



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

August 7, 2018

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

RE: Notice of Exempt Modification for Sprint DO Macro: 806366
Sprint Site ID: CT03XC210
73 North Main Street, Marlborough, CT 06447
Latitude: 41° 37' 47.32"/ Longitude: -71° 57' 59.41"

Dear Ms. Bachman:

Sprint currently maintains six (6) antennas at the 130-foot level of the existing 155.5-foot monopole tower at 73 North Main Street, Marlborough, CT. The tower is owned by Crown Castle. The property is owned by Village Properties LLC, C/O Crown Atlantic CO. Sprint now intends to replace six (6) antennas with six (6) new antennas. These antennas would be installed at the 130-foot level of the tower. Sprint also intends to install twelve (12) RRH's, four (4) Hybrid cables and remove six (6) coax cables.

The facility was approved by the Connecticut Siting Council in Docket No. 169 on October 25, 1995. This approval included the condition that:

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed communication service, sufficient to accommodate the antennas of Springwich Cellular Limited Partnership and the Town of Marlborough, and not to exceed the total height of 160 feet above ground level (AGL).

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to First Selectman- Ms. Amy Traversa & The Planning Commission, Town of Marlborough, CT. Crown Castle is the tower owner and is stated on the property card as Crown Atlantic CO.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.

Melanie A. Bachman

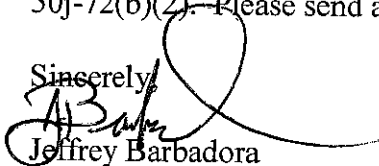
August 7, 2018

Page 2

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,



Jeffrey Barbadora

Real Estate Specialist

12 Gill Street, Suite 5800, Woburn, MA 01801

781-729-0053

Jeff.Barbadora@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes

Tab 2: Exhibit-2: Structural Modification Report

Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: Amy J. Traversa, First-Selectman
Town of Marlborough
26 North Main Street
Marlborough, CT 06447
(860) 295-6204

Town of Marlborough Planning Commission
26 North Main Street
Marlborough, CT 06447
(860) 295-6200

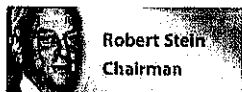


Governor Dannel P. Malloy |

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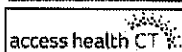
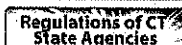
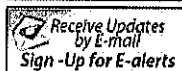
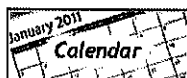
CONNECTICUT SITING COUNCIL

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Robert Stein
Chairman

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Robert Stein
Chairman

Melanie Bachman,
Acting Executive Director

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DOCKET NO. 169 - An application of Bell Atlantic NYNEX Mobile, for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a telecommunications tower and associated equipment located within a 56+/- acre parcel at 56 East Hampton Road, in Marlborough, Connecticut. The proposed alternatives are located within a 21.7+/- acre parcel at North Main Street and within a 2.5+/- acre parcel at 9-11 South Main Street, in Marlborough, Connecticut.

Connecticut Siting Council

October 25, 1995

DECISION AND ORDER

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a cellular telecommunications tower and equipment building at the proposed first alternate site in Marlborough, Connecticut, including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to Bell Atlantic NYNEX Mobile, Inc. (BANM) for the construction, operation, and maintenance of a cellular telecommunications tower, associated equipment, and building at the proposed first alternate site, located within a 21.7+/- acre parcel at North Main Street, Marlborough, Connecticut. We find the effects on scenic resources and adjacent land uses of the prime site and second alternate site to be significant, and therefore deny certification of these sites.

The facility shall be constructed, operated, and maintained as a monopole substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed communications service, sufficient to accommodate the antennas of Springwich Cellular Limited Partnership and the Town of Marlborough, and not to exceed a total height of 160 feet above ground level (AGL).
2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include placement of utilities underground, relocation of the tower within the leased parcel to provide the maximum practicable buffer of the tower from adjacent land owners; plans for the tower foundation; specifications for the placement of all antennas to be attached to this tower; plans for the equipment building and security fence; plans for the access road and utility line installation from North Main Street; plans for site clearing and tree trimming; and plans for water drainage and erosion and sedimentation controls consistent with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.
3. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.
4. The Certificate Holder shall provide the Council a recalculated report of electromagnetic radio frequency power density if and when circumstances in operation cause a change in power density above the levels originally calculated and provided in the application.
5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
6. If the facility does not initially provide, or permanently ceases to provide cellular services following completion of construction, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapplication for any continued or new use shall be made to the Council before any such use is made.
7. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the effective date of this Decision and Order or within three years after all appeals to this Decision and Order have been resolved.
8. The Certificate Holder shall notify the Council upon completion of construction and provide the final cost to construct the facility.

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Pursuant to General Statutes § 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in The Hartford Courant, and the Middletown Press.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

The parties and intervenors to this proceeding are:

APPLICANT

Bell Atlantic NYNEX Mobile, Inc.

ITS REPRESENTATIVE

Brian C. S. Freeman, Esq.
Kenneth C. Baldwin, Esq.
Robinson & Cole
One Commercial Plaza
Hartford, CT 06103-3597

David S. Malko
General Manager - Engineering
Sandy M. Ranciato
Regulatory Services
Bell Atlantic NYNEX Mobile, Inc.
20 Alexander Drive
Wallingford, CT 06492

INTERVENOR

Springwich Cellular Limited Partnership

ITS REPRESENTATIVE

Peter J. Tyrrell, Esq.
Springwich Cellular Limited Partnership
227 Church Street
New Haven, CT 06510

PARTY

Town of Marlborough

ITS REPRESENTATIVE

William S. Fish, Jr.
Tyler, Cooper & Alcorn
CityPlace, 35th Floor
Hartford, CT 06103-3488

PARTY

Neighbors Endorsing an Appropriate Tower (NEAT)

ITS REPRESENTATIVE

Barry S. Zitser
Perakos, Kindl & Zitser
207 Main Street
Hartford, CT 06106

Content Last Modified on 8/9/2002 11:28:31 AM

Ten Franklin Square New Britain, CT 06051 / 860- 827-2935

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CURRENT OWNER	TOPO.	UTILITIES	STRT./ROAD	LOCATION	DESCRIPTION	CURRENT ASSESSMENT	PREVIOUS ASSESSMENTS (HISTORY)
VILLAGE PROPERTIES LLC C/O CROWN ATLANTIC CO PMB 353 4017 WASHINGTON RD MCNURRAY, PA 15317 Additional Owners:	2 Above Street		1 Paved		Comm Land Comm Bldg Comm OB	2-1 121,900 2-2 80,600 2-5 663,000	85,330 56,420 464,100
Other ID: 2014T			EXEMPT CO				
Census Dev. Lot Dev. Map			Lake Area Photo Retake CB Letter				
SUPPLEMENTAL DATA							
ASSOC PID#							
GIS ID: 6/26/65T							



RECORD OF OWNERSHIP	BK-VOL/PAGE	SALE DATE	q/u	w/	SALE PRICE	V.C.
VILLAGE PROPERTIES LLC	127/ 9	02/03/1999	U	1		29

EXEMPTIONS	Amount	Code	Description	Number	Amount	Comm. Int.
OTHER ASSESSMENTS						
ASSESSING NEIGHBORHOOD						
NBHD/SUB	NBHD Name	Street Index Name	Tracing	Batch		
000M/A						
NOTES						
CELL TOWER LOCATED BEHIND MARLBORO BARN						
CELLULAR TOWER; GATED						
500 FT LF FALL, DOWN ZONE = 5.74 AC						
1.84 COMMERCIAL SITE						
3.9 COMMERCIAL EXCESS						
CELL TOWER VALUE = \$2083/MONTH=5% VAC.						
15% EXPENSES = \$20,184 CAPPED AT 10% =						
\$201,880 PER SITE X 5 SITES = \$1,009,400						
2017 UPDATE-TERMINATION/EXPIRATION OF ONE CARRIER/SPRINT/NEXTEL						

APPRAISED VALUE SUMMARY

Appraised Bidg. Value (Card)	80,600
Appraised XF (B) Value (Bidg)	0
Appraised OB (L) Value (Bidg)	663,000
Appraised Land Value (Bidg)	121,900
Special Land Value	0
Total Appraised Parcel Value	865,500
Valuation Method:	C
Adjustment:	0
Net Total Appraised Parcel Value	865,500

Permit ID	Issue Date	Type	Description	Amount	hsq. Date	% Comp.	Date Comp.	Comments	Date	Type	IS	ID	CL	Purpose/Result
17-035	03/09/2017	BP	Commercial	7,500	07/27/2015	0		REPLACE 3 RRUS TO E07/27/2015						
15-101	05/12/2015	CM	Commercial	0	07/27/2015	100		ANTENNA UPGRADE				IM	99	Vacant Land
1128	12/27/2012	CM	Commercial	0	07/27/2015	100		GROUND MOUNTED C						
500	12/13/2011	CM	Commercial	0	07/27/2015	100		CHANGE SEVEN (7) AN						

BUILDING PERMIT RECORD

VISIT/ CHANGE HISTORY

B Use # Code	Use Description	Zone	D From	Depth	Units	Unit Price	I Factor	S.A.	C Factor	Disc	ST. Idx	Adj.	Notes-Adj	Special Pricing	S Adj Fact	Adj. Unit Price	Land Value
1 200	Commercial	R	A	181	1.84 AC	76,000.00	0.6150	1.0000	1.00	1.00	D	1.10			1.00		94,600
1 200	Commercial	R	A	181	3.90 AC	7,000.00	1.0000	0	1.00	1.00	D	0.00			1.00		27,300

LAND LINE VALUATION SECTION

Total Card Land Units:	5.74 AC	Parcel Total Land Area:	5.74 AC	Total Land Value:	121,900
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CONSTRUCTION DETAIL

Element	Cd	Ch	Description	Element	Cd	Ch	Description
Style	91		Support Shed				
Model	94		Commercial				
Grade	03		Average				
Stories	1						
Occupancy	1						
Exterior Wall A	24		Reinforce Concr				
Exterior Wall B							
Roof Structure	01		Flat				
Roof Cover	04		T & G/Rubber				
Interior Wall A	01		Minimum				
Interior Wall B							
Interior Floor A	03		Concrete				
Interior Floor B							
Heating Fuel	01		Coal or Wood				
Heating Type	01		None				
AC Type	03		Central				
Bldg Use	200		Commercial				

CONSTRUCTION DETAIL (CONTINUED)

Element	Cd	Ch	Description	Code	Description	Percentage
				200	Commercial	100

MIXED USE

Code	Description	Percentage
200	Commercial	100

COST/MARKET VALUATION

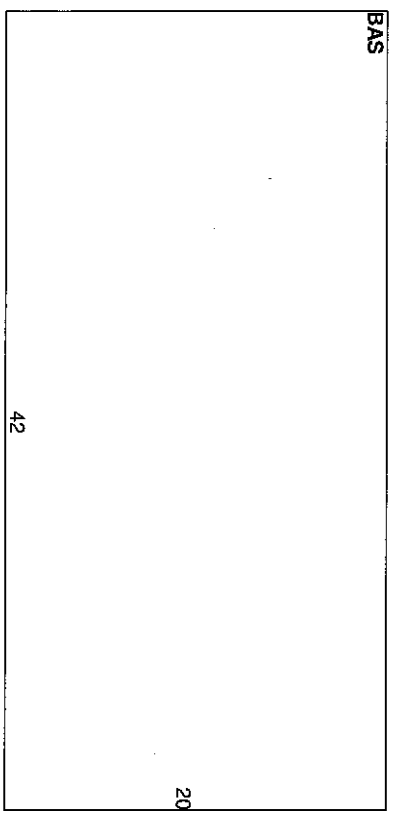
Adj. Base Rate:	110.32
Replace Cost	92,659
AYB	2000
Dep Code	A
Renodel Rating	
Year Renodelled	
Dep %	13
Functional Obslnc	
External Obslnc	
Cost Trend Factor	1
Condition	
% Complete	87
Overall % Cond	80,600
Apprais Val	0
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	

OB-OUTBUILDING & YARD ITEMS(C) / XF-BUILDING EXTRA FEATURES(B)

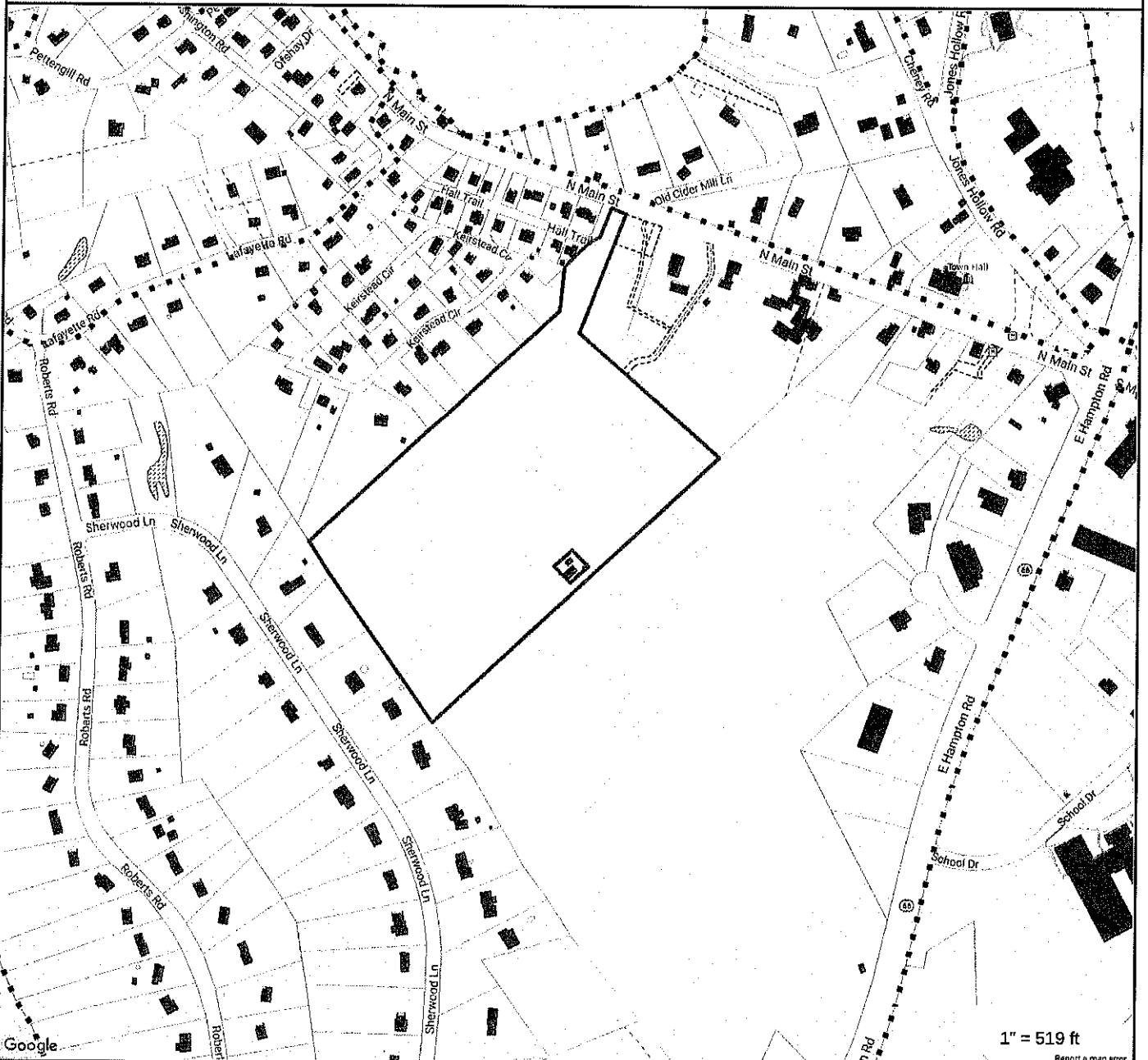
Code	Description	Sub	Sub Descript	L/B Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value
SHD1	Shed	FR	FR Frame	L	360	20,00	1999		5	60	4,300
FN4	Fence 8'	L	L	L	322	20,00	2000		5	60	3,900
PATI	Patio	CR	Concrete	L	192	3.50	2000			60	400
CELL	Cell Tower	L	L	L	4	163,600.00	2011	0		100	654,400

