Filed by:
G. Scott Shepherd, Sr. Property Specialist - SBA Communications
134 Flanders Rd., Suite 125, Westborough, MA 01581
508.251.0720 x 3807 - gshepherd@sbasite.com

November 22, 2019

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

Notice of Exempt Modification
640 Hilliard Street, Manchester, CT
41.784500 N
-72.550806 W
Sprint #: CT52XC028_DO Macro Upgrade

Dear Ms. Bachman:

Sprint (Clearwire) currently maintains three (3) 800/1900 MHz antennas and one (1) MW Dish at the 117-foot level of the existing 149-foot Monopole Tower at 640 Hilliard Street. The property is owned by Hilliard Mills, LLC. The Tower is owned by SBA Infrastructure, LLC. Sprint now intends to remove the (3) existing 800/1900 MHz antennas and replace them with (3) newer technology 800/1900 MHz antennas and install three (3) additional 2500 MHz antennas at the 117-foot level of the tower.

Planned Modifications:

TOWER

Remove:

- (3) ¼" lines
- (3) 5/8" lines
- (1) 5/16" line
- (3) Clearwire RRHs

Remove and Replace:

- Remove (3) KMW - ETCR-654L12H6 Panel Antennas / Replace with (3) Commscope NNVV-65B-R4 - Panel
- Remove (2) ring-mounts, 3' Standoff Arms, (2/sector), Back-to-Back RRH Mounts, (2/sector), 8' Pipe Masts (2/Sector); / Replace with (6) Sitepro UDS-NPL (T-Arm)

Install New:

- (3) Nokia MIMO AAHC (64T64R) Panel antenna
- (3) ALU 1900 MHz RRUs
- (6) ALU 800 MHz RRUs
- (3) ALU TD-RRH8x20-25 RRUs

Existing Equipment to Remain:

- (1) 1/2" MW Dish cable
- (4) 1-1/4" fiber
- (1) Andrew VHLP2.5-11 dish

Entitlements:

- (1) Andrew VHLP2.5-11 dish

GROUND

No change to ground area / replacing equipment on existing 7'x7' concrete pad

- Remove Clearwire equipment cabinet / Replace with Sprint equipment cabinet on existing concrete pad
- Remove Clearwire GPS / Replace with Sprint GPS
- Remove Clearwire Junction Box
- Remove Clearwire Equipment Cabinet

This facility was approved by the Council on November 29, 2007 under Docket 339. Approval was initially for a 150' brown monopole with flush mounted antennas painted to match the pole. On December 17, 2015, the Council reissued the Decision and Order in Docket 339 "eliminating the requirement that all antennas on the facility be flush-mounted and color thereof to match the monopole" and approving the installation of T-arm mount kits. Such tower shall incorporate a yield point to eliminate the potential fall radius on to the adjacent property. The Certificate Holders 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 served on the Town of Manchester for comment, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction and shall include:
a) a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment compound, radio equipment, access road, utility line, and landscaping;
b) construction plans for site clearing, grading, landscaping, water drainage, and erosion and sedimentation controls consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended; and c) detail of construction activities consistent with the Department of Public Health Best Management Practices.
The Certificate Holders shall, prior to the commencement of operation, provide the Council worst-case modeling of the electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of the electromagnetic radio frequency power density be submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order. 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. The Certificate Holders 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. The Certificate Holders shall provide reasonable space on the tower for no compensation for any Town of Manchester public safety services (police, fire and medical services), provided such use can be accommodated and is compatible with the structural integrity of the tower. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed and providing wireless services within eighteen months from the date of the mailing of the Council's Findings of Fact, Opinion, and Decision and Order (collectively called "Final Decision"), this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's Final Decision shall not be counted in calculating this deadline. Any request for extension of the time period referred to in Condition 9 shall be filed with the Council not later than 60 days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list, and the Town of Manchester. Any proposed modifications to this Decision and Order shall likewise be so served.
If the facility ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The Certificate Holder shall remove any nonfunctioning antenna, and associated antenna mounting equipment, within 60 days of the date the antenna ceased to function. In accordance with Section 16-50j-77 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of the completion of site construction and the commencement of site operation. It is SBA's opinion that the proposed modification complies with all tower conditions. There were no further post construction stipulations set. Please see attached.

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.C.S.A. § 16.50j-73, a copy of this letter is being sent to the Town's General Manager, Scott Shanley, and Zoning Enforcement Officer, James Davis, as well as to the Property Owner. (Separate notice is not being sent to the tower owner, as it belongs to SBA.)

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. §16.50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modification will not require the extension of the site boundary.
3. The proposed modifications 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 Communications Commission safety standard.
5. The proposed modification 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-referenced telecommunication facility constitute an exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

G. Scott Shepherd
Sr. Property Specialist
SBA COMMUNICATIONS CORPORATION
134 Flanders Rd., Suite 125
Westborough, MA 01581
508.251.0720 x3807 + T - 508.366.2610 + F –
gshepherd@sbasite.com

Attachments

cc: Scott Shanley, General Manager / with attachments
Town of Manchester, 41 Center Street, Manchester, CT 06045
James Davis, Zoning Enforcement Officer / with attachments
Town of Manchester, Lincoln Center, 2nd Floor, 494 Main St., Manchester, CT 06045
Hilliard Mills, LLC, Property Owner / with attachments
40 Hansen Drive, Vernon, CT 06066 (per SBA records)
642 Hilliard Street, Suite 2301, Manchester, CT 06042 (per Assessor DB)

Exhibit List

Exhibit 1	Check Copy	X
Exhibit 2	Notification Receipts	X
Exhibit 3	Property Card	X
Exhibit 4	Property Map	X
Exhibit 5	Original Zoning Approval	CSC-11/29/07, CSC –12/10/15
Exhibit 6	Construction Drawings	Pro Terra (11/12/19)
Exhibit 7	Structural Analysis	TES (11/7/19)
Exhibit 8	Mount Analysis	DESTEK Engineering (11/22/19)
Exhibit 9	EME Report	EBI Consulting (11/18/19)

EXHIBIT 1

EXHIBIT 2

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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EXHIBIT 3

640 HILLIARD STREET

Location	640 HILLIARD STREET	**Mblu**	45/ 2920/ 640/ /
Acct#	292000640	**Owner**	HILLIARD MILLS LLC
Assessment	$173,100	**Appraisal**	$247,300
PID	7687	**Building Count**	2
DISTRICT	E	**CONCRETE**	

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$132,100	$115,200	$247,300
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$92,500	$80,600	$173,100

Owner of Record

Owner HILLIARD MILLS LLC
Address 642 HILLIARD STREET SUITE 2301
MANCHESTER, CT 06042

Sale Price $75,000
Certificate
Book & Page 3649/ 42
Sale Date 04/02/2009
Instrument 03

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
HILLIARD MILLS LLC	$75,000		3649/ 42	03	04/02/2009
SBA INFRASTRUCTURE HOLDINGS II INC	$0		3649/ 32	43	04/02/2009
OPTASITE INC	$196,657		3570/ 277	33	05/16/2008
SIX HUNDRED FORTY HILLIARD ST LLC	$0		3358/ 001	31	11/01/2006
LYONS PAMELA J	$0	C	1591/ 131		04/21/1993

Building Information

Building 1 : Section 1

Year Built: 1900

Building Photo

Living Area: 8,160
Replacement Cost: $240,776
Replacement Cost Less Depreciation: $127,600

Building Attributes	
Field	**Description**
STYLE	Mill Building
MODEL	Ind/Comm
Grade	Average
Stories:	2
Occupancy	3
Exterior Wall 1	Masonite
Exterior Wall 2	Brick/Masonry
Roof Structure	Gable/Hip
Roof Cover	Asphalt Shingl
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	Hardwood
Heating Fuel	Gas
Heating Type	Hot Air-no Duc
AC Type	None
Bldg Use	Industrial 96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	300
Heat/AC	None
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Wall	Ceil & Min Wl
Rooms/Prtns	Above Average
Wall Height	10
% Comn Wall	0

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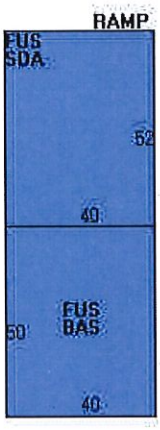
Building Layout



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Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
FUS	Upper Story, Finished	4,080	4,080
SDA	Store Display Area	2,080	2,080
BAS	First Floor	2,000	2,000
		8,160	8,160

Building 2 : Section 1

Year Built: 1900
Living Area: 4,168
Replacement Cost: $90,020
Replacement Cost Less Depreciation: $4,500

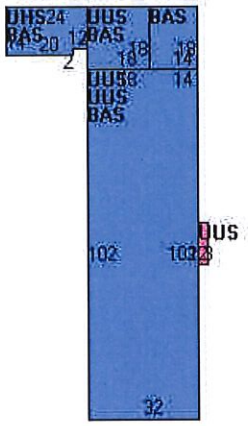
Building Attributes : Bldg 2 of 2	
Field	**Description**

STYLE	Mill Building
MODEL	Ind/Comm
Grade	Minimum
Stories:	3
Occupancy	1
Exterior Wall 1	Brick Veneer
Exterior Wall 2	Clapboard
Roof Structure	Gable/Hip
Roof Cover	Asphalt Shingl
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Dirt/None
Interior Floor 2	
Heating Fuel	Coal or Wood
Heating Type	None
AC Type	None
Bldg Use	Industrial 96
Total Rooms	
Total Bedrms	
Total Baths	
1st Floor Use:	
Heat/AC	None
Frame Type	Wood Frame
Baths/Plumbing	None
Ceiling/Wall	Ceil & Min Wl
Rooms/Prtns	Average
Wall Height	9
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos2/ManchesterCTPhotos//default.jp

Building Layout



(http://images.vgsi.com/photos2/ManchesterCTPhotos//Sketches

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	4,168	4,168
UHS	Half Story, Unfinished	328	0
UUS	Upper Story, Unfinished	6,888	0
		11,384	4,168

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 300

Land Line Valuation

Size (Acres) 1.23

Description	Industrial 96	**Frontage**	0
Zone	IND	**Depth**	0
Neighborhood	3000	**Assessed Value**	$80,600
Alt Land Appr	No	**Appraised Value**	$115,200
Category			

Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$156,600	$115,200	$271,800
2010	$186,700	$120,800	$307,500
2005	$144,800	$85,900	$230,700

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$109,600	$80,600	$190,200
2010	$130,700	$84,500	$215,200
2005	$101,400	$60,100	$161,500

EXHIBIT 4

Town of Manchester, CT

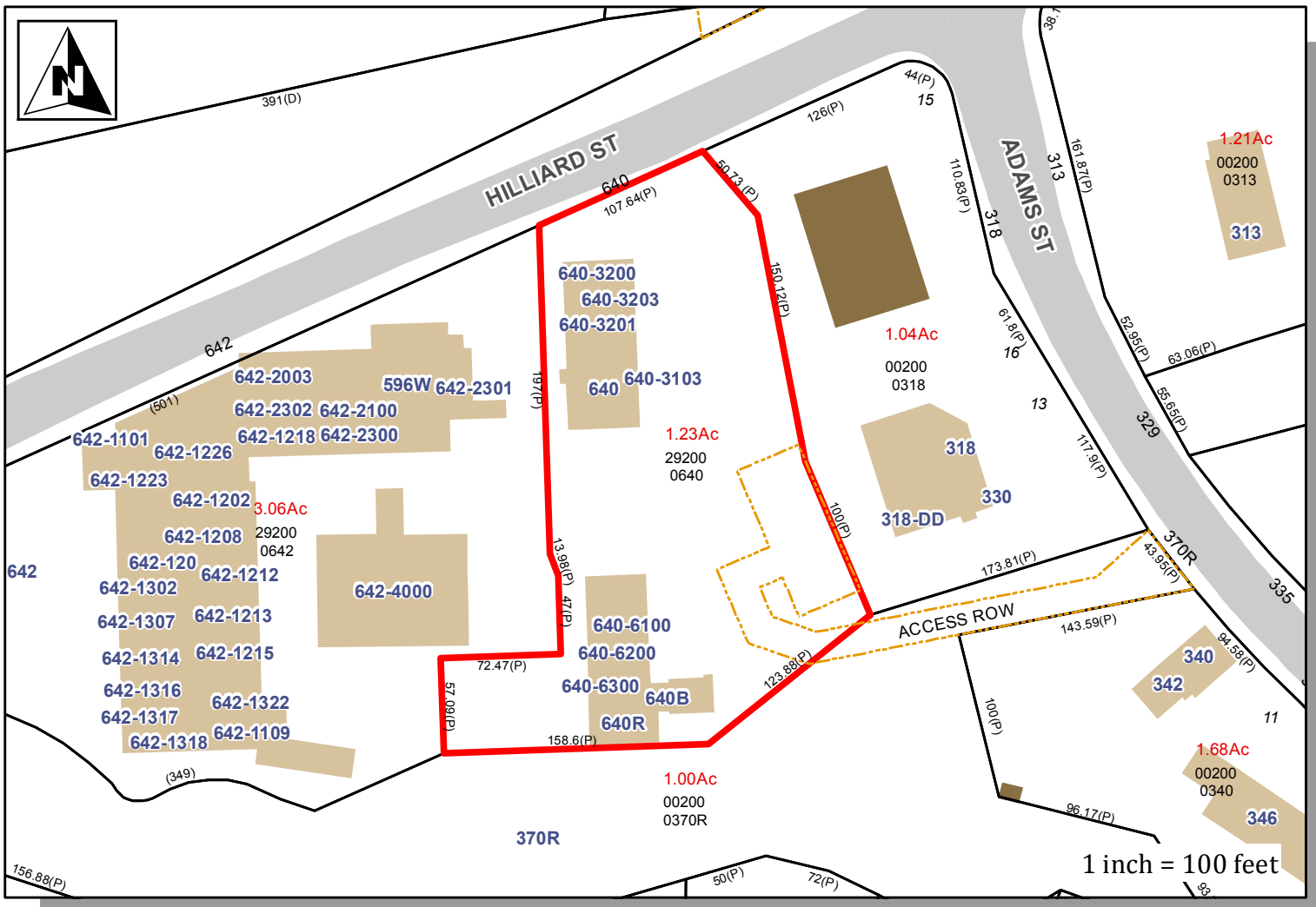
Address: 640 HILLIARD STREET

RPKEY: 292000640

Property Information:

Mailing Address:	640 HILLIARD ST MANCHESTER, CT
Owner Name:	HILLIARD MILLS LLC
Owner Address:	642 HILLIARD ST MANCHESTER, CT 06042
Land Class:	Industrial 96
Land Use Code:	300
Zoning:	IND

Acreage:	1.23
Year Built:	1900
Appraisal:	247300
Assessment:	173100
Sale Price:	$75000.00
Sale Date:	04/02/2009
Book/Page:	3649/42



Report Created: 4/4/2019

EXHIBIT 5

DOCKET NO. 339- SBA Infrastructure LLC Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a telecommunications facility located at 640 Hilliard Street, Manchester, Connecticut.	}	Connecticut
	}	Siting
	}	Council

December 10, 2015

Decision and Order

In response to the Connecticut Siting Council's (Council) reopening of the record in this docket on December 10, 2015 to consider whether changed conditions exist that would warrant a modification to the original Decision and Order's Condition 2 eliminating the requirement that all antennas on this telecommunications facility must be flush-mounted and color thereof to match the monopole, the Council hereby rescinds the Decision and Order in Docket 339 issued on November 29, 2007 and issues this new Decision and Order for the construction, maintenance and operation of a telecommunications facility located at 640 Hilliard Street, Manchester, Connecticut.

