20	0.00	0.00	197.52
1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy	31839.54	90.22	223.11	0.00	0.00	180.45
1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy	26529.89	66.81	-27.60	0.00	0.00	-66.48
1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy	32611.84	-105.85	-158.76	0.00	0.00	-206.54
1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy	33716.69	-277.01	-339.68	0.00	0.00	-171.32
1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy	29460.69	-224.66	-529.18	0.00	0.00	-81.78
1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy	22768.43	2.33	-404.47	0.00	0.00	-192.86
1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy	27406.50	184.12	-225.78	0.00	0.00	-159.39
1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy	30050.07	212.75	-70.39	0.00	0.00	131.96
1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy	27265.79	289.94	14.10	0.00	0.00	343.95
1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy	22116.10	377.71	223.03	0.00	0.00	292.59
1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy	28658.25	393.27	483.04	0.00	0.00	142.68
1.2 Dead+1.0 Ice+1.0 Temp+Guy	50615.00	-35.79	26.87	0.00	0.00	62.21
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy	51731.92	-4.71	121.18	0.00	0.00	119.42
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy	51979.24	-36.05	75.24	0.00	0.00	127.62
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy	52097.86	-54.34	29.62	0.00	0.00	95.11
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy	52306.26	-79.52	-5.43	0.00	0.00	49.19
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy	52267.54	-106.61	-44.75	0.00	0.00	28.79
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy	51543.53	-101.04	-79.43	0.00	0.00	21.87
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy	50779.31	-63.64	-72.06	0.00	0.00	2.45
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy	50296.13	-39.19	-19.43	0.00	0.00	-8.51

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy	50061.09	-29.67	29.77	0.00	0.00	32.84
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy	50073.93	3.07	58.77	0.00	0.00	86.31
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy	50387.82	39.10	96.26	0.00	0.00	99.06
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy	51032.24	33.03	130.34	0.00	0.00	101.12
Dead+Wind 0 deg - Service+Guy	19424.15	79.87	58.10	0.00	0.00	71.74
Dead+Wind 30 deg - Service+Guy	19567.68	61.43	10.75	0.00	0.00	66.99
Dead+Wind 60 deg - Service+Guy	19653.75	66.58	-24.09	0.00	0.00	7.16
Dead+Wind 90 deg - Service+Guy	19641.71	43.40	-34.96	0.00	0.00	-37.97
Dead+Wind 120 deg - Service+Guy	19545.06	3.31	-68.98	0.00	0.00	-31.05
Dead+Wind 150 deg - Service+Guy	19398.53	3.36	-119.99	0.00	0.00	-9.84
Dead+Wind 180 deg - Service+Guy	19242.31	49.49	-103.55	0.00	0.00	-21.16
Dead+Wind 210 deg - Service+Guy	19104.21	67.39	-49.05	0.00	0.00	-16.51
Dead+Wind 240 deg - Service+Guy	19020.34	56.04	-10.48	0.00	0.00	42.95
Dead+Wind 270 deg - Service+Guy	19028.81	85.38	-3.13	0.00	0.00	87.82
Dead+Wind 300 deg - Service+Guy	19121.20	131.87	33.89	0.00	0.00	80.87
Dead+Wind 330 deg - Service+Guy	19262.55	126.21	81.26	0.00	0.00	60.00

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-7919.06	-0.00	-0.31	7919.03	0.12	0.004%
2	18.51	-9487.65	-10667.45	-18.50	9487.64	10667.31	0.001%
3	5537.76	-9467.03	-9550.91	-5537.74	9467.02	9550.80	0.001%
4	9882.04	-9448.46	-5698.89	-9881.79	9448.46	5699.22	0.003%
5	11269.86	-9466.50	-13.45	-11269.75	9466.49	13.49	0.001%
6	9337.20	-9487.02	5362.94	-9337.06	9487.02	-5362.88	0.001%
7	5201.57	-9471.32	8995.51	-5201.18	9471.31	-8995.31	0.003%
8	-18.51	-9456.05	10629.98	18.68	9456.05	-10629.96	0.001%
9	-5537.75	-9476.68	9550.91	5537.57	9476.67	-9550.79	0.002%
10	-9914.49	-9495.25	5717.62	9914.19	9495.23	-5717.44	0.002%
11	-11269.86	-9477.21	13.45	11269.66	9477.20	-13.33	0.002%
12	-9304.75	-9456.68	-5344.21	9304.96	9456.67	5343.68	0.004%
13	-5201.57	-9472.38	-8995.51	5201.60	9472.37	8995.11	0.003%
14	-0.00	-35760.34	0.00	0.19	35760.34	-0.02	0.001%
15	29.53	-35785.53	-4040.58	-29.54	35785.52	4040.06	0.001%
16	2077.77	-35752.64	-3564.93	-2077.80	35752.64	3564.61	0.001%
17	3615.23	-35723.03	-2094.86	-3614.56	35723.02	2094.93	0.002%
18	4151.96	-35751.80	-21.45	-4151.51	35751.79	21.75	0.002%
19	3535.39	-35784.53	2014.65	-3535.27	35784.53	-2014.59	0.000%
20	1996.13	-35759.50	3466.42	-1995.69	35759.49	-3466.22	0.001%
21	-29.53	-35735.16	4034.30	29.68	35735.16	-4034.24	0.000%
22	-2077.77	-35768.05	3564.93	2077.82	35768.05	-3564.78	0.000%
23	-3620.68	-35797.66	2098.00	3620.44	35797.66	-2097.86	0.001%
24	-4151.96	-35768.89	21.45	4151.81	35768.89	-21.47	0.000%
25	-3529.94	-35736.16	-2011.51	3529.98	35736.15	2010.88	0.002%
26	-1996.13	-35761.19	-3466.42	1996.15	35761.19	3466.10	0.001%
27	4.43	-7922.84	-2550.94	-4.34	7922.84	2550.60	0.004%
28	1324.26	-7917.91	-2283.93	-1324.04	7917.91	2283.62	0.005%
29	2363.12	-7913.47	-1362.79	-2363.05	7913.47	1362.76	0.001%
30	2694.99	-7917.78	-3.22	-2694.92	7917.78	3.21	0.001%
31	2232.83	-7922.69	1282.46	-2232.77	7922.69	-1282.44	0.001%
32	1243.87	-7918.93	2151.12	-1243.60	7918.93	-2150.96	0.004%
33	-4.43	-7915.29	2541.98	4.52	7915.29	-2541.78	0.003%
34	-1324.26	-7920.22	2283.93	1324.16	7920.22	-2283.77	0.002%
35	-2370.88	-7924.65	1367.27	2370.69	7924.65	-1367.15	0.003%
36	-2694.99	-7920.34	3.22	2694.81	7920.34	-3.19	0.002%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
37	-2225.07	-7915.44	-1277.98	2224.96	7915.43	1277.83	0.002%
38	-1243.87	-7919.19	-2151.12	1243.87	7919.19	2150.85	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	7	0.00000001	0.00013313
2	Yes	12	0.00000001	0.00004518
3	Yes	12	0.00000001	0.00003721
4	Yes	10	0.00000001	0.00005902
5	Yes	12	0.00000001	0.00004091
6	Yes	12	0.00000001	0.00004876
7	Yes	11	0.00000001	0.00014445
8	Yes	10	0.00000001	0.00004534
9	Yes	11	0.00000001	0.00007967
10	Yes	11	0.00000001	0.00011374
11	Yes	11	0.00000001	0.00008788
12	Yes	9	0.00000001	0.00013427
13	Yes	11	0.00000001	0.00013553
14	Yes	8	0.00000001	0.00004489
15	Yes	9	0.00000001	0.00010957
16	Yes	9	0.00000001	0.00006825
17	Yes	8	0.00000001	0.00013689
18	Yes	9	0.00000001	0.00011043
19	Yes	10	0.00000001	0.00003193
20	Yes	9	0.00000001	0.00010402
21	Yes	9	0.00000001	0.00003823
22	Yes	8	0.00000001	0.00004217
23	Yes	8	0.00000001	0.00006000
24	Yes	8	0.00000001	0.00003837
25	Yes	8	0.00000001	0.00013149
26	Yes	9	0.00000001	0.00007255
27	Yes	6	0.00000001	0.00013852
28	Yes	6	0.00000001	0.00014544
29	Yes	7	0.00000001	0.00004045
30	Yes	7	0.00000001	0.00004031
31	Yes	7	0.00000001	0.00003854
32	Yes	6	0.00000001	0.00013423
33	Yes	6	0.00000001	0.00009654
34	Yes	6	0.00000001	0.00007460
35	Yes	6	0.00000001	0.00008663
36	Yes	6	0.00000001	0.00007419
37	Yes	6	0.00000001	0.00008342
38	Yes	6	0.00000001	0.00011533

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	104 - 89	0.809	29	0.0906	0.0063

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T2	89 - 74	0.515	29	0.0823	0.0053
T3	74 - 59	0.280	29	0.0690	0.0108
T4	59 - 54	0.072	29	0.0685	0.0116

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
104.00	Lightning Rod 1"x6.5'	29	0.809	0.0906	0.0063	89613
100.00	NNVV-65B-R4 w/Mount Pipe	29	0.727	0.0889	0.0055	89613
90.00	(2) 7770.00 w/Mount Pipe	29	0.533	0.0831	0.0050	33201
86.01	Guy	29	0.463	0.0795	0.0064	31133
67.00	GPS	29	0.183	0.0678	0.0099	134052

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	104 - 89	5.193	6	0.5687	0.0363
T2	89 - 74	3.368	6	0.5336	0.0326
T3	74 - 59	1.817	6	0.4581	0.0491
T4	59 - 54	0.461	6	0.4416	0.0490

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
104.00	Lightning Rod 1"x6.5'	6	5.193	0.5687	0.0363	22009
100.00	NNVV-65B-R4 w/Mount Pipe	6	4.692	0.5631	0.0337	22009
90.00	(2) 7770.00 w/Mount Pipe	6	3.483	0.5377	0.0321	8193
86.01	Guy	6	3.034	0.5190	0.0352	7808
67.00	GPS	6	1.178	0.4454	0.0506	34352

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	104	Leg	A325N	0.7500	4	12.81	29820.60	0.000 ✔	1	Bolt Tension

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load / Allowable	Allowable Ratio	Criteria
		Diagonal	A325N	0.5000	1	4683.86	7952.16	0.589 ✔	1	Bolt Shear
		Top Girt	A325N	0.5000	1	168.51	7952.16	0.021 ✔	1	Bolt Shear
		Bottom Girt	A325N	0.5000	1	2368.54	7952.16	0.298 ✔	1	Bolt Shear
T2	89	Leg	A325N	0.7500	4	3363.90	29820.60	0.113 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	3260.72	4165.56	0.783 ✔	1	Member Bearing
		Top Girt	A325N	0.5000	1	299.02	4165.56	0.072 ✔	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	243.43	4165.56	0.058 ✔	1	Member Bearing
T3	74	Leg	A325N	0.7500	4	1432.33	29820.60	0.048 ✔	1	Bolt Tension
		Diagonal	A325N	0.5000	1	1474.26	4165.56	0.354 ✔	1	Member Bearing
		Top Girt	A325N	0.5000	1	559.91	4165.56	0.134 ✔	1	Member Bearing
		Bottom Girt	A325N	0.5000	1	1464.18	4165.56	0.351 ✔	1	Member Bearing
T4	59	Leg	A325N	0.7500	4	1416.09	29820.60	0.047 ✔	1	Bolt Tension

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T_u lb	Allowable ϕT_n lb	Required S.F.	Actual S.F.
T2	86.01 (A) (126)	1/2 EHS	2690.00	26900.04	8988.54	16140.00	1.000	1.796 ✔
	86.01 (A) (127)	1/2 EHS	2690.00	26900.04	8802.43	16140.00	1.000	1.834 ✔
	86.01 (B) (122)	1/2 EHS	2690.00	26900.04	8671.33	16140.00	1.000	1.861 ✔
	86.01 (B) (123)	1/2 EHS	2690.00	26900.04	8888.57	16140.00	1.000	1.816 ✔
	86.01 (C) (115)	1/2 EHS	2690.00	26900.04	10784.40	16140.00	1.000	1.497 ✔
	86.01 (C) (116)	1/2 EHS	2690.00	26900.04	10597.30	16140.00	1.000	1.523 ✔

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	104 - 89	ROHN 2.5 X-STR	15.00	2.38	61.8 K=2.00	2.2535	-17908.40	76718.10	0.233 [1] ✔
T2	89 - 74	ROHN 2.5 EH	15.00	2.38	30.9 K=1.00	2.2535	-24068.80	94576.40	0.254 [1] ✔
T3	74 - 59	ROHN 2.5 X-STR	15.00	2.38	61.8	2.2535	-17188.00	76718.10	0.224 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T4	59 - 54	ROHN 2.5 X-STR	5.38	1.52	K=2.00 19.8 K=1.00	2.2535	-18745.90	98550.20	0.190 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	104 - 89	ROHN TS1.5x11 GA	4.16	3.87	94.9 K=1.00	0.5202	-4669.15	11316.70	0.413 [1]
T2	89 - 74	ROHN TS1.5x16 GA	4.16	3.87	91.0 K=1.00	0.2627	-3411.90	5969.57	0.572 [1]
T3	74 - 59	ROHN TS1.5x16 GA	4.16	3.87	91.0 K=1.00	0.2627	-1503.22	5969.57	0.252 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T4	59 - 54	L4x4x1/4	2.45	2.21	33.3 K=1.00	1.9400	-331.05	57389.50	0.006 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	104 - 89	ROHN TS1.5x11 GA	3.42	3.18	77.8 K=1.00	0.5202	-168.51	13553.60	0.012 [1]
T2	89 - 74	ROHN TS1.5x16 GA	3.42	3.18	74.7 K=1.00	0.2627	-265.77	7048.75	0.038 [1]
T3	74 - 59	ROHN TS1.5x16 GA	3.42	3.18	74.7 K=1.00	0.2627	-541.26	7048.75	0.077 [1]