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprc. Value
BAS	First Floor	840	840	840		92,659
Ttl. Gross Liv/Lease Area:		840	840	840		92,659



73 North Main Street



1" = 519 ft

Report a map error

Property Information

Property ID 6/26/65
 Location NO MAIN ST
 Owner VILLAGE PROPERTIES LLC



**MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT**

Town of Marlborough, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 10/1/2017
Properties updated 08/06/2018

Address 73 NO MAIN ST

ID 6/26/65T

Ownership

Name VILLAGE
PROPERTIES LLC

Address PMB 353

Valuation

Total \$865500

Assessment

Land \$121900

Last Sale \$0.00 on 1999-02-
03

Land

Area 5.74 acres



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 FROM ZERO TO INFINIGY
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 1011 W. Main Street, Suite 100
 Overland Park, KS 66204
 Phone: 913-494-2733 | Fax: 913-494-2735
 www.infinigy.com
 200 2023 102-2023102

M.A. PARTNERS
CROWN CASTLE

STATE OF CONNECTICUT
 JAMES M. CROWNE
 PROFESSIONAL ENGINEER
 License No. 14268

DRAWING NOTES:
 THESE INSTALLMENTS ARE CONSTRUCTION AND ARE
 THE FIELD AND SHALL BE REMOVED OR REDISTRIBUTED
 WITHOUT THE EXPRESS WRITTEN CONSENT OF
 SWM.

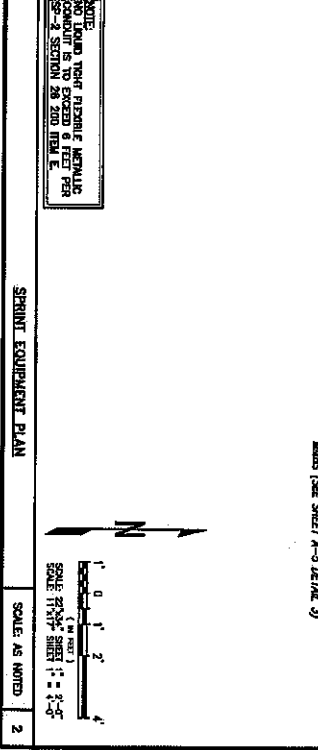
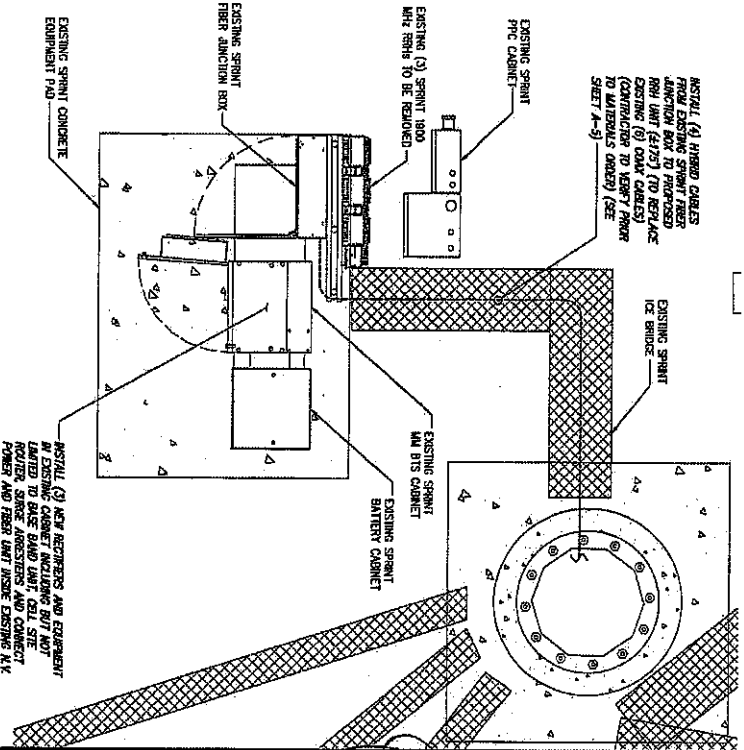
REVISION	DESCRIPTION	DATE	BY	REV

SITE NAME:
MARLBOROUGH (CROWN)

SITE ADDRESS:
**73 NORTH MAIN STREET
 MARLBOROUGH, CT 06447**

SHEET NUMBER:
1

SITE PLAN
A-1



OVERALL SITE PLAN

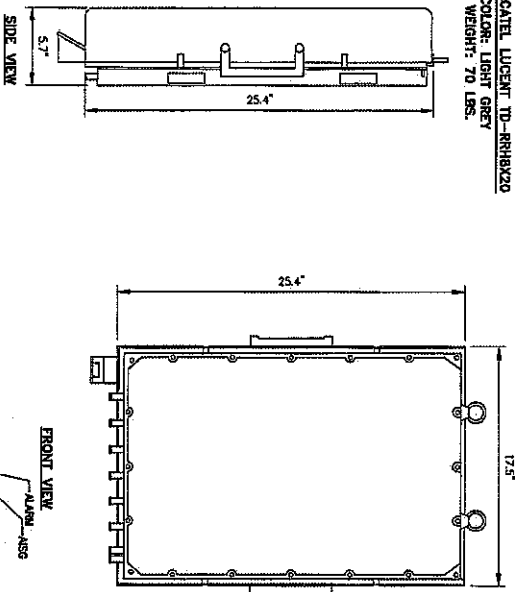
SCALE AS NOTED
 1

SCALE AS NOTED
 2

NOTE:
 INFORMATION CONTAINED WITHIN DRAWINGS ARE BASED ON PROVIDED INFORMATION AND ARE NOT THE RESULT OF A FIELD SURVEY.

RRH: ALCATEL LUCENT TD-RRHXX20

COLOR: LIGHT GREY
WEIGHT: 70 LBS.



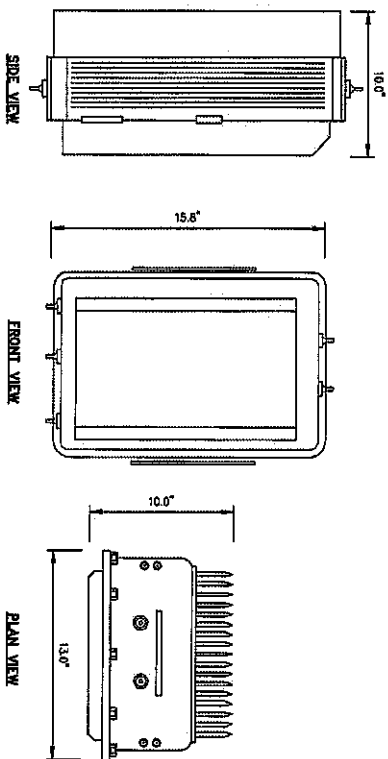
NOTES
COMPLY WITH MANUFACTURER'S INSTRUCTIONS TO ENSURE THAT ALL RRH'S RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING. DO NOT OPEN RRH PACKAGES IN THE RAIN.

2.5. RRH'S

NO SCALE 1

RRH: ALCATEL LUCENT RRH 800 MHz 2x350W

COLOR: LIGHT GREY
WEIGHT: 53 LBS.



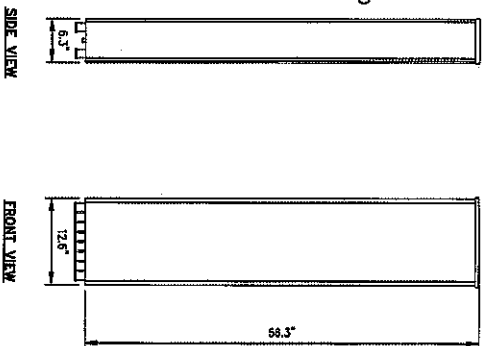
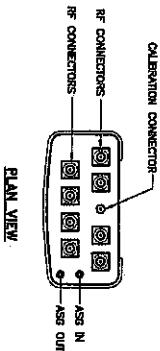
NOTES
COMPLY WITH MANUFACTURER'S INSTRUCTIONS TO ENSURE THAT ALL RRH'S RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING. DO NOT OPEN RRH PACKAGES IN THE RAIN.

800 MHz RRH

NO SCALE 2

ANTENNA RES APYVIM14-ALLI-120

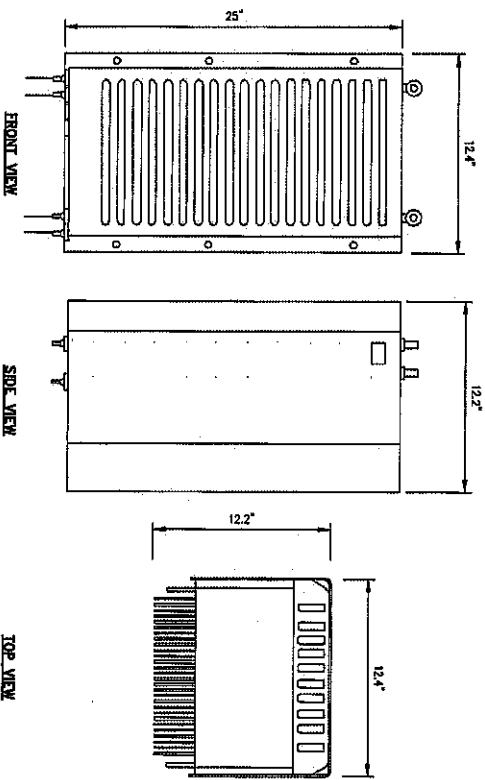
PACKAGE MATERIAL: ASA
PACKAGE COLOR: LIGHT GREY
DIMENSIONS: 58.3" x 12.6" x 6.3" (1450x320x160mm)
WEIGHT: 64.2 lbs
CONNECTORS:
(0) 4.1/9.5 DIN female
(1) RF - CALIBRATION CONNECTOR



2.5. ANTENNA

NO SCALE 3

RRH: ALCATEL LUCENT 1900 MHz
COLOR: LIGHT GREY
WEIGHT: 70 LBS.
(INCLUDING OPTIONAL SOLAR SHIELD)



1900 RRH'S

NO SCALE 4

PLAN PREPARED FOR:
Sprint
6500 South Parkway
Crested Peak, Kansas 66251

PLAN PREPARED BY:
INFINIGY®
FROM ZERO TO INFINIGY
The solutions are endless
10000 S. W. 10th St., Suite 100
Miami, FL 33150
Phone: 305-445-0216 Fax: 305-445-0218
www.infinigy.com
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PLAN PREPARED BY:
CROWN CASTLE
ENGINEERING LICENSE:

PROFESSIONAL ENGINEER
STATE OF KANSAS
JOHN S. STANG
No. 1111
Exp. 12/31/2008
Professional Engineering License

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REVISION	DATE	BY	REV
1	07/27/08	SM	1
2	07/27/08	SM	1
3	07/27/08	SM	1

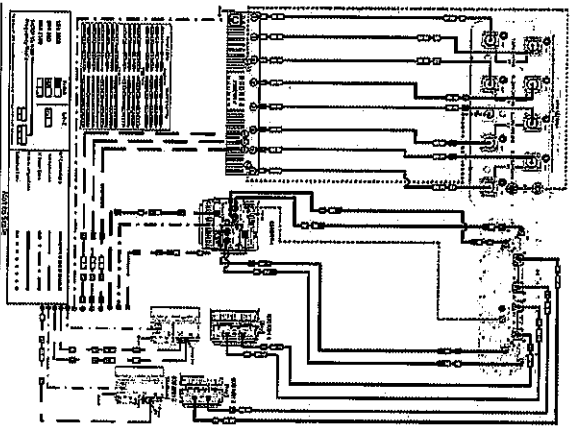
SITE NAME:
MARLBOROUGH (CROWN)