The facility shall be constructed, operated, and maintained 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 brown monopole, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of T-Mobile and other entities, both public and private, but such tower shall not exceed a height of 150 feet above ground level.

2. The height at the top of the antennas shall not exceed 150 feet above ground level.

3. Such tower shall incorporate a yield point to eliminate the potential fall radius on to the adjacent property.

4. The Certificate Holders 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 served on the Town of Manchester for comment, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction and shall include:
    a) a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment compound, radio equipment, access road, utility line, and landscaping;
    b) construction plans for site clearing, grading, landscaping, water drainage, and erosion and sedimentation controls consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended; and
    c) detail of construction activities consistent with the Department of Public Health Best Management Practices.

5. The Certificate Holders shall, prior to the commencement of operation, provide the Council worst-case modeling of the electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of the electromagnetic radio frequency power density be submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

6. 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.

7. The Certificate Holders 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.

8. The Certificate Holders shall provide reasonable space on the tower for no compensation for any Town of Manchester public safety services (police, fire and medical services), provided such use can be accommodated and is compatible with the structural integrity of the tower.

9. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed and providing wireless services within eighteen months from the date of the mailing of the Council's Findings of Fact, Opinion, and Decision and Order (collectively called "Final Decision"), this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's Final Decision shall not be counted in calculating this deadline.

10. Any request for extension of the time period referred to in Condition 9 shall be filed with the Council not later than 60 days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list, and the Town of Manchester. Any proposed modifications to this Decision and Order shall likewise be so served.

11. If the facility ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.

12. The Certificate Holder shall remove any nonfunctioning antenna, and associated antenna mounting equipment, within 60 days of the date the antenna ceased to function.

13. In accordance with Section 16-50j-77 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of the completion of site construction and the commencement of site operation.

We hereby direct that a copy of the Staff report and reissued Decision and Order be served on each person listed in the Service List, dated November 6, 2015, and notice of issuance published in Journal Inquirer.

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.

MIDDLE TURNPIKE

DOCKET NO. 339- Optasite Towers LLC and Omnipoint Communications, Inc. application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a telecommunications facility located at 640 Hilliard Street, Manchester, Connecticut. } Connecticut Siting Council } November 29, 2007

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 telecommunications facility, 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 Optasite Towers LLC and Omnipoint Communications, Inc., a subsidiary of T-Mobile USA, Inc. d/b/a T-Mobile, hereinafter referred to as the Certificate Holders, for a telecommunications facility located at 640 Hilliard Street, Manchester, Connecticut.

The facility shall be constructed, operated, and maintained 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 brown monopole, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of T-Mobile and other entities, both public and private, but such tower shall not exceed a height of 150 feet above ground level.

2. All antennas on this tower shall be flush mounted and color thereof to match the monopole. The height at the top of the antennas shall not exceed 150 feet above ground level.

3. Such tower shall incorporate a yield point to eliminate the potential fall radius on to the adjacent property.

4. The Certificate Holders 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 served on the Town of Manchester for comment, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction and shall include:
    a) a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment compound, radio equipment, access road, utility line, and landscaping;
    b) construction plans for site clearing, grading, landscaping, water drainage, and erosion and sedimentation controls consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended; and
    c) detail of construction activities consistent with the Department of Public Health Best Management Practices.

4. The Certificate Holders shall, prior to the commencement of operation, provide the Council worst-case modeling of the electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of the electromagnetic radio frequency power density be submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

5. 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.

6. The Certificate Holders 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.

7. The Certificate Holders shall provide reasonable space on the tower for no compensation for any Town of Manchester public safety services (police, fire and medical services), provided such use can be accommodated and is compatible with the structural integrity of the tower.

8. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed and providing wireless services within eighteen months from the date of the mailing of the Council's Findings of Fact, Opinion, and Decision and Order (collectively called "Final Decision"), this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's Final Decision shall not be counted in calculating this deadline.

9. Any request for extension of the time period referred to in Condition 8 shall be filed with the Council not later than 60 days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list, and the Town of Manchester. Any proposed modifications to this Decision and Order shall likewise be so served.

10. If the facility ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.

11. The Certificate Holder shall remove any nonfunctioning antenna, and associated antenna mounting equipment, within 60 days of the date the antenna ceased to function.

12. In accordance with Section 16-50j-77 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of the completion of site construction and the commencement of site operation.

Pursuant to General Statutes § 16-50p, the Council hereby directs 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 Journal Inquirer.

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	**Representative**
Optasite, Inc. Omnipoint Communications, Inc., a subsidiary of T-Mobile USA, Inc. d/b/a T-Mobile	Julie Kohler, Esq. Carrie L. Larson, Esq. Cohen and Wolf, P.C. 1115 Broad Street Bridgeport, CT 06604

EXHIBIT 6

Sprint®

SITE NAME:	SBA HILLARD
SITE NUMBER:	CT52XC028
AUGMENT ID:	CT-HFD0042Q17.1
SITE ADDRESS:	640 HILLIARD STREET MANCHESTER, CT 06040
JURISDICTION:	TOWN OF MANCHESTER/ CT SITING COUNCIL
SITE TYPE:	EXISTING 149' MONOPOLE
PROGRAM:	DO MACRO UPGRADE EQUIPMENT DEPLOYMENT

PROJECT INFORMATION

SITE INFORMATION

LATTITUDE: (PER SBA RECORD)	41° 47' 04.20" N (41.7845°)
LONGITUDE: (PER SBA RECORD)	72° 33' 02.90" W (-72.5508°)
GROUND ELEVATION:	100'± AMSL (PER GOOGLE EARTH)
STRUCTURE HEIGHT:	149'± AGL (FROM RECORD STRUCTURAL)
STRUCTURE TYPE:	MONOPOLE
ZONING JURISDICTION	TOWN OF MANCHESTER/ CT SITING COUNCIL
ZONING DISTRICT/ OCCUPANCY:	IND (INDUSTRIAL)
COUNTY:	HARTFORD

APPLICANT

SPRINT
1 INTERNATIONAL BLVD. SUITE 800
MAHWAH, NJ 07495

PROPERTY OWNER:

N/F HILLIARD MILLS LLC
642 HILLIARD STREET
MANCHESTER, CT 06042

TOWER OWNER:

SBA INFRASTRUCTURE, LLC
8051 CONGRESS AVENUE
BOCA RATON, FL 33487
(561) 995-7670

SBA SITE ID:	CT13063-A
SBA SITE NAME:	MIDDLE TURNPIKE

SBA CONTACT:

STEPHEN ROTH
(860) 539-4920
SRoth@sbasite.com

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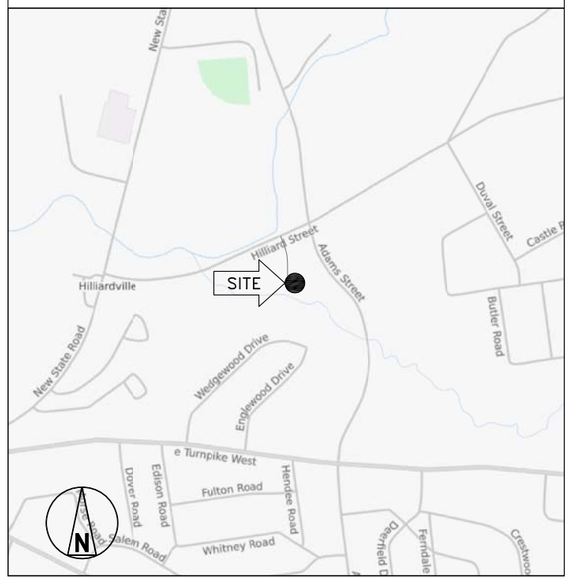
LOCATION MAP N.T.S.

AREA MAP N.T.S.



SCOPE OF WORK

1. REMOVE EXISTING SPRINT (CLEARWIRE) TOWER TOP JUNCTION BOXES.
2. REMOVE EXISTING CABLING AND REPLACE WITH (4) HYBRID CABLES.
3. REMOVE EXISTING SPRINT (CLEARWIRE) ANTENNA SUPPORT ASSEMBLY, FURNISH AND INSTALL NEW REPLACEMENT ANTENNA SUPPORT ASSEMBLY.
4. REMOVE (3) EXISTING SPRINT (CLEARWIRE) PANEL ANTENNAS AND REPLACE WITH (3) NEW SPRINT PANEL ANTENNAS.
5. INSTALL (3) NEW SPRINT MIMO ANTENNAS.
6. REMOVE (3) EXISTING SPRINT (CLEARWIRE) RRHS.
7. INSTALL (6) NEW SPRINT 800 MHZ RRHS.
8. INSTALL (3) NEW SPRINT 1900 MHZ RRHS.
9. REMOVE EXISTING SPRINT (CLEARWIRE) EQUIPMENT CABINET AND REPLACE WITH NEW SPRINT EQUIPMENT CABINET WITH CABLING CABINET.
10. REMOVE EXISTING SPRINT (CLEARWIRE) GPS ANTENNA AND REPLACE WITH NEW SPRINT GPS ANTENNA.
11. INSTALL NEW SPRINT PPC MOUNTED TO A NEW H-FRAME.

GENERAL NOTES

1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION:
   - ADA COMPLIANCE NOT REQUIRED.
   - POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED.
   - NO OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACE THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.

DRAWING INDEX

SHEET NO.	SHEET DESCRIPTION	REV. NO.
T-1	TITLE SHEET	3
SP-1	OUTLINE SPECIFICATIONS	3
SP-2	OUTLINE SPECIFICATIONS	3
SP-3	OUTLINE SPECIFICATIONS	3
A-1	COMPOUND PLAN	3
A-2	ELEVATION AND ANTENNA PLANS	3
A-3	TOWER EQUIPMENT DETAILS	3
S-1	ANTENNA AND RRH MOUNTING DETAILS	3
S-2	GROUND EQUIPMENT DETAILS	3
E-1	ELECTRICAL AND GROUNDING DETAILS	3
RF-1	RF DATA SHEET	3
RF-2	PLUMBING DIAGRAM AND RAN WIRING	3

CODE COMPLIANCE

1. 2018 CONNECTICUT STATE BUILDING CODE WITH AMENDMENTS. (IBC 2015 BASED)
2. 2017 NATIONAL ELECTRICAL CODE WITH AMENDMENTS
3. TIA-EIA-222-G

BASED ON INFORMATION PROVIDED BY SPRINT, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE TAX RELIEF ACT OF 2012, 47 USC 1455(A), AND IS SUBJECT TO AN EXPEDITED ELIGIBLE FACILITIES REQUEST/REVIEW AND ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW).

APPROVALS

TITLE	SIGNATURE	DATE
PROJECT MANAGER:		
CONSTRUCTION:		
RF ENGINEER:		
ZONING/SITE ACQ:		
OPERATIONS:		
TOWER OWNER:		

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

Sprint®
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
11/12/19

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
3	11/12/19	CONSTRUCTION FINAL	PN
2	06/11/18	CONSTRUCTION REVISED	PN
1	05/15/18	CONSTRUCTION REVISED	JEB/PN
0	11/13/17	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT52XC028
SITE NAME:
SBA HILLARD
SITE ADDRESS:
640 HILLIARD STREET
MANCHESTER, CT 06040

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

THESE OUTLINE SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT STANDARD CONSTRUCTION SPECIFICATIONS, INCLUDING CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

SECTION 01 100 - SCOPE OF WORK

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT CONSTRUCTION STANDARDS FOR WIRELESS SITES, CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 PRECEDENCE: SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES INCLUDING THE STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. NOTIFY SPRINT CONSTRUCTION MANAGER IF THIS OCCURS.

1.4 NATIONALLY RECOGNIZED CODES AND STANDARDS:

A. THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:

1. GR–78–CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
2. GR–1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY –GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
3. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC") AND NFPA 101 (LIFE SAFETY CODE).
4. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
5. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
6. AMERICAN CONCRETE INSTITUTE (ACI)
7. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
8. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
9. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
10. PORTLAND CEMENT ASSOCIATION (PCA)
11. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
12. BRICK INDUSTRY ASSOCIATION (BIA)
13. AMERICAN WELDING SOCIETY (AWS)
14. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
15. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
16. DOOR AND HARDWARE INSTITUTE (DHI)
17. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
18. APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

1.5 DEFINITIONS:

A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B. COMPANY: SPRINT CORPORATION
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D. CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
E. THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.
F. OFCI: OWNER FURNISHED, CONTRACTOR INSTALLED EQUIPMENT.
G. CONSTRUCTION MANAGER – ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT...

1.6 SITE FAMILIARITY: CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SPRINT CONSTRUCTION MANAGER PRIOR TO THE COMMENCEMENT OF WORK. NO COMPENSATION WILL BE AWARDED BASED ON CLAIM OF LACK OF KNOWLEDGE OR FIELD CONDITIONS.

1.7 POINT OF CONTACT: COMMUNICATION BETWEEN SPRINT AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE SPRINT CONSTRUCTION MANAGER APPOINTED TO MANAGE THE PROJECT FOR SPRINT.

1.8 ON–SITE SUPERVISION: THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

1.9 DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.

A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS–BUILT" DRAWINGS.
B. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK.
C . DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

1.10 USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.11 UTILITIES SERVICES: WHERE NECESSARY TO CUT EXISTING PIPES, ELECTRICAL WIRES, CONDUITS, CABLES, ETC., OF UTILITY SERVICES, OR OF FIRE PROTECTION OR COMMUNICATIONS SYSTEMS, THEY SHALL BE CUT AND CAPPED AT SUITABLE PLACES OR WHERE SHOWN. ALL SUCH ACTIONS SHALL BE COORDINATED WITH THE UTILITY COMPANY INVOLVED:

1.12 PERMITS / FEES: WHEN REQUIRED THAT A PERMIT OR CONNECTION FEE BE PAID TO A PUBLIC UTILITY PROVIDER FOR NEW SERVICE TO THE CONSTRUCTION PROJECT, PAYMENT OF SUCH FEE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

1.13 CONTRACTOR SHALL TAKE ALL MEASURES AND PROVIDE ALL MATERIAL NECESSARY FOR PROTECTING EXISTING EQUIPMENT AND PROPERTY.

1.14 METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION: CONTRACTOR SHALL PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLATION AND COMMISSIONING MOPS.