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	104 - 89	ROHN TS1.5x11 GA	3.42	3.18	77.8 K=1.00	0.5202	-2238.22	13553.60	0.165 [1] ✔
T2	89 - 74	ROHN TS1.5x16 GA	3.42	3.18	74.7 K=1.00	0.2627	-98.81	7048.75	0.014 [1] ✔

[1] P_u / ϕP_n controls

Top Guy Pull-Off Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	89 - 74	2L2x2x1/4x3/8 2L 'a' > 18.3674 in - 120	3.42	3.18	99.8 K=1.00	1.8750	-6284.95	35965.00	0.175 [1]

[1] P_u / ϕP_n controls

Top Guy Pull-Off Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T2	89 - 74	2L2x2x1/4x3/8	0.00	1999.17	0.000	0.00	3394.58	0.000

Top Guy Pull-Off Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	89 - 74	2L2x2x1/4x3/8	0.175	0.000	0.000	0.175 [1] ✔	1.000	4.8.1 ✔

[1] P_u / ϕP_n controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	89 - 74 (117)	C10x15.3	3.42	3.30	55.5 K=1.00	4.4900	-824.41	123708.00	0.007
T2	89 - 74 (118)	C10x15.3	3.42	3.30	55.5 K=1.00	4.4900	-497.52	123708.00	0.004
T2	89 - 74 (124)	C10x15.3	3.42	3.30	55.5 K=1.00	4.4900	-4171.25	123708.00	0.034
T2	89 - 74 (125)	C10x15.3	3.42	3.30	55.5 K=1.00	4.4900	-4386.17	123708.00	0.035
T2	89 - 74 (128)	C10x15.3	3.42	3.30	55.5 K=1.00	4.4900	-604.33	123708.00	0.005
T2	89 - 74 (129)	C10x15.3	3.42	3.30	55.5 K=1.00	4.4900	-578.49	123708.00	0.005

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T2	89 - 74 (117)	C10x15.3	-27477.83	36450.00	0.754	0.00	6345.00	0.000
T2	89 - 74 (118)	C10x15.3	-19946.83	36450.00	0.547	0.00	6345.00	0.000
T2	89 - 74 (124)	C10x15.3	-18254.50	36450.00	0.501	0.00	6345.00	0.000
T2	89 - 74 (125)	C10x15.3	-26808.00	36450.00	0.735	-0.00	6345.00	0.000
T2	89 - 74 (128)	C10x15.3	-19032.58	36450.00	0.522	-0.00	6345.00	0.000
T2	89 - 74 (129)	C10x15.3	-19885.75	36450.00	0.546	0.00	6345.00	0.000

Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	89 - 74 (117)	C10x15.3	0.007	0.754	0.000	0.757 ✔	1.000	4.8.1 ✔
T2	89 - 74 (118)	C10x15.3	0.004	0.547	0.000	0.549 ✔	1.000	4.8.1 ✔
T2	89 - 74 (124)	C10x15.3	0.034	0.501	0.000	0.518 ✔	1.000	4.8.1 ✔
T2	89 - 74 (125)	C10x15.3	0.035	0.735	0.000	0.753 ✔	1.000	4.8.1 ✔
T2	89 - 74 (128)	C10x15.3	0.005	0.522	0.000	0.525 ✔	1.000	4.8.1 ✔
T2	89 - 74 (129)	C10x15.3	0.005	0.546	0.000	0.548 ✔	1.000	4.8.1 ✔

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	104 - 89	ROHN 2.5 X-STR	15.00	2.38	30.9	2.2535	13456.80	101409.00	0.133 [1] ✓
T2	89 - 74	ROHN 2.5 EH	15.00	2.38	30.9	2.2535	16702.70	101409.00	0.165 [1] ✓

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	104 - 89	ROHN TS1.5x11 GA	4.16	3.87	94.9	0.5202	4683.86	19665.40	0.238 [1] ✓
T2	89 - 74	ROHN TS1.5x16 GA	4.16	3.87	91.0	0.2627	3260.72	9931.96	0.328 [1] ✓
T3	74 - 59	ROHN TS1.5x16 GA	4.16	3.87	91.0	0.2627	1474.26	9931.96	0.148 [1] ✓

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T4	59 - 54	L4x4x1/4	3.19	2.95	28.3	1.9400	2640.95	62856.00	0.042 [1] ✓

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	104 - 89	ROHN TS1.5x11 GA	3.42	3.18	77.8	0.5202	165.16	19665.40	0.008 [1] ✓
T2	89 - 74	ROHN TS1.5x16 GA	3.42	3.18	74.7	0.2627	299.02	9931.96	0.030 [1] ✓
T3	74 - 59	ROHN TS1.5x16 GA	3.42	3.18	74.7	0.2627	559.91	9931.96	0.056 [1] ✓

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T1	104 - 89	ROHN TS1.5x11 GA	3.42	3.18	77.8	0.5202	2368.54	19665.40	0.120 [1] ✔
T2	89 - 74	ROHN TS1.5x16 GA	3.42	3.18	74.7	0.2627	243.43	9931.96	0.025 [1] ✔
T3	74 - 59	ROHN TS1.5x16 GA	3.42	3.18	74.7	0.2627	1464.18	9931.96	0.147 [1] ✔

[1] P_u / ϕP_n controls

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T2	89 - 74	2L2x2x1/4x3/8 2L 'a' > 18.3674 in - 120	3.42	3.18	62.6	1.8750	6478.56	60750.00	0.107 [1]

[1] P_u / ϕP_n controls

Top Guy Pull-Off Bending Design Data

Section No.	Elevation	Size	M_{ux}	ϕM_{nx}	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy}	ϕM_{ny}	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	ft		lb-ft	lb-ft		lb-ft	lb-ft	
T2	89 - 74	2L2x2x1/4x3/8	0.00	1999.17	0.000	0.00	3394.58	0.000

Top Guy Pull-Off Interaction Design Data

Section No.	Elevation	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	ft							
T2	89 - 74	2L2x2x1/4x3/8	0.107	0.000	0.000	0.107 [1] ✔	1.000	4.8.1 ✔

[1] P_u / ϕP_n controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	89 - 74 (117)	C10x15.3	3.42	3.30	55.5	4.4900	2434.53	145476.00	0.017
T2	89 - 74 (118)	C10x15.3	3.42	3.30	55.5	4.4900	2676.24	145476.00	0.018
T2	89 - 74 (124)	C10x15.3	3.42	3.30	55.5	4.4900	2654.57	145476.00	0.018
T2	89 - 74 (125)	C10x15.3	3.42	3.30	55.5	4.4900	2477.06	145476.00	0.017
T2	89 - 74 (128)	C10x15.3	3.42	3.30	55.5	4.4900	2784.40	145476.00	0.019
T2	89 - 74 (129)	C10x15.3	3.42	3.30	55.5	4.4900	2843.12	145476.00	0.020

Torque-Arm Top Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T2	89 - 74 (117)	C10x15.3	-23606.92	36450.00	0.648	0.00	6345.00	0.000
T2	89 - 74 (118)	C10x15.3	-18375.50	36450.00	0.504	0.00	6345.00	0.000
T2	89 - 74 (124)	C10x15.3	-17020.00	36450.00	0.467	-0.00	6345.00	0.000
T2	89 - 74 (125)	C10x15.3	-23572.92	36450.00	0.647	0.00	6345.00	0.000
T2	89 - 74 (128)	C10x15.3	-17293.50	36450.00	0.474	-0.00	6345.00	0.000
T2	89 - 74 (129)	C10x15.3	-18257.08	36450.00	0.501	-0.00	6345.00	0.000

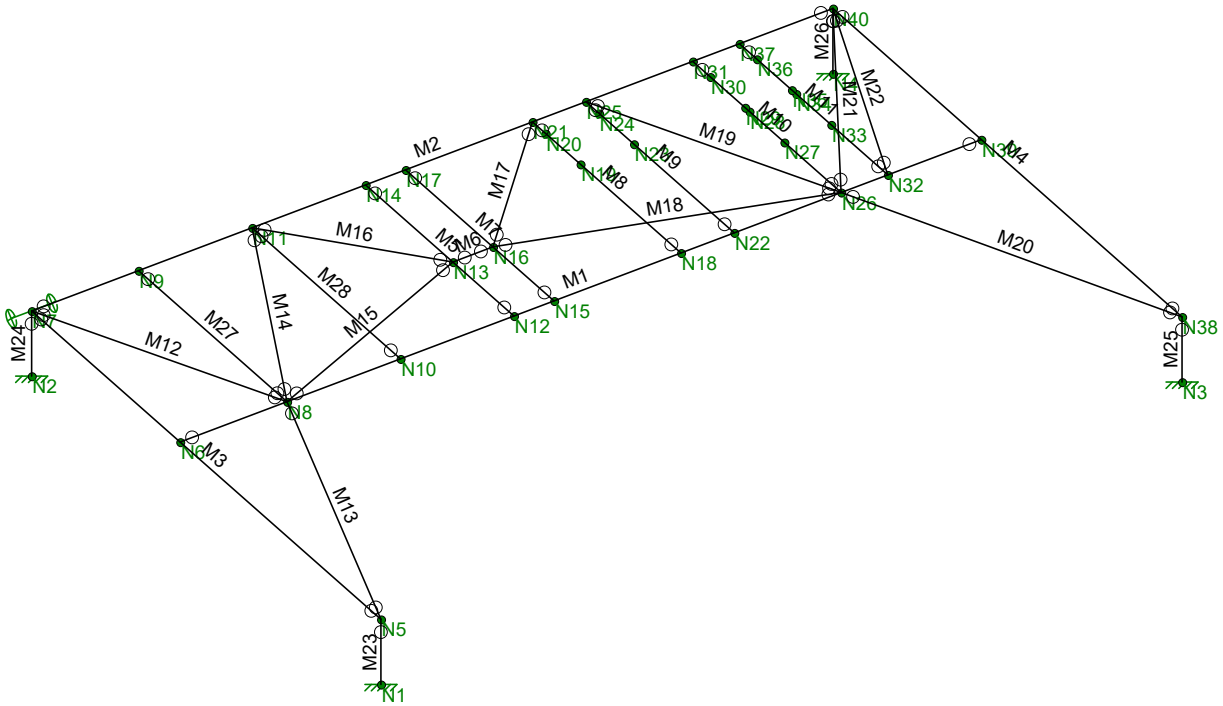
Torque-Arm Top Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	89 - 74 (117)	C10x15.3	0.017	0.648	0.000	0.656 ✔	1.000	4.8.1 ✔
T2	89 - 74 (118)	C10x15.3	0.018	0.504	0.000	0.513 ✔	1.000	4.8.1 ✔
T2	89 - 74 (124)	C10x15.3	0.018	0.467	0.000	0.476 ✔	1.000	4.8.1 ✔
T2	89 - 74 (125)	C10x15.3	0.017	0.647	0.000	0.655 ✔	1.000	4.8.1 ✔
T2	89 - 74 (128)	C10x15.3	0.019	0.474	0.000	0.484 ✔	1.000	4.8.1 ✔
T2	89 - 74 (129)	C10x15.3	0.020	0.501	0.000	0.511 ✔	1.000	4.8.1 ✔

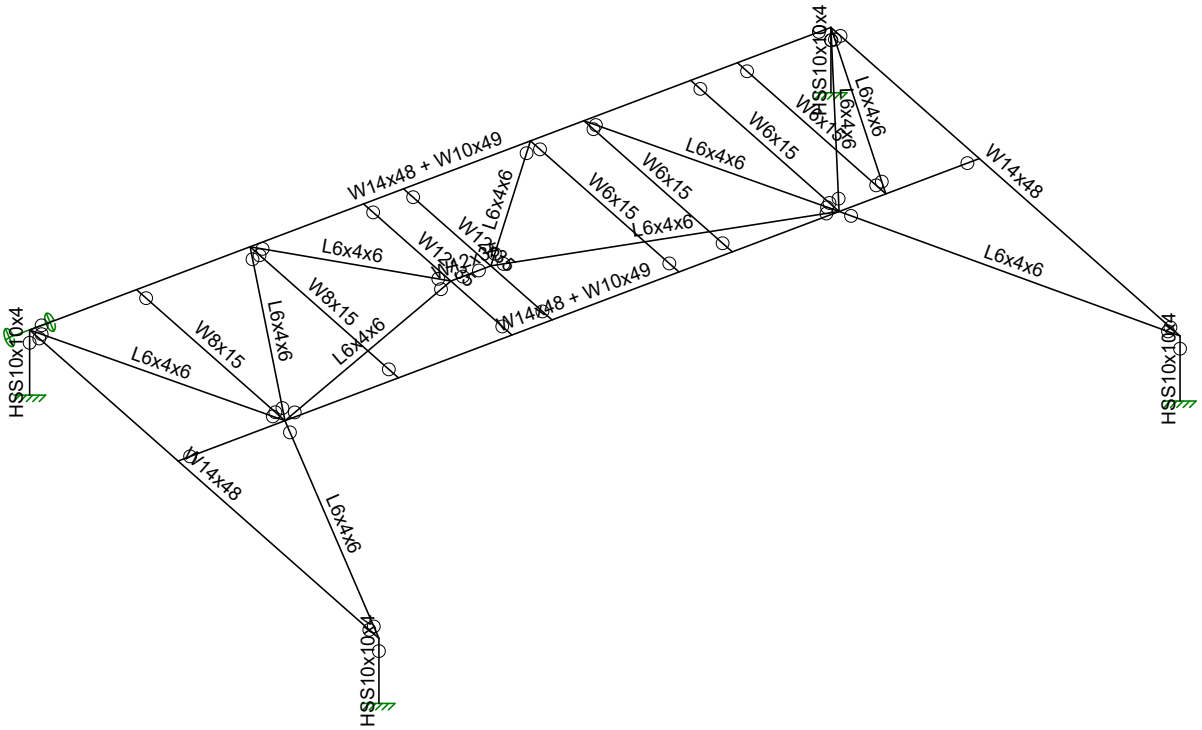
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	104 - 89	Leg	ROHN 2.5 X-STR	1	-17908.40	76718.10	23.3	Pass
		Diagonal	ROHN TS1.5x11 GA	11	-4669.15	11316.70	41.3	Pass
		Top Girt	ROHN TS1.5x11 GA	5	-168.51	13553.60	1.2	Pass
		Bottom Girt	ROHN TS1.5x11 GA	8	-2238.22	13553.60	16.5	Pass
T2	89 - 74	Leg	ROHN 2.5 EH	29	-24068.80	94576.40	25.4	Pass
		Diagonal	ROHN TS1.5x16 GA	67	-3411.90	5969.57	57.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Top Girt	ROHN TS1.5x16 GA	33	-265.77	7048.75	3.8	Pass
		Bottom Girt	ROHN TS1.5x16 GA	34	243.43	9931.96	2.5	Pass
		Guy A@86.0069	1/2	126	8988.54	16140.00	55.7	Pass
		Guy B@86.0069	1/2	123	8888.57	16140.00	55.1	Pass
		Guy C@86.0069	1/2	115	10784.40	16140.00	66.8	Pass
		Top Guy Pull-Off@86.0069	2L2x2x1/4x3/8	120	-6284.95	35965.00	17.5	Pass
		Torque Arm Top@86.0069	C10x15.3	117	2434.53	145476.00	75.7	Pass
T3	74 - 59	Leg	ROHN 2.5 X-STR	74	-17188.00	76718.10	22.4	Pass
		Diagonal	ROHN TS1.5x16 GA	98	-1503.22	5969.57	25.2	Pass
		Top Girt	ROHN TS1.5x16 GA	77	-541.26	7048.75	7.7	Pass
		Bottom Girt	ROHN TS1.5x16 GA	81	1464.18	9931.96	14.7	Pass
T4	59 - 54	Leg	ROHN 2.5 X-STR	101	-18745.90	98550.20	19.0	Pass
		Horizontal	L4x4x1/4	103	2640.95	62856.00	4.2	Pass
							Summary	
						Leg (T2)	25.4	Pass
						Diagonal (T2)	57.2	Pass
						Horizontal (T4)	4.2	Pass
						Top Girt (T3)	7.7	Pass
						Bottom Girt (T1)	16.5	Pass
						Guy A (T2)	55.7	Pass
						Guy B (T2)	55.1	Pass
						Guy C (T2)	66.8	Pass
						Top Guy Pull-Off (T2)	17.5	Pass
						Torque Arm Top (T2)	75.7	Pass
						Bolt Checks	78.3	Pass
						RATING =	**78.3**	**Pass**