SITE CHAIRCODE:
CTW3XC210

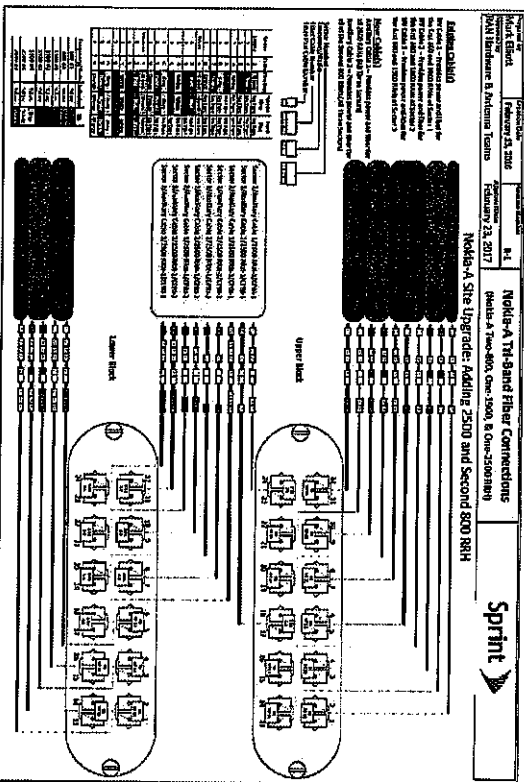
SITE ADDRESS:
**73 NORTH MAIN STREET
MARLBOROUGH, CT 06447**

SHEET DESCRIPTION:
EQUIPMENT & MOUNTING DETAILS

SHEET NUMBER:
A-4



ADD 213 4800M14-ADD-228 NINA/CGB-RK and others



PLUMBING DIAGRAM

NO SCALE 1

PLANS REQUIRED FOR

6500 Spaul Parkway
Overland Park, Kansas 66251

PLANS PROVIDED BY:

INFINGY

FROM ZERO TO INFINIGY
the solutions are endless

402 Westwood Square #411, Albany, NY 12244
Phone: 518-486-1234
www.infingy.com
© 2013 Infingy, Inc.

PLANS PROVIDED BY:

CROWN CASTLE

REGISTERED PROFESSIONAL ENGINEER

JOHN S. STEVENS
10174
12/31/14
10174

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REVISION	DATE	BY	APP
ISSUED FOR CONSTRUCTION	02/23/17	MS	
ISSUED FOR PERMITS	02/23/17	MS	

SITE NAME:
**MARLBOROUGH
(CROWN)**

SITE ADDRESS:
CT03XC210

SITE ADDRESS:
**73 NORTH MAIN STREET
MARLBOROUGH, CT 06447**

PROJECT DESCRIPTION:
PLUMBING DIAGRAM

PROJECT NUMBER:
A-6

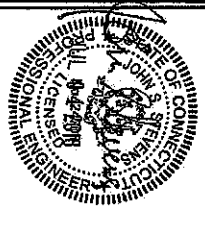


6300 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:
INFINIGY
FROM ZERO TO INFINIGY
the solutions you endorse
1028 Waterliss Lane, Suite 201, Albany, NY 12204
Phone: 518-438-0270 | Fax: 518-438-0333
www.infinigy.com
JOB NUMBER: 201-003



MANUFACTURER:
MANUFACTURER: HARTY ELECTRONICS
PART NUMBER: 10714-10240-107
REV: 1/25



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REVISION	DESCRIPTION	DATE	BY	REV
1	ISSUE FOR CONSTRUCTION	02/04/10	SB	0
2	ISSUE FOR REVIEW	06/07/10	SB	1

SITE NAME:
MARLBOROUGH (CROWN)

SITE PACKAGE:
CT103XC210

SITE ADDRESS:
**73 NORTH MAIN STREET
MARLBOROUGH, CT 06447**

SHEET DESCRIPTION:
ELECTRICAL & GROUNDING DETAILS

SHEET NUMBER:
E-1

FINAL EQUIPMENT CONFIGURATION

SECTOR	ANTENNA MANUFACTURER	ANTENNA MODEL	RAD CENTER	AZIMUTH	HORIZONTAL RANGE
1	COMMSCOPE	ANV45S34	130'	315°	0/100/10000 250/300 1/100/10000 0/0/0/0 0/100/10000 0/0/0/0
2	COMMSCOPE	ANV45S34	130'	315°	0/100/10000 250/300 1/100/10000 0/0/0/0 0/100/10000 0/0/0/0
3	COMMSCOPE	ANV45S34	130'	210°	0/100/10000 250/300 1/100/10000 0/0/0/0 0/100/10000 0/0/0/0

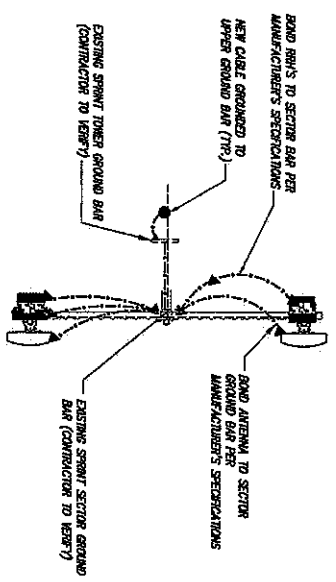
FEEDER CABLES			
MANUFACTURER	MODEL	LENGTH	QTY
ANV45S34	ANV45S34	1725'	10
ANV45S34	ANV45S34	1725'	10

NOTE:
1. CONTRACTOR TO VERIFY PROPOSED ANTENNA INSTALLATION IS THE MOST APPROPRIATE FOR THE SITE.
2. CONTRACTOR TO VERIFY PROPOSED FEEDER CABLES FROM TO CONSTRUCTION.

ANTENNA/CABLE SCHEDULE

NO SCALE

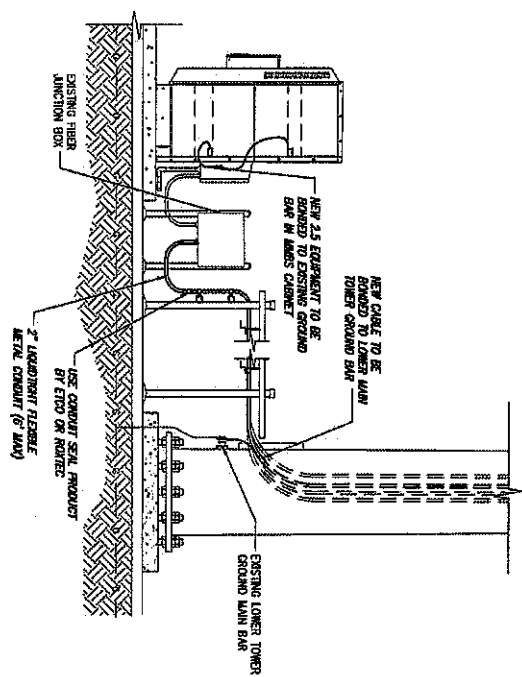
- LEGEND:**
- ○ — EXISTING GROUND RING
 - COUNDED CONNECTION (EXOTHERMIC WELD)
 - ▲ MECHANICAL CONNECTION
 - ⊕ GROUND ROD
 - CABLE GROUND KIT



TYPICAL ANTENNA GROUNDING PLAN

NO SCALE

2



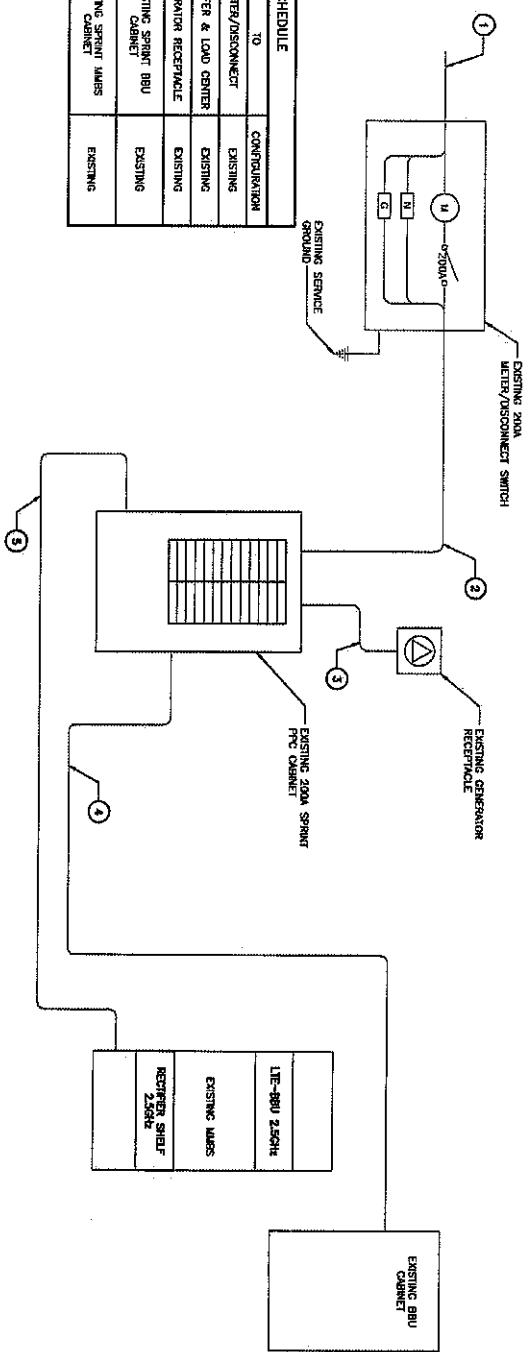
TYPICAL EQUIPMENT GROUNDING PLAN (ELEVATION)

NO SCALE

3

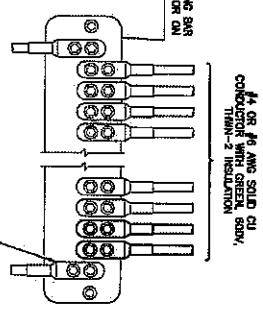
NOTES
 1. SEE SMALL REFERENCE ALL SPECS FOR
 2. SEE NEW INSTALLATION SPECIFICATIONS
 3. SEE ALL CONNECTION SPECIFICATIONS

CIRCUIT SCHEDULE			
NO	FROM	TO	CONNECTION
1	UTILITY SOURCE	METER/DISCONNECT	EXISTING
2	METER/DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	TRANSFER & LOAD CENTER	EXISTING SPRINT BBU	EXISTING
5	TRANSFER & LOAD CENTER	EXISTING SPRINT WABS	EXISTING

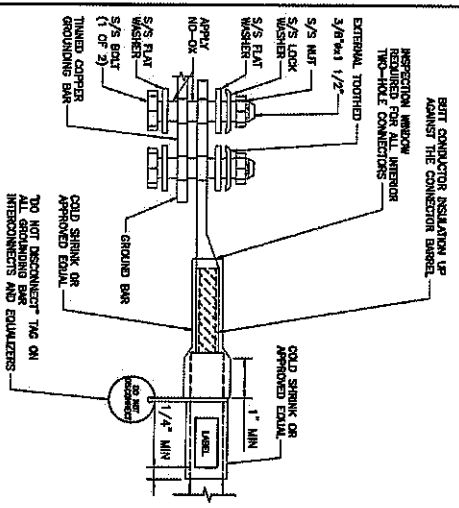


ELECTRICAL ONE-LINE DIAGRAM

NO SCALE 1



NOTES
 1. APPLY NO-OX TO LUGS AND BAR CONTACT SURFACE. DO NOT OXIDE MAKE USE.
 2. IF SPRINT GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT OR FOR REPLACEMENT THROUGH ROD KIT.

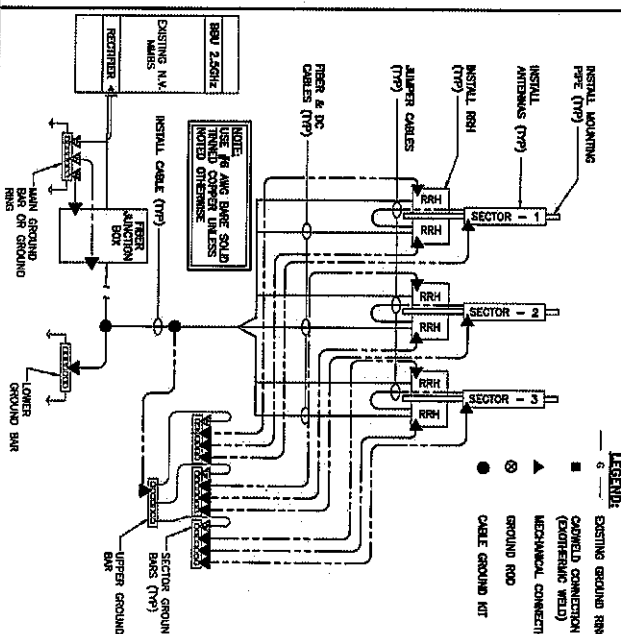


INSTALLATION OF GROUNDING CONDUCTOR TO GROUNDING BAR

TWO-HOLE LUG

GROUNDING BISEL DIAGRAM

NO SCALE 4



PLANS PREPARED BY:
INFINIGY
 FROM ZERO TO INFINIGY
 This solutions are outlined
 1234 Rte 1, Albany, NY 12205
 Phone: 518-862-1111 Fax: 518-862-0713
 Web: www.infigny.com
 2013-2014

ENGINEERING LICENSE:
CROWN CASTLE

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 2013-2014

REVISIONS:

NO.	DESCRIPTION	DATE	BY	REV
1	ISSUED FOR CONSTRUCTION	07/20/13	SS	A
2	ISSUED FOR REVIEW	07/27/13	SS	A

PROJECT INFORMATION:
MARLBOROUGH (CROWN)

DATE: 07/20/13
PROJECT NO.: CT103XC210

CLIENT ADDRESS:
 73 NORTH MAIN STREET
 MARLBOROUGH, CT 06447

PROJECT NAME:
ELECTRICAL & GROUNDING DETAILS

PROJECT NUMBER:
E-2

Date: June 06, 2018

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



2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: Structural Analysis Report

Carrier Designation: Sprint PCS Co-Locate
Carrier Site Number: CT03XC210
Carrier Site Name: HRT 107

Crown Castle Designation: Crown Castle BU Number: 806366
Crown Castle Site Name: HRT 107(C) 943204
Crown Castle JDE Job Number: 465318
Crown Castle Work Order Number: 1582419
Crown Castle Order Number: 410917 Rev. 2

Engineering Firm Designation: Crown Castle Project Number: 1582419

Site Data: 73 North Main Street, MARLBOROUGH, Hartford County, CT
Latitude 41° 37' 47.3", Longitude -72° 27' 59.4"
155.5 Foot - Monopole Tower

Dear Denice Nicholson,

Crown Castle is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1582419, in accordance with order 410917, revision 2.