A. TOP HAT
B. HOW TO INSTALL A NEW CABINET
C. BASE BAND UNIT IN EXISTING UNIT
D. INSTALLATION OF BATTERIES
E. INSTALLATION OF HYBRID CABLE
F. INSTALLATION OF RRH'S
G. CABLING
H. TS–0200 REV 4 – ANTENNA LINE ACCEPTANCE STANDARDS
I. SPRINT CELL SITE ENGINEERING NOTICE – EN 2012–001, REV 1.
J. COMMISSIONING MOPS
K. SPRINT CELL SITE ENGINEERING NOTICE – EN–2013–002
L. SPRINT ENGINEERING LETTER – EL–0504
M. SPRINT ENGINEERING LETTER – EL–0568
N. SPRINT TECHNICAL SPECIFICATION – TS–0193

1.15 USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:

A. CONTRACTOR WILL UTILIZE ITS BEST EFFORTS TO WORK WITH SPRINT ELECTRONIC PROJECT MANAGEMENT SYSTEMS. CONTRACTOR UNDERSTANDS THAT SUFFICIENT INTERNET ACCESS, EQUIVALENT TO "BROADBAND" OR BETTER, IS REQUIRED TO TIMELY AND EFFECTIVELY UTILIZE SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS AND AGREES TO MAINTAIN APPROPRIATE CONNECTIONS FOR CONTRACTOR'S STAFF AND OFFICES THAT ARE COMPATIBLE WITH SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

3.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

3.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD–PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

3.4 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

3.5 EXISTING CONDITIONS: NOTIFY THE SPRINT CONSTRUCTION MANAGER OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

SECTION 01 200 - COMPANY FURNISHED MATERIAL AND EQUIPMENT

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 RECEIPT OF MATERIAL AND EQUIPMENT:

A. COMPANY FURNISHED MATERIAL AND EQUIPMENT IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DOCUMENTS.

B. THE CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:

1. ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
2. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
3. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
4. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY–FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
5. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
6. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF–LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

3.2 DELIVERABLES:

A. COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE.

B. IF APPLICABLE, COMPLETE LOST/STOLEN/DAMAGED DOCUMENTATION REPORT AS NECESSARY IN ACCORDANCE WITH COMPANY PRACTICE, AND AS DIRECTED BY COMPANY.

C. UPLOAD DOCUMENTATION INTO SPRINT SITE MANAGEMENT SYSTEM (SMS) AND/OR PROVIDE HARD COPY DOCUMENTATION AS REQUESTED.

SECTION 01 300 - CELL SITE CONSTRUCTION

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 NOTICE TO PROCEED:

A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF THE WORK ORDER.

B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE SPRINT WITH AN OPERATIONAL WIRELESS FACILITY.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 FUNCTIONAL REQUIREMENTS:

A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. THE ACTIVITIES DESCRIBED ARE NOT EXHAUSTIVE, AND CONTRACTOR SHALL TAKE ANY AND ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING WIRELESS FACILITY AT THE SITE IN ACCORDANCE WITH COMPANY PROCESSES.

B. SUBMIT SPECIFIC DOCUMENTATION AS INDICATED HEREIN, AND OBTAIN REQUIRED APPROVALS WHILE THE WORK IS BEING PERFORMED.

C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES

D. PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
2. PREPARE GROUND SITES; PROVIDE DE–GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
3. MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND TELCO BACKHAUL.
4. INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
5. INSTALL ABOVE GROUND GROUNDING SYSTEMS.
6. PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
7. INSTALL "H–FRAMES", CABINETS AND SHELTERS AS INDICATED.
8. INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
9. ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.
10. PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
11. PROVIDE SLABS AND EQUIPMENT PLATFORMS.
12. INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
13. PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
14. CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER
15. INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
16. INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
17. INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
18. PERFORM, DOCUMENT, AND CLOSE OUT ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
19. PERFORM ANTENNAL AND COAX SWEEP TESTING AND MAKE ANY AND ALL NECESSARY CORRECTIONS.
20. REMAIN ON SITE MOBILIZED THROUGHOUT HAND–OFF AND INTEGRATION TO ASSIST AS NEEDED UNTIL SITE IS DEEMED SUBSTANTIALLY COMPLETE AND PLACED "ON AIR."

3.2 GENERAL REQUIREMENTS FOR CIVIL CONSTRUCTION:

A. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.

C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.

1. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
2. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.

D. CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION

E. CONDUCT TESTING AS REQUIRED HEREIN.

3.3 DELIVERABLES:

A. CONTRACTOR SHALL REVIEW, APPROVE, AND SUBMIT TO SPRINT SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND SIMILAR SUBMITTALS AS REQUIRED HEREINAFTER

B. PROVIDE DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.

1. ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
2. PROJECT PROGRESS REPORTS.
3. CIVIL CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
4. ELECTRICAL SERVICE COMPLETION DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
5. LINES AND ANTENNA INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
6. POWER INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
7. TELCO READY DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
8. PPC (OR SHELTER) INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
9. TOWER CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
10. TOWER CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
11. BTS AND RADIO EQUIPMENT DELIVERED AT SITE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
12. NETWORK OPERATIONS HANDOFF CHECKLIST (HOC WALK) COMPLETE (UPLOAD FORM IN SMS)
13. CIVIL CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
14. SITE CONSTRUCTION PROGRESS PHOTOS UNLOADED INTO SMS.

CONTINUE SHEET SP-2

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STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
11/12/19

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
3	11/12/19	CONSTRUCTION FINAL	PN
2	06/11/18	CONSTRUCTION REVISED	PN
1	05/15/18	CONSTRUCTION REVISED	JEB/PN
0	11/13/17	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT52XC028
SITE NAME:
SBA HILLARD
SITE ADDRESS:
640 HILLIARD STREET
MANCHESTER, CT 06040

SHEET TITLE
OUTLINE SPECIFICATIONS

SHEET NUMBER
SP–1

CONTINUED FROM SP-1:

SECTION 01 400 - SUBMITTALS, TESTS, AND INSPECTIONS

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 SUBMITTALS:

A. THE WORK IN ALL ASPECTS SHALL COMPLY WITH THE CONSTRUCTION DRAWINGS AND THESE SPECIFICATIONS.

B. SUBMIT THE FOLLOWING TO COMPANY REPRESENTATIVE FOR APPROVAL.
1. CONCRETE MIX–DESIGNS FOR TOWER FOUNDATIONS, ANCHORS PIERS, AND CONCRETE PAVING.
2. CONCRETE BREAK TESTS AS SPECIFIED HEREIN.
3. SPECIAL FINISHES FOR INTERIOR SPACES, IF ANY.
4. ALL EQUIPMENT AND MATERIALS SO IDENTIFIED ON THE CONSTRUCTION DRAWINGS.
5. CHEMICAL GROUNDING DESIGN.

C. ALTERNATES: AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO BEING SHIPPED TO SITE. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHALL INCLUDE A STATEMENT OF COST REDUCTION PROPOSED FOR USE OF ALTERNATE PRODUCT.

1.4 TESTS AND INSPECTIONS:

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.

B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. COAX SWEEPS AND FIBER TESTS PER SPRINT TS–0200 CURRENT VERSION ANTENNA LINE ACCEPTANCE STANDARDS.
2. AGL, AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE–FOR–THE–PURPOSE ANTENNA ALIGNMENT TOOL.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.

C. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING;
1. AZIMUTH, DOWNTILT, AGL – UPLOAD REPORT FROM ANTENNA ALIGNMENT TOOL TO SITERRA TASK 465. INSTALLED AZIMUTH, DOWNTILT, AND AGL MUST CONFORM TO THE RF DATA SHEETS. SWEEP AND FIBER TESTS
2. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
3. ALL AVAILABLE JURISDICTIONAL INFORMATION
4. PDF SCAN OF REDLINES PRODUCED IN FIELD
5. ELECTRONIC AS–BUILT DRAWINGS IN AUTOCAD AND PDF FORMATS. ANY FIELD CHANGE MUST BE REFLECTED BY MODIFYING THE PLANS, ELEVATIONS, AND DETAILS IN THE DRAWING SETS. GENERAL NOTES INDICATING MODIFICATIONS WILL NOT BE ACCEPTED. CHANGES SHALL BE HIGHLIGHTED AS "CLOUDS" IDENTIFIED AS THE "AS–BUILT" CONDITION.
6. LIEN WAIVERS
7. FINAL PAYMENT APPLICATION
8. REQUIRED FINAL CONSTRUCTION PHOTOS
9. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS
10. ALL POST NTP TASKS INCLUDING DOCUMENT UPLOADS COMPLETED IN SITERRA (SPRINTS DOCUMENT REPOSITORY OF RECORD).

1.5 COMMISSIONING: PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPS

1.6 INTEGRATION: PERFORM ALL INTEGRATION ACTIVITIES AS REQUIRED BY APPLICABLE MOPS

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 REQUIREMENTS FOR TESTING:

A. THIRD PARTY TESTING AGENCY: WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
1. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
2. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.
3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.

3.2 REQUIRED TESTS:

A. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. CONCRETE CYLINDER BREAK TESTS FOR THE TOWER AND ANCHOR FOUNDATIONS AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
2. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED IN SECTION: HOT MIX ASPHALT PAVING.
3. FIELD QUALITY CONTROL TESTING AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
4. TESTING REQUIRED UNDER SECTION: AGGREGATE BASE FOR ACCESS ROADS, PADS AND ANCHOR LOCATIONS
5. STRUCTURAL BACKFILL COMPACTION TESTS FOR THE TOWER FOUNDATION.
6. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
7. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
8. GROUNDING AT ANTENNA MASTS FOR GPS AND ANTENNAS
9. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

3.3 REQUIRED INSPECTIONS:

A. SCHEDULE INSPECTIONS WITH COMPANY REPRESENTATIVE.

B. CONDUCT INSPECTIONS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. GROUNDING SYSTEM INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
3. COMPACTION OF BACKFILL MATERIALS; AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS; ASPHALT PAVING; AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
4. PRE– AND POST–CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES.
5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
6. ANTENNA AZIMUTH , DOWN TILT AND PER SUNLIGHT TOOL SUNSIGHT INSTRUMENTS – ANTENNALIGN ALIGNMENT TOOL (AAT)
7. VERIFICATION DOCUMENTED WITH THE ANTENNA CHECKLIST REPORT, BY A&E, SITE DEVELOPMENT REP, OR RF REP.
8. FINAL INSPECTION CHECKLIST AND HANDOFF WALK (HOC.). SIGNED FORM SHOWING ACCEPTANCE BY FIELD OPS IS TO BE UPLOADED INTO SMS.
9. COAX SWEEP AND FIBER TESTING DOCUMENTS SUBMITTED VIA SMS FOR RF APPROVAL.
10. SCAN–ABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
11. ALL AVAILABLE JURISDICTIONAL INFORMATION
12. PDF SCAN OF REDLINES PRODUCED IN FIELD

E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.

F. CONSTRUCTION INSPECTIONS AND CORRECTIVE MEASURES SHALL BE DOCUMENTED BY THE CONTRACTOR WITH WRITTEN REPORTS AND PHOTOGRAPHS. PHOTOGRAPHS MUST BE DIGITAL AND OF SUFFICIENT QUALITY TO CLEARLY SHOW THE SITE CONSTRUCTION. PHOTOGRAPHS MUST CLEARLY IDENTIFY THE PHOTOGRAPHED ITEM AND BE LABELED WITH THE SITE CASCADE NUMBER, SITE NAME, DESCRIPTION, AND DATE.

3.4 DELIVERABLES: TEST AND INSPECTION REPORTS AND CLOSEOUT DOCUMENTATION SHALL BE UPLOADED TO THE SMS AND/OR FORWARDED TO SPRINT FOR INCLUSION INTO THE PERMANENT SITE FILES.

A. THE FOLLOWING TEST AND INSPECTION REPORTS SHALL BE PROVIDED AS APPLICABLE.
1. CONCRETE MIX AND CYLINDER BREAK REPORTS.
2. STRUCTURAL BACKFILL COMPACTION REPORTS.
3. SITE RESISTANCE TO EARTH TEST.
4. ANTENNA AZIMUTH AND DOWN TILT VERIFICATION
5. TOWER ERECTION INSPECTIONS AND MEASUREMENTS DOCUMENTING TOWER INSTALLED PER SUPPLIER'S REQUIREMENTS AND THE APPLICABLE SECTIONS HEREIN.
6. COAX CABLE SWEEP TESTS PER COMPANY'S "ANTENNA LINE ACCEPTANCE STANDARDS".

B. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES THE FOLLOWING;
1. TEST WELLS AND TRENCHES: PHOTOGRAPHS OF ALL TEST WELLS; PHOTOGRAPHS SHOWING ALL OPEN EXCAVATIONS AND TRENCHING PRIOR TO BACKFILLING SHOWING A TAPE MEASURE VISIBLE IN THE EXCAVATIONS INDICATING DEPTH.
2. CONDUITS, CONDUCTORS AND GROUNDING: PHOTOGRAPHS SHOWING TYPICAL INSTALLATION OF CONDUCTORS AND CONNECTORS; PHOTOGRAPHS SHOWING TYPICAL BEND RADIUS OF INSTALLED GROUND WIRES AND GROUND ROD SPACING;
3. CONCRETE FORMS AND REINFORCING: CONCRETE FORMING AT TOWER AND EQUIPMENT/SHELTER PAD/FOUNDATIONS – PHOTOGRAPHS SHOWING ALL REINFORCING STEEL, UTILITY AND CONDUIT STUB OUTS; PHOTOGRAPHS SHOWING CONCRETE POUR OF SHELTER SLAB/FOUNDATION, TOWER FOUNDATION AND GUY ANCHORS WITH VIBRATOR IN USE; PHOTOGRAPHS SHOWING EACH ANCHOR ON GUYED TOWERS, BEFORE CONCRETE POUR.
4. TOWER, ANTENNAS AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNA(S); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING – TOP AND BOTTOM; PHOTOS OF COAX GROUNDING––TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
5. ROOF TOPS: PRE–CONSTRUCTION AND POST–CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;
6. SITE LAYOUT – PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.
7. FINISHED UTILITIES: CLOSE–UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE–UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE–UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.
8. REQUIRED MATERIALS CERTIFICATIONS: CONCRETE MIX DESIGNS; MILL CERTIFICATION FOR ALL REINFORCING AND STRUCTURAL STEEL; AND ASPHALT PAVING MIX DESIGN.
9. ANY AND ALL SUBMITTALS BY THE JURISDICTION OR COMPANY.

SECTION 01 500 - PROJECT REPORTING

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 WEEKLY REPORTS:

A. CONTRACTOR SHALL PROVIDE SPRINT WITH WEEKLY REPORTS SHOWING PROJECT STATUS. THIS STATUS REPORT FORMAT WILL BE PROVIDED TO THE CONTRACTOR BY SPRINT. THE REPORT WILL CONTAIN SITE ID NUMBER, THE MILESTONES FOR EACH SITE, INCLUDING THE BASELINE DATE, ESTIMATED COMPLETION DATE AND ACTUAL COMPLETION DATE.

B. REPORT INFORMATION WILL BE TRANSMITTED TO SPRINT VIA ELECTRONIC MEANS AS REQUIRED. THIS INFORMATION WILL PROVIDE A BASIS FOR PROGRESS MONITORING AND PAYMENT.