Ramaker & Associates, Inc.	West Hartford Bishops (CT03XC074)	SK - 1
TEM		Apr 5, 2018 at 4:39 PM
22995		22995 Modified rev4.r3d



Ramaker & Associates, Inc.	West Hartford Bishops (CT03XC074)	SK - 2
TEM		Apr 5, 2018 at 4:39 PM
22995		22995 Modified rev4.r3d

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[lb/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	490.0003	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	490.0003	50	1.1	65	1.1
3	A992	29000	11154	.3	.65	490.0003	50	1.1	65	1.1
4	A500 Gr.42	29000	11154	.3	.65	490.0003	42	1.4	58	1.3
5	A500 Gr.46	29000	11154	.3	.65	490.0003	46	1.4	58	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	HR1	W14x48	Beam	Wide Flange	A36 Gr.36	Typical	14.1	51.4	484	1.45
2	HR2	W12x35	Beam	Wide Flange	A36 Gr.36	Typical	10.3	24.5	285	.741
3	HR3	W6x15	Beam	Wide Flange	A36 Gr.36	Typical	4.43	9.32	29.1	.101
4	HR4	L3x3x6	VBrace	Single Angle	A36 Gr.36	Typical	2.11	1.75	1.75	.101
5	HR5	L6x4x6	HBrace	Single Angle	A36 Gr.36	Typical	3.61	4.86	13.4	.177
6	HR6	HSS10x10x4	Column	SquareTube	A36 Gr.36	Typical	8.96	141	141	220
7	HR7	W8x15	Column	SquareTube	A36 Gr.36	Typical	4.44	3.41	48	.137
8	HR8	W8x15	Column	SquareTube	A36 Gr.36	Typical	4.44	3.41	48	.137
9	HR9	W14x48 + W10...	Beam	Wide Flange	A36 Gr.36	Typical	28.5	144.8	1763.32	2.85

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N6	N39			HR9	Beam	Wide Flange	A36 Gr.36	Typical
2	M2	N7	N40			HR9	Beam	Wide Flange	A36 Gr.36	Typical
3	M3	N5	N7			HR1	Beam	Wide Flange	A36 Gr.36	Typical
4	M4	N40	N38			HR1	Beam	Wide Flange	A36 Gr.36	Typical
5	M5	N12	N14			HR2	Beam	Wide Flange	A36 Gr.36	Typical
6	M6	N13	N16			HR2	Beam	Wide Flange	A36 Gr.36	Typical
7	M7	N15	N17			HR2	Beam	Wide Flange	A36 Gr.36	Typical
8	M8	N21	N18			HR3	Beam	Wide Flange	A36 Gr.36	Typical
9	M9	N22	N25			HR3	Beam	Wide Flange	A36 Gr.36	Typical
10	M10	N31	N26			HR3	Beam	Wide Flange	A36 Gr.36	Typical
11	M11	N37	N32			HR3	Beam	Wide Flange	A36 Gr.36	Typical
12	M12	N8	N7			HR5	HBrace	Single Angle	A36 Gr.36	Typical
13	M13	N5	N8			HR5	HBrace	Single Angle	A36 Gr.36	Typical
14	M14	N8	N11			HR5	HBrace	Single Angle	A36 Gr.36	Typical
15	M15	N8	N13			HR5	HBrace	Single Angle	A36 Gr.36	Typical
16	M16	N11	N13			HR5	HBrace	Single Angle	A36 Gr.36	Typical
17	M17	N16	N21			HR5	HBrace	Single Angle	A36 Gr.36	Typical
18	M18	N16	N26			HR5	HBrace	Single Angle	A36 Gr.36	Typical
19	M19	N25	N26			HR5	HBrace	Single Angle	A36 Gr.36	Typical
20	M20	N26	N38			HR5	HBrace	Single Angle	A36 Gr.36	Typical
21	M21	N26	N40			HR5	HBrace	Single Angle	A36 Gr.36	Typical
22	M22	N32	N40			HR5	HBrace	Single Angle	A36 Gr.36	Typical
23	M23	N1	N5			HR6	Column	SquareTube	A36 Gr.36	Typical
24	M24	N2	N7			HR6	Column	SquareTube	A36 Gr.36	Typical
25	M25	N3	N38			HR6	Column	SquareTube	A36 Gr.36	Typical
26	M26	N4	N40			HR6	Column	SquareTube	A36 Gr.36	Typical
27	M27	N8	N9			HR7	Column	SquareTube	A36 Gr.36	Typical
28	M28	N10	N11			HR7	Column	SquareTube	A36 Gr.36	Typical

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Tower - With Wind	DL					2			
2	Equipment	DL					2		2	
3	Self Weight	DL		-1					2	
4	Live	LL							2	
5	Tower - No Wind	None					2			
6	BLC 2 Transient Area Loads	None						4		
7	BLC 3 Transient Area Loads	None						4		
8	BLC 4 Transient Area Loads	None						4		

Load Combinations

	Description	Solve	PDe...	SR...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	Strength	Yes	Y		DL	1.2	LL	1.6																
2	D + L		Y		DL	1	LL	1																
3	*******		Y																					
4	No Wind		Y		5	1.2	2	1	3	1														

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [lb-ft]	MY [lb-ft]	MZ [lb-ft]
1	1	N7	0	0	0	0	0	-18.683
2	1	N1	.178	9.492	.062	155.895	0	-445.202
3	1	N2	.178	27.998	-.022	-54.637	0	-445.806
4	1	N4	.136	30.393	.01	24.869	0	-341.99
5	1	N3	.131	9.459	-.05	-126.182	0	-327.429
6	1	Totals:	.623	77.342	0			
7	1	COG (ft):	X: 15.098	Y: -.006	Z: 15.458			

Member AISC 14th(360-10): LRFD Steel Code Checks (By Combination)

	LC	Member	Shape	UC Max	Loc[ft]	Shear ...	Loc[ft]	Dir	phi*Pnc[k]	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
1	1	M1	W14x48 + W10x49	.550	13.75	.131	0	y	252.408	923.4	125107..	451434..	1.006	H1-1b
2	1	M2	W14x48 + W10x49	.413	14.063	.108	30	y	252.408	923.4	125107..	451434..	1.089	H1-1b
3	1	M3	W14x48	.486	11.458	.122	20	y	198.842	456.84	52920	211680	1.67	H1-1b
4	1	M4	W14x48	.484	8.542	.130	0	y	198.842	456.84	52920	211680	1.63	H1-1b
5	1	M5	W12x35	.391	3.542	.194	0	y	265.082	333.72	31050	138240	1.662	H1-1b
6	1	M6	W12x35	.150	.75	.324	0	y	331.336	333.72	31050	138240	1.316	H1-1b
7	1	M7	W12x35	.391	3.542	.195	0	y	265.082	333.72	31050	138240	1.662	H1-1b
8	1	M8	W6x15	.006	4.25	.004	0	y	110.633	143.532	12535....	28709....	1.166	H1-1b
9	1	M9	W6x15	.084	3.984	.042	0	y	110.633	143.532	12535....	28709....	1.126	H1-1b
10	1	M10	W6x15	.180	3.542	.090	0	y	110.633	143.532	12535....	28709....	1.028	H1-1b
11	1	M11	W6x15	.172	3.453	.086	0	y	110.633	143.532	12535....	28709....	1.03	H1-1b
12	1	M12	L6x4x6	.028	4.697	.002	9.394	y	47.635	116.964	4974.1...	11445....	1.136	H2-1
13	1	M13	L6x4x6	.052	6.088	.002	12.176	y	28.915	116.964	4974.1...	10599....	1.136	H2-1
14	1	M14	L6x4x6	.033	4.752	.006	9.503	y	46.746	116.964	4974.1...	11411....	1.136	H2-1
15	1	M15	L6x4x6	.030	4.596	.007	9.192	y	49.294	116.964	4974.1...	11510....	1.136	H2-1
16	1	M16	L6x4x6	.015	3.281	.013	6.562	y	71.961	116.964	4974.1...	12384....	1.136	H2-1
17	1	M17	L6x4x6	.016	3.448	.014	6.897	y	69.064	116.964	4974.1...	12269....	1.136	H2-1
18	1	M18	L6x4x6	.046	5.653	.006	0	y	33.539	116.964	4974.1...	10856....	1.136	H2-1
19	1	M19	L6x4x6	.032	4.697	.006	0	y	47.635	116.964	4974.1...	11445....	1.136	H2-1
20	1	M20	L6x4x6	.054	6.321	.002	0	y	26.823	116.964	4974.1...	10463....	1.136	H2-1
21	1	M21	L6x4x6	.031	4.995	.002	0	y	42.863	116.964	4974.1...	11258....	1.136	H2-1
22	1	M22	L6x4x6	.026	4.596	.002	0	y	49.294	116.964	4974.1...	11510....	1.136	H2-1
23	1	M23	HSS10x10x4	.033	0	.002	0	y	288.398	290.304	75970....	75970....	1.667	H1-1b*

Member AISC 14th(360-10): LRFD Steel Code Checks (By Combination) (Continued)

	LC	Member	Shape	UC Max	Loc[ft]	Shear ...	Loc[ft]	Dir	phi*Pnc[k]	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
24	1	M24	HSS10x10x4	.097	0	.002	0	y	288.398	290.304	75970....	75970....	1.667	H1-1b*
25	1	M25	HSS10x10x4	.033	0	.002	0	y	288.398	290.304	75970....	75970....	1.667	H1-1b*
26	1	M26	HSS10x10x4	.105	0	.002	0	y	288.398	290.304	75970....	75970....	1.667	H1-1b*
27	1	M27	W8x15	.005	4.25	.004	8.5	y	70.503	143.856	7209	33105....	1.136	H1-1b
28	1	M28	W8x15	.005	4.25	.004	8.5	y	70.503	143.856	7209	33105....	1.136	H1-1b

STEEL MEMBER REINFORCEMENT ANALYSIS

Existing Member Reinforced with New I-shaped Member at Bottom

Per AISC 13th Edition Manual (LRFD)

Project Name:	West Hartford Bishops (CT03XC074)	Client:	Sprint		
Project No.:	22995	Prep. By:	TEM	Date:	4/5/2018

Input Data:

Member and I-Beam Reinf. Sizes:

Exist. Member =	W14x48
I-Beam Reinf. =	W10x49

Member Loadings:

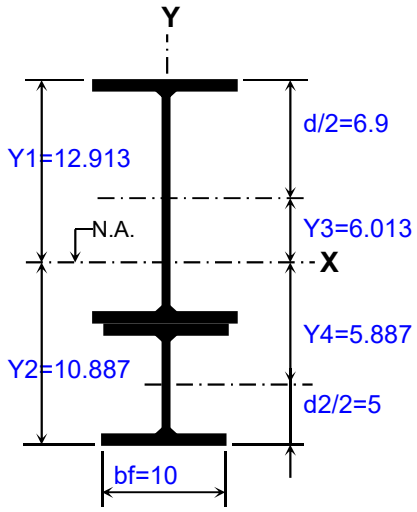
P(axial) =	0.00	kips
Mx(total) =	235.82	ft-kips
Mx(cutoff) =	211.68	ft-kips
Mx(residual) =	101.89	ft-kips
My =	0.09	ft-kips
Rv(shear) =	20.56	kips

Design Parameters:

Fy (mem./I-bm.) =	36.00	ksi
Kx =	1.00	
Ky =	1.00	
Kz =	1.00	
Lx =	4.750	ft.
Ly =	4.750	ft.
Lb =	4.750	ft.
Cb =	1.00	
Full Lgth. Reinf.?	Yes	

Exist. W14x48 Properties:

A =	14.10	in.^2
d =	13.800	in.
tw =	0.340	in.
bf =	8.030	in.
tf =	0.595	in.
k =	1.190	in.
Ix =	484.0	in.^4
Sx =	70.2	in.^3
rx =	5.85	in.
Zx =	78.4	in.^3
Iy =	51.40	in.^4
Sy =	12.80	in.^3
ry =	1.910	in.
Zy =	19.6	in.^3
J =	1.450	in.^4
Cw =	2240.0	in.^6



New W10x49 Properties:

A2 =	14.40	in.^2
d2 =	10.000	in.
tw2 =	0.340	in.
bf2 =	10.000	in.
tf2 =	0.560	in.
k2 =	1.060	in.
Ix2 =	272.00	in.^4

W10x49 Properties (Cont'd):

Iy2 =	93.40	in.^4
Zy2 =	28.30	in.^3
J2 =	1.39	in.^4

Section Ratios & Parameters:

bf/(2*tf) =	6.75
h/tw =	63.38

Results:

Combined Section Properties:

Y1 =	12.913	in.	Y1 = d+d2-Y2
Y2 =	10.887	in.	Y2 = (A*(d2+d/2)+(A2*d2/2))/(A+A2)
Y3 =	6.013	in.	Y3 = Y1-d/2
Y4 =	5.887	in.	Y4 = Y2-d2/2
Ac =	28.50	in.^2	Ac = A+A2
rtc =	2.040	in.	rtc = SQRT((tf*bf^3/12+(Y1-tf)/3*tw^3/12)/(bf*tf+(Y1-tf)/3*tw))
Ixc =	1764.86	in.^4	Ixc = Ix1+Ix2+A1*Y3^2+A2*Y4^2
Sxc(top/mem) =	136.68	in.^3	Sxc(top/mem) = Ixc/Y1 (ref. to top/upper flange of exist. member)
Sxc(bot/mem) =	1988.87	in^3	Sxc(bot/mem) = Ixc/ABS(Y2-d2) (ref. to bot/lower flg. of exist. member)
Sxc(bot/pl) =	162.10	in.^3	Sxc(bot/bm) = Ixc/Y2 (referenced to bottom of reinforcing beam)
rxc =	7.869	in.	rxc = SQRT(Ixc/Ac)

(continued)

Combined Section Properties (continued):

Zxc =	309.50	in.^3	P.N.A. is Below Bottom Flange of Existing Beam
Iyc =	144.80	in.^4	Iyc = Iy+Iy2
Syc(top/mem) =	36.06	in.^3	Syc(top/mem) = Iyc/(bf/2) (referenced to tip of top flange of member)
Syc(bot/mem) =	36.06	in.^3	Syc(bot/mem) = Iyc/(bf/2) (referenced to tip of bot. flange of member)
Syc(bot/bm) =	28.96	in.^3	Syc(bot/bm) = Iyc/(bfwt/2) (referenced to tip of flange of reinf. bm)
ryc =	2.254	in.	ryc = SQRT(Iyc/Ac)
Zyc =	47.9	in.^3	Zyc = Zy (I-shape) + Zy (bm)
J =	2.840	in.^4	J = ∑ of J for Each Shape (conservative)
Cwc =	8931.6	in.^6	Cwc ≈ h'^2*Ic*It/(Ic+It)

Check Stresses:

For Axial Compression: (for combined section)

KL/rx =	7.24		KL/rx = Kx*Lx*12/rxc (use rxc for combined section)
KL/ry =	25.29		KL/ry = Ky*Ly*12/ryc (use ryc for combined section)
KL/r =	25.29		KL/r = Max. of: Kx*Lx*12/rxc or Ky*Ly*12/ryc
Fe =	N.A.		
fa =	0.00	ksi	fa = P/Ac (use Ac for combined section)
Fa =	29.89	ksi	Governing Equation is (Eqn. E7-2)
Pa =	851.90	kips	Pa = Fa*Ac (use Ac for combined section)
S.R. =	0.000		S.R = fa/Fa

For X-axis Bending: (for combined section)

Lp =	5.31	ft.	(Eqn. F2-5, max. value of Lb for Fbx = 0.6*SF*Fy)
Lr =	21.99	ft.	(Eqn. F4-8, max. value of Lb for inelastic LTB)
rtc =	7.87		rxc = SQRT(Ixc/Ac)
fbx(residual) =	17.42	ksi	fbx = Mx(residual)*12/Sx
fbx(add. top) =	11.76	ksi	fbx = {Mx(total) - Mx(residual)}*12/Sxc(top/mem)
fbx(add. bot) =	0.81	ksi	fbx = {Mx(total) - Mx(residual)}*12/Sxc(bot/mem)
fbx(top/mem) =	29.18	ksi	fbx(top/mem) = fbx(residual)+fbx(added, top/mem)
fbx(bot/mem) =	18.23	ksi	fbx(bot/mem) = fbx(residual)+fbx(added, bot/mem)
fbx(bot/bm) =	9.91	ksi	fbx = {Mx(total) - Mx(residual)}*12/Sxc(bot/bm)
Fbx(residual) =	36.18	ksi	Governing Equation is (Eqn. F2-1)
Fbx(top/mem) =	51.84	ksi	Governing Equation is (Eqn. F4-1)
Fbx(bot/mem) =	51.84	ksi	Governing Equation is (Eqn. F4-1)
Fbx(bot/bm) =	51.84	ksi	Governing Equation is (Eqn. F4-1)
Mrx =	590.44	ft-kips	Mrx=Min. of: Sxc(top/mem)*Fbx(top)/12, Sxc(top)*Fbx(bot/mem)/12, Sxc(bot/WT)*Fbx(bot/bm)/12
S.R. (top/mem) =	0.708		S.R = fbx(residual)/Fbx(residual) + fbx(added,top)/Fbx(top)
S.R. (bot/mem) =	0.497		S.R = fbx(residual)/Fbx(residual) + fbx(added,bot)/Fbx(bot)
S.R. (bot/bm) =	0.191		S.R = fbx(bot/bm)/Fbx(bot/bm)

For Y-axis Bending: (for combined section)

fby(top/mem) =	0.03	ksi	fby(top/mem) = My*12/Syc(top/mem)
fby(bot/mem) =	0.03	ksi	fby(bot/mem) = My*12/Syc(bot/mem)
fby(bot/bm) =	0.04	ksi	fby(bot/bm) = My*12/Syc(bot/bm)
Fby =	43.03	ksi	Governing Equation is (Eqn. F6-1)
Mry =	103.85	ft-kips	Mry=Min. of: Syc(top/mem)*Fby/12, Syc(bot/mem)*Fby/12, Syc(bot/bm)*Fby/12
S.R. (top/mem) =	0.001		S.R = fby(top/mem)/Fby
S.R. (bot/mem) =	0.001		S.R = fby(bot/mem)/Fby
S.R. (bot/bm) =	0.001		S.R = fby(bot/bm)/Fby

(continued)

Combined Stress Ratios:

S.R.(top/mem) =	0.709	Eqn. H1-1b	S.R. = 0.5*fa/Fa + (fbx/Fbx+fby/Fby)	S.R.(top/mem) <= 1.0, O.K.
S.R.(bot/mem) =	0.498	Eqn. H1-1b	S.R. = 0.5*fa/Fa + (fbx/Fbx+fby/Fby)	S.R.(top/mem) <= 1.0, O.K.
S.R.(bot/WT) =	0.192	Eqn. H1-1b	S.R. = 0.5*fa/Fa + (fbx/Fbx+fby/Fby)	S.R.(top/mem) <= 1.0, O.K.

Weld Design:

Interior Welds of I-Beam Reinf. to Exist. Member:

Fw =	0.494	kips/in.	Fw = Rv*A2*Y4/(2*Ixc) (weld force per inch)
ω(min) =	1/4	in.	ω(min) = Min. fillet weld size from AISC Table J2.4, page 16.1-96
ω(max,eff) =	0.3620	in.	ω(max eff) = Min. of: (tf1 or tf2)*(0.40*Fy/((SQRT(2)/2)*0.60*0.75*70))
ω(use) =	1/4	in.	ω(use) = ω(min) <= 5/16"
Lw(min) =	1.500	in./ft.	Lw(min) = Max. of: 1.5" or 4*ω(min)
Lw(use) =	1.500	in./ft.	Lw(use) = Max. of: (Fw*12)/(ω*SQRT(2)/2*0.60*0.75*70) or Lw(min)

Note: ω = ω (use)

Use: 1/4" Fillet Weld, 1.5" @ 12" Each Side of Beam Reinf.

End Welds of I-Beam Reinf. to Exist. Member:

For Case #1: Weld Across End of Beam Reinf.

Fw(total) =	122.02	kips	Fw(total) = M(cutoff)*12*A2*Y4/Ixc
Lw(end) =	8.030	in.	Lw(end) = Min. of: bf1 or bf2
a'(min) =	15.000	in.	a'(min) = 1.5*bf2, for weld size < 0.75*tf2
a'(req'd) =	6.941	in.	a'(req'd) = (Fw(total)/(ω*SQRT(2)/2*0.60*0.75*70)-Lw(end))/2
a'(use) =	15.000	in.	a'(use) = Max. of: a'(min) or a'(req'd)
Lw(total) =	38.030	in.	Lw(total) = 2*a'(use)+Lw(end) (@ each end of beam reinf.)

Note: ω = ω (use)

Use: 1/4" Fillet Weld, 15" Continuous Each Side of Beam Reinf. and Across End

For Case #2: No Weld Across End of Beam Reinf.

Fw(total) =	122.02	kips	Fw(total) = M(cutoff)*12*A2*Y4/Ixc
Lw(end) =	0.000	in.	Lw(end) = 0 (assumed)
a'(min) =	20.000	in.	a'(min) = 2*bf2, for no weld across end of beam reinf.
a'(req'd) =	10.956	in.	a'(req'd) = (Fw(total)/(ω*SQRT(2)/2*0.60*0.75*70))/2
a'(use) =	20.000	in.	a'(use) = Max. of: a'(min) or a'(req'd)
Lw(total) =	40.000	in.	Lw(total) = 2*a'(use) (@ each end of beam reinf.)

Note: ω = ω (use)

Use: 1/4" Fillet Weld, 20" Continuous Each Side of Beam Reinf.

Comments:

Info. From SEA Consultants

DL Factor	1.2	
LL Factor	1.6	

Roof

1.5" Metal Deck	2	psf
2" Insulation	3	psf
3 Ply Roof & Gravel	6	psf
Steel Framing	4	psf
Misc	5	psf
Total	20	psf
Snow Load	30	psf
Use Live	30	psf
DL + LL (Roof)	72	psf (non-reduced)

Floor

Steel Framing	7	psf
4" Conc. Slab	50	psf
Misc.	5	psf
Total	62	psf
Floor Live	50	psf
Partitions	20	psf
Total	70	psf

LL Reduction

KLL - assumed	4	
Lo	70	psf
AT	600	sq ft
L	38.9	psf
Lmin	35	psf
L use	38.9	psf
DL + LL (Floor)	186.4	psf (non-reduced)
DL + LL (Floor)	136.7	psf (reduced)

300 Ton Chiller Weight	25	kip
Factored Platform Reaction	30.393	kip

Shape HSS5-1/2×5-1/2×1/4

K	1.0		t	0.25	in	
L	11	ft	tdes	0.233	in	
Fy	33	ksi	B	5.5	in	
E	29000	ksi	H	5.5	in	
f'c	3	ksi	As	4.77	in^2	OK
wc	145	pcf	Is	21.7	in^4	
Ec	3024.215	ksi	rs	2.13	in	
			h/t	20.6		OK, Composite
			b/t	20.6		Compact, Non-Composite
			C2	0.85		0.85 Rectangular
						0.95 Circular

Analysis per AISC 13th

Non-Composite			Composite					
Ωc	1.67		Ωc	2.00		ϕc	0.75	
ϕc	0.90		r	0.35	in	Po	222.00	kip
KL/r	61.97		b	4.80	in	C3	0.92	
Fe	74.53	ksi	h	4.80	in	C3	0.90	
Fy/Fe	0.44		r-t	0.12	in	Eleff	774759	kip-in^2
Fcr1	27.42	ksi	Ac	25.33	in^2			
Fcr2	65.36	ksi				Pe	438.85	kip
Fcr	27.42	ksi	h1	5.03	in	Po/Pe	0.51	
Pn	130.78	kip	b1	4.80	in	Pn1	179.64	kip
ϕPn	117.70	kip	h2	4.80	in	Pn2	384.87	kip
Pn/Ω	78.31	kip	b2	0.12	in	Pn	179.64	kip
			r-t	0.12	in	ϕPn	134.73	kip
			Ic	53.44	in^4	Pn/Ω	89.82	kip

Column 77 - Roof to 4th Floor

Width	20	ft
Length	30	ft
Area	600	sq ft

24" Girder

Width	20	ft
Length	30	ft
Grider Wt	0.1	klf
DL + LL (Roof) - Fctr	72	psf
Grider Load - Fctr	1.56	klf
Chiller - Fctr	7.5	k
Reaction	30.9	k

16" Girder

Width	20	ft
Length	30	ft
Grider Wt	0.05	klf
DL + LL (Roof) - Fctr	72	psf
Grider Load - Fctr	1.5	klf
Chiller - Fctr	0	k
Reaction	22.5	k

Column 77 - Roof to 4th Floor

Column Load	53.4	k
Proposed Load	30.39	k
Total Load	83.79	k
Capacity	71.2%	

Column 76 - Analysis - Roof

Column Load	53.4	k
Platform Reaction	30.39	k
Total	83.79	k
Capacity	71.2%	

Shape 8H31

A	9.13	in^2
Iy	37	in^4
ry	2.01	in
K	1	
L	13	ft
Fy	33	ksi
E	29000	ksi

Non-Composite

Ωc	1.67	
ϕc	0.90	
KL/r	77.61	
Fe	47.52	ksi
Fy/Fe	0.69	
Fcr1	24.68	ksi
Fcr2	41.67	ksi
Fcr	24.68	ksi
Pn	225.29	kip
ϕPn	202.76	kip
Pn/Ω	134.90	kip