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

LC5: Existing + Proposed Equipment

Sufficient Capacity

Note: See Table I and Table II for the proposed and existing loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 130 mph converted to a nominal 3-second gust wind speed of 101 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B and Risk Category II were used in this analysis.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

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

Structural analysis prepared by: Steven Hu / Shan

Respectfully submitted by:

Maribel Dentinger

Maribel Dentinger, P. E.
Senior Project Engineer

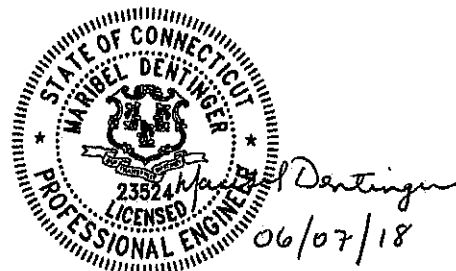


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1) INTRODUCTION

This tower is a 155.5 ft. Monopole tower designed by FWT INC. in December of 1997. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 101 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category B.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
128.0	130.0	3	alcatel lucent	PCS 1900MHZ 4X45W-65MHZ	3 1	1-1/4 7/8	-
		6	alcatel lucent	RRH2X50-800			
		3	alcatel lucent	TD-RRH8X20-25			
		3	commscope	NNVV-65B-R4 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
156.0	159.0	3	decibel	DB809K-Y	3	1-5/8	3
		3	alcatel lucent	RRH2x60-700	14	1-5/8	1
		3	alcatel lucent	RRH2x60-AWS			
		3	alcatel lucent	RRH2x60-PCS			
		6	andrew	SBNHH-1D65B w/ Mount Pipe			
		5	commscope	LNX-6514DS-A1M w/ Mount Pipe			
		1	commscope	LNX-8513DS-VTM w/ Mount Pipe			
	2	rfs celwave	DB-T1-6Z-8AB-0Z				
156.0	1	tower mounts	Platform Mount [LP 1001-1]				
144.0	144.0	6	ericsson	RRUS-11	1 2 12 1	3/8 3/4 1-1/4 conduit	1
		3	kmw comm	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave tech	1001940			
		6	powerwave tech	7770.00 w/ Mount Pipe			
		6	powerwave tech	LGP 17201			
		6	powerwave tech	LGP21903			
		1	raycap	DC6-48-60-18-8F			
135.0	135.0	3	kathrein	742 213 w/ Mount Pipe	6	1-1/4	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
128.0	130.0	6	decibel	DB980H90E-M w/ Mount Pipe	6	1-1/4	2
	128.0	2	tower mounts	T-Arm Mount [TA 602-3]	-	-	1
100.0	100.0	6	andrew	ETM19V2S12UB	12	1-1/4	1
		3	commscope	ATBT-BOTTOM-24V			
		3	commscope	LNx-6515DS-VTM w/ Mount Pipe			
		3	ems wireless	RV90-17-00DP w/ Mount Pipe			
		1	tower mounts	Side Arm Mount [SO 701-3]			

Notes:

- 1) Existing Equipment
- 2) Equipment To Be Removed; Not Considered In This Analysis
- 3) Abandoned Equipment; Considered in Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
157.75	157.75	12	Swedcom	ALP-9212-N	-	-
144.25	144.25	9	Swedcom	ALP-9212-N	-	-
132.00	132.00	2	Celwave	PD1142	-	-
		1	Celwave	PD201		
		2	Celwave	PD220		
		9	Decibel	DB980		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Engineering	2208816	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FWT, Inc.	823125	CCISITES
4-TOWER MANUFACTURER DRAWINGS	FWT, Inc.	823126	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	155.5 - 110	Pole	TP64.606x58.6x0.375	1	-26.32	3989.11	15.2	Pass
L2	110 - 72.5	Pole	TP68.805x62.8x0.4375	2	-45.14	5321.74	28.6	Pass
L3	72.5 - 36	Pole	TP72.748x66.8082x0.5	3	-66.83	6775.62	37.8	Pass
L4	36 - 0	Pole	TP76.5x70.56x0.5	4	-95.70	6928.62	56.8	Pass
							Summary	
						Pole (L4)	56.8	Pass
						Rating =	56.8	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	57.4	Pass
1	Base Plate	0	25.9	Pass
1	Base Foundation Structure	0	33.2	Pass
1	Base Foundation Soil Interaction	0	34.3	Pass

Structure Rating (max from all components) =	57.4%
---	--------------

Notes:

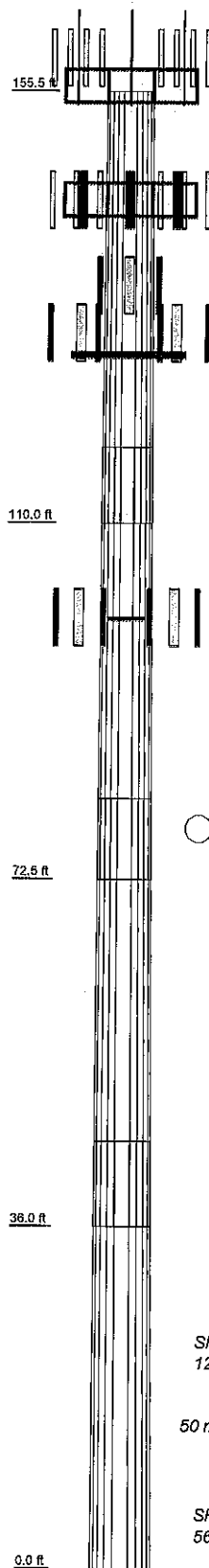
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	45.50	12	0.3750	8.00	58.6000	64.9060	A572-65	11.4
2	45.50	12	0.4375	8.50	62.8000	68.8050	A572-65	14.3
3	45.00	12	0.5000	9.00	66.8082	72.7480	A572-65	17.1
4	45.00	12	0.5000	70.5600	76.5000		A572-65	18.0



DESIGNED APPURTENANCE LOADING

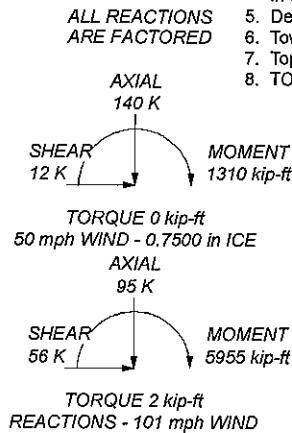
TYPE	ELEVATION	TYPE	ELEVATION
DB809K-Y	156	(2) RRUS-11	144
DB809K-Y	156	1001940	144
DB809K-Y	156	1001940	144
LNK-6513DS-VTM w/ Mount Pipe	156	1001940	144
LNK-6514DS-A1M w/ Mount Pipe	156	DC8-48-60-18-8F	144
(2) LNK-6514DS-A1M w/ Mount Pipe	156	(2) 6' x 2" Mount Pipe	144
(2) LNK-6514DS-A1M w/ Mount Pipe	156	(2) 6' x 2" Mount Pipe	144
(2) SBNHH-1D65B w/ Mount Pipe	156	(2) 6' x 2" Mount Pipe	144
(2) SBNHH-1D65B w/ Mount Pipe	156	Platform Mount [LP 1001-1]	144
(2) SBNHH-1D65B w/ Mount Pipe	156	742 213 w/ Mount Pipe	135
RRH2x60-AWS	156	742 213 w/ Mount Pipe	135
RRH2x60-AWS	156	742 213 w/ Mount Pipe	135
RRH2x60-AWS	156	NNVV-65B-R4 w/ Mount Pipe	128
RRH2x60-PCS	156	NNVV-65B-R4 w/ Mount Pipe	128
RRH2x60-PCS	156	NNVV-65B-R4 w/ Mount Pipe	128
RRH2x60-PCS	156	APXVTM14-ALU-I20 w/ Mount Pipe	128
(2) DB-T1-6Z-BAB-0Z	156	APXVTM14-ALU-I20 w/ Mount Pipe	128
RRH2x60-700	156	APXVTM14-ALU-I20 w/ Mount Pipe	128
RRH2x60-700	156	RRH2X50-600	128
RRH2x60-700	156	(4) RRH2X50-800	128
6' x 2" Mount Pipe	156	RRH2X50-800	128
6' x 2" Mount Pipe	156	(3) PCS 1900MHZ 4X45W-65MHZ	128
6' x 2" Mount Pipe	156	(3) TD-RRH8X20-25	128
Platform Mount [LP 1001-1]	156	T-Arm Mount [TA 602-3]	128
(2) 7770.00 w/ Mount Pipe	144	T-Arm Mount [TA 602-3]	128
(2) 7770.00 w/ Mount Pipe	144	6' x 2" Mount Pipe	128
(2) 7770.00 w/ Mount Pipe	144	6' x 2" Mount Pipe	128
AM-X-CD-16-65-00T-RET w/ Mount Pipe	144	6' x 2" Mount Pipe	128
AM-X-CD-16-65-00T-RET w/ Mount Pipe	144	LNK-6513DS-VTM w/ Mount Pipe	100
AM-X-CD-16-65-00T-RET w/ Mount Pipe	144	LNK-6513DS-VTM w/ Mount Pipe	100
AM-X-CD-16-65-00T-RET w/ Mount Pipe	144	LNK-6513DS-VTM w/ Mount Pipe	100
(2) LGP 17201	144	RV90-17-00DP w/ Mount Pipe	100
(2) LGP 17201	144	RV90-17-00DP w/ Mount Pipe	100
(2) LGP 17201	144	RV90-17-00DP w/ Mount Pipe	100
(2) LGP21903	144	ATBT-BOTTOM-24V	100
(2) LGP21903	144	ATBT-BOTTOM-24V	100
(2) LGP21903	144	ATBT-BOTTOM-24V	100
(2) LGP21903	144	(2) ETM19V2S12UB	100
(2) RRUS-11	144	(2) ETM19V2S12UB	100
(2) RRUS-11	144	(2) ETM19V2S12UB	100
		Side Arm Mount [SO 701-3]	100

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 101 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 56.8%



<p>CROWN CASTLE The Pathway to Possible</p>	<p>Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-4623</p>			<p>Job: BU# 806366</p>
	Project:	Client: Crown Castle	Drawn by: Steven Hu	App'd:
	Code: TIA-222-G	Date: 06/06/18	Scale: NTS	
	Path:	R:\ISA Models - Letters\Work Area\Sheet1 - WIP\BU06366 WO 1582419\BU06366.dwg		

Tower Input Data

There is a pole section.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

- 4) Tower is located in Hartford County, Connecticut.
- 5) Basic wind speed of 101 mph.
- 6) Structure Class II.
- 7) Exposure Category B.
- 8) Topographic Category 1.
- 9) Crest Height 0.00 ft.
- 10) Nominal ice thickness of 0.7500 in.
- 11) Ice thickness is considered to increase with height.
- 12) Ice density of 56 pcf.
- 13) A wind speed of 50 mph is used in combination with ice.
- 14) Temperature drop of 50 °F.
- 15) Deflections calculated using a wind speed of 60 mph.
- 16) A non-linear (P-delta) analysis was used.
- 17) Pressures are calculated at each section.
- 18) Stress ratio used in pole design is 1.
- 19) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	155.50-110.00	45.50	8.00	12	58.6000	64.6060	0.3750	1.5000	A572-65 (65 ksi)
L2	110.00-72.50	45.50	8.50	12	62.8000	68.8050	0.4375	1.7500	A572-65 (65 ksi)
L3	72.50-36.00	45.00	9.00	12	66.8082	72.7480	0.5000	2.0000	A572-65 (65 ksi)
L4	36.00-0.00	45.00		12	70.5600	76.5000	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	60.6672	70.3067	30422.968 0	20.8446	30.3548	1002.2457	61645.181 3	34.6028	14.6998	39.199
	66.8851	77.5589	40842.013 1	22.9947	33.4659	1220.4065	82756.991 3	38.1721	16.3094	43.492
L2	66.1084	87.8532	43610.436 1	22.3258	32.5304	1340.6056	88366.567 0	43.2387	15.6579	35.789
	71.2322	96.3127	57460.444 0	24.4756	35.6410	1612.2011	116430.43 78	47.4022	17.2672	39.468
L3	70.3265	106.7562	59911.926 3	23.7383	34.6066	1731.2263	121397.80 56	52.5421	16.5646	33.129
	75.3143	116.3193	77497.789 3	25.8648	37.6835	2056.5463	157031.53 18	57.2488	18.1565	36.313
L4	74.2790	112.7967	70668.019 5	25.0815	36.5501	1933.4563	143192.56 65	55.5151	17.5701	35.14
	79.1986	122.3600	90209.568 0	27.2080	39.6270	2276.4673	182789.04 18	60.2219	19.1620	38.324

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
L1 155.50-110.00				1	1	1			
L2 110.00-72.50				1	1	1			
L3 72.50-36.00				1	1	1			
L4 36.00-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C _A A _A	Weight
				ft		ft ² /ft	plf
LDF7-50A(1-5/8)	C	No	Inside Pole	155.50 - 0.00	3	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
561(1-5/8)	C	No	Inside Pole	155.50 - 0.00	12	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	155.50 - 0.00	2	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
**							
UCF114-50JA(1-1/4)	C	No	Inside Pole	144.00 - 0.00	12	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
FB-L98B-002-75000(3/8)	C	No	Inside Pole	144.00 - 0.00	1	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	144.00 - 0.00	2	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
2" Rigid Conduit	C	No	Inside Pole	144.00 - 0.00	1	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
**							
AVA6-50(1-1/4)	C	No	Inside Pole	135.00 - 0.00	6	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
**							

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _{AA}		Weight
						ft ² /ft	plf	
HB114-08U3M12-XXXF(7/8)	C	No	Inside Pole	128.00 - 0.00	1	No Ice	0.00	0.68
						1/2" Ice	0.00	0.68
						1" Ice	0.00	0.68
HB114-1-08U4-M5F(1-1/4)	C	No	Inside Pole	128.00 - 0.00	3	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
**								
AVA6-50(1-1/4)	C	No	Inside Pole	100.00 - 0.00	6	No Ice	0.00	0.46
						1/2" Ice	0.00	0.46
						1" Ice	0.00	0.46
LDF6-50A(1-1/4)	C	No	Inside Pole	100.00 - 0.00	6	No Ice	0.00	0.60
						1/2" Ice	0.00	0.60
						1" Ice	0.00	0.60