3.2 PROJECT CONFERENCE CALLS:

A. SPRINT MAY HOLD WEEKLY PROJECT CONFERENCE CALLS. CONTRACTOR WILL BE REQUIRED TO COMMUNICATE SITE STATUS, MILESTONE COMPLETIONS AND UPCOMING MILESTONE PROJECTIONS, AND ANSWER ANY OTHER SITE STATUS QUESTIONS AS NECESSARY.

3.3 PROJECT TRACKING IN SMS:

A. CONTRACTOR SHALL PROVIDE SCHEDULE UPDATES AND PROJECTIONS IN THE SMS SYSTEM ON A WEEKLY BASIS.

3.4 ADDITIONAL REPORTING:

A. ADDITIONAL OR ALTERNATE REPORTING REQUIREMENTS MAY BE ADDED TO THE REPORT AS DETERMINED TO BE REASONABLY NECESSARY BY COMPANY.

3.5 PROJECT PHOTOGRAPHS:

A. FILE DIGITAL PHOTOGRAPHS OF COMPLETED SITE IN JPEG FORMAT IN THE SMS PHOTO LIBRARY FOR THE RESPECTIVE SITE. PHOTOGRAPHS SHALL BE CLEARLY LABELED WITH SITE NUMBER, NAME AND DESCRIPTION, AND SHALL INCLUDE AT A MINIMUM THE FOLLOWING AS APPLICABLE:
1. SHELTER AND TOWER OVERVIEW.
2. TOWER FOUNDATION(S) – FORMS AND STEEL BEFORE POUR (EACH ANCHOR ON GUYED TOWERS).
3. TOWER FOUNDATION(S) POUR WITH VIBRATOR IN USE (EACH ANCHOR ON GUYED TOWERS).
4. TOWER STEEL AS BEING INSTALLED INTO HOLE (SHOW ANCHOR STEEL ON GUYED TOWERS).
5. PHOTOS OF TOWER SECTION STACKING.
6. CONCRETE TESTING / SAMPLES.
7. PLACING OF ANCHOR BOLTS IN TOWER FOUNDATION.
8. BUILDING/WATER TANK FROM ROAD FOR TENANT IMPROVEMENTS OR COMMENTS.
9. SHELTER FOUNDATION––FORMS AND STEEL BEFORE POURING.
10. SHELTER FOUNDATION POUR WITH VIBRATOR IN USE.
11. COAX CABLE ENTRY INTO SHELTER.
12. PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
13. ROOFTOP PRE AND POST CONSTRUCTION PHOTOS TO INCLUDE PENETRATIONS AND INTERIOR CEILING.
14. PHOTOS OF TOWER TOP COAX LINE COLOR CODING AND COLOR CODING AT GROUND LEVEL.
15. PHOTOS OF ALL APPROPRIATE COMPANY OR REGULATORY SIGNAGE.
16. PHOTOS OF EQUIPMENT BOLT DOWN INSIDE SHELTER.
17. POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE AND POWER AND TELCO SUPPLY LOCATIONS INCLUDING METER/DISCONNECT.
18. ELECTRICAL TRENCH(S) WITH ELECTRICAL / CONDUIT BEFORE BACKFILL.
19. ELECTRICAL TRENCH(S) WITH FOIL–BACKED TAPE BEFORE FURTHER BACKFILL.
20. TELCO TRENCH WITH TELEPHONE / CONDUIT BEFORE BACKFILL.
21. TELCO TRENCH WITH FOIL–BACKED TAPE BEFORE FURTHER BACKFILL.
22. SHELTER GROUND–RING TRENCH WITH GROUND–WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
23. TOWER GROUND–RING TRENCH WITH GROUND–WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
24. FENCE GROUND–RING TRENCH WITH GROUND–WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
25. ALL BTS GROUND CONNECTIONS.
26. ALL GROUND TEST WELLS.
27. ANTENNA GROUND BAR AND EQUIPMENT GROUND BAR.
28. ADDITIONAL GROUNDING POINTS ON TOWERS ABOVE 200'.
29. HVAC UNITS INCLUDING CONDENSERS ON SPLIT SYSTEMS.
30. GPS ANTENNAS.
31. CABLE TRAY AND/OR WAVEGUIDE BRIDGE.
32. DOGHOUSE/CABLE EXIT FROM ROOF.
33. EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA.
34. MASTER BUS BAR.
35. TELCO BOARD AND NIU.
36. ELECTRICAL DISTRIBUTION WALL.
37. CABLE ENTRY WITH SURGE SUPPRESSION.
38. ENTRANCE TO EQUIPMENT ROOM.
39. COAX WEATHERPROOFING–TOP AND BOTTOM OF TOWER.
40. COAX GROUNDING –TOP AND BOTTOM OF TOWER.
41. ANTENNA AND MAST GROUNDING.
42. LANDSCAPING – WHERE APPLICABLE.

3.6 FINAL PROJECT ACCEPTANCE: COMPLETE ALL REQUIRED REPORTING TASKS PER CONTRACT, CONTRACT DOCUMENTS OR THE SPRINT INTEGRATED CONSTRUCTION STANDARDS FOR WIRELESS SITES AND UPLOAD INTO SITERRA.

SECTION 07 500 - ROOF CUTTING, PATCHING AND REPAIR

SUMMARY:
THIS SECTION SPECIFIES CUTTING AND PATCHING EXISTING ROOFING SYSTEMS WHERE CONDUIT OR CABLES EXIT THE BUILDING ONTO THE ROOF OR BUILDING–MOUNTED ANTENNAS, AND AS REQUIRED FOR WATERTIGHT PERFORMANCE. ROOFTOP ENTRY OPENINGS IN MEMBRANE ROOFTOPS SHALL BE CONSTRUCTED TO COMPLY WITH LANDLORD, ANY EXISTING WARRANTY, AND LOCAL JURISDICTIONAL STANDARDS.

1.4 SUBMITTALS:

A. PRE–CONSTRUCTION ROOF PHOTOS: COMPLETE A ROOF INSPECTION PRIOR TO THE INSTALLATION OF SPRINT EQUIPMENT ON ANY ROOFTOP BUILD. AT A MINIMUM INSPECT AND PHOTOGRAPH (MINIMUM 3 EA.) ALL AREAS IMPACTED BY THE ADDITION OF THE SPRINT EQUIPMENT.

B. PROVIDE SIMILAR PHOTOGRAPHS SHOWING ROOF CONDITIONS AFTER CONSTRUCTION (MINIMUM 3 EA.)

C. ROOF INSPECTION PHOTOGRAPHS SHOULD BE UPLOADED WITH CLOSEOUT PHOTOGRAPHS.

SECTION 09 900 - PAINTING

QUALITY ASSURANCE:

A. COMPLY WITH GOVERNING CODES AND REGULATIONS. PROVIDE PRODUCTS OF ACCEPTABLE MANUFACTURERS WHICH HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR THREE YEARS. USE EXPERIENCED INSTALLERS. DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

B. COMPLY WITH ALL ENVIRONMENTAL REGULATIONS FOR VOLATILE ORGANIC COMPOUNDS.

CONTINUE SHEET SP-3

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STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED
PROFESSIONAL ENGINEER
11/12/19

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
3	11/12/19	CONSTRUCTION FINAL	PN
2	06/11/18	CONSTRUCTION REVISED	PN
1	05/15/18	CONSTRUCTION REVISED	JEB/PN
0	11/13/17	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT52XC028
SITE NAME:
SBA HILLARD
SITE ADDRESS:
640 HILLIARD STREET
MANCHESTER, CT 06040

SHEET TITLE
OUTLINE SPECIFICATIONS

SHEET NUMBER
SP–2

CONTINUED FROM SP-2:

MATERIALS:

A. MANUFACTURERS: BENJAMIN MOORE, ICI DEVOE COATINGS, PPG, SHERWIN WILLIAMS OR APPROVED EQUAL. PROVIDE PREMIUM GRADE, PROFESSIONAL-QUALITY PRODUCTS FOR COATING SYSTEMS.

PAINT SCHEDULE:

A. EXTERIOR ANTENNAE AND ANTENNA MOUNTING HARDWARE: ONE COAT OF PRIMER AND TWO FINISH COATS. PAINT FOR ANTENNAE SHALL BE NON-METALLIC BASED AND CONTAIN NO METALLIC PARTICLES. PROVIDE COLORS AND PATTERNS AS REQUIRED TO MASK APPEARANCE OF ANTENNAE ON ADJACENT BUILDING SURFACES AND AS ACCEPTABLE TO THE OWNER. REFER TO ANTENNA MANUFACTURER'S INSTRUCTIONS WHENEVER POSSIBLE.

B. ROOF TOP CONSTRUCTION: TOUCH UP – PREPARE SURFACES TO BE REPAIRED. FOLLOW INDUSTRY STANDARDS AND REQUIREMENTS OF OWNER TO MATCH EXISTING COATING AND FINISH.

PAINTING APPLICATION:

1. INSPECT SURFACES, REPORT UNSATISFACTORY CONDITIONS IN WRITING; BEGINNING WORK MEANS ACCEPTANCE OF SUBSTRATE.
2. COMPLY WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS FOR PREPARATION, PRIMING AND COATING WORK. COORDINATE WITH WORK OF OTHER SECTIONS.
3. MATCH APPROVED MOCK-UPS FOR COLOR, TEXTURE, AND PATTERN. RE-COAT OR REMOVE AND REPLACE WORK WHICH DOES NOT MATCH OR SHOWS LOSS OF ADHESION.
4. CLEAN UP, TOUCH UP AND PROTECT WORK.

TOUCHUP PAINTING:

1. GALVANIZING DAMAGE AND ALL BOLTS AND NUTS SHALL BE TOUCHED UP AFTER TOWER ERECTION WITH "GALVANOX," "DRY GALV," OR "ZINC-IT."
2. FIELD TOUCHUP PAINT SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
3. ALL METAL COMPONENTS SHALL BE HANDLED WITH CARE TO PREVENT DAMAGE TO THE COMPONENTS, THEIR PRESERVATIVE TREATMENT, OR THEIR PROTECTIVE COATINGS.

SECTION 11 700 - ANTENNA ASSEMBLY, REMOTE RADIO HEADS AND CABLE INSTALLATION

SUMMARY:
THIS SECTION SPECIFIES INSTALLATION OF ANTENNAS, RRH'S, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

ANTENNAS AND RRH'S:
THE NUMBER AND TYPE OF ANTENNAS AND RRH'S TO BE INSTALLED IS DETAILED ON THE CONSTRUCTION DRAWINGS.

HYBRID CABLE:
HYBRID CABLE WILL BE DC/FIBER AND FURNISHED FOR INSTALLATION AT EACH SITE. CABLE SHALL BE INSTALLED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

JUMPERS AND CONNECTORS:
FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRH'S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 12-50, CR 540, OR FXL 540. SUPER-FLEX CABLES ARE NOT ACCEPTABLE. JUMPERS BETWEEN THE RRH'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE. DO NOT USE SUPERFLEX OUTDOORS. JUMPERS SHALL BE FACTORY FABRICATED IN APPROPRIATE LENGTHS WITH A MAXIMUM OF 4 FEET EXCESS PER JUMPER AND HAVE CONNECTORS AT EACH END, MANUFACTURED BY SUPPLIER. IF JUMPERS ARE FIELD FABRICATED, FOLLOW MANUFACTURER'S REQUIREMENTS FOR INSTALLATION OF CONNECTORS

REMOTE ELECTRICAL TILT (RET) CABLES:

MISCELLANEOUS:
INSTALL SPLITTERS, COMBINERS, FILTERS PER RF DATA SHEET, FURNISHED BY SPRINT.

ANTENNA INSTALLATION:
THE CONTRACTOR SHALL ASSEMBLE ALL ANTENNAS ONSITE IN ACCORDANCE WITH THE INSTRUCTIONS SUPPLIED BY THE MANUFACTURER. ANTENNA HEIGHT, AZIMUTH, AND FEED ORIENTATION INFORMATION SHALL BE A DESIGNATED ON THE CONSTRUCTION DRAWINGS.

A. THE CONTRACTOR SHALL POSITION THE ANTENNA ON TOWER PIPE MOUNTS SO THAT THE BOTTOM STRUT IS LEVEL. THE PIPE MOUNTS SHALL BE PLUMB TO WITHIN 1 DEGREE.

B. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE DRAWINGS.

HYBRID CABLES INSTALLATION:

A. THE CONTRACTOR SHALL ROUTE, TEST, AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAN THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADII.

C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.

1. FASTENING MAIN HYBRID CABLES: ALL CABLES SHALL BE PERMANENTLY FASTENED TO THE COAX LADDER AT 4'-0" OC USING NON-MAGNETIC STAINLESS STEEL CLIPS.
2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBTS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:
   a. FIBER: SUPPORT FIBER BUNDLES USING ½" VELCRO STRAPS OF THE REQUIRED LENGTH @ 18" OC. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.
   b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.
3. FASTENING JUMPERS: SECURE JUMPERS TO THE SIDE ARMS OR HEAD FRAMES USING STAINLESS STEEL TIE WRAPS OR STAINLESS STEEL BUTTERFLY CLIPS.
4. CABLE INSTALLATION:
   a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE, NOTIFY THE CONSTRUCTION MANAGER.
   b. CABLE ROUTING: CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOP AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.
   c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURES RECOMMENDED MAXIMUM BEND RADIUS.
5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.
6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED PER SPRINT TS 0200 CURRENT VERSION.
7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE-EN 2012-001, REV 1

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

A. ALL FIBER & COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.

1. COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2" ELECTRICAL TAPE EXTENDING 2" BEYOND TUBING. PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.
2. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF-AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF-AMALGAMATING TAPE.
3. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
4. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

SECTION 11 800 – INSTALLATION OF MULTIMODAL BASE STATIONS (MMBTS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBTS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).

B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRE BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURERS INSTALLATION AND START-UP REQUIREMENTS

DC CIRCUIT BREAKER LABELING

A. LABEL CIRCUIT BREAKERS ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE – EN 2012-001, REV 1.

SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE TRANSCIEVER STATIONS (MMBTS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBTS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).

B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRE BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURERS INSTALLATION AND START-UP REQUIREMENTS

SUPPORTING DEVICES:

A. MANUFACTURED STRUCTURAL SUPPORT MATERIALS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE FOLLOWING:
1. ALLIED TUBE AND CONDUIT
2. B-LINE SYSTEM
3. UNISTRUT DIVERSIFIED PRODUCTS
4. THOMAS & BETTS

B. FASTENERS: TYPES, MATERIALS, AND CONSTRUCTION FEATURES AS FOLLOWS:
1. EXPANSION ANCHORS: CARBON STEEL WEDGE OR SLEEVE TYPE.
2. POWER-DRIVEN THREADED STUDS: HEAT-TREATED STEEL, DESIGNED SPECIFICALLY FOR THE INTENDED SERVICE.
3. FASTEN BY MEANS OF WOOD SCREWS ON WOOD.
4. TOGGLE BOLTS ON HOLLOW MASONRY UNITS.
5. CONCRETE INSERTS OR EXPANSION BOLTS ON CONCRETE OR SOLID MASONRY.
6. MACHINE SCREWS, WELDED THREADED STUDS, OR SPRING-TENSION CLAMPS ON STEEL.
7. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE SHALL NOT BE PERMITTED.
8. DO NOT WELD CONDUIT, PIPE STRAPS, OR ITEMS OTHER THAN THREADED STUDS TO STEEL STRUCTURES.
9. IN PARTITIONS OF LIGHT STEEL CONSTRUCTION, USE SHEET METAL SCREWS.