Guy Anchor Analysis

Roof - Conservative

1.5" Metal Deck	1.5	psf
2" Insulation	2	psf
3 Ply Roof & Gravel	3	psf
Steel Framing	3	psf
Misc	2	psf
Total	11.5	psf
0.9*Total	10.35	psf
Tributary Area	600	sq ft
Resisting Weight	6.21	kip
Guy Anchor Uplift	16.77	kip
Difference	10.56	kip
Needed Capacity	11.73	kip

Assume Base Plate from Roof Supporting Column has a connection capacity of at least 12 kips

Column 76 & 77 - 4th Floor to 3rd Floor

Width	20	ft
Length	30	ft
Area	600	sq ft
DL + LL (Floor) - Fctr	136.69	psf
Total	82.02	k
Roof	83.79	k
Existing Load	165.81	k
Capacity	81.8%	

PREPARED FOR

Sprint®

MODIFICATION PACKAGE FOR A 50 FT ROHN 80 GUYED TOWER

PREPARED BY

SEMAAN ENGINEERING SOLUTIONS

SEMAAN ENGINEERING SOLUTIONS HOLDINGS, LLC

CLIENT SITE NAME/NUMBER

CT03XC074

OWNER/SITE NUMBER/SITE NAME

SPRINT/CT03XC074/WEST HARTFORD BISHOPS

PROPOSED CARRIER/SITE NUMBER/SITE NAME

AT&T/CT1195/WEST HARTFORD BISHOPS CORNER

SITE ADDRESS

345 NORTH MAIN STREET
WEST HARTFORD, CT 06117
HARTFORD COUNTY
N41°47'6.3", W72°44'54.5

DATE:

10/20/2014

CONTACT INFORMATION

ENGINEER OF RECORD

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ELKHORN, NE 68022

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SHEET INDEX

SHEET #	SHEET TITLE	REV #
T-1	TITLE SHEET	0
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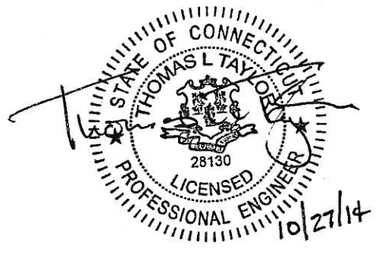
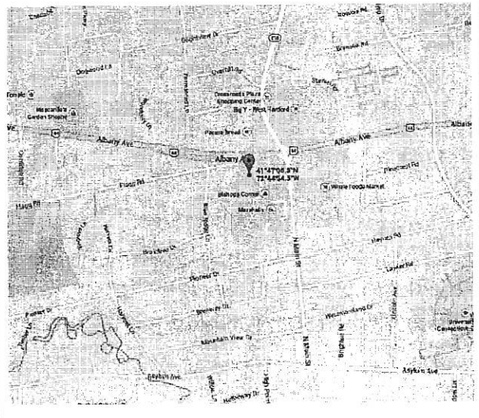
S-3	STRAND TERMINATION AND STANDARD SAFETY INSTALLATION DETAILS	0

STAMP



I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF CONNECTICUT

VICINITY MAP



MODIFICATION OUTLINE

THE MODIFICATIONS PROVIDED IN THESE DRAWINGS ARE BASED ON THE RECOMMENDATIONS OUTLINED IN THE STRUCTURAL MODIFICATIONS ANALYSIS REPORT COMPLETED BY SEMAAN ENGINEERING SOLUTIONS HOLDINGS, LLC (SES) DATED 10/20/2014 (REV 0). THIS REPORT IS BASED ON A SPECIFIC ANTENNA LOADING AND COAX CONFIGURATION AS DEFINED IN THE REPORT. ANY OTHER ANTENNA OR COAX CONFIGURATION REQUIRES REVIEW BY SES

CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, QUANTITIES, PART NUMBERS AND COAX/ANTENNA PLACEMENTS PRIOR TO BIDDING, ORDERING MATERIALS, AND CONSTRUCTION.

GENERAL NOTES:

1. REFERENCE THE SEMAAN ENGINEERING SOLUTIONS ANALYSIS DATED 10/20/2014 FOR THE PROPOSED AND EXISTING LOADS CONSIDERED. THIS DRAWING IS NOT VALID IF LOADS OTHER THAN THOSE CONSIDERED IN THE ANALYSIS ARE ADDED TO OR REMOVED FROM THE STRUCTURE UNLESS APPROVED IN WRITING BY SEMAAN ENGINEERING SOLUTIONS HOLDINGS, LLC.
2. THE PROPOSED LOADS SHALL NOT BE ADDED TO THE STRUCTURE UNTIL ALL MODIFICATIONS HAVE BEEN COMPLETED, INSPECTED BY A 3RD PARTY, AND APPROVED BY THE ENGINEER OF RECORD.
3. ALL METHODS, MATERIALS AND WORKMANSHIP SHALL FOLLOW THE DICTATES OF GOOD CONSTRUCTION PRACTICE.
4. ALL WORK INDICATED ON THESE DRAWINGS SHALL BE PERFORMED BY QUALIFIED CONTRACTORS EXPERIENCED IN TOWER AND FOUNDATION CONSTRUCTION.
5. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING DIMENSIONS, ELEVATIONS AND CONDITIONS PRIOR TO FABRICATION. THE CONTRACTOR WILL BE SOLELY RESPONSIBLE FOR THE PROPER FIT AND CLEARANCE IN THE FIELD. CONTACT SEMAAN ENGINEERING IF ANY DISCREPANCIES EXIST.
6. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD IMMEDIATELY OF ANY INSTALLATION INTERFERENCES. ALL NEW WORK SHALL ACCOMMODATE EXISTING CONDITIONS. DETAILS NOT SPECIFICALLY SHOWN ON THE DRAWINGS SHALL FOLLOW SIMILAR DETAILS FOR THIS JOB.
7. ~~THIS DRAWING DOES NOT INDICATE THE METHOD OF CONSTRUCTION.~~ THE CONTRACTOR SHALL SUPERVISE AND INSPECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL THE CONSTRUCTION MEANS, TECHNIQUES, SEQUENCES AND PROCEDURES.
8. ALL WORK SHALL BE DONE IN ACCORDANCE WITH LOCAL CODES AND OSHA SAFETY REGULATIONS. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE ON-SITE SAFETY ASSOCIATED WITH THE WORK TO BE PERFORMED AS WELL AS THE PUBLIC AFFECTED BY THE WORK IN THE VICINITY OF THE JOB SITE.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND EXECUTION OF ALL MISCELLANEOUS SHORING, BRACING, TEMPORARY SUPPORTS, ETC. NECESSARY, PER TIA-1019-A-2001, TO PROVIDE A COMPLETE AND STABLE STRUCTURE AS SHOWN ON THESE DRAWINGS.
10. THE CONTRACTOR'S PROPOSED INSTALLATION SHALL NOT INTERFERE, NOR DENY ACCESS TO, ANY EXISTING OPERATIONAL AND SAFETY EQUIPMENT.
11. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR THE PROTECTION OF THE PROPERTY IN THE VICINITY OF THE JOB SITE. THE CONTRACTOR SHALL USE THE PRECAUTIONARY MEANS NECESSARY FOR ADEQUATE PROTECTION.
12. ALL WORK SHALL BE PERFORMED IN CALM WIND CONDITIONS, WHERE SPEED DOES NOT EXCEED 10 MPH.
13. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR ONE YEAR FROM ACCEPTANCE DATE.
14. ALL TOWER MODIFICATION WORK SHALL BE IN ACCORDANCE WITH TIA-1019-A STANDARDS FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

APPLICABLE CODES AND STANDARDS:

1. EIA/TIA-222 STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES, REV F.
2. 2006 INTERNATIONAL BUILDING CODE. WITH CONNECTICUT STATE AMENDMENTS.
3. ACI 318: AMERICAN CONCRETE INSTITUTE, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, 318-11 (LATEST EDITION).
4. CRSI: CONCRETE REINFORCEMENT STEEL INSTITUTE, MANUAL OF STANDARD PRACTICE, (LATEST EDITION).
5. AISC: AMERICAN INSTITUTE OF STEEL CONSTRUCTION, MANUAL OF STEEL CONSTRUCTION, 14TH EDITION - 2011 (LATEST EDITION).
6. AWS: AMERICAN WELDING SOCIETY D1.1, STRUCTURAL WELDING CODE - 2011, (LATEST EDITION).

STEEL CONSTRUCTION:

1. STRUCTURAL STEEL SHALL CONFORM TO THE AISC MANUAL OF STEEL CONSTRUCTION, 14TH EDITION, FOR THE DESIGN, FABRICATION, AND ERECTION OF STEEL COMPONENTS.
2. UNLESS NOTED OTHERWISE, ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
   - ANGLE: ASTM A36
   - PIPE/TUBE: ASTM A500 (46 ksi YIELD)
   - PLATE: ASTM A36

   A. ALL BOLTS, ASTMA325 GALVANIZED HIGH STRENGTH BOLTS.
   B. ALL U-BOLTS, ASTM A36
   C. ALL NUTS, A563 CARBON AND STEEL ALLOY NUTS.
   D. ALL WASHERS, ASTM F436 HARDENED STEEL WASHERS
3. SHOP DRAWINGS SHALL BE SUBMITTED TO SES FOR APPROVAL PRIOR TO FABRICATION. SHOP DRAWINGS SHALL INCLUDE ALL FABRICATED STEEL ASSEMBLIES INCLUDING MONOPOLE/TOWER EXTENSIONS

STEEL CONSTRUCTION (CONT.):

4. ALL EXTERIOR STEEL WORK SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123 FOR COMPONENTS AND ASTM A153 FOR HARDWARE, AND AS FOLLOWS, UNLESS OTHERWISE NOTED.
   A. GALVANIZING SHALL BE PERFORMED AFTER SHOP FABRICATION AND WELDING TO THE GREATEST EXTENT POSSIBLE
   B. ALL DINGS, SCRAPES, MARS AND WELDS IN THE GALVANIZED AREA SHALL BE COATED WITH (3) BRUSH COATS OF ZRC COLD GALVANIZING COMPOUND OR APPROVED EQUAL. THE COATING SHALL BE APPLIED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
   C. IF THE STRUCTURE WAS ORIGINALLY PAINTED, AFTER ZINC-RICH COATING IS DRY, OVERCOAT WITH AN APPROPRIATE PAINT WITH THE SAME COLOR AS THE EXISTING.
5. NO TORCH CUTTING SHALL BE PERMITTED UNLESS APPROVED BY THE ENGINEER.
6. DO NOT PLACE HOLES THROUGH STRUCTURAL STEEL MEMBERS EXCEPT AS SHOWN AND DETAILED ON DRAWINGS.

WELDING NOTES:

1. ALL WELDING TO BE PERFORMED BY AWS CERTIFIED WELDERS AND CONDUCTED IN ACCORDANCE WITH THE LATEST EDITION OF THE AWS WELDING CODE D1.1.
2. CONTRACTOR SHALL RETAIN AN AWS CERTIFIED WELD INSPECTOR TO PERFORM VISUAL INSPECTIONS ON ALL FIELD WELDS. A REPORT SHALL BE SUBMITTED TO SEMAAN ENGINEERING FOR FINAL APPROVAL.
3. ALL ELECTRODES SHALL BE LOW HYDROGEN E70XX ELECTRODES, PER AWS D1.1, UNLESS NOTED OTHERWISE.
4. MINIMUM WELD SIZE TO BE 0.1875 INCH FILLET WELDS, UNLESS NOTED OTHERWISE.
5. PRIOR TO FIELD WELDING GALVANIZED MATERIAL, CONTRACTOR SHALL GRIND OFF GALVANIZING AND ANY OTHER CONTAMINANTS 2" BEYOND ALL FIELD WELD SURFACES. AFTER WELDING, REPAIR ALL GROUND AND WELDED SURFACES WITH (3) BRUSH COATS OF ZRC COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURERS REQUIREMENTS.
6. ALL FULL PENETRATION WELDS ARE REQUIRED TO BE 100% NDE INSPECTED BY ULTRASONIC TESTING (UT) IN ACCORDANCE WITH AWS D1.1.
7. ALL PARTIAL PENETRATION AND FILLET WELDS ARE REQUIRED TO BE 50% NDE INSPECTED BY MAGNETIC PARTICLE (MT) IN ACCORDANCE WITH AWS D1.1.

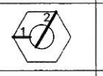
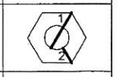
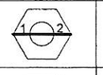
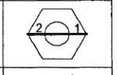
BOLTING NOTES:

1. STRUCTURAL CONNECTIONS TO BE ASSEMBLED AND INSPECTED IN ACCORDANCE WITH RCSC-2009 (SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS.)
2. ALL CONNECTION BOLTS SHALL BE ASTM A325N (GALVANIZED). UNLESS NOTED OTHERWISE.
3. SPLICE/FLANGE BOLTS SUBJECT TO DIRECT TENSION SHALL BE INSTALLED AND TIGHTENED AS PER SECTION 8.2.1 OF THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING A325 OR A490 BOLTS". LOCATED IN THE AISC MANUAL OF STEEL CONSTRUCTION. THE INSTALLATION PROCEDURE IS PARAPHRASED AS FOLLOWS:

   FASTENERS SHALL BE INSTALLED IN PROPERLY ALIGNED HOLES AND TIGHTENED BY ONE OF THE METHODS DESCRIBED IN SUBSECTION 8.2.1 THROUGH 8.2.4.

   8.2.1 TURN-OF-NUT PRETENSIONING
   BOLTS SHALL BE INSTALLED IN ALL HOLES OF THE CONNECTION AND BROUGHT TO A SNUG TIGHT CONDITION AS DEFINED IN SECTION 8.1, UNTIL ALL THE BOLTS ARE SIMULTANEOUSLY SNUG TIGHT AND THE CONNECTION IS FULLY COMPACTED. FOLLOWING THIS INITIAL OPERATION ALL BOLTS IN THE CONNECTION SHALL BE TIGHTENED FURTHER BY THE APPLICABLE AMOUNT OF ROTATION SPECIFIED IN THE TABLE PROVIDED. DURING THE TIGHTENING OPERATION THERE SHALL BE NO ROTATION OF THE PART NOT TURNED BY THE WRENCH. TIGHTENING SHALL PROGRESS SYSTEMATICALLY.