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R	A _F	C _{AA} In Face	C _{AA} Out Face	Weight
			ft ²	ft ²	ft ²	ft ²	K
L1	155.50-110.00	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	1.48
L2	110.00-72.50	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	1.65
L3	72.50-36.00	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	1.66
L4	36.00-0.00	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	1.64

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R	A _F	C _{AA} In Face	C _{AA} Out Face	Weight
				ft ²	ft ²	ft ²	ft ²	K
L1	155.50-110.00	A	1.724	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	1.48
L2	110.00-72.50	A	1.661	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	1.65
L3	72.50-36.00	A	1.577	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	1.66
L4	36.00-0.00	A	1.410	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	1.64

Feed Line Center of Pressure

Section	Elevation ft	CP _x	CP _z	CP _x Ice	CP _z Ice
		in	in	in	in
L1	155.50-110.00	0.0000	0.0000	0.0000	0.0000
L2	110.00-72.50	0.0000	0.0000	0.0000	0.0000
L3	72.50-36.00	0.0000	0.0000	0.0000	0.0000
L4	36.00-0.00	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
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Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K

DB809K-Y	A	From Face	4.00	0.0000	156.00	No Ice	2.85	2.85	0.03
			0.00			1/2"	4.03	4.03	0.05
			3.00			Ice	5.21	5.21	0.08
DB809K-Y	B	From Face	4.00	0.0000	156.00	1" Ice	2.85	2.85	0.03
			0.00			1/2"	4.03	4.03	0.05
			3.00			Ice	5.21	5.21	0.08
DB809K-Y	C	From Face	4.00	0.0000	156.00	1" Ice	2.85	2.85	0.03
			0.00			1/2"	4.03	4.03	0.05
			3.00			Ice	5.21	5.21	0.08

LNX-8513DS-VTM w/ Mount Pipe	A	From Face	4.00	0.0000	156.00	No Ice	8.41	7.08	0.06
			0.00			1/2"	8.97	8.27	0.13
			3.00			Ice	9.50	9.18	0.21
LNX-6514DS-A1M w/ Mount Pipe	A	From Face	4.00	0.0000	156.00	1" Ice	8.41	7.08	0.06
			0.00			1/2"	8.97	8.27	0.13
			3.00			Ice	9.50	9.18	0.21
(2) LNX-6514DS-A1M w/ Mount Pipe	B	From Face	4.00	0.0000	156.00	1" Ice	8.41	7.08	0.06
			0.00			1/2"	8.97	8.27	0.13
			3.00			Ice	9.50	9.18	0.21
(2) LNX-6514DS-A1M w/ Mount Pipe	C	From Face	4.00	0.0000	156.00	1" Ice	8.41	7.08	0.06
			0.00			1/2"	8.97	8.27	0.13
			3.00			Ice	9.50	9.18	0.21
(2) SBNHH-1D65B w/ Mount Pipe	A	From Face	4.00	0.0000	156.00	No Ice	8.39	7.08	0.08
			0.00			1/2"	8.95	8.28	0.15
			3.00			Ice	9.48	9.19	0.22
(2) SBNHH-1D65B w/ Mount Pipe	B	From Face	4.00	0.0000	156.00	1" Ice	8.39	7.08	0.08
			0.00			1/2"	8.95	8.28	0.15
			3.00			Ice	9.48	9.19	0.22
(2) SBNHH-1D65B w/ Mount Pipe	C	From Face	4.00	0.0000	156.00	No Ice	8.39	7.08	0.08
			0.00			1/2"	8.95	8.28	0.15
			3.00			Ice	9.48	9.19	0.22
RRH2x60-AWS	A	From Face	4.00	0.0000	156.00	1" Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			3.00			Ice	4.03	2.29	0.11
RRH2x60-AWS	B	From Face	4.00	0.0000	156.00	1" Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			3.00			Ice	4.03	2.29	0.11

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
			ft	ft					
RRH2x60-AWS	C	From Face	4.00	0.0000	156.00	1" Ice	3.50	1.82	0.06
			0.00			No Ice	3.76	2.05	0.08
			3.00			1/2" Ice	4.03	2.29	0.11
RRH2x60-PCS	A	From Face	4.00	0.0000	156.00	1" Ice	2.20	1.72	0.06
			0.00			No Ice	2.39	1.90	0.08
			3.00			1/2" Ice	2.59	2.09	0.10
RRH2x60-PCS	B	From Face	4.00	0.0000	156.00	1" Ice	2.20	1.72	0.06
			0.00			No Ice	2.39	1.90	0.08
			3.00			1/2" Ice	2.59	2.09	0.10
RRH2x60-PCS	C	From Face	4.00	0.0000	156.00	1" Ice	2.20	1.72	0.06
			0.00			No Ice	2.39	1.90	0.08
			3.00			1/2" Ice	2.59	2.09	0.10
(2) DB-T1-6Z-8AB-0Z	A	From Face	4.00	0.0000	156.00	1" Ice	4.80	2.00	0.04
			0.00			No Ice	5.07	2.19	0.08
			3.00			1/2" Ice	5.35	2.39	0.12
RRH2x60-700	A	From Face	4.00	0.0000	156.00	1" Ice	3.50	1.82	0.06
			0.00			No Ice	3.76	2.05	0.08
			3.00			1/2" Ice	4.03	2.29	0.11
RRH2x60-700	B	From Face	4.00	0.0000	156.00	1" Ice	3.50	1.82	0.06
			0.00			No Ice	3.76	2.05	0.08
			3.00			1/2" Ice	4.03	2.29	0.11
RRH2x60-700	C	From Face	4.00	0.0000	156.00	1" Ice	3.50	1.82	0.06
			0.00			No Ice	3.76	2.05	0.08
			3.00			1/2" Ice	4.03	2.29	0.11
6' x 2" Mount Pipe	A	From Leg	4.00	0.0000	156.00	1" Ice	1.43	1.43	0.02
			0.00			No Ice	1.92	1.92	0.03
			0.00			1/2" Ice	2.29	2.29	0.05
6' x 2" Mount Pipe	B	From Leg	4.00	0.0000	156.00	1" Ice	1.43	1.43	0.02
			0.00			No Ice	1.92	1.92	0.03
			0.00			1/2" Ice	2.29	2.29	0.05
6' x 2" Mount Pipe	C	From Leg	4.00	0.0000	156.00	1" Ice	1.43	1.43	0.02
			0.00			No Ice	1.92	1.92	0.03
			0.00			1/2" Ice	2.29	2.29	0.05
Platform Mount [LP 1001-1]	C	None		0.0000	156.00	1" Ice	47.70	47.70	3.02
						No Ice	59.50	59.50	3.62
						1/2" Ice	71.30	71.30	4.22
***						1" Ice			
(2) 7770.00 w/ Mount Pipe	A	From Face	4.00	0.0000	144.00	1" Ice	5.75	4.25	0.06
			0.00			No Ice	6.18	5.01	0.10
			0.00			1/2" Ice	6.61	5.71	0.16
(2) 7770.00 w/ Mount Pipe	B	From Face	4.00	0.0000	144.00	1" Ice	5.75	4.25	0.06
			0.00			No Ice	6.18	5.01	0.10
			0.00			1/2" Ice	6.61	5.71	0.16
(2) 7770.00 w/ Mount Pipe	C	From Face	4.00	0.0000	144.00	1" Ice	5.75	4.25	0.06
			0.00			No Ice	6.18	5.01	0.10
			0.00			1/2" Ice	6.61	5.71	0.16
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Face	4.00	0.0000	144.00	1" Ice	8.26	6.30	0.07
			0.00			No Ice	8.82	7.48	0.14
			0.00			1/2" Ice	9.35	8.37	0.21

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _{Front}	C _A A _{Side}	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft ²	ft ²	K
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Face	4.00	0.0000	144.00	1" Ice	8.26	6.30	0.07
			0.00			No Ice	8.82	7.48	0.14
			0.00			1/2" Ice	9.35	8.37	0.21
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Face	4.00	0.0000	144.00	1" Ice	8.26	6.30	0.07
			0.00			No Ice	8.82	7.48	0.14
			0.00			1/2" Ice	9.35	8.37	0.21
(2) LGP 17201	A	From Face	4.00	0.0000	144.00	1" Ice	1.67	0.47	0.03
			0.00			No Ice	1.83	0.57	0.04
			0.00			1/2" Ice	2.00	0.68	0.06
(2) LGP 17201	B	From Face	4.00	0.0000	144.00	1" Ice	1.67	0.47	0.03
			0.00			No Ice	1.83	0.57	0.04
			0.00			1/2" Ice	2.00	0.68	0.06
(2) LGP 17201	C	From Face	4.00	0.0000	144.00	1" Ice	1.67	0.47	0.03
			0.00			No Ice	1.83	0.57	0.04
			0.00			1/2" Ice	2.00	0.68	0.06
(2) LGP21903	A	From Face	4.00	0.0000	144.00	1" Ice	0.23	0.16	0.01
			0.00			No Ice	0.29	0.21	0.01
			0.00			1/2" Ice	0.36	0.28	0.02
(2) LGP21903	B	From Face	4.00	0.0000	144.00	1" Ice	0.23	0.16	0.01
			0.00			No Ice	0.29	0.21	0.01
			0.00			1/2" Ice	0.36	0.28	0.02
(2) LGP21903	C	From Face	4.00	0.0000	144.00	1" Ice	0.23	0.16	0.01
			0.00			No Ice	0.29	0.21	0.01
			0.00			1/2" Ice	0.36	0.28	0.02
(2) RRUS-11	A	From Face	4.00	0.0000	144.00	1" Ice	2.78	1.19	0.05
			0.00			No Ice	2.99	1.33	0.07
			0.00			1/2" Ice	3.21	1.49	0.09
(2) RRUS-11	B	From Face	4.00	0.0000	144.00	1" Ice	2.78	1.19	0.05
			0.00			No Ice	2.99	1.33	0.07
			0.00			1/2" Ice	3.21	1.49	0.09
(2) RRUS-11	C	From Face	4.00	0.0000	144.00	1" Ice	2.78	1.19	0.05
			0.00			No Ice	2.99	1.33	0.07
			0.00			1/2" Ice	3.21	1.49	0.09
1001940	A	From Leg	4.00	0.0000	144.00	1" Ice	0.18	0.08	0.00
			0.00			No Ice	0.23	0.13	0.00
			0.00			1/2" Ice	0.30	0.18	0.01
1001940	B	From Leg	4.00	0.0000	144.00	1" Ice	0.18	0.08	0.00
			0.00			No Ice	0.23	0.13	0.00
			0.00			1/2" Ice	0.30	0.18	0.01
1001940	C	From Leg	4.00	0.0000	144.00	1" Ice	0.18	0.08	0.00
			0.00			No Ice	0.23	0.13	0.00
			0.00			1/2" Ice	0.30	0.18	0.01
DC6-48-60-18-8F	B	From Face	4.00	0.0000	144.00	1" Ice	0.79	0.79	0.02
			0.00			No Ice	1.27	1.27	0.04
			0.00			1/2" Ice	1.45	1.45	0.05
(2) 6' x 2" Mount Pipe	A	From Leg	4.00	0.0000	144.00	1" Ice	1.43	1.43	0.02
			0.00			No Ice	1.92	1.92	0.03
			0.00			1/2" Ice	2.29	2.29	0.05
						1" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment	Placement ft		C _{AA} _{Front} ft ²	C _{AA} _{Side} ft ²	Weight K
(2) 6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						Ice	2.29	2.29	0.05
						1" Ice			
(2) 6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						Ice	2.29	2.29	0.05
						1" Ice			
Platform Mount [LP 1001-1]	C	None		0.0000	144.00	No Ice	47.70	47.70	3.02
						1/2" Ice	59.50	59.50	3.62
						Ice	71.30	71.30	4.22
						1" Ice			

742 213 w/ Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice	5.37	4.62	0.05
						1/2" Ice	5.95	6.00	0.09
						Ice	6.50	6.98	0.15
						1" Ice			
742 213 w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice	5.37	4.62	0.05
						1/2" Ice	5.95	6.00	0.09
						Ice	6.50	6.98	0.15
						1" Ice			
742 213 w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice	5.37	4.62	0.05
						1/2" Ice	5.95	6.00	0.09
						Ice	6.50	6.98	0.15
						1" Ice			

NNVV-65B-R4 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice	12.51	7.41	0.10
						1/2" Ice	13.11	8.60	0.19
						Ice	13.67	9.50	0.29
						1" Ice			
NNVV-65B-R4 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice	12.51	7.41	0.10
						1/2" Ice	13.11	8.60	0.19
						Ice	13.67	9.50	0.29
						1" Ice			
NNVV-65B-R4 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice	12.51	7.41	0.10
						1/2" Ice	13.11	8.60	0.19
						Ice	13.67	9.50	0.29
						1" Ice			
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice	6.58	4.96	0.08
						1/2" Ice	7.03	5.75	0.13
						Ice	7.47	6.47	0.19
						1" Ice			
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice	6.58	4.96	0.08
						1/2" Ice	7.03	5.75	0.13
						Ice	7.47	6.47	0.19
						1" Ice			
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice	6.58	4.96	0.08
						1/2" Ice	7.03	5.75	0.13
						Ice	7.47	6.47	0.19
						1" Ice			
RRH2X50-800	A	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice	1.70	1.28	0.05
						1/2" Ice	1.86	1.43	0.07
						Ice	2.03	1.58	0.09
						1" Ice			
(4) RRH2X50-800	B	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice	1.70	1.28	0.05
						1/2" Ice	1.86	1.43	0.07
						Ice	2.03	1.58	0.09
						1" Ice			
RRH2X50-800	C	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice	1.70	1.28	0.05
						1/2" Ice	1.86	1.43	0.07
						Ice	2.03	1.58	0.09
						1" Ice			
(3) PCS 1900MHZ 4X45W-65MHZ	A	From Leg	4.00 0.00 2.00	0.0000	128.00	No Ice	2.32	2.24	0.06
						1/2" Ice	2.53	2.44	0.08
						Ice	2.74	2.65	0.11
						1" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
(3) TD-RRH8X20-25	C	From Leg	4.00 0.00 2.00	0.0000	128.00	1" Ice No Ice 1/2" Ice 4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
T-Arm Mount [TA 602-3]	C	None		0.0000	128.00	1" Ice No Ice 1/2" Ice 11.59 15.44 19.29	11.59 15.44 19.29	0.77 0.99 1.21
T-Arm Mount [TA 602-3]	C	None		0.0000	128.00	1" Ice No Ice 1/2" Ice 11.59 15.44 19.29	11.59 15.44 19.29	0.77 0.99 1.21
8' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	128.00	1" Ice No Ice 1/2" Ice 1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
8' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	128.00	1" Ice No Ice 1/2" Ice 1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
8' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	128.00	1" Ice No Ice 1/2" Ice 1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06

LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	100.00	1" Ice No Ice 1/2" Ice 11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	100.00	1" Ice No Ice 1/2" Ice 11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	100.00	1" Ice No Ice 1/2" Ice 11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
RV90-17-00DP w/ Mount Pipe	A	From Leg	3.00 0.00 0.00	0.0000	100.00	1" Ice No Ice 1/2" Ice 4.59 5.02 5.44	3.32 4.09 4.78	0.04 0.08 0.12
RV90-17-00DP w/ Mount Pipe	B	From Leg	3.00 0.00 0.00	0.0000	100.00	1" Ice No Ice 1/2" Ice 4.59 5.02 5.44	3.32 4.09 4.78	0.04 0.08 0.12
RV90-17-00DP w/ Mount Pipe	C	From Leg	3.00 0.00 0.00	0.0000	100.00	1" Ice No Ice 1/2" Ice 4.59 5.02 5.44	3.32 4.09 4.78	0.04 0.08 0.12
ATBT-BOTTOM-24V	A	From Leg	3.00 0.00 0.00	0.0000	100.00	1" Ice No Ice 1/2" Ice 0.10 0.15 0.20	0.06 0.10 0.15	0.00 0.00 0.01
ATBT-BOTTOM-24V	B	From Leg	3.00 0.00 0.00	0.0000	100.00	1" Ice No Ice 1/2" Ice 0.10 0.15 0.20	0.06 0.10 0.15	0.00 0.00 0.01
ATBT-BOTTOM-24V	C	From Leg	3.00 0.00 0.00	0.0000	100.00	1" Ice No Ice 1/2" Ice 0.10 0.15 0.20	0.06 0.10 0.15	0.00 0.00 0.01
(2) ETM19V2S12UB	A	From Leg	3.00 0.00 0.00	0.0000	100.00	1" Ice No Ice 1/2" Ice 0.67 0.77 0.88	0.20 0.27 0.34	0.01 0.02 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment	Placement ft	C _A A _{Front} ft ²	C _A A _{Side} ft ²	Weight K
(2) ETM19V2S12UB	B	From Leg	3.00 0.00 0.00	0.0000	100.00	1" Ice No Ice 1/2" Ice	0.67 0.20 0.77 0.27 0.88 0.34	0.01 0.02 0.02
(2) ETM19V2S12UB	C	From Leg	3.00 0.00 0.00	0.0000	100.00	1" Ice No Ice 1/2" Ice	0.67 0.20 0.77 0.27 0.88 0.34	0.01 0.02 0.02
Side Arm Mount [SO 701-3]	C	None		0.0000	100.00	1" Ice No Ice 1/2" Ice 1" Ice	2.83 2.83 3.92 3.92 5.01 5.01	0.20 0.24 0.28

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service

Comb. No.	Description
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	155.5 - 110	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-49.75	2.74	1.62
			Max. Mx	20	-26.32	746.79	4.08
			Max. My	2	-26.33	4.51	738.74
			Max. Vy	20	-28.91	746.79	4.08
			Max. Vx	2	-28.61	4.51	738.74
			Max. Torque	18			-1.73
L2	110 - 72.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-76.78	2.74	1.62
			Max. Mx	20	-45.14	2023.00	4.82
			Max. My	2	-45.15	5.25	2003.91
			Max. Vy	20	-39.87	2023.00	4.82
			Max. Vx	2	-39.57	5.25	2003.91
			Max. Torque	18			-1.73
L3	72.5 - 36	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-104.62	2.74	1.62
			Max. Mx	20	-66.83	3608.51	5.53
			Max. My	2	-66.84	5.96	3578.65
			Max. Vy	20	-47.93	3608.51	5.53
			Max. Vx	2	-47.64	5.96	3578.65
			Max. Torque	18			-1.73
L4	36 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-140.21	2.74	1.62
			Max. Mx	20	-95.70	5955.60	6.38
			Max. My	2	-95.70	6.82	5912.42
			Max. Vy	20	-56.10	5955.60	6.38
			Max. Vx	2	-55.81	6.82	5912.42
			Max. Torque	18			-1.73

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	140.21	0.00	0.00
	Max. H _x	20	95.71	56.07	0.02
	Max. H _z	2	95.71	0.02	55.78
	Max. M _x	2	5912.42	0.02	55.78
	Max. M _z	8	5953.94	-56.07	-0.02
	Max. Torsion	6	1.72	-48.55	27.87
	Min. Vert	5	71.78	-28.02	48.29
	Min. H _x	8	95.71	-56.07	-0.02
	Min. H _z	14	95.71	-0.02	-55.78
	Min. M _x	14	-5911.62	-0.02	-55.78
	Min. M _z	20	-5955.60	56.07	0.02
	Min. Torsion	18	-1.73	48.55	-27.87

Tower Mast Reaction Summary

Load Combination	Vertical	Shear _x	Shear _z	Overtuning Moment, M _x	Overtuning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	79.76	0.00	0.00	-0.32	0.68	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	95.71	-0.02	-55.78	-5912.42	6.82	-1.11
0.9 Dead+1.6 Wind 0 deg - No Ice	71.78	-0.02	-55.78	-5886.96	6.57	-1.11
1.2 Dead+1.6 Wind 30 deg - No Ice	95.71	28.02	-48.29	-5117.36	-2971.37	-1.63
0.9 Dead+1.6 Wind 30 deg - No Ice	71.78	28.02	-48.29	-5095.32	-2958.84	-1.63
1.2 Dead+1.6 Wind 60 deg - No Ice	95.71	48.55	-27.87	-2951.22	-5153.16	-1.72
0.9 Dead+1.6 Wind 60 deg - No Ice	71.78	48.55	-27.87	-2938.47	-5131.26	-1.71
1.2 Dead+1.6 Wind 90 deg - No Ice	95.71	56.07	0.02	5.59	-5953.94	-1.34
0.9 Dead+1.6 Wind 90 deg - No Ice	71.78	56.07	0.02	5.65	-5928.59	-1.34
1.2 Dead+1.6 Wind 120 deg - No Ice	95.71	48.57	27.90	2960.79	-5159.14	-0.62
0.9 Dead+1.6 Wind 120 deg - No Ice	71.78	48.57	27.90	2948.18	-5137.20	-0.62
1.2 Dead+1.6 Wind 150 deg - No Ice	95.71	28.05	48.31	5122.55	-2981.74	0.28
0.9 Dead+1.6 Wind 150 deg - No Ice	71.78	28.05	48.31	5100.67	-2969.14	0.27
1.2 Dead+1.6 Wind 180 deg - No Ice	95.71	0.02	55.78	5911.62	-5.15	1.10
0.9 Dead+1.6 Wind 180 deg - No Ice	71.78	0.02	55.78	5886.37	-5.33	1.10
1.2 Dead+1.6 Wind 210 deg - No Ice	95.71	-28.02	48.29	5116.57	2973.04	1.64
0.9 Dead+1.6 Wind 210 deg - No Ice	71.78	-28.02	48.29	5094.73	2960.08	1.63
1.2 Dead+1.6 Wind 240 deg - No Ice	95.71	-48.55	27.87	2950.43	5154.83	1.73
0.9 Dead+1.6 Wind 240 deg - No Ice	71.78	-48.55	27.87	2937.88	5132.50	1.73
1.2 Dead+1.6 Wind 270 deg - No Ice	95.71	-56.07	-0.02	-6.38	5955.60	1.36
0.9 Dead+1.6 Wind 270 deg - No Ice	71.78	-56.07	-0.02	-6.25	5929.83	1.35
1.2 Dead+1.6 Wind 300 deg - No Ice	95.71	-48.57	-27.90	-2961.58	5160.81	0.61
0.9 Dead+1.6 Wind 300 deg - No Ice	71.78	-48.57	-27.90	-2948.77	5138.45	0.61
1.2 Dead+1.6 Wind 330 deg - No Ice	95.71	-28.05	-48.31	-5123.34	2983.41	-0.29
0.9 Dead+1.6 Wind 330 deg - No Ice	71.78	-28.05	-48.31	-5101.27	2970.38	-0.29
1.2 Dead+1.0 Ice+1.0 Temp	140.21	0.00	0.00	-1.62	2.74	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	140.21	-0.00	-11.73	-1301.24	3.91	-0.22
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	140.21	5.89	-10.16	-1126.61	-649.66	-0.33
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	140.21	10.20	-5.86	-650.57	-1128.38	-0.35
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	140.21	11.78	0.00	-0.66	-1303.98	-0.28
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	140.21	10.20	5.87	648.97	-1129.42	-0.13
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	140.21	5.89	10.16	1124.26	-651.45	0.05
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	140.21	0.00	11.73	1297.85	1.83	0.22

Load Combination	Vertical	Shear _x	Shear _z	Overtuning Moment, M _x	Overtuning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	140.21	-5.89	10.16	1123.22	655.40	0.33
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	140.21	-10.20	5.86	647.18	1134.12	0.35
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	140.21	-11.78	-0.00	-2.73	1309.73	0.28
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	140.21	-10.20	-5.87	-652.36	1135.16	0.13
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	140.21	-5.89	-10.16	-1127.65	657.20	-0.05
Dead+Wind 0 deg - Service	79.76	-0.00	-11.01	-1163.85	1.87	-0.22
Dead+Wind 30 deg - Service	79.76	5.53	-9.53	-1007.38	-584.26	-0.32
Dead+Wind 60 deg - Service	79.76	9.58	-5.50	-581.07	-1013.65	-0.34
Dead+Wind 90 deg - Service	79.76	11.07	0.00	0.85	-1171.24	-0.27
Dead+Wind 120 deg - Service	79.76	9.58	5.51	582.45	-1014.82	-0.12
Dead+Wind 150 deg - Service	79.76	5.54	9.53	1007.90	-586.30	0.06
Dead+Wind 180 deg - Service	79.76	0.00	11.01	1163.19	-0.49	0.22
Dead+Wind 210 deg - Service	79.76	-5.53	9.53	1006.72	585.64	0.32
Dead+Wind 240 deg - Service	79.76	-9.58	5.50	580.41	1015.03	0.34
Dead+Wind 270 deg - Service	79.76	-11.07	-0.00	-1.51	1172.63	0.27
Dead+Wind 300 deg - Service	79.76	-9.58	-5.51	-583.11	1016.21	0.12
Dead+Wind 330 deg - Service	79.76	-5.54	-9.53	-1008.56	587.68	-0.06