SUPPORTING DEVICES:

A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.

B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.

C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:

D. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.

E. USE VIBRATION AND SHOCK-RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS.

ELECTRICAL IDENTIFICATION:

A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.

B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

SECTION 26 200 - ELECTRICAL MATERIALS AND EQUIPMENT

CONDUIT:

A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR ENCASED RUNS IN CONCRETE. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1, FEDERAL SPECIFICATION WW-C-581 AND SHALL BE LISTED WITH THE UNDERWRITERS' LABORATORIES. FITTINGS SHALL BE THREADED – SET SCREW OR COMPRESSION FITTINGS WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.

B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.

C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.

D. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED IN FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO-GALVANIZED OR HOT-DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATION C80.3, FEDERAL SPECIFICATION WW-C-563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. FITTINGS SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.

E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTION TO EQUIPMENT. FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6-FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRE BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.

F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21MM).

HUBS AND BOXES:

A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED. HUB SHALL INCLUDE LOCKNUT AND NEOPRENE O-RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION.

B. CABLE TERMINATION FITTINGS FOR CONDUIT
1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O-Z/GEDNEY OR EQUAL.
2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO – CL2075; OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.

C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS, CROUSE-HINDS WAB SERIES OR EQUAL.

D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKETED COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION. PROVIDE CROUSE-HINDS FORM 8 OR EQUAL.

E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE "D", CROUSE-HINDS, COOPER, ADALET, APPLETON, O-Z GEDNEY, RACO, OR APPROVED EQUAL.

SUPPLEMENTAL GROUNDING SYSTEM

A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM AS INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMETS. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS AS INDICATED.

B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO HOLE SPADES WITH NO OX.

C. STOLEN GROUND-BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CM FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

EXISTING STRUCTURE:

A. EXISTING EXPOSED WIRING AND ALL EXPOSED OUTLETS, RECEPTACLES, SWITCHES, DEVICES, BOXES, AND OTHER EQUIPMENT THAT ARE NOT TO BE UTILIZED IN THE COMPLETED PROJECT SHALL BE REMOVED OR DE-ENERGIZED AND CAPPED IN THE WALL, CEILING, OR FLOOR SO THAT THEY ARE CONCEALED AND SAFE. WALL, CEILING, OR FLOOR SHALL BE PATCHED TO MATCH THE ADJACENT CONSTRUCTION.

CONDUIT AND CONDUCTOR INSTALLATION:

A. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.

B. CONDUCTORS SHALL BE PULLED IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE.

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

SBA
SBA COMMUNICATIONS CORP.
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WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
11/12/19

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

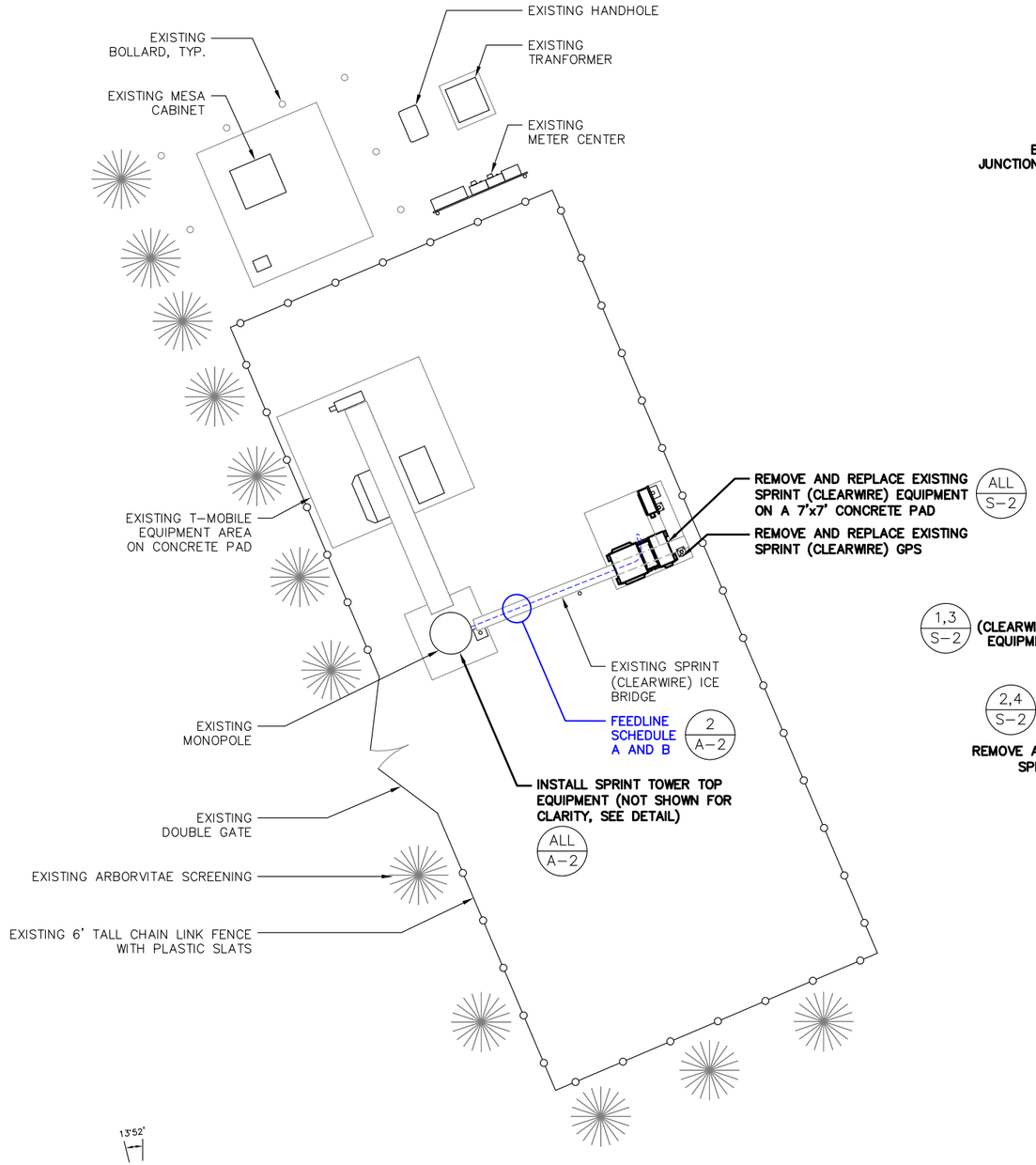
SUBMITTALS

REV.	DATE	DESCRIPTION	BY
3	11/12/19	CONSTRUCTION FINAL	PN
2	06/11/18	CONSTRUCTION REVISED	PN
1	05/15/18	CONSTRUCTION REVISED	JEB/PN
0	11/13/17	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT52XC028
SITE NAME:
SBA HILLARD
SITE ADDRESS:
640 HILLIARD STREET
MANCHESTER, CT 06040

SHEET TITLE
OUTLINE SPECIFICATIONS

SHEET NUMBER
SP-3



COMPOUND PLAN

1 / A-1

SCALE: 1"=12' (11"x17")
1"=6' (22"x34")

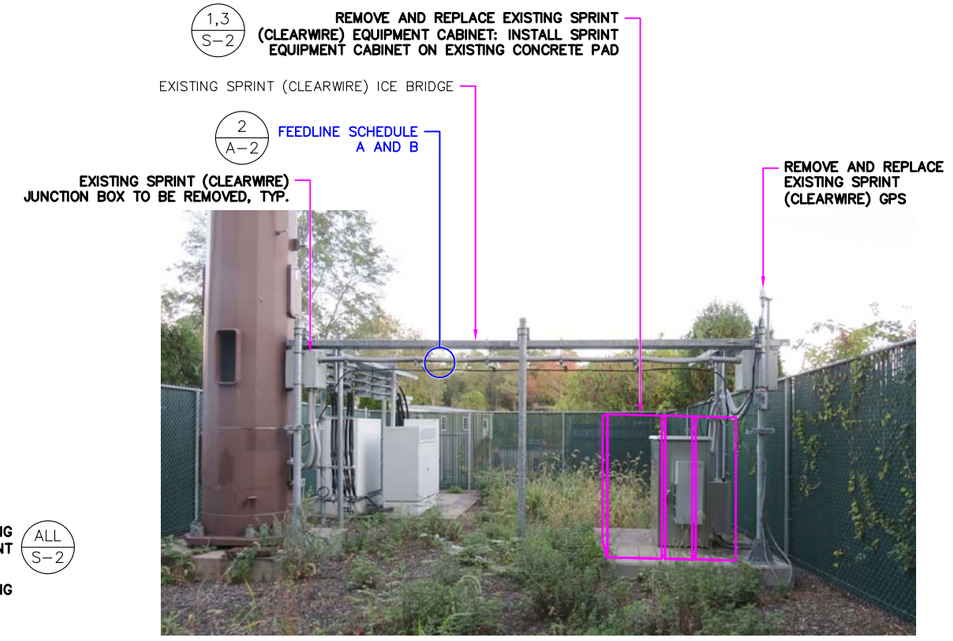


IMAGE SOURCE: PROTERRA 10/20/2017
(VIEW FROM SOUTHEAST)

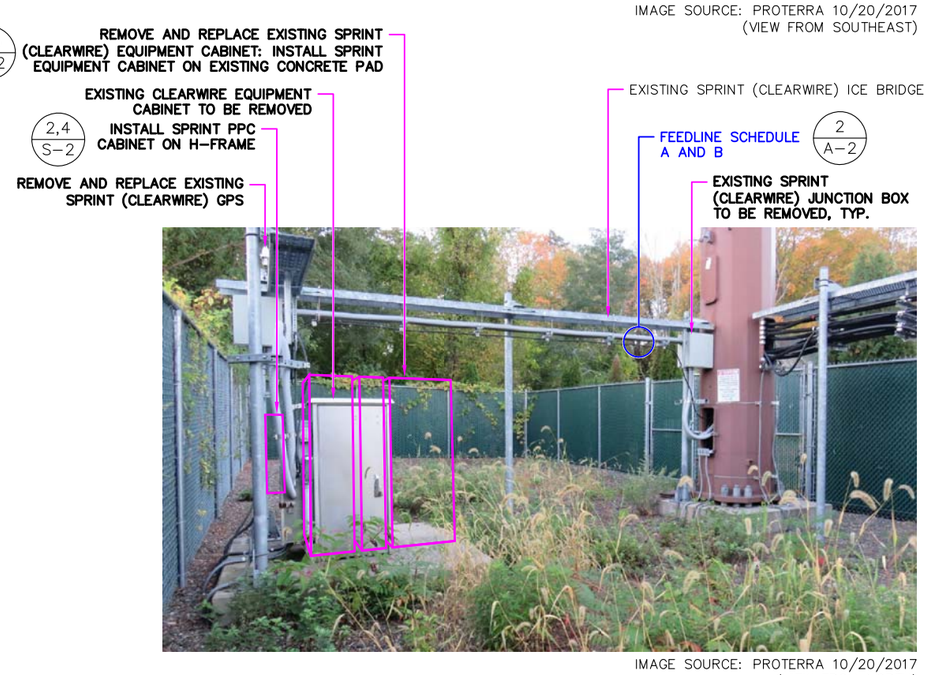


IMAGE SOURCE: PROTERRA 10/20/2017
(VIEW FROM NORTH)

EQUIPMENT PLAN PHOTO DETAIL

2 / A-1

SCALE: N.T.S.

Sprint
1 INTERNATIONAL BLVD, SUITE 800
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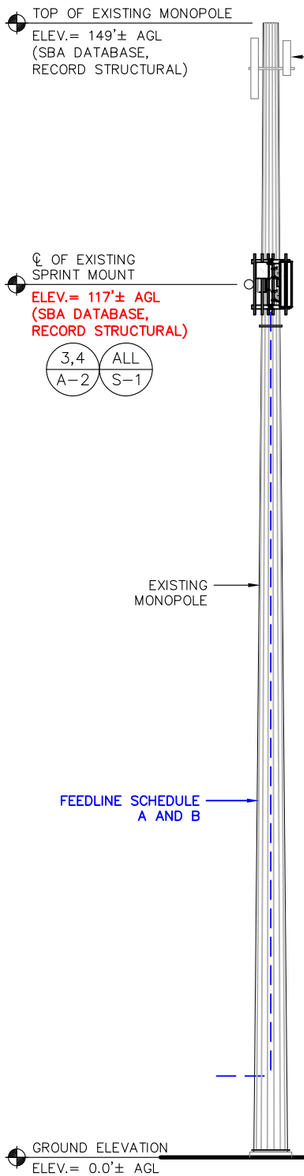
MANCHESTER, CT 06040

SHEET TITLE
COMPOUND PLAN

SHEET NUMBER
A-1



NOTE:
GROUND EQUIPMENT NOT SHOWN FOR CLARITY

ELEVATION

SCALE: 1"=20' (11"x17")
1"=10' (22"x34")

1 / A-2

20 10 0 20

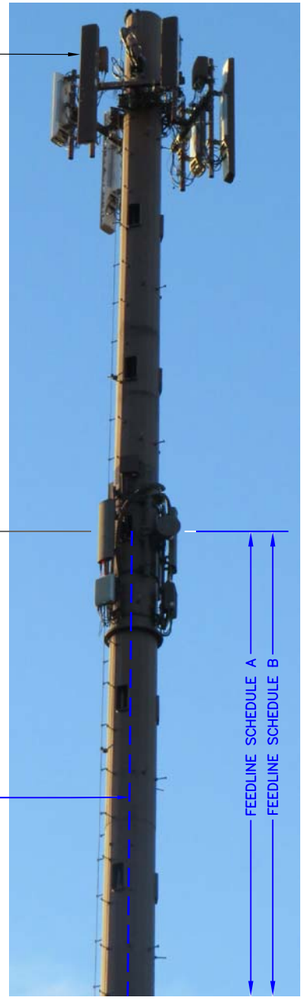


IMAGE SOURCE: PROTERRA 10/20/2017

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO BE REMOVED: (1) 7/8" COAX, (3) 3/8" DC, AND (3) 1" HYBRID (PER COLO-APP, IN FLEX CONDUIT) TO 117' RAD EXISTING TO REMAIN: (1) 1/2" MICROWAVE DISH CABLE TO 117' RAD	UP INSIDE MONOPOLE TO RAD
B	PROPOSED: (4) HYBRID TO 117' RAD;	UP INSIDE MONOPOLE TO RAD

NOTE:
EXISTING SPRINT EQUIPMENT FEEDLINE INVENTORY BASED ON COLOCATION APPLICATION AND SBA RECORD, NOT FIELD OBSERVATIONS. RFDS AND FEEDLINE LEASING ENTITLEMENTS MAY DIFFER

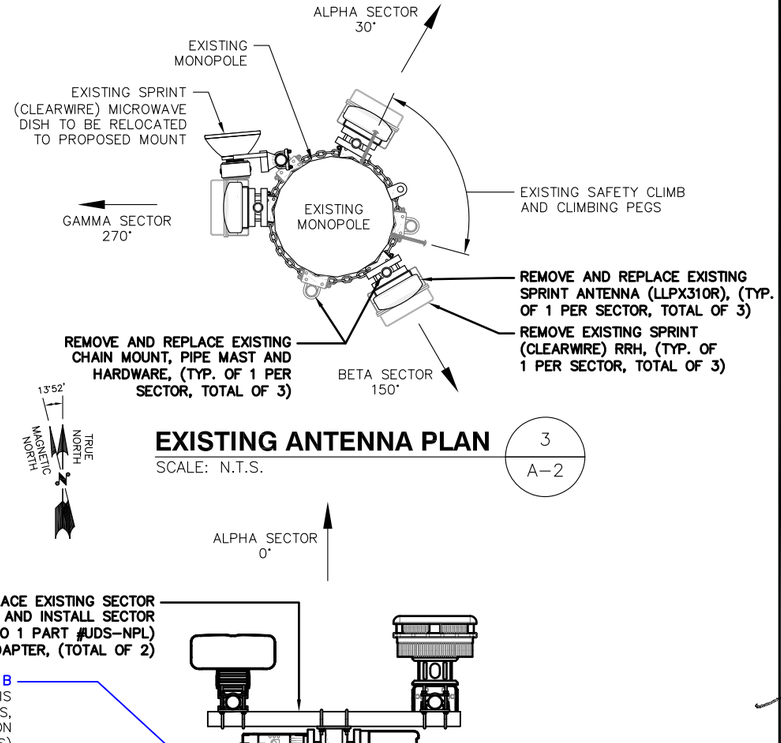
TOWER ELEVATION PHOTO DETAIL

SCALE: N.T.S.