TURN-OF-NUT ROTATION FROM SNUG TIGHT CONDITION

BOLT LENGTH (UNDER SIDE OF HEAD TO END OF BOLT)	BOTH FACES NORMAL TO BOLT AXIS		
	NUT ROTATION	INITIAL MARKING POSITION	FINAL MARKING POSITION
UP TO AND INCLUDING 4 DIAMETERS	1/3 TURN		
OVER 4 DIA-METERS BUT NOT EXCEED-ING 8 DIA.	1/2 TURN		
OVER 8 DIA-METERS BUT NOT EXCEED-ING 12 DIA.	2/3 TURN		

USE A WATERPROOF BLACK MARKER TO MARK THE BOLT AND NUT AS SHOWN ON THE TABLE.

BOLTING NOTES (CONT.):

4. ALL OTHER BOLTED CONNECTIONS SHALL BE BROUGHT TO A SNUG TIGHT CONDITION AS DEFINED IN SECTION 8.1 OF THE SPECIFICATION.
5. ALL BOLT HOLES SHALL BE ALIGNED TO PERMIT INSERTION OF THE BOLTS WITHOUT UNDUE DAMAGE TO THE THREADS. BOLTS SHALL BE PLACED IN ALL HOLES WITH WASHERS POSITIONED AS REQUIRED AND NUTS THREADED TO COMPLETE THE ASSEMBLY. COMPACTING THE JOINT TO THE SNUG-TIGHT CONDITION SHALL PROGRESS SYSTEMATICALLY FROM THE MOST RIGID PART OF THE JOINT. THE SNUG-TIGHTENED CONDITION IS THE TIGHTNESS THAT IS ATTAINED WITH A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF AN IRONWORKER USING AN ORDINARY SPUD WRENCH TO BRING THE CONNECTED PLIES INTO FIRM CONTACT.
6. A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED BOLTS.
7. ALL NEW BOLTS SHALL BE LONG ENOUGH TO FULLY ENGAGE THE FULL DEPTH OF THE NUT AND LOCKING DEVICE.
8. GALVANIZED ASTM A325 BOLTS SHALL NOT BE REUSED.

CONCRETE CONSTRUCTION:

1. ALL CONCRETE SHALL CONFORM TO THE SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS, ACI 301
2. ALL CONCRETE SHALL BE MADE WITH STONE AGGREGATE & SHALL DEVELOP 4000 PSI MIN. COMPRESSIVE STRENGTH IN 28 DAYS. CONCRETE MIX DESIGN: 6 1/2 SACKS OF CEMENT MINIMUM PER CUBIC YARD, 3/4" MAXIMUM AGGREGATE. AIR ENTRAINMENT = 6% ± 1% AND SLUMP = 4" ± 1" (WITHOUT PLASTICIZER)
3. ALL REINFORCING SHALL BE HIGH STRENGTH DEFORMED BARS, GRADE 60, ASTM A615, WITH 60,000 PSI MINIMUM YIELD POINT.
4. REINFORCING PROTECTION: CONCRETE POURED AGAINST EARTH.....3"
5. ALL BAR LENGTHS ARE NOT DRAWN TO SCALE. NO SPLICES OF REINFORCEMENT SHALL BE MADE EXCEPT AS DETAILED OR AS AUTHORIZED BY THE STRUCTURAL ENGINEER. LAP SPLICES, WHERE PERMITTED, SHALL BE A MINIMUM OF 40 BAR DIAMETERS UNLESS NOTED.
6. DETAIL BARS IN ACCORDANCE WITH ACI DETAILING MANUAL & ACI BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
7. PROVIDE ALL ACCESSORIES NECESSARY TO SUPPORT REINFORCING AT THE POSITIONS SHOWN ON THE PLANS.
8. BACKFILL AND COMPACT SOIL TO A MINIMUM 95% OF STANDARD PROCTOR DENSITY PER ASTM D 698.THE COMPACTED SOIL SHALL PROVIDE A MINIMUM UNIT WEIGHT OF 120 POUNDS PER CUBIC FOOT FOR THE FILL MATERIAL.
9. AS APPLICABLE, ORIENT NEW ANCHORS IN LINE WITH EXISTING ANCHORS.
10. AS APPLICABLE, ANCHOR RODS TO PASS THROUGH CENTROID OF BLOCK.

EPOXY-GROUTED FASTENER INSTALLATION:

1. CONTRACTOR SHALL VERIFY THAT DRILLING CLEARANCE IS ADEQUATE PRIOR TO CONSTRUCTION. NOTIFY THE ENGINEER IF A CLEARANCE PROBLEM EXISTS.
2. ALL HOLES SHALL BE WIRE-BRUSHED TO PROFILE THE CONCRETE SURFACE, ALL CORED HOLES WITH SMOOTH WALLS SHALL BE ROUGHENED.
3. USE COMPRESSED AIR TO BLOW ANY REMAINING DEBRIS OUT OF THE NEWLY DRILLED HOLES.
4. EPOXY GROUT THE NEW ANCHOR BOLTS OR REBAR IN PLACE PER THE MANUFACTURER'S INSTRUCTIONS.

CONTINUOUS INSPECTION AND MAINTENANCE:

CONTINUOUS INSPECTION OF THE STRUCTURE AND THE ADDED REINFORCING CONSISTENT WITH THE CURRENT REQUIREMENTS OF THE LATEST TIA 222 STANDARD SHALL BE IMPLEMENTED BY THE OWNER. ANY FUTURE CORROSION OR OTHER DETERIORATION OF THE STRUCTURE OR ITS REINFORCING WILL REDUCE ITS CAPACITY TO WITHSTAND THE REQUIRED LOADS. ANY DEFECTS SHALL BE REPAIRED TO ENSURE THE STRUCTURAL INTEGRITY FOR THE LIFE OF THE STRUCTURE.

CLIENT

Sprint

SITE NAME/NUMBER

CT03XC074

SITE ADDRESS

345 NORTH MAIN STREET
WEST HARTFORD, CT 06117
N41°47'6.3", W72°44'54.5

DRAWINGS PREPARED BY:

SEMAAN ENGINEERING SOLUTIONS

SEMAAN ENGINEERING SOLUTIONS HOLDINGS, LLC

1079 NORTH 205TH STREET
OMAHA, NEBRASKA 68022
PHONE: (402) 289-1888
FAX: (402) 289-1861

STAMP

STATE OF CONNECTICUT
THOMAS L TAYLOR
28130
LICENSED
PROFESSIONAL ENGINEER
10/27/14

DRAWN BY:	KRC
APPROVED BY:	LMP

REV	DESCRIPTION	DATE
0	FIRST ISSUE	10/20/2014

DRAWING DESCRIPTION

GENERAL NOTES

SHEET NUMBER	REVISION
N-1	0

PLUMB AND TENSION:

1. RE-TENSIONING OF EXISTING GUY WIRES SHALL BE PERFORMED AT A TIME WHEN THE WIND VELOCITY IS LESS THAN 10 MPH AT GROUND LEVEL AND WITH NO ICE ON THE STRUCTURE AND THE GUY WIRES.
2. PLUMB THE TOWER WHILE RE-TENSIONING THE EXISTING GUY WIRES. THE HORIZONTAL DISTANCE BETWEEN THE VERTICAL CENTERLINES AT ANY TWO ELEVATIONS SHALL NOT EXCEED 0.25% OF THE VERTICAL DISTANCE BETWEEN THE TWO ELEVATIONS (EXAMPLE, NOT TO EXCEED 0.6 INCHES FOR 20 FEET VERTICAL DISTANCE).
3. THE TWIST BETWEEN ANY TWO ELEVATIONS SHALL NOT EXCEED 0.5 DEGREES IN 10 FEET. THE MAXIMUM TWIST OVER THE STRUCTURE HEIGHT SHALL NOT EXCEED 5 DEGREES.
4. INSTALL/RE-INSTALL THE SAFETY GUY AS SHOWN ON SHEET S-3.

SPECIAL INSPECTION:

1. A QUALIFIED INDEPENDENT INSPECTION FIRM, EMPLOYED BY THE OWNER, SHALL PERFORM INSPECTION AND TESTING IN ACCORDANCE WITH THE IBC 2006, SECTION 1704 AS REQUIRED BY PROJECT SPECIFICATIONS FOR THE FOLLOWING CONSTRUCTION WORK TO BE INCLUDED IN THE POST-MODIFICATION INSPECTION (PMI) REPORT.
   a. CONSTRUCTION INSPECTIONS
   b. HIGH STRENGTH BOLT INSPECTION
   c. GUY CABLE TENSION REPORT
   d. GENERAL CONTRACTOR AS-BUILT DOCUMENTS
2. THE INSPECTION AGENCY SHALL SUBMIT INSPECTION AND TEST REPORTS TO THE BUILDING DEPARTMENT, THE ENGINEER OF RECORD, AND THE OWNER IN ACCORDANCE WITH IBC 2006, 1704. THE INSPECTION FIRM SHALL ALSO PROVIDE A REDLINE SET OF THE AS-BUILT DRAWINGS AND COMPLETE PHOTO DOCUMENTATION OF THE MODIFICATIONS COMPLETED AT THE SITE.

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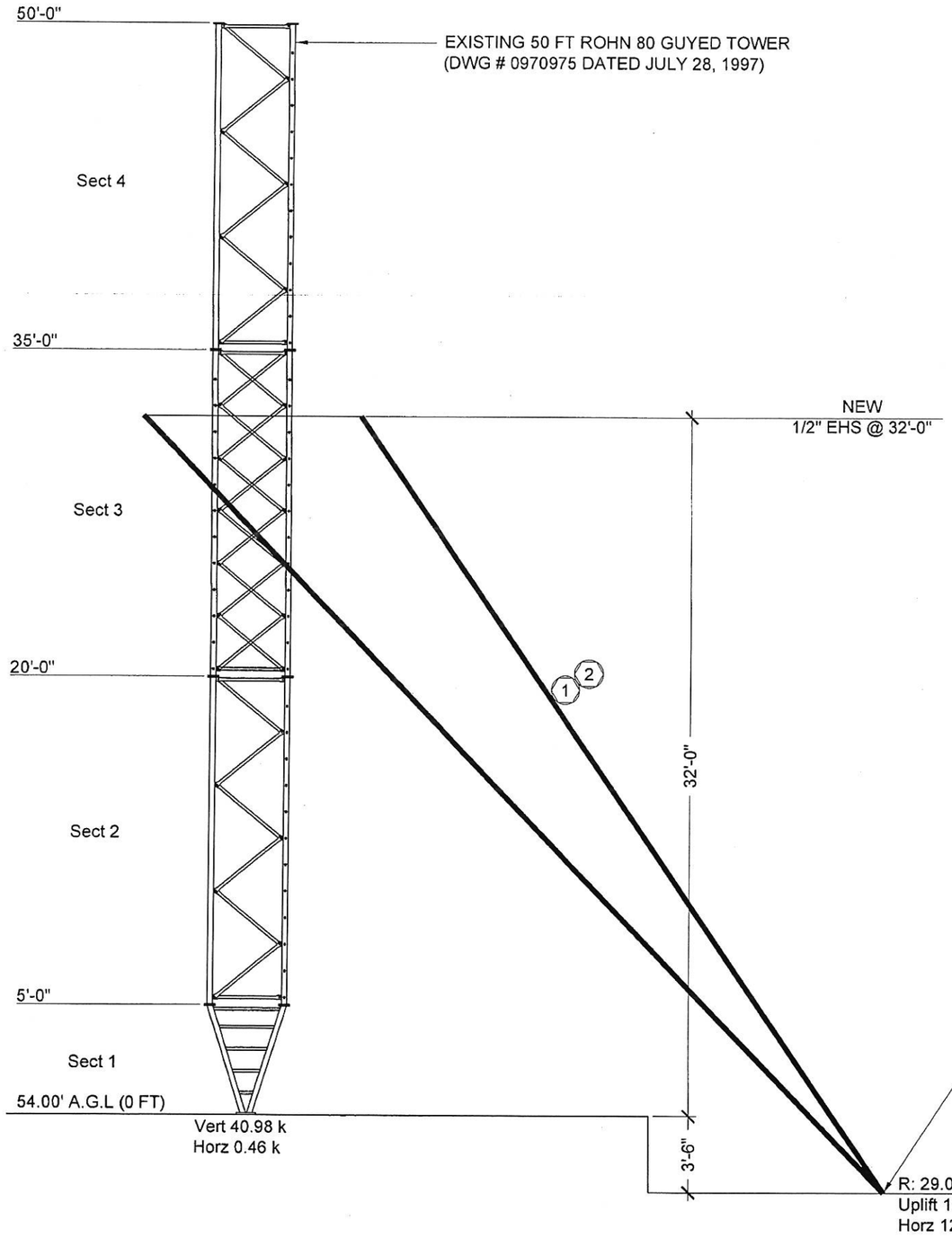
0	FIRST ISSUE	10/20/2014

DRAWING DESCRIPTION

GENERAL NOTES

SHEET NUMBER	REVISION
N-2	0



SECTION PROPERTIES

SECTION	LEG MEMBERS	DIAGONAL MEMBERS	HORIZONTAL MEMBERS
1	PXX 50 ksi 2 1/2" DIA PIPE		SAE 36 ksi 4x4x0.25
2 - 3	PX 50 ksi 2 1/2" DIA PIPE	PSP 42 ksi 1 1/2"x16GA	PSP 42 ksi 1 1/2"x16GA
4	PX 50 ksi 2 1/2" DIA PIPE	PSP 42 ksi 1 1/2"x11GA	PSP 42 ksi 1 1/2"x11GA

MODIFICATION SCHEDULE

NO.	MODIFICATION DESCRIPTION	ELEVATIONS (FT)	SHEETS
1	REPLACE (3) 3/8" EHS GUY CABLES W/ (3) NEW 1/2" EHS GUY CABLES AND COMPATIBLE HARDWARE.	32	S-3
2	RETENSION ALL GUY CABLES	-	S-2

CONTRACTOR NOTES:

1. PROVIDE TEMPORARY GUY CABLES DIRECTLY ABOVE OR BELOW AND CABLES THAT ARE BEING TEMPORARILY REMOVED. AT NO TIME SHOULD ANY OF THE GUY POINTS ON THE OTWER BE LEFT UNSUPPORTED.