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-79.76	0.00	0.00	79.76	0.00	0.000%
2	-0.02	-95.71	-55.78	0.02	95.71	55.78	0.000%
3	-0.02	-71.78	-55.78	0.02	71.78	55.78	0.000%
4	28.02	-95.71	-48.29	-28.02	95.71	48.29	0.000%
5	28.02	-71.78	-48.29	-28.02	71.78	48.29	0.000%
6	48.55	-95.71	-27.87	-48.55	95.71	27.87	0.000%
7	48.55	-71.78	-27.87	-48.55	71.78	27.87	0.000%
8	56.07	-95.71	0.02	-56.07	95.71	-0.02	0.000%
9	56.07	-71.78	0.02	-56.07	71.78	-0.02	0.000%
10	48.57	-95.71	27.90	-48.57	95.71	-27.90	0.000%
11	48.57	-71.78	27.90	-48.57	71.78	-27.90	0.000%
12	28.05	-95.71	48.31	-28.05	95.71	-48.31	0.000%
13	28.05	-71.78	48.31	-28.05	71.78	-48.31	0.000%
14	0.02	-95.71	55.78	-0.02	95.71	-55.78	0.000%
15	0.02	-71.78	55.78	-0.02	71.78	-55.78	0.000%
16	-28.02	-95.71	48.29	28.02	95.71	-48.29	0.000%
17	-28.02	-71.78	48.29	28.02	71.78	-48.29	0.000%
18	-48.55	-95.71	27.87	48.55	95.71	-27.87	0.000%
19	-48.55	-71.78	27.87	48.55	71.78	-27.87	0.000%
20	-56.07	-95.71	-0.02	56.07	95.71	0.02	0.000%
21	-56.07	-71.78	-0.02	56.07	71.78	0.02	0.000%
22	-48.57	-95.71	-27.90	48.57	95.71	27.90	0.000%
23	-48.57	-71.78	-27.90	48.57	71.78	27.90	0.000%
24	-28.05	-95.71	-48.31	28.05	95.71	48.31	0.000%
25	-28.05	-71.78	-48.31	28.05	71.78	48.31	0.000%
26	0.00	-140.21	0.00	0.00	140.21	0.00	0.000%
27	-0.00	-140.21	-11.73	0.00	140.21	11.73	0.000%
28	5.89	-140.21	-10.16	-5.89	140.21	10.16	0.000%
29	10.20	-140.21	-5.86	-10.20	140.21	5.86	0.000%
30	11.78	-140.21	0.00	-11.78	140.21	-0.00	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
31	10.20	-140.21	5.87	-10.20	140.21	-5.87	0.000%
32	5.89	-140.21	10.16	-5.89	140.21	-10.16	0.000%
33	0.00	-140.21	11.73	-0.00	140.21	-11.73	0.000%
34	-5.89	-140.21	10.16	5.89	140.21	-10.16	0.000%
35	-10.20	-140.21	5.86	10.20	140.21	-5.86	0.000%
36	-11.78	-140.21	-0.00	11.78	140.21	0.00	0.000%
37	-10.20	-140.21	-5.87	10.20	140.21	5.87	0.000%
38	-5.89	-140.21	-10.16	5.89	140.21	10.16	0.000%
39	-0.00	-79.76	-11.01	0.00	79.76	11.01	0.000%
40	5.53	-79.76	-9.53	-5.53	79.76	9.53	0.000%
41	9.58	-79.76	-5.50	-9.58	79.76	5.50	0.000%
42	11.07	-79.76	0.00	-11.07	79.76	-0.00	0.000%
43	9.58	-79.76	5.51	-9.58	79.76	-5.51	0.000%
44	5.54	-79.76	9.53	-5.54	79.76	-9.53	0.000%
45	0.00	-79.76	11.01	-0.00	79.76	-11.01	0.000%
46	-5.53	-79.76	9.53	5.53	79.76	-9.53	0.000%
47	-9.58	-79.76	5.50	9.58	79.76	-5.50	0.000%
48	-11.07	-79.76	-0.00	11.07	79.76	0.00	0.000%
49	-9.58	-79.76	-5.51	9.58	79.76	5.51	0.000%
50	-5.54	-79.76	-9.53	5.54	79.76	9.53	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00007403
3	Yes	4	0.00000001	0.00004049
4	Yes	4	0.00000001	0.00070112
5	Yes	4	0.00000001	0.00045463
6	Yes	4	0.00000001	0.00075257
7	Yes	4	0.00000001	0.00048937
8	Yes	4	0.00000001	0.00007566
9	Yes	4	0.00000001	0.00004174
10	Yes	4	0.00000001	0.00072243
11	Yes	4	0.00000001	0.00046866
12	Yes	4	0.00000001	0.00072512
13	Yes	4	0.00000001	0.00047077
14	Yes	4	0.00000001	0.00007192
15	Yes	4	0.00000001	0.00003879
16	Yes	4	0.00000001	0.00074910
17	Yes	4	0.00000001	0.00048717
18	Yes	4	0.00000001	0.00070159
19	Yes	4	0.00000001	0.00045464
20	Yes	4	0.00000001	0.00007811
21	Yes	4	0.00000001	0.00004368
22	Yes	4	0.00000001	0.00074159
23	Yes	4	0.00000001	0.00048151
24	Yes	4	0.00000001	0.00073488
25	Yes	4	0.00000001	0.00047713
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00072221
28	Yes	4	0.00000001	0.00073437
29	Yes	4	0.00000001	0.00073521
30	Yes	4	0.00000001	0.00072221
31	Yes	4	0.00000001	0.00073480
32	Yes	4	0.00000001	0.00073300
33	Yes	4	0.00000001	0.00071889
34	Yes	4	0.00000001	0.00073468
35	Yes	4	0.00000001	0.00073820
36	Yes	4	0.00000001	0.00072777
37	Yes	4	0.00000001	0.00074169
38	Yes	4	0.00000001	0.00073914
39	Yes	4	0.00000001	0.00001098
40	Yes	4	0.00000001	0.00001489
41	Yes	4	0.00000001	0.00001568
42	Yes	4	0.00000001	0.00001108
43	Yes	4	0.00000001	0.00001509
44	Yes	4	0.00000001	0.00001511
45	Yes	4	0.00000001	0.00001096
46	Yes	4	0.00000001	0.00001562
47	Yes	4	0.00000001	0.00001493
48	Yes	4	0.00000001	0.00001111
49	Yes	4	0.00000001	0.00001542
50	Yes	4	0.00000001	0.00001529

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	155.5 - 110	6.103	48	0.2815	0.0003
L2	118 - 72.5	3.938	48	0.2631	0.0002
L3	81 - 36	2.063	48	0.2108	0.0001
L4	45 - 0	0.717	48	0.1350	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.00	DB809K-Y	48	6.103	0.2815	0.0003	437406
144.00	(2) 7770.00 w/ Mount Pipe	48	5.426	0.2781	0.0003	190176
135.00	742 213 w/ Mount Pipe	48	4.901	0.2745	0.0002	106684
128.00	NNVV-65B-R4 w/ Mount Pipe	48	4.499	0.2707	0.0002	79528
100.00	LNX-6515DS-VTM w/ Mount Pipe	48	2.982	0.2416	0.0002	46366

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	155.5 - 110	30.995	20	1.4292	0.0015
L2	118 - 72.5	20.006	20	1.3361	0.0010
L3	81 - 36	10.482	20	1.0710	0.0006
L4	45 - 0	3.643	20	0.6860	0.0003

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.00	DB809K-Y	20	30.995	1.4292	0.0015	86551
144.00	(2) 7770.00 w/ Mount Pipe	20	27.557	1.4119	0.0014	37631
135.00	742 213 w/ Mount Pipe	20	24.894	1.3938	0.0013	21109
128.00	NNVV-65B-R4 w/ Mount Pipe	20	22.854	1.3746	0.0012	15736
100.00	LNX-6515DS-VTM w/ Mount Pipe	20	15.148	1.2274	0.0008	9153

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	KI/r	A in ²	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	155.5 - 110 (1)	TP64.606x58.6x0.375	45.50	0.00	0.0	76.283 8	-26.32	3989.11	0.007
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	45.50	0.00	0.0	94.732 4	-45.14	5321.74	0.008
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	45.00	0.00	0.0	114.40 70	-66.83	6775.62	0.010
L4	36 - 0 (4)	TP76.5x70.56x0.5	45.00	0.00	0.0	122.36 00	-95.70	6928.62	0.014

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	155.5 - 110 (1)	TP64.606x58.6x0.375	748.19	5144.30	0.145	0.00	5144.30	0.000
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	2023.01	7300.90	0.277	0.00	7300.90	0.000
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	3608.52	9817.58	0.368	0.00	9817.58	0.000
L4	36 - 0 (4)	TP76.5x70.56x0.5	5955.61	10742.08	0.554	0.00	10742.08	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	155.5 - 110 (1)	TP64.606x58.6x0.375	28.85	1994.56	0.014	0.61	10431.00	0.000
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	39.87	2660.87	0.015	1.36	14803.92	0.000
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	47.93	3387.81	0.014	1.36	19907.00	0.000
L4	36 - 0 (4)	TP76.5x70.56x0.5	56.10	3464.31	0.016	1.36	21781.58	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	155.5 - 110 (1)	0.007	0.145	0.000	0.014	0.000	0.152	1.000	4.8.2
L2	110 - 72.5 (2)	0.008	0.277	0.000	0.015	0.000	0.286	1.000	4.8.2
L3	72.5 - 36 (3)	0.010	0.368	0.000	0.014	0.000	0.378	1.000	4.8.2
L4	36 - 0 (4)	0.014	0.554	0.000	0.016	0.000	0.568	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail	
L1	155.5 - 110	Pole	TP64.606x58.6x0.375	1	-26.32	3989.11	15.2	Pass	
L2	110 - 72.5	Pole	TP68.805x62.8x0.4375	2	-45.14	5321.74	28.6	Pass	
L3	72.5 - 36	Pole	TP72.748x66.8082x0.5	3	-66.83	6775.62	37.8	Pass	
L4	36 - 0	Pole	TP76.5x70.56x0.5	4	-95.70	6928.62	56.8	Pass	
							Summary		
							Pole (L4)	56.8	Pass
							RATING =	56.8	Pass

APPENDIX B
BASE LEVEL DRAWING



(INSTALLED)
(6) 1-1/4" TO 135 FT LEV

(INSTALLED)
(12) 1-1/4" TO 100 FT LEVEL

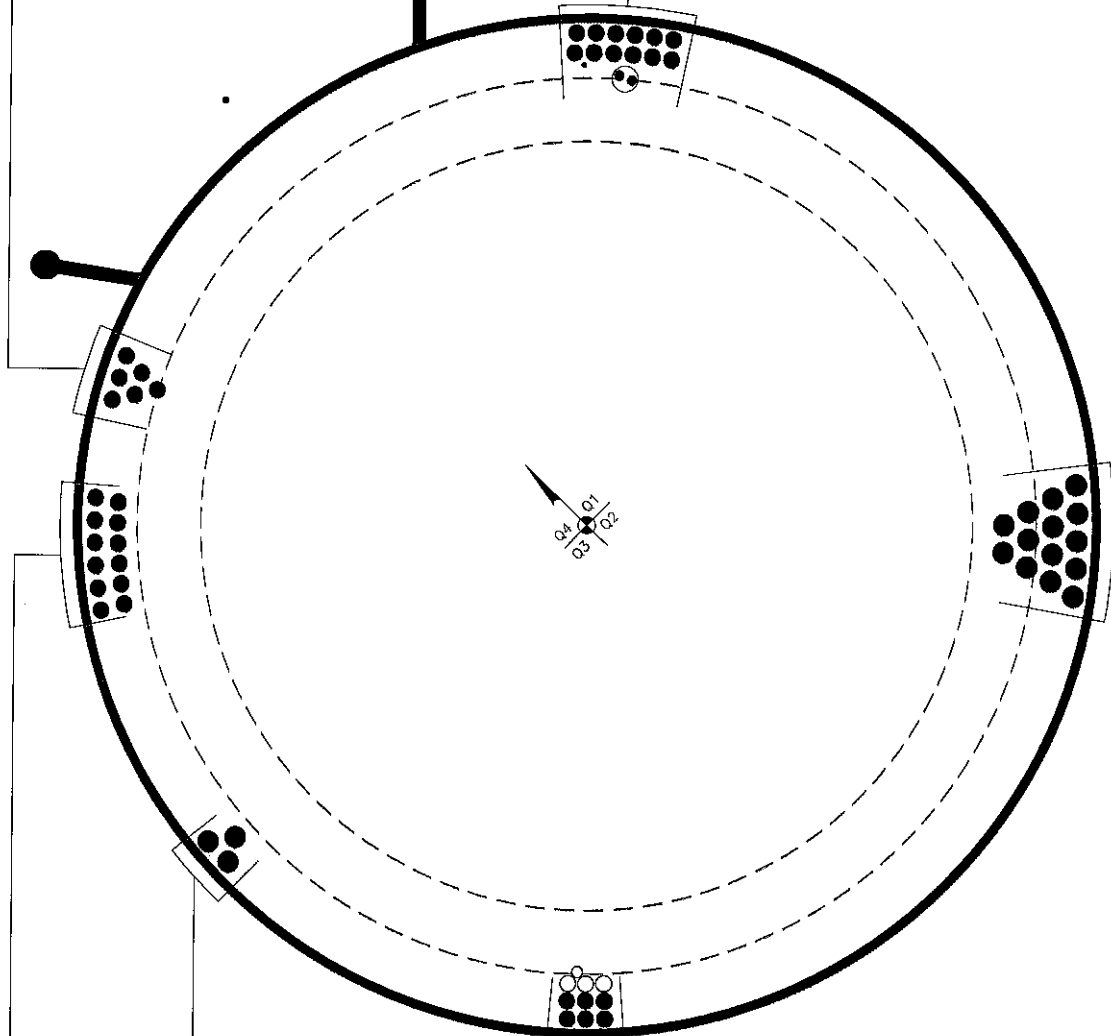
(ABANDONED)
(3) 1-5/8" TO 156 FT LEVEL

CLIMBING PECS
W/ SAFETY CLIMB

(PROPOSED)
(1) 7/8" TO 128 FT LEVEL
(3) 1-1/4" TO 128 FT LEVEL
(INSTALLED-TO BE REMOVED)
(6) 1-1/4" TO 126 FT LEVEL

(INSTALLED-IN 2" CONDUIT)
(2) 3/4" TO 144 FT LEVEL
(INSTALLED)
(1) 3/8" TO 144 FT LEVEL
(12) 1-1/4" TO 144 FT LE

(INSTALLED)
(14) 1-5/8" TO 156 FT LE



APPENDIX C
ADDITIONAL CALCULATIONS

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

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

Site Data	
BU#:	806366
Site Name:	HRT 107(C) 943204
App #:	410917 Rev. 2
Pole Manufacturer:	Other

Anchor Rod Data	
Qty:	24
Diam:	2.25 in
Rod Material:	A615-J
Strength (Fu):	100 ksi
Yield (Fy):	75 ksi
Bolt Circle:	84.75 in

Plate Data	
Diam:	91 in
Thick:	3.25 in
Grade:	60 ksi
Single-Rod B-eff:	10.25 in

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

Pole Data	
Diam:	76.5 in
Thick:	0.5 in
Grade:	65 ksi
# of Sides:	12 "0" IF Round
Fu:	80 ksi
Reinf. Fillet Weld:	0 "0" if None

Reactions		
Mu:	5955	ft-kips
Axial, Pu:	95	kips
Shear, Vu:	56	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

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

Anchor Rod Results
 Max Rod (Cu+ Vu/η): 149.2 Kips
 Allowable Axial, Φ*Fu*Anet: 260.0 Kips
 Anchor Rod Stress Ratio: 57.4% Pass

Rigid
AISC LRFD
φ*Tn

Base Plate Results
 Base Plate Stress: 14.0 ksi
 Allowable Plate Stress: 54.0 ksi
 Base Plate Stress Ratio: 25.9% Pass

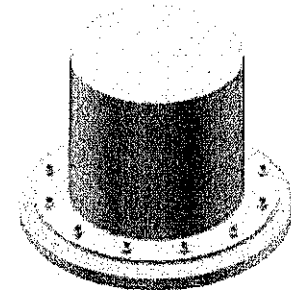
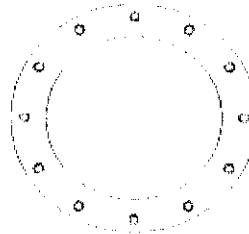
Flexural Check
 14.0 ksi
 54.0 ksi
 25.9% Pass

Rigid
AISC LRFD
φ*Fy
Y.L. Length: 36.47

n/a

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

Pole Results
 Pole Punching Shear Check: n/a



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

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

Pier and Pad Foundation



BU #: 806366
 Site Name: HRT 107(C) 94320
 App. Number: 410917 Rev. 2

TIA-222 Revision: G
 Tower Type: Monopole

Block Foundation?:

Superstructure Analysis Reactions		
Compression, P_{comp} :	95	kips
Base Shear, V_{u_comp} :	56	kips
Moment, M_u :	5955	ft-kips
Tower Height, H:	155.5	ft
BP Dist. Above Fdn, bp_{dist} :	3.875	in

Foundation Analysis Checks				
	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	680.37	56.00	8.2%	Pass
Bearing Pressure (ksf)	15.75	2.11	13.4%	Pass
Overturing (kip*ft)	18740.54	6421.08	34.3%	Pass
Pier Flexure (Comp.) (kip*ft)	18525.47	6151.00	33.2%	Pass
Pier Compression (kip)	51554.88	146.03	0.3%	Pass
Pad Flexure (kip*ft)	8427.96	2177.88	25.8%	Pass
Pad Shear - 1-way (kips)	1850.42	238.81	12.9%	Pass
Pad Shear - 2-way (ksi)	0.19	0.02	11.7%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, d_{pier} :	9.0	ft
Ext. Above Grade, E:	0.50	ft
Pier Rebar Size, S_c :	11	
Pier Rebar Quantity, m_c :	59	
Pier Tie/Spiral Size, S_t :	5	
Pier Tie/Spiral Quantity, m_t :	7	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	3	in

Soil Rating: 34.3%
 Structural Rating: 33.2%

Pad Properties		
Depth, D:	7.5	ft
Pad Width, W:	33.3	ft
Pad Thickness, T:	4.5	ft
Pad Rebar Size, S_p :	11	
Pad Rebar Quantity, m_p :	25	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, F_y :	60000	psi
Concrete Compressive Strength, F'_c :	4000	psi
Dry Concrete Density, δ_c :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	130	pcf
Ultimate Gross Bearing, Q_{ult} :	21,000	ksf
Cohesion, C_u :	0.000	ksf
Friction Angle, ϕ :	40	degrees
SPT Blow Count, N_{blows} :	100	
Base Friction, μ :	0.4	
Neglected Depth, N:	3.30	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw:	14.5	ft

<--Toggle between Gross and Net

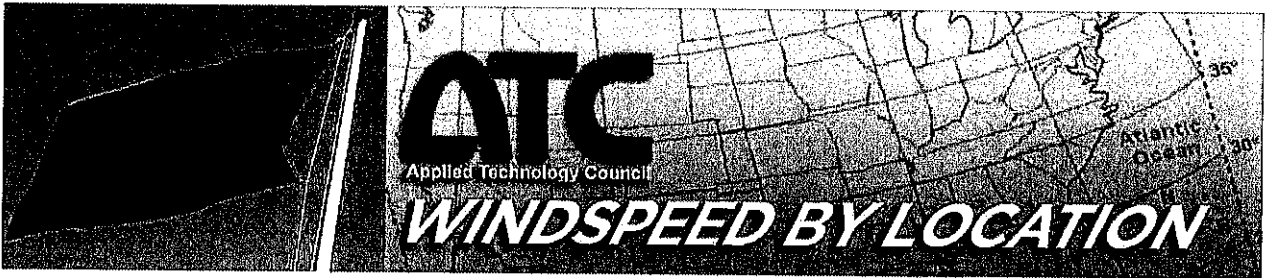
CCISeismic - Design Category

Per 2012/2015 IBC

Site BU: 806366
 Work Order: 1582419
 Application: 410917 Rev. 2



	Degrees	Minutes	Seconds	
Site Latitude =	41	37	47.30	41.6298 degrees
Site Longitude =	-72	27	59.39	-72.4665 degrees
Ground Supported Structure =	Yes			
Structure Class =	II			(Table 2-1)
Site Class =	D - Stiff Soil			(Table 2-11)
Spectral response acceleration short periods, S_s =	0.177			USGS Seismic Tool
Spectral response acceleration 1 s period, S_1 =	0.062			
Importance Factor, I =	1.0			(Table 2-3)
Acceleration-based site coefficient, F_a =	1.6			(Table 2-12)
Velocity-based site coefficient, F_v =	2.4			(Table 2-13)
Design spectral response acceleration short period, S_{DS} =	0.189			(2.7.6)
Design spectral response acceleration 1 s period, S_{D1} =	0.099			(2.7.6)
Seismic Design Category - Short Period Response =	B			ASCE 7-05 Table 11.6-1
Seismic Design Category - 1s Period Response =	B			ASCE 7-05 Table 11.6-2
Worst Case Seismic Design Category =	B			ASCE 7-05 Tables 11.6-1 and 6-2



[ASCE 7 Windspeed](#)
 [ASCE 7 Ground Snow Load](#)
 [Related Resources](#)
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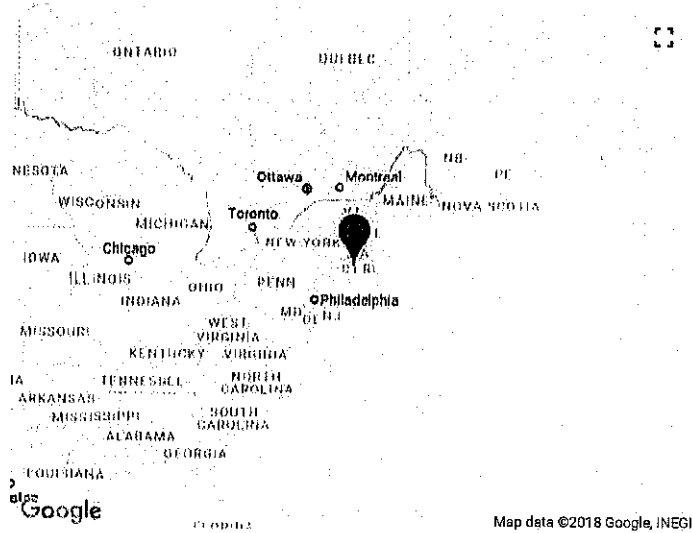
Search Results

Query Date: Mon Jun 04 2018
Latitude: 41.6298
Longitude: -72.4665

ASCE 7-10 Windspeeds
(3-sec peak gust in mph*):

Risk Category I: 116
Risk Category II: 127
Risk Category III-IV: 136
MRI 10-Year:** 77
MRI 25-Year:** 88
MRI 50-Year:** 95
MRI 100-Year:** 102


ASCE 7-05 Windspeed:
 105 (3-sec peak gust in mph)
ASCE 7-93 Windspeed:
 82 (fastest mile in mph)



Marlborough Municipality , V Ult. 130 mph = 101 mph V Nom

*Miles per hour
 **Mean Recurrence Interval

Users should consult with local building officials to determine if there are community-specific wind speed requirements that govern.

 [Print your results](#)

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

SPRINT Existing Facility

Site ID: CT03XC210

Marlborough (Crown)
73 North Main Street
Marlborough, CT 06447

July 31, 2018

EBI Project Number: 6218005228

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	19.91 %



July 31, 2018

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

Emissions Analysis for Site: **CT03XC210 – Marlborough (Crown)**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **73 North Main Street, Marlborough, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ 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 ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 850 MHz Band is approximately $567 \mu\text{W}/\text{cm}^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is $1000 \mu\text{W}/\text{cm}^2$. 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 **73 North Main Street, Marlborough, 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 for directional panel antennas, 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 50 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.



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- 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 for directional panel antennas, 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 for directional panel antennas, 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 panel antennas are **130 feet** above ground level (AGL) for **Sector A**, **130 feet** above ground level (AGL) for **Sector B** and **130 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.



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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):	130 feet	Height (AGL):	130 feet	Height (AGL):	130 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):	280 Watts	Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts
ERP (W):	7,378.61	ERP (W):	7,378.61	ERP (W):	7,378.61
Antenna A1 MPE%:	2.12 %	Antenna B1 MPE%:	2.12 %	Antenna C1 MPE%:	2.12 %
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APXVTM14-ALU-I20	Make / Model:	RFS APXVTM14-ALU-I20	Make / Model:	RFS APXVTM14-ALU-I20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	130 feet	Height (AGL):	130 feet	Height (AGL):	130 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%:	1.46 %	Antenna B2 MPE%:	1.46 %	Antenna C2 MPE%:	1.46 %

Site Composite MPE%	
Carrier	MPE%
SPRINT – Max per sector	3.58 %
AT&T	2.86 %
MetroPCS	0.41 %
Verizon Wireless	3.59 %
T-Mobile	3.44 %
Town	6.03 %
Site Total MPE %:	19.91 %

SPRINT Sector A Total:	3.58 %
SPRINT Sector B Total:	3.58 %
SPRINT Sector C Total:	3.58 %
Site Total:	19.91 %

SPRINT Frequency Band / Technology (All Sectors)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	376.73	130	0.88	850 MHz	567	0.14%
Sprint 850 MHz LTE	2	941.82	130	4.40	850 MHz	567	0.78%
Sprint 1900 MHz (PCS) CDMA	5	511.82	130	5.98	1900 MHz (PCS)	1000	0.60%
Sprint 1900 MHz (PCS) LTE	2	1,279.56	130	5.98	1900 MHz (PCS)	1000	0.60%
Sprint 2500 MHz (BRS) LTE	8	778.09	130	14.55	2500 MHz (BRS)	1000	1.46%
						Total:	3.58%



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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:	3.58 %
Sector B:	3.58 %
Sector C:	3.58 %
SPRINT Maximum MPE % (per sector):	3.58 %
Site Total:	19.91 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **19.91 %** 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.

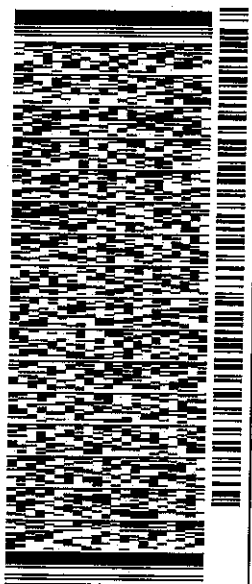
ORIGIN ID: BEDA (781) 970-0053
JEFF BARENDORA
CROWN CASTLE
12 GIL STREEF
SUITE 5800
WOBURN, MA 01804
UNITED STATES US

SHIP DATE: 07/AUG/18
ACTWGT: 0.50 LB
CAD: 104024197/MET4040
BILL SENDER

TO FIRST SELECTMAN-MS. AMY TRAVERSA
TOWN OF MARLBOROUGH
26 NORTH MAIN STREET

MARLBOROUGH CT 06447
(860) 295-9204 REF: 17865890
DEPT.
PO.

552.J1/3309/DCA5

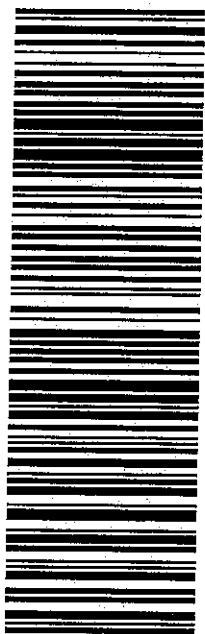


TRK# 7729 1242 9658
0201

WED - 08 AUG 12:00P
PRIORITY OVERNIGHT

EB SKKA

06447
CT-US BDL



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Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Wednesday, August 8, 2018 10:07 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 772912429658 Delivered

Your package has been delivered

Tracking # 772912429658

Ship date:
Tue, 8/7/2018

Jeff Barbadora
Crown Castle
WOBURN, MA 01801
US

Delivery date:
Wed, 8/8/2018 10:04
am

First Selectman-Ms. Amy
Traversa
Town of Marlborough
26 North Main Street
MARLBOROUGH, CT 06447
US



Shipment Facts

Our records indicate that the following package has been delivered.

Tracking number: 772912429658
Status: Delivered: 08/08/2018 10:04 AM Signed for By: L.GRIFFIN
Reference: 1766.6680
Signed for by: L.GRIFFIN
Delivery location: MARLBOROUGH, CT
Delivered to: Receptionist/Front Desk
Service type: FedEx Priority Overnight®
Packaging type: FedEx® Envelope
Number of pieces: 1
Weight: 1.00 lb.
Special handling/Services: Deliver Weekday
Standard transit: 8/8/2018 by 12:00 pm

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All weights are estimated.



ORIGIN ID: BEDA (781) 970-0053
JEFF BARBADORA
CROWN CASTLE
12 GILL STREET
SUITE 5800
WOBURN, MA 01804
UNITED STATES US

SHIP DATE: 07AUG18
ACTWGT: 0.50 LB
CAD: 10492419VNET4040
BILL SENDER

TO **PLANNING COMMISSION**
TOWN OF MARLBOROUGH
26 NORTH MAIN STREET

MARLBOROUGH CT 06447
(860) 295-6200 REF: 17656990
NY DEPT:



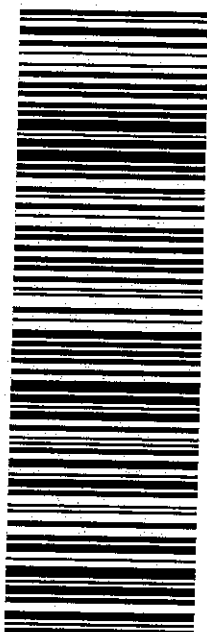
J182018072231uv

TRK# 7729 1245 3321
0201

WED - 08 AUG 12:00P
PRIORITY OVERNIGHT

EB SKKA

06447
CT-US BDL



552J1/3309/DCA5

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Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Wednesday, August 8, 2018 10:07 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 772912453321 Delivered

Your package has been delivered

Tracking # 772912453321

Ship date:
Tue, 8/7/2018
Jeff Barbadora
Crown Castle
WOBURN, MA 01801
US

Delivery date:
**Wed, 8/8/2018 10:04
am**




Planning Commission
Town of Marlborough
26 North Main Street
MARLBOROUGH, CT 06447
US



Shipment Facts

Our records indicate that the following package has been delivered.

Tracking number: 772912453321
Status: Delivered: 08/08/2018 10:04 AM
Signed for By: L.GRIFFIN
Reference: 1766.6680
Signed for by: L.GRIFFIN
Delivery location: MARLBOROUGH, CT
Delivered to: Receptionist/Front Desk
Service type: FedEx Priority Overnight®
Packaging type: FedEx® Envelope
Number of pieces: 1
Weight: 1.00 lb.
Special handling/Services: Deliver Weekday
Standard transit: 8/8/2018 by 12:00 pm

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All weights are estimated.

To track the latest status of your shipment, click on the tracking number above.