2 / A-2

SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS):
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL FEEDLINE BUNDLING OR RELOCATION.

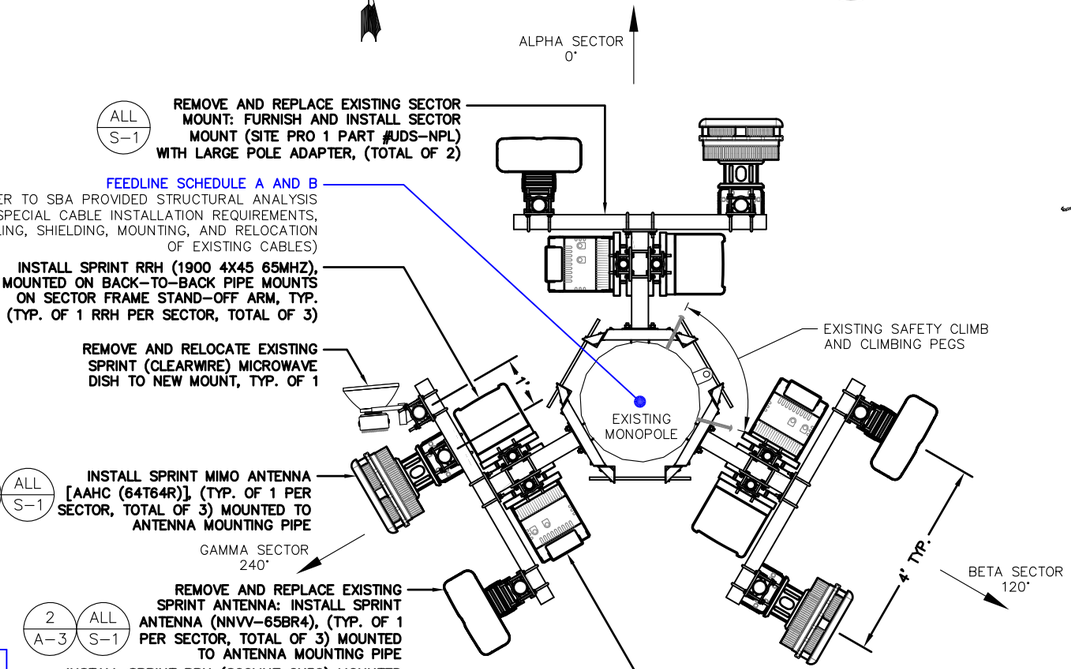
SPECIAL CONSTRUCTION WORK NOTE (PAINT-TO-MATCH REQUIRED):
PAINT-TO-MATCH BROWN ALL PROPOSED AND EXPOSED EQUIPMENT CONSISTING OF ANTENNA RADOMES, ANTENNA BACKPLANES, RRH SOLAR SHIELD, AND ASSOCIATED MOUNTING HARDWARE (PIPES, BRACKETS, COLLAR MOUNTS, STANDOFF ARMS), AND EXPOSED HYBRID CABLES, COAX JUMPERS, FIBER JUMPERS AND DC CABLES. ANTENNA RADOME PAINT SHALL CONTAIN <5% METALLIC PIGMENTS/EMULSIONS AND EQUIVALENT TO SHERMAN-WILLIAMS COROTHANE II (AND/OR OTHERWISE APPROVED BY ANTENNA MANUFACTURER/RF ENGINEER).



EXISTING ANTENNA PLAN

SCALE: N.T.S.

3 / A-2



PROPOSED ANTENNA PLAN

SCALE: N.T.S.

4 / A-2

SPECIAL INSTALLATION NOTE:
JUMPERS FROM RRHs TO ANTENNA SHALL NOT EXCEED 15'. NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY DISCREPANCY

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION

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1 INTERNATIONAL BLVD, SUITE 800
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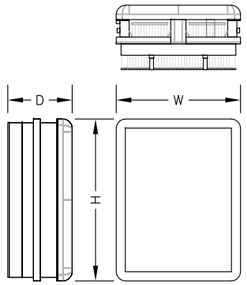
SITE NAME:
SBA HILLARD
SITE ADDRESS:
640 HILLIARD STREET
MANCHESTER, CT 06040

SHEET TITLE
ELEVATION AND ANTENNA PLANS

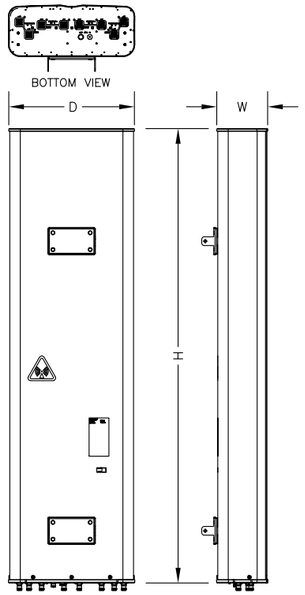
SHEET NUMBER
A-2



MIMO ANTENNA SPECIFICATIONS	
MANUF.	NOKIA
MODEL #	2.5G MAA-AAHC(64T64R)
HEIGHT	25.6"
WIDTH	19.7"
DEPTH	9.6"
WEIGHT	103.7± LBS. (MOUNT BRACKETS NOT INCLUDED)

MIMO ANTENNA DETAIL (1 / A-3)

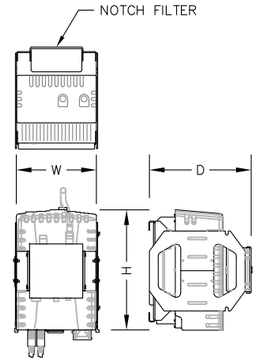
SCALE: N.T.S.



ANTENNA SPECIFICATIONS	
MANUF.	COMMSCOPE
MODEL #	NNVV-65B-R4
HEIGHT	72.0"
WIDTH	19.6"
DEPTH	7.8"
WEIGHT	77.4± LBS. (MOUNT BRACKETS NOT INCLUDED)

800 MHZ/1900 MHZ ANTENNA DETAIL (2 / A-3)

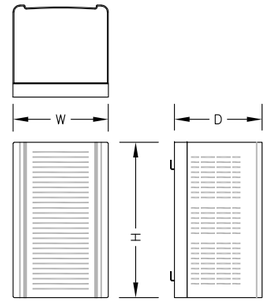
SCALE: N.T.S.



800 MHZ RRH SPECIFICATIONS	
MANUF.	NOKIA (ALU)
MODEL #	800MHZ 2X50W
HEIGHT	16"
WIDTH	13"
DEPTH	13.7" (INCLUDING FILTER)
WEIGHT	69.1± LBS (INCLUDING FILTER)

800 MHz RRH DETAIL (3 / A-3)

SCALE: N.T.S.



1900 MHZ RRH SPECIFICATIONS	
MANUF.	NOKIA (ALU)
MODEL #	1900 4X45 65MHZ
HEIGHT	25"
WIDTH	11.1"
DEPTH	11.4"
WEIGHT	60± LBS

EXISTING 1900 MHz RRH DETAIL (4 / A-3)

SCALE: N.T.S.

MAJOR RF EQUIPMENT LIST

(GC SHALL FURNISH AND INSTALL ALL OTHER MATERIALS AND EQUIPMENT NOT SUPPLIED BY SPRINT)

DESCRIPTION	QUANTITY	UNITS	MAKE/MODEL/MATERIAL	PROVIDED BY
ANTENNA	3	EA	2.5G MAA-AAHC(64T64R)	SPRINT
ANTENNA	3	EA	COMMSCOPE NNVV-65B-R4	SPRINT
1900 RRH	3	EA	NOKIA (ALU) 1900 4X45 65MHZ	SPRINT
800 RRH	6	EA	NOKIA (ALU) 800MHz 2x50W	SPRINT
FIBER (800/1900 MHz)	3 @ 200'± FROM FIBER CABINET	LINEAR FEET LISTED [INCLUDES (2) 10' COILS]	1-1/4" HYBRIFLEX	SPRINT
FIBER (MIMO)	1 @ 200'± FROM FIBER CABINET	LINEAR FEET LISTED [INCLUDES (2) 10' COILS]	NOKIA HYBRID	SPRINT
ELTEK EQUIPMENT CABINET	1	EA	ELTEK DO EXTERNAL ECAB & BCAB ASSEMBLY WITH CABLING CABINET	SPRINT
PPC/TELCO CABINET	1	EA	PURCELL SYSTEMS, INC. (VERIFY MODEL WITH SPRINT)	SPRINT

SPRINT-PROVIDED EQUIPMENT SCHEDULE (5 / A-3)

SCALE: N.T.S.

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
11/12/19

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

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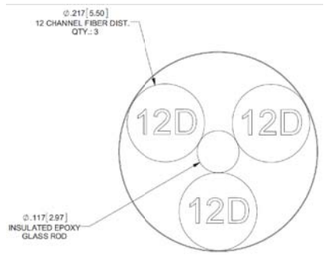
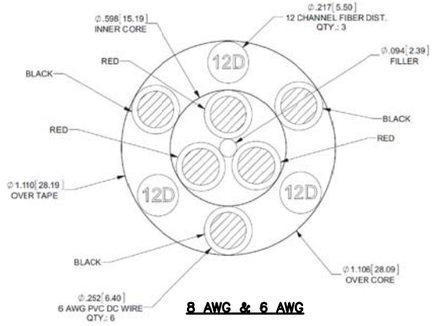
SITE NUMBER:
CT52XC028
SITE NAME:
SBA HILLARD
SITE ADDRESS:
640 HILLIARD STREET
MANCHESTER, CT 06040

SHEET TITLE
TOWER EQUIPMENT DETAILS

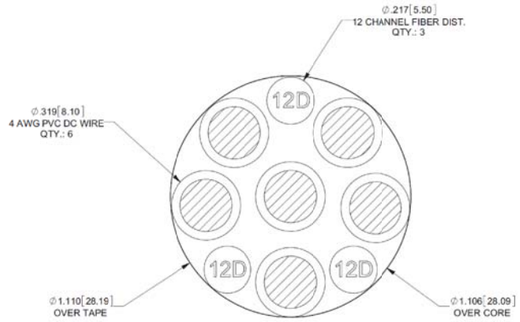
SHEET NUMBER
A-3



FIBER ONLY



8 AWG & 6 AWG



4 AWG

HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE

MANUF: RFS

	CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
	FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
(*)	HYBRIFLEX	<200'	8 AWG	1-1/4"
	HYBRIFLEX	225-300'	6 AWG	1-1/4"
	HYBRIFLEX	325-375'	4 AWG	1-1/4"

RFS HYBRIFLEX RISER CABLE SCHEDULE

Fiber Only (Existing DC Power)	**Hybrid cable** MN: HB058-M12-050F 12x multi-mode fiber pairs, Top: Outdoor protected connectors, Bottom: LC Connectors, 5/8 cable, 50 ft	50 ft
	MN: HB058-M12-075F	75 ft
	MN: HB058-M12-100F	100 ft
	MN: HB058-M12-125F	125 ft
	MN: HB058-M12-150F	150 ft
	MN: HB058-M12-175F	175 ft
	MN: HB058-M12-200F	200 ft
8 AWG Power	**Hybrid cable** MN: HB114-08U3M12-050F 3x 8 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 50 ft	50 ft
	MN: HB114-08U3M12-075F	75 ft
	MN: HB114-08U3M12-100F	100 ft
	MN: HB114-08U3M12-125F	125 ft
	MN: HB114-08U3M12-150F	150 ft
	MN: HB114-08U3M12-175F	175 ft
(*)	MN: HB114-08U3M12-200F	200 ft
6 AWG Power	**Hybrid cable** MN: HB114-13U3M12-225F 3x 6 AWG power pair, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 225 ft	225 ft
	MN: HB114-13U3M12-250F	250 ft
	MN: HB114-13U3M12-275F	275 ft
	MN: HB114-13U3M12-300F	300 ft
4 AWG Power	**Hybrid cable** MN: HB114-21U3M12-325F 3x 4 AWG power pair, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 325 ft	325 ft
	MN: HB114-21U3M12-350F	350 ft
	MN: HB114-21U3M12-375F	375 ft

RFS HYBRIFLEX JUMPER CABLE SCHEDULE

Fiber Only	**Hybrid Jumper cable** MN: HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	MN: HBF012-M3-10F1	10 ft
	MN: HBF012-M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15'. NOTIFY SPRINT CM OF ANY DISCREPANCY	
8 AWG Power	**Hybrid Jumper cable** MN: HBF058-08U1M3-5F1 5 ft, 1x 8 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 5/8 cable	5 ft
	MN: HBF058-08U1M3-10F1	10 ft
(*)	MN: HBF058-08U1M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15'. NOTIFY SPRINT CM OF ANY DISCREPANCY	
6 AWG Power	**Hybrid Jumper cable** MN: HBF058-13U1M3-5F1 5 ft, 1x 6 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 5/8 cable	5 ft
	MN: HBF058-13U1M3-10F1	10 ft
	MN: HBF058-13U1M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15'. NOTIFY SPRINT CM OF ANY DISCREPANCY	
4 AWG Power	**Hybrid Jumper cable** MN: HBF078-21U1M3-5F1 5 ft, 1x 4 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 7/8 cable	5 ft
	MN: HBF078-21U1M3-10F1	10 ft
	MN: HBF078-21U1M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15'. NOTIFY SPRINT CM OF ANY DISCREPANCY	

2.5 HYBRID CABLE X-SECTION AND DATA

SCALE: N.T.S.