NOTE:
THE CONNECTIONS TO THE BUILDING AND THE BUILDING STRUCTURE ITSELF MUST BE CHECKED BY OTHERS. ONLY AFTER THE CONNECTION AND THE BUILDING STRUCTURE IS DEEMED TO BE STRUCTURALLY ADEQUATE BY A SEPARATE 3RD PARTY ENGINEER PROVIDING STAMPED AND SIGNED CALCULATIONS MAY THE NEW LARGER GUY CABLES BE INSTALLED.

TOWER ELEVATION
NOT TO SCALE

CLIENT
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REV	DESCRIPTION	DATE
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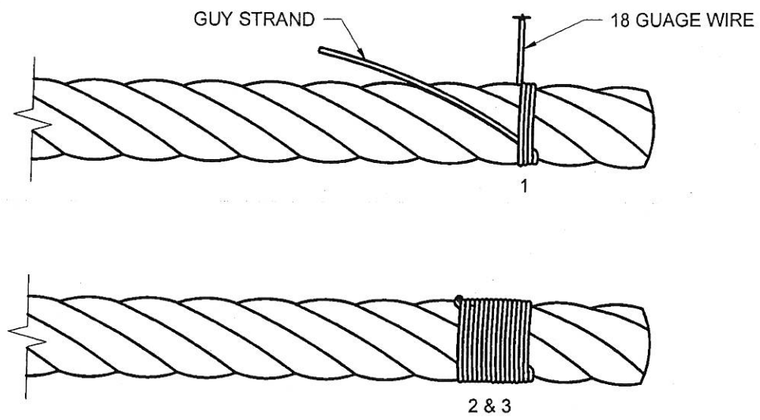
DRAWING DESCRIPTION
GUYED TOWER
ELEVATION VIEW

SHEET NUMBER: S-1
REVISION: 0

INITIAL TENSION NOTES:

THE MAXIMUM DEVIATION FROM THE DESIGN INITIAL TENSION ARE:

1. ±10% FOR GUYS < 1" DIAMETER
2. ±5% FOR GUYS > 1" DIAMETER, OF THE INITIAL TENSIONS SPECIFIED ON THIS TEMPERATURE/TENSION CHART.



1. LAY ONE END OF THE SEIZING WIRE IN THE GROOVE BETWEEN TWO STRANDS IN THE WIRE ROPE AND WRAP THE OTHER END TIGHTLY OVER THE PORTION IN THE GROOVE.
2. CONTINUE TWISTING WITH PLIERS TO TAKE UP SLACK AND TIGHTEN. WIND SEIZING WIRE AROUND ROPE FOR A LENGTH EQUAL TO THE ROPE DIAMETER.
3. TWIST WIRE TIGHTLY AGAINST SERVING, WINDING TWISTED WIRE INTO KNOT BEFORE CUTTING OFF ENDS OF THE WIRE. POUND KNOT SNUGLY AGAINST THE ROPE.

GUY TENSION TABLE							
Cable Dia. (in)	Anchor Radius (ft)	Guy Elevation (ft)	T (lbs) @ 20 degrees F	T (LBS) @ 40 Degrees F	T (LBS) @ 60 Degrees F	T (LBS) @ 80 Degrees F	T (LBS) @ 100 Degrees F
1/2	29	32+3.5	3074	2872	2670	2458	2266

FIELD VERIFY THE EXISTING HOLE DIAMETERS IN THE GUY LUGS, TORQUE ARM, AND ANCHOR HEAD WILL WORK WITH THE LARGER CONNECTION HARDWARE. CONTACT SEMAAN ENGINEERING AT (402)289-1888 IF ANY PROBLEMS EXIST.

GUY CABLE NOTES:

1. ALL EHS AND BRIDGE STRAND HAS A LEFT HAND LAY.
2. THE WORKING LOADS ARE BASED ON A SAFETY FACTOR OF 2.0. FOR TOWER TALLER THAN 700', A HIGHER SAFETY FACTOR IS REQUIRED BY EIA.
3. USE (1) 3/8" WIRE ROPE CLIP PER ANCHOR WITH 3/8" EHS GUY STRAND X 15' FOR TURNBUCKLE TIE.
4. ALL CUT LENGTHS ARE CALCULATED BASED ON TOWER DRAWINGS AND MAPPING, AND ARE THEORETICAL PLUS 5% OR 25 FEET WHICHEVER IS GREATER. CONTRACTOR NEED TO BE AWARE THAT ACTUAL LENGTHS IN FIELD MAY VARY FROM THE CALCULATED LENGTH.
5. IF HARDWARE IS NOT PROVIDED (INDICATED AS N/A ON HARDWARE CHART), REUSE EXISTING HARDWARE AND/OR GUY WIRES AS NECESSARY.
6. VERIFY SIZES OF GUY WIRES BEFORE RE-TENSIONING. IF ANY DISCREPANCIES ARE NOTED IN THE FIELD, PLEASE CONTACT SEMAAN ENGINEERING (402-289-1888) IMMEDIATELY FOR FURTHER INSTRUCTIONS.

GUY WIRE TENSION TABLE
NOT TO SCALE

CLIENT
Sprint

SITE NAME/NUMBER
CT03XC074

SITE ADDRESS
345 NORTH MAIN STREET
WEST HARTFORD, CT 06117
N41°47'6.3", W72°44'54.5

DRAWINGS PREPARED BY:
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REV	DESCRIPTION	DATE
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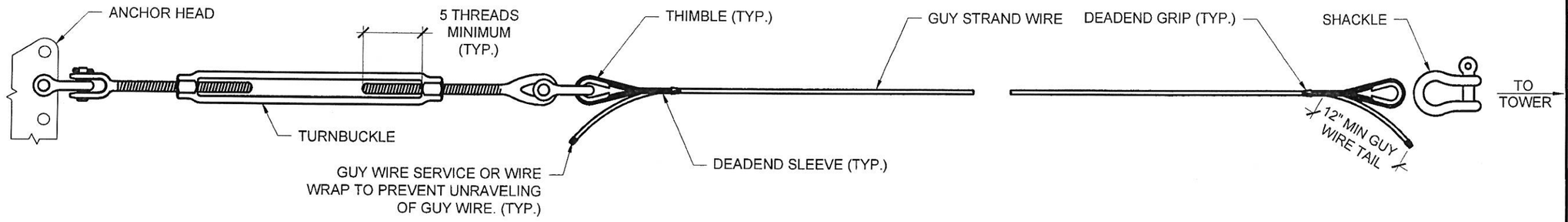
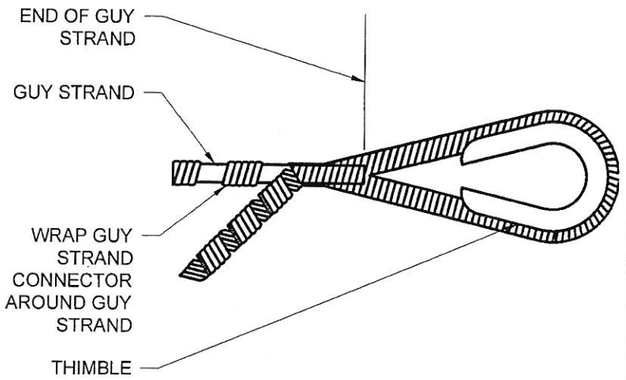
DRAWING DESCRIPTION
GUY WIRE TENSION TABLE

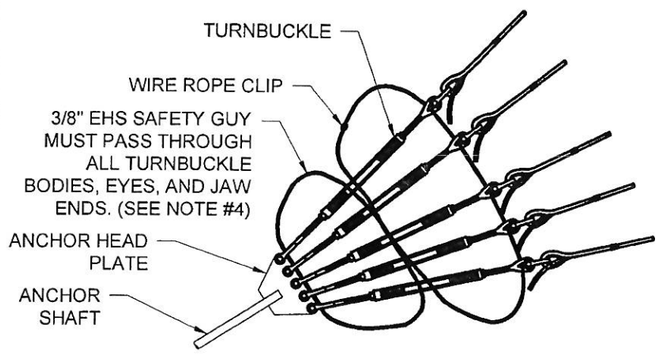
SHEET NUMBER: S-2
REVISION: 0



TYPICAL GUY ASSEMBLY
NOT TO SCALE



TYPICAL DEADEND GRIP DETAIL
NOT TO SCALE



TYPICAL TIE WIRE ASSEMBLY
NOT TO SCALE

STANDARD GUY STRAND HARDWARE CHART

GUY STRAND			CROSBY TURNBUCKLE HG-228 (JAW & JAW) OR HG-227 (JAW & EYE)				DEADEND GRIP	DEADEND SLEEVE	CROSBY THIMBLE (G-414)	CROSBY SCREW PIN ANCHOR SHACKLE (G-209-A)			
SIZE	U.T.S.	W.L.	SIZE	U.T.S.	W.L.	PIN DIA.	SIZE	SIZE	SIZE	SIZE	U.T.S.	W.L.	PIN DIA.
5/16 EHS	11.2	**5.6**	5/8 x 12	17.5	**8.8**	1/2"	5/16"	5/16"	3/8 HVY	1/2"	33.3	**16.6**	5/8"
3/8 EHS	15.4	**7.7**	5/8 x 12	17.5	**8.8**	1/2"	3/8"	3/8"	1/2 HVY	1/2"	33.3	**16.6**	5/8"
7/16 EHS	20.8	**10.4**	3/4 x 12	26.0	**13.0**	5/8"	7/16"	7/16"	1/2 HVY	1/2"	33.3	**16.6**	5/8"
1/2 EHS	26.9	**13.5**	3/4 x 12	26.0	**13.0**	5/8"	1/2"	1/2"	1/2 HVY	1/2"	33.3	**16.6**	5/8"
9/16 EHS	35.0	**17.5**	7/8 x 12	36.0	**18.0**	3/4"	9/16"	9/16"	3/4 HVY	5/8"	50.0	**25.0**	3/4"
5/8 EHS	42.4	**21.2**	1 x 12	50.0	**25.0**	7/8"	5/8"	5/8"	3/4 HVY	5/8"	50.0	**25.0**	3/4"
11/16 EHS	50.0	**25.0**	1 x 12	50.0	**25.0**	7/8"	11/16"	11/16"	3/4 HVY	5/8"	50.0	**25.0**	3/4"
3/4 EHS	58.3	**29.2**	1 1/4 x 18	76.0	**38.0**	1 1/8"	3/4"	3/4"	1 HVY	3/4"	70.0	**35.0**	7/8"
7/8 EHS	78.7	**39.9**	1 1/2 x 18	107.0	**53.5**	1 3/8"	7/8"	7/8"	1 1/8 HVY	7/8"	95.0	**47.5**	1"
1 EHS	104.5	**52.3**	1 1/2 x 18	107.0	**53.5**	1 3/8"	1"	1"	1 1/8 HVY	1"	125.0	**62.5**	1 1/8"
5/8 BS	48.0	**24.0**	1 x 12	50.0	**25.0**	7/8"	5/8"	5/8"	3/4 HVY	5/8"	50.0	**25.0**	3/4"
11/16 BS	58.0	**29.0**	1 1/4 x 18	76.0	**38.0**	1 1/8"	11/16"	11/16"	7/8 HVY	3/4"	70.0	**35.0**	7/8"
3/4 BS	68.0	**34.0**	1 1/4 x 18	76.0	**38.0**	1 1/8"	3/4"	3/4"	1 HVY	3/4"	70.0	**35.0**	7/8"
13/16 BS	80.0	**40.0**	1 1/2 x 18	107.0	**53.5**	1 3/8"	13/16"	13/16"	1 HVY	7/8"	95.0	**47.5**	1"
7/8 BS	92.0	**46.0**	1 1/2 x 18	107.0	**53.5**	1 3/8"	7/8"	7/8"	1 1/8 HVY	7/8"	95.0	**47.5**	1"
15/16 BS	108.0	**54.0**	1 3/4 x 24	140.0	**70.0**	1 5/8"	15/16"	15/16"	1 1/8 HVY	1"	125.0	**62.5**	1 1/8"

NOTE:
1. THE WORKING LOADS ARE BASED ON A SAFETY FACTOR OF 2.0. FOR TOWERS TALLER THAN 700', A HIGHER SAFETY FACTOR IS REQUIRED BY EIA.
2. ALL EHS AND BRIDGE STRAND HAS A LEFT HAND WIRE LAY.
3. USE (1) 3/8" WIRE ROPE CLIP PER ANCHOR WITH 3/8" EHS GUY STRAND x 15' FOR TURNBUCKLE TIE.

THE FOLLOWING CHART IS FOR OTHER TYPES OF SHACKLES AND IS FOR INFORMATION ONLY.

GUY STRAND			CROSBY FORGED SHACKLE (G-209)				CROSBY BOLT TYPE SHACKLE (G-2130)			
SIZE	U.T.S.	W.L.	SIZE	U.T.S.	W.L.	PIN DIA.	SIZE	U.T.S.	W.L.	PIN DIA.
5/16 EHS	11.2	**5.6**	1/2"	24	**12.0**	5/8"	1/2"	24	**12.0**	5/8"
3/8 EHS	15.4	**7.7**	1/2"	24	**12.0**	5/8"	1/2"	24	**12.0**	5/8"
7/16 EHS	20.8	**10.4**	1/2"	24	**12.0**	5/8"	1/2"	24	**12.0**	5/8"
1/2 EHS	26.9	**13.5**	5/8"	39	**19.5**	3/4"	5/8"	39	**19.5**	3/4"
9/16 EHS	35.0	**17.5**	5/8"	39	**19.5**	3/4"	5/8"	39	**19.5**	3/4"
5/8 EHS	42.4	**21.2**	3/4"	57	**28.5**	7/8"	3/4"	57	**28.5**	7/8"
3/4 EHS	58.3	**29.2**	7/8"	78	**39.0**	1"	7/8"	78	**39.0**	1"
7/8 EHS	79.7	**39.9**	1"	102	**51.0**	1 1/8"	1"	102	**51.0**	1 1/8"
1 EHS	104.5	**52.3**	1 1/8"	114	**57.0**	1 1/4"	1 1/8"	114	**57.0**	1 1/4"

NOTES:
1. THE GUY STRAND CONNECTER MUST FOLLOW THE LAY OF THE GUY STRAND.
2. THE STRAND AND THE CONNECTOR SHOWN HAVE A LEFT HAND LAY. STRAND WHICH HAS A RIGHT HAND LAY REQUIRES A CONNECTOR WITH A RIGHT HAND LAY.
3. IF REMOVAL IF EXISTING PERFORMS IS REQUIRED - THEY CANNOT BE RE-USED.
4. IF THE EXISTING SAFETY CABLES DO NOT HAVE THE LENGTH SUFFICIENT TO MAKE THE CONFIGURATION AS SHOWN, PLEASE REPLACE WITH NEW CABLES AND GUY CLIPS.

STANDARD GUY STRAND HARWARE CHART
NOT TO SCALE

CLIENT
Sprint

SITE NAME/NUMBER
CT03XC074

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WEST HARTFORD, CT 06117
N41°47'6.3", W72°44'54.5

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REV	DESCRIPTION	DATE
0	FIRST ISSUE	10/20/2014

DRAWING DESCRIPTION
STRAND TERMINATION AND STANDARD SAFETY INSTALLATION DETAILS

SHEET NUMBER	REVISION
S-3	0

EBI Consulting
environmental | engineering | due diligence

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

SPRINT Existing Facility

Site ID: CT03XC074

345 North Main
345 North Main Street
Hartford, CT 06117

April 18, 2018

EBI Project Number: 6218002918

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	41.60 %

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

EBI Consulting
environmental | engineering | due diligence

April 18, 2018

SPRINT
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Emissions Analysis for Site: **CT03XC074 – 345 North Main Street**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **345 North Main Street, Hartford, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT 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 population 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 population 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.

General population 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 850 MHz Band is approximately 567 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) 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 SPRINT Wireless antenna facility located at **345 North Main Street, Hartford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT 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) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

3) 5 CDMA channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 16 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 40 Watts per Channel.

5) 8 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 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 **Commscope NNVV-65B-R4 and the RFS APXVTM14-ALU-I20** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) 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 **100 feet** above ground level (AGL) for **Sector A**, **100 feet** above ground level (AGL) for **Sector B** and **100 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 population threshold limits.

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4
Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd
Height (AGL):	**100 feet**	Height (AGL):	**100 feet**	Height (AGL):	**100 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts
ERP (W):	6,248.42	ERP (W):	6,248.42	ERP (W):	6,248.42
Antenna A1 MPE%	**2.90%**	Antenna B1 MPE%	**2.90%**	Antenna C1 MPE%	**2.90%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVTM14-ALU-120	Make / Model:	RFS APXVTM14-ALU-120	Make / Model:	RFS APXVTM14-ALU-120
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**100 feet**	Height (AGL):	**100 feet**	Height (AGL):	**100 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	**2.53 %**	Antenna B2 MPE%	**2.53 %**	Antenna C2 MPE%	**2.53 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**5.43 %**
Verizon Wireless	14.90 %
T-Mobile	7.96 %
Clearwire	0.22 %
AT&T	13.09 %
Site Total MPE %:	**41.60 %**

SPRINT Sector A Total:	5.43 %
SPRINT Sector B Total:	5.43 %
SPRINT Sector C Total:	5.43 %
Site Total:	41.60 %

SPRINT _ Frequency Band / Technology Max Power Values (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**
Sprint 850 MHz CDMA	1	376.73	100	1.53	850 MHz	567	0.27%
Sprint 850 MHz LTE	2	376.73	100	3.07	850 MHz	567	0.55%
Sprint 1900 MHz (PCS) CDMA	5	511.82	100	10.41	1900 MHz (PCS)	1000	1.04%
Sprint 1900 MHz (PCS) LTE	2	1,279.56	100	10.41	1900 MHz (PCS)	1000	1.04%
Sprint 2500 MHz (BRS) LTE	8	778.09	100	25.33	2500 MHz (BRS)	1000	2.53%
						Total:	**5.43%**

Summary

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

The anticipated maximum composite contributions from the SPRINT facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

SPRINT Sector	Power Density Value (%)
Sector A:	5.43 %
Sector B:	5.43 %
Sector C:	5.43 %
SPRINT Maximum Total (per sector):	5.43 %
Site Total:	41.60 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **41.60 %** of the allowable FCC established general population 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.

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

August 15, 2014

Melanie Howlett
HPC Wireless Services
22 Shelter Rock Lane, Building C
Danbury, CT 06811

RE: **EM-SPRINT-155-140613** – Sprint Spectrum, L.P. notice of intent to modify an existing telecommunications facility located at 345 North Main Street, West Hartford, Connecticut.

Dear Ms. Howlett:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- New guy-wires shall be installed in accordance with the recommendations made in the Structural Analysis Report prepared by SEMAAN Engineering, stamp dated on May 14, 2014;
- Within 45 days following completion of the antenna installation, Sprint shall provide documentation certified by a professional engineer that its installation complied with the requirements of the structural analysis;
- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- Any nonfunctioning antenna and associated antenna mounting equipment on this facility owned and operated by Sprint shall be removed within 60 days of the date the antenna ceased to function.
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated June 12, 2014. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site by any dimension, increase noise levels at the tower site boundary by six decibels or more, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standards adopted by the Federal Communications Commission pursuant to Section 704 of the Telecommunications Act of 1996 and by the state Department of Energy and

Environmental Protection pursuant to Connecticut General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below state and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/RDM/cm

c: The Honorable Scott Slifka, Mayor, Town of West Hartford
Ronald Van Winkle, Town Manager, Town of West Hartford
Todd Dumais, Town Planner, Town of West Hartford
Edens & Avant Investments L.P.

WEST HARTFORD
CONNECTICUT

Account info last updated on Apr 19, 2018

0 BILL(S) - $0.00

Home Shopping Cart Checkout

TAX BILLS

TAXPAYER INFORMATION

Bill #	2013-2-0913749 **(PERSONALPROPERTY)**	Gross Assessment	10,720
Unique ID	4219852	Exemptions	0
District		Net Assessment	10,720
Name	EDENS	Town Mill Rate	37.37
Address			
Property Location	345 NORTH MAIN STREET BISHOPS CORNER (E&A) LLC		
MBL		Town Benefit	0.00
Volume & Page		Elderly Benefit (C)	0.00

BILL INFORMATION AS OF 04/19/2018

Installment	**Due Date**	**Town**	**District**	**Other**	**Total Installments**	**$400.62**
#1	07/01/2014	$200.31	$0.00		Paid	$400.62
#2	01/01/2015	$200.31			Tax/Princ/Bint Due	$0.00
#3					Interest Due	$0.00
#4					Lien Due	$0.00
Total		**$400.62**	**$0.00**	**$0.00**	Fee Due	$0.00
Adjustment		$0.00	**$0.0**	**$0.0**	**Total Due Now**	**$0.00**

PAY DATE	TYPE	TAX/PRINCIPAL	INTEREST	LIEN	FEE	TOTAL
01/05/2015	PAY	$200.31	$0.00	$0.00	$0.00	$200.31
07/29/2014	PAY	$200.31	$0.00	$0.00	$0.00	$200.31

Total Payments made to taxes in 2017: **$0.00**

This is not a tax form, contact your financial advisor for information regarding tax reporting.

Back To Search Result Download PDF View All Bills

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FedEx® Tracking

772080394556

Ship date:
Wed 4/25/2018

Charles Cherundolo Consulting
Steve Sofman
Suite 9
1280 Route 46 West
PARSIPPANY, NJ US 07054
973 477-8032

Delivery exception
WINDSOR LOCKS, CT

Scheduled delivery:
Tue 5/01/2018 by 4:30 pm

Edans & Avant LLC
Suite 304
345 N Main St
WEST HARTFORD, CT US 06117
860 523-5739

Customer not Available or Business Closed

Recommended action:
Door tag will provide the time and address of the FedEx location where you may pick up your shipment, and also indicate if another delivery attempt will be made.

Travel History

Date/Time	Activity	Location
- 4/30/2018 - Monday		
1:45 pm	Delivery exception Customer not available or business closed	WINDSOR LOCKS, CT
11:32 am	Delivery exception Customer not available or business closed	WINDSOR LOCKS, CT
7:51 am	On FedEx vehicle for delivery	WINDSOR LOCKS, CT
- 4/27/2018 - Friday		
5:19 pm	At local FedEx facility	WINDSOR LOCKS, CT
2:58 pm	Delivery exception Customer not available or business closed	WINDSOR LOCKS, CT
8:02 am	On FedEx vehicle for delivery	WINDSOR LOCKS, CT
7:30 am	At local FedEx facility	WINDSOR LOCKS, CT
6:40 am	At destination sort facility	EAST GRANBY, CT
3:44 am	Departed FedEx location	NEWARK, NJ
- 4/25/2018 - Wednesday		
10:17 pm	Arrived at FedEx location	NEWARK, NJ
9:45 pm	Left FedEx origin facility	EAST HANOVER, NJ
7:55 pm	Picked up	EAST HANOVER, NJ
2:51 pm	Shipment information sent to FedEx	

Shipment Facts

Tracking Number	772080394556	**Service**	FedEx 2Day
Door tag number	DT104858932808	**Weight**	1 lbs / 0.45 kgs
Delivery attempts	2	**Total pieces**	1
Total shipment weight	1 lbs / 0.45 kgs	**Terms**	Not Available
Shipper reference	CT03XC074 CSC filing	**Packaging**	FedEx Pak
Special handling section	Deliver Weekday	**Standard transit**	4/27/2018 by 4:30 pm

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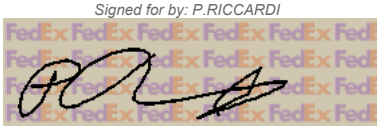
FedEx® Tracking

772080334940

Ship date:
Wed 4/25/2018

Charles Cherundolo Consulting
Steve Sofman
Suite 9
1280 Route 46 West
PARSIPPANY, NJ US 07054
973 477-8032

Delivered
Signed for by: P.RICCARDI



Actual delivery:
Fri 4/27/2018 9:42 am

West Hartford - Planning
Todd Dumais
50 South Main St
WEST HARTFORD, CT US 06107
860 561-7500

Travel History

Date/Time	Activity	Location
- 4/27/2018 - Friday		
9:42 am	Delivered	WEST HARTFORD, CT
8:02 am	On FedEx vehicle for delivery	WINDSOR LOCKS, CT
7:30 am	At local FedEx facility	WINDSOR LOCKS, CT
6:40 am	At destination sort facility	EAST GRANBY, CT
3:44 am	Departed FedEx location	NEWARK, NJ
- 4/25/2018 - Wednesday		
10:17 pm	Arrived at FedEx location	NEWARK, NJ
9:45 pm	Left FedEx origin facility	EAST HANOVER, NJ
7:55 pm	Picked up	EAST HANOVER, NJ
2:48 pm	Shipment information sent to FedEx	

Shipment Facts

Tracking Number	772080334940	**Service**	FedEx 2Day
Weight	1 lbs / 0.45 kgs	**Delivery attempts**	1
Delivered To	Receptionist/Front Desk	**Total pieces**	1
Total shipment weight	1 lbs / 0.45 kgs	**Terms**	Not Available
Shipper reference	CT03XC074 CSC filing	**Packaging**	FedEx Pak
Special handling section	Deliver Weekday	**Standard transit**	4/27/2018 by 4:30 pm

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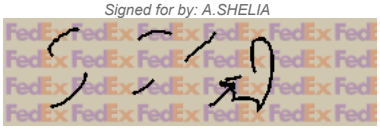
FedEx® Tracking

772080321285

Ship date:
Wed 4/25/2018

Charles Cherundolo Consulting
Steve Sofman
Suite 9
1280 Route 46 West
PARSIPPANY, NJ US 07054
973 477-8032

Delivered
Signed for by: A.SHELIA



Actual delivery:
Fri 4/27/2018 4:57 pm

West Hartford
Mayor Shari Cantor
50 South Main St
WEST HARTFORD, CT US 06107
860 561-7500

Travel History

Date/Time	Activity	Location
- 4/27/2018 - Friday		
4:57 pm	Delivered	WEST HARTFORD, CT
3:15 pm	On FedEx vehicle for delivery	WINDSOR LOCKS, CT
1:10 pm	Delivery exception Package at station, arrived after courier dispatch	WINDSOR LOCKS, CT
1:09 pm	At local FedEx facility	WINDSOR LOCKS, CT
8:41 am	In transit	WATERTOWN, CT
8:12 am	At local FedEx facility	WATERTOWN, CT
- 4/25/2018 - Wednesday		
10:17 pm	Arrived at FedEx location	NEWARK, NJ
9:45 pm	Left FedEx origin facility	EAST HANOVER, NJ
7:55 pm	Picked up	EAST HANOVER, NJ
2:47 pm	Shipment information sent to FedEx	

Shipment Facts

Tracking Number	772080321285	**Service**	FedEx 2Day
Weight	1 lbs / 0.45 kgs	**Delivery attempts**	1
Delivered To	Receptionist/Front Desk	**Total pieces**	1
Total shipment weight	1 lbs / 0.45 kgs	**Terms**	Not Available
Shipper reference	CT03XC074 CSC filing	**Packaging**	FedEx Pak
Special handling section	Deliver Weekday	**Standard transit**	4/27/2018 by 4:30 pm