1
A-4

* NOTE: SPRINT CM TO CONFIRM HYBRID RISER CABLE AND HYBRID JUMPER CABLE MODEL NUMBERS BEFORE PREPARING BOM.

Sprint

1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

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SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC

4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED
PROFESSIONAL ENGINEER
11/12/19

CHECKED BY: JMM/TEJ

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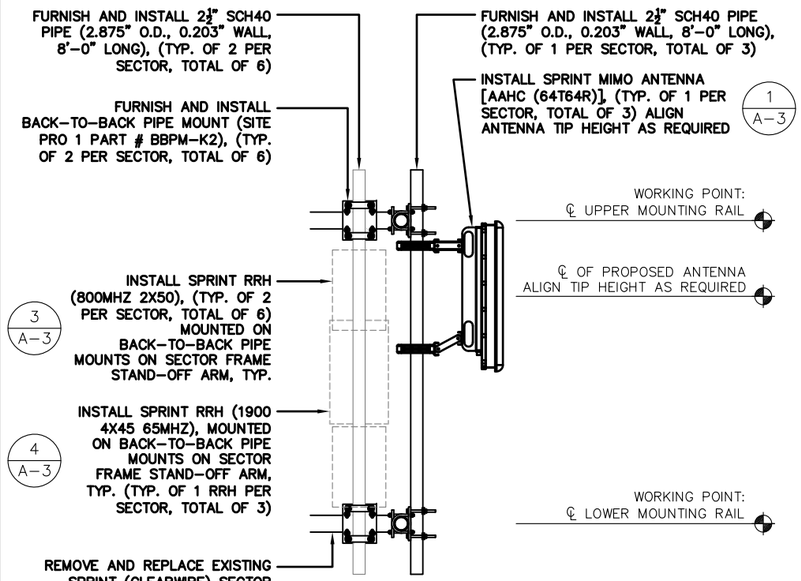
SITE NUMBER:
CT52XC028
SITE NAME:
SBA HILLARD

SITE ADDRESS:
640 HILLIARD STREET
MANCHESTER, CT 06040

SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-4



SECTOR FRAME PLAN DETAIL

1 / S-1

SCALE: N.T.S.

SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS): GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL FEEDLINE BUNDLING OR RELOCATION.

SPECIAL CONSTRUCTION WORK NOTE (PAINT-TO-MATCH REQUIRED): PAINT-TO-MATCH BROWN ALL PROPOSED AND EXPOSED EQUIPMENT CONSISTING OF ANTENNA RADOMES, ANTENNA BACKPLANES, RRH SOLAR SHIELD, AND ASSOCIATED MOUNTING HARDWARE (PIPES, BRACKETS, COLLAR MOUNTS, STANDOFF ARMS), AND EXPOSED HYBRID CABLES, COAX JUMPERS, FIBER JUMPERS AND DC CABLES. ANTENNA RADOME PAINT SHALL CONTAIN <5% METALLIC PIGMENTS/EMULSIONS AND EQUIVALENT TO SHERMAN-WILLIAMS COROTHANE II (AND/OR OTHERWISE APPROVED BY ANTENNA MANUFACTURER/RF ENGINEER).

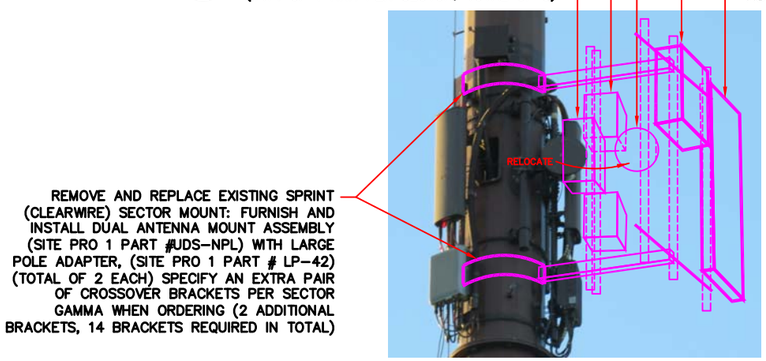
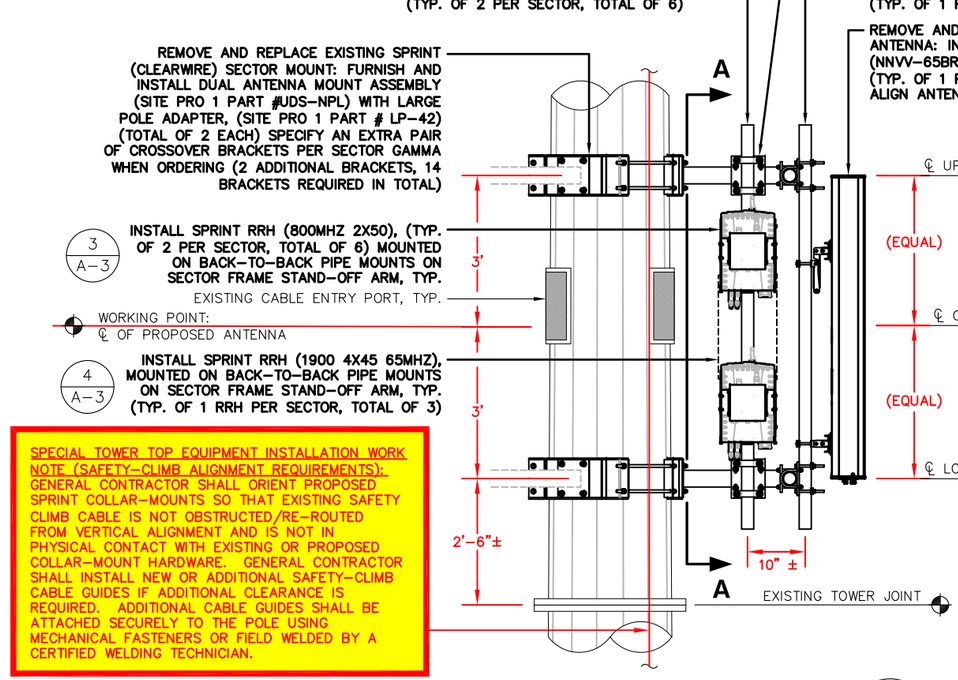


IMAGE SOURCE: PROTERRA 10/20/2017

ANTENNA AND RRH MOUNT PHOTO DETAIL

3 / S-1

SCALE: N.T.S.

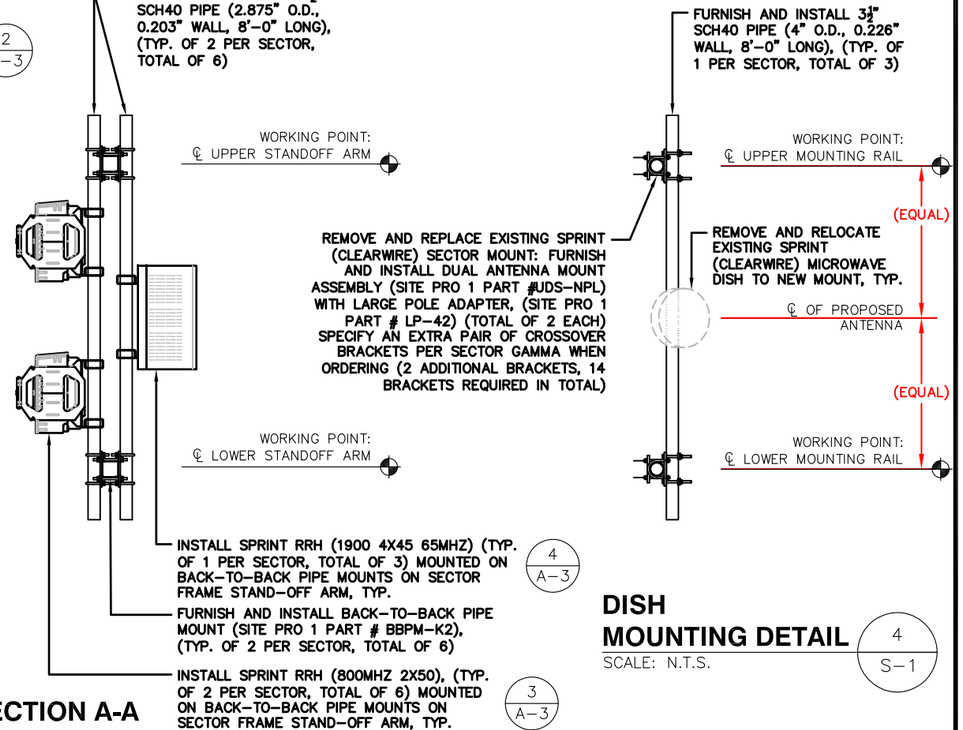


SPECIAL TOWER TOP EQUIPMENT INSTALLATION WORK NOTE (SAFETY-CLIMB ALIGNMENT REQUIREMENTS): GENERAL CONTRACTOR SHALL ORIENT PROPOSED SPRINT COLLAR-MOUNTS SO THAT EXISTING SAFETY CLIMB CABLE IS NOT OBSTRUCTED/RE-ROUTED FROM VERTICAL ALIGNMENT AND IS NOT IN PHYSICAL CONTACT WITH EXISTING OR PROPOSED COLLAR-MOUNT HARDWARE. GENERAL CONTRACTOR SHALL INSTALL NEW OR ADDITIONAL SAFETY-CLIMB CABLE GUIDES IF ADDITIONAL CLEARANCE IS REQUIRED. ADDITIONAL CABLE GUIDES SHALL BE ATTACHED SECURELY TO THE POLE USING MECHANICAL FASTENERS OR FIELD WELDED BY A CERTIFIED WELDING TECHNICIAN.

800MHZ/1900MHZ ANTENNA AND RRH MOUNTING DETAIL

2 / S-1

SCALE: N.T.S.



SECTION A-A

DISH MOUNTING DETAIL

4 / S-1

SCALE: N.T.S.

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
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Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED
PROFESSIONAL ENGINEER
11/12/19

CHECKED BY: JMM/TEJ

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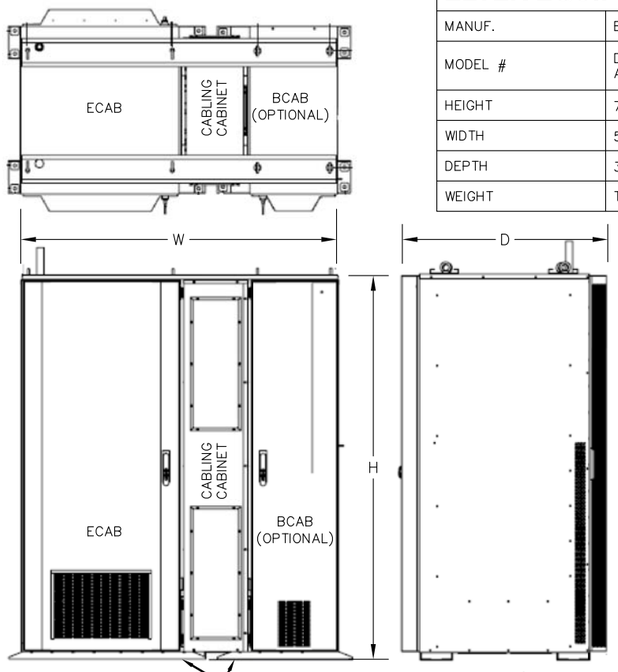
SITE NUMBER:
CT52XC028
SITE NAME:
SBA HILLARD
SITE ADDRESS:
640 HILLIARD STREET
MANCHESTER, CT 06040

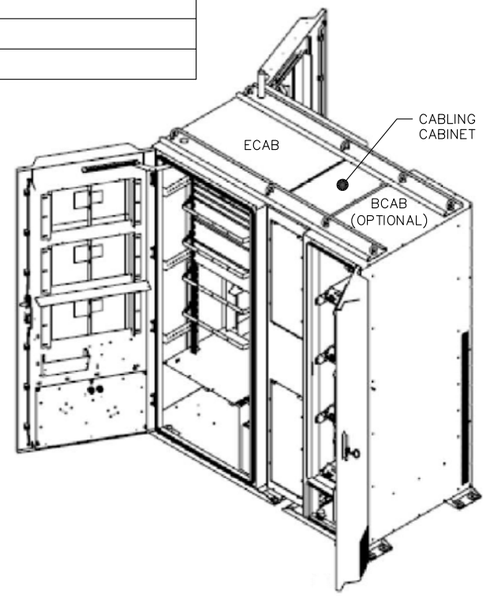
SHEET TITLE
ANTENNA AND RRH MOUNTING DETAILS

SHEET NUMBER
S-1

ELTEK EQUIPMENT CABINET

MANUF.	ELTEK
MODEL #	DO EXTERNAL ECAB & BCAB ASSEMBLY
HEIGHT	72.3"
WIDTH	59.5"
DEPTH	38"
WEIGHT	TBD

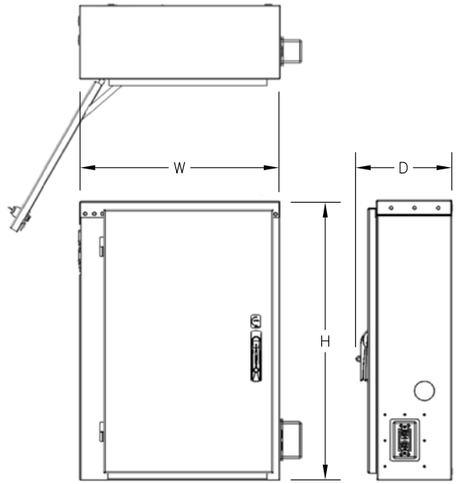




ELTEK EQUIPMENT CABINET DETAIL

SCALE: N.T.S.

1 / S-2



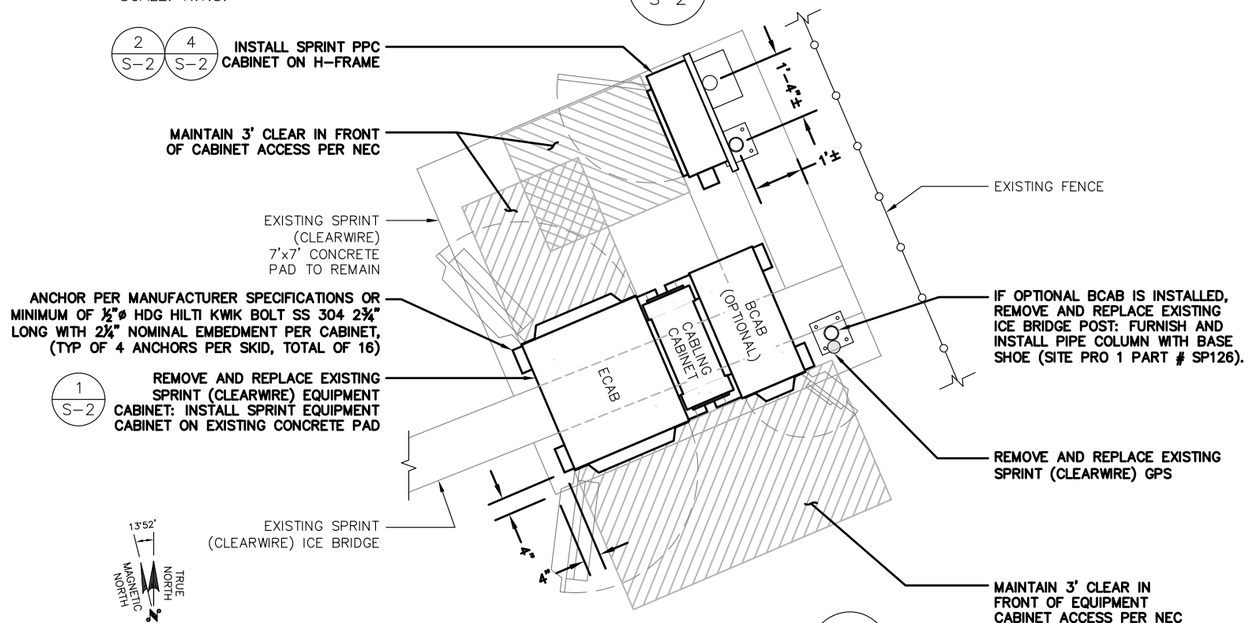
PPC CABINET

MANUF.	PURCELL SYSTEMS, INC.
MODEL #	PPC (VERIFY WITH SPRINT MODEL)
HEIGHT	36"
WIDTH	26"
DEPTH	12.2"
WEIGHT	67± LBS

PPC DETAIL

SCALE: N.T.S.

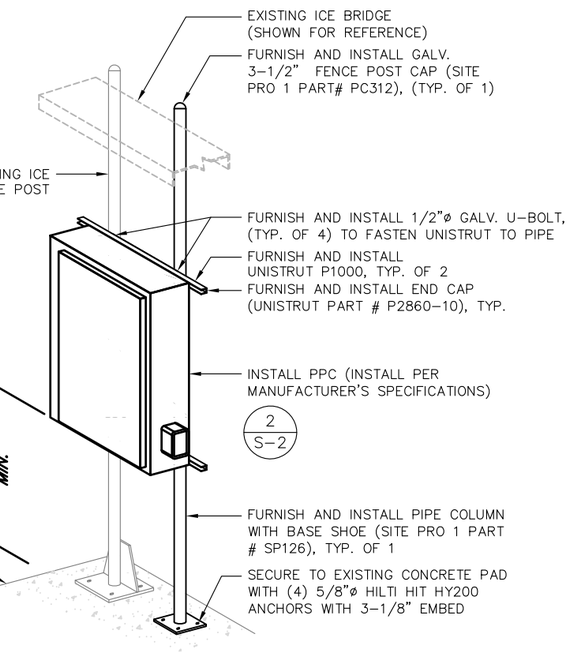
2 / S-2



GROUND LEVEL EQUIPMENT PLAN

SCALE: N.T.S.

3 / S-2



PPC H-FRAME MOUNTING DETAIL

SCALE: N.T.S.

4 / S-2

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
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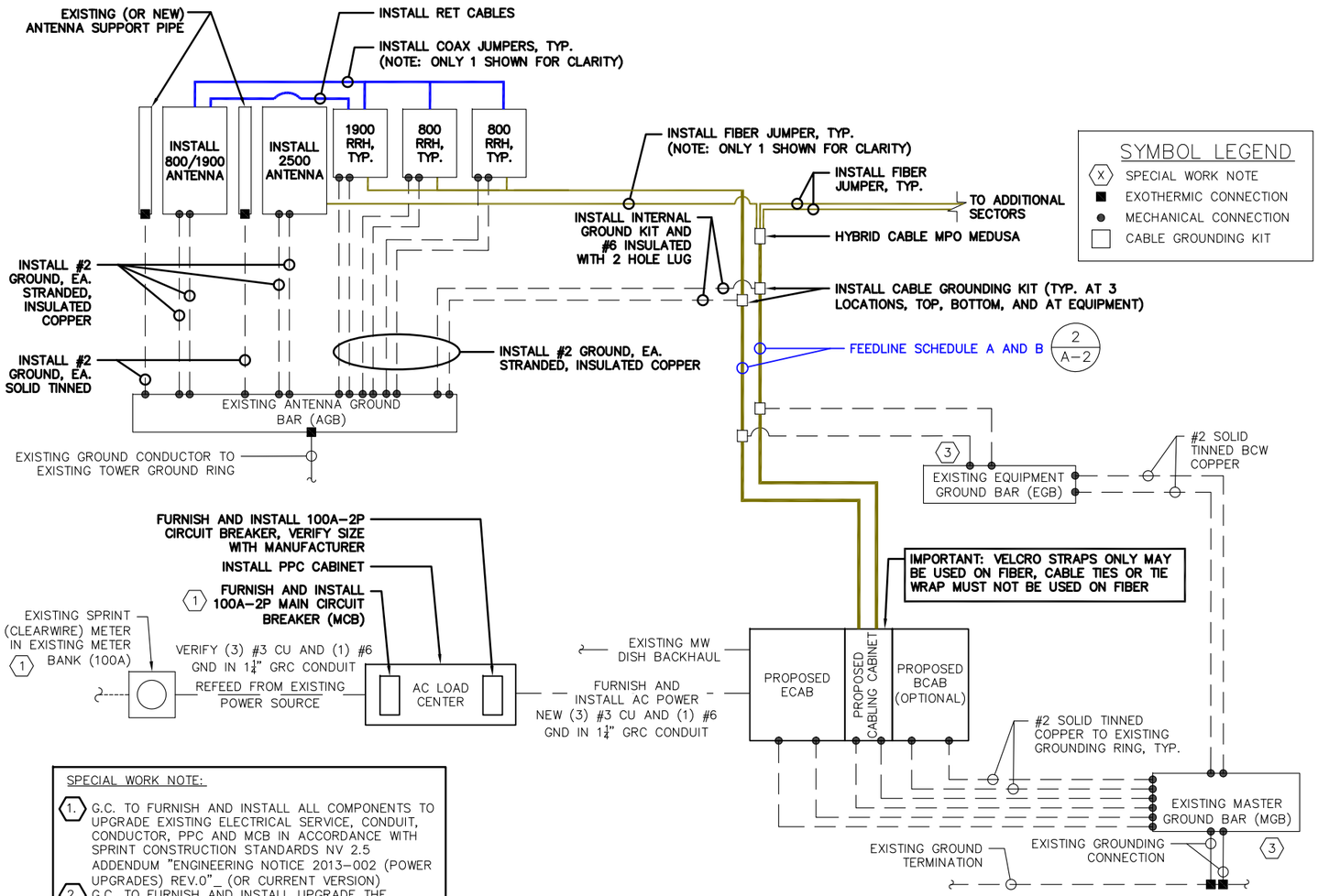
SHEET TITLE
GROUND EQUIPMENT DETAILS

SHEET NUMBER
S-2



SPECIAL WORK NOTE:

1. G.C. TO FURNISH AND INSTALL ALL COMPONENTS TO UPGRADE EXISTING ELECTRICAL SERVICE, CONDUIT, CONDUCTOR, PPC AND MCB IN ACCORDANCE WITH SPRINT CONSTRUCTION STANDARDS NV 2.5 ADDENDUM "ENGINEERING NOTICE 2013-002 (POWER UPGRADES) REV.0"_ (OR CURRENT VERSION)
2. G.C. TO FURNISH AND INSTALL UPGRADE THE EXISTING MMBTS BREAKER, CONDUCTOR, AND CONDUIT TO A MINIMUM NEC RATING.
3. FOR NEW OR REPAIRED GROUNDING EQUIPMENT, REFER TO SPRINT GROUNDING STANDARDS AND FOLLOWING (SUPPLEMENTS):
   -ANTI-THEFT UPDATE TO SPRINT GROUNDING DATED 08-24-12 (OR CURRENT VERSION)
   -SPRINT ENGINEERING LETTER EL-0504 DATED 04-20-12 (OR CURRENT VERSION).

TYPICAL POWER AND GROUNDING ONE LINE DIAGRAMS

1 / E-1

SCALE: N.T.S.

ELECTRICAL NOTES

1) ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2) THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONDUIT ROUTING WITH LOCAL UTILITY COMPANIES AND SPRINT CONSTRUCTION MANAGER.
3) ALL CONDUITS ROUTED BELOW GRADE SHALL TRANSITION TO RIGID GALVANIZED ELBOWS WITH RIGID GALVANIZED STEEL CONDUIT ABOVE GRADE.
4) ALL METAL CONDUITS SHALL BE PROVIDED WITH GROUNDING BUSHINGS.
5) GENERAL CONTRACTOR SHALL PROVIDE ALL DIRECT BURIED CONDUITS WITH PLASTIC WARNING TAPE IDENTIFYING CONTENTS. TAPE COLORS SHALL BE ORANGE FOR TELEPHONE AND RED FOR ELECTRIC.
6) ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
7) THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIALS DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
8) GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
9) ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
10) BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
11) ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
12) RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE PPC AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
13) RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
14) FIBER OPTIC CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 770-OPTICAL FIBER CABLES AND RACEWAYS.
15) COMMUNICATIONS CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 800-COMMUNICATIONS SYSTEMS.

Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

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Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT THOMAS E. JOHNSON No. 28192 LICENSED PROFESSIONAL ENGINEER
FOR SCHEMATIC ONLY

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

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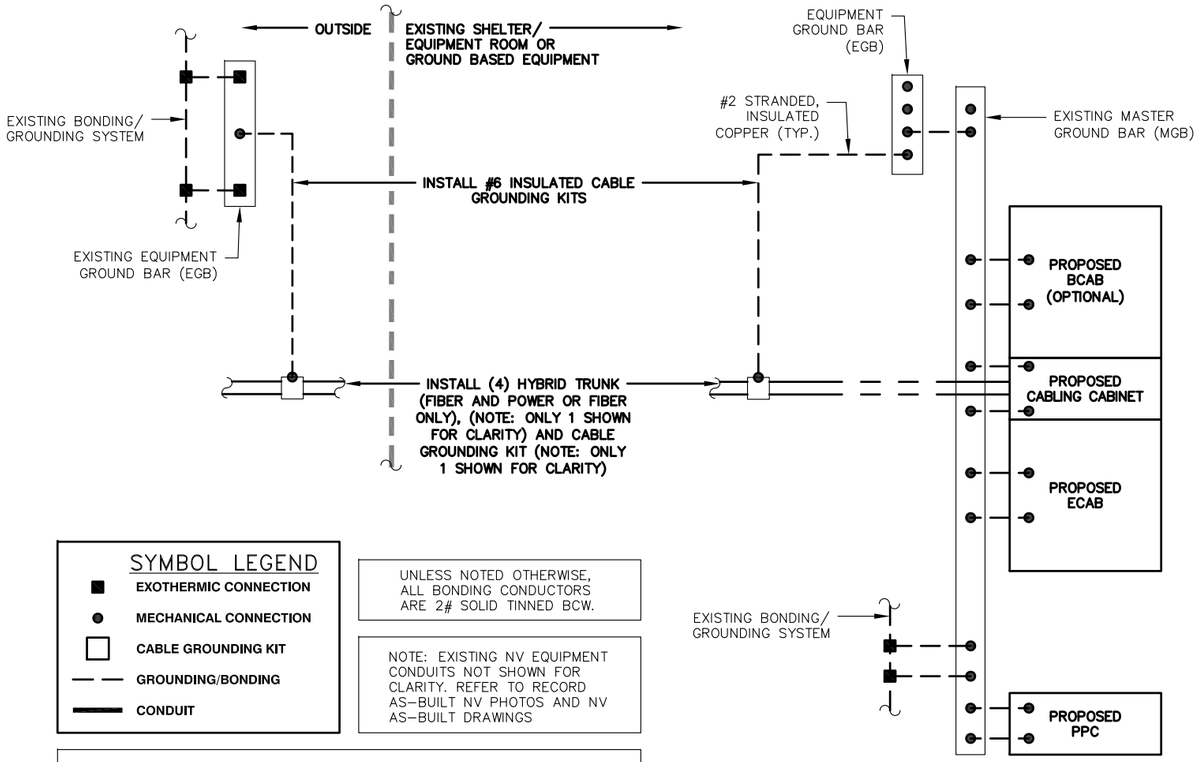
MANCHESTER, CT 06040

SHEET TITLE
ELECTRICAL AND GROUNDING DETAILS

SHEET NUMBER
E-1



SYMBOL LEGEND

- EXOTHERMIC CONNECTION
- MECHANICAL CONNECTION
- CABLE GROUNDING KIT
- GROUNDING/BONDING
- CONDUIT

UNLESS NOTED OTHERWISE, ALL BONDING CONDUCTORS ARE 2# SOLID TINNED BCW.

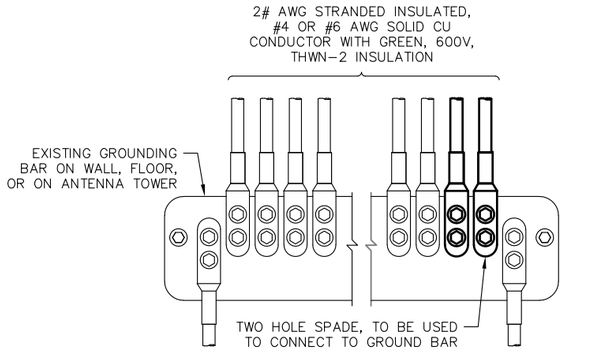
NOTE: EXISTING NV EQUIPMENT CONDUITS NOT SHOWN FOR CLARITY. REFER TO RECORD AS-BUILT NV PHOTOS AND NV AS-BUILT DRAWINGS

NOTE: HYBRIFLEX (FIBER & POWER) AND HYBRIFLEX (FIBER-ONLY) SHOWN. REFER TO RAN EQUIPMENT RFDS FOR SITE-SPECIFIC SCENARIO.

RAN EQUIPMENT GROUNDING SCHEMATIC

SCALE: N.T.S.

1 / E-2

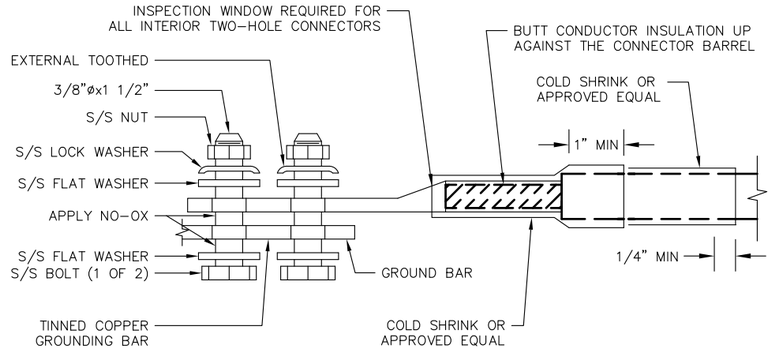


1. APPLY NO-OX TO LUG AND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

INSTALLATION OF GROUNDING CONDUCTOR TO GROUNDING BAR

SCALE: N.T.S.

2 / E-2



TWO HOLE LUG

SCALE: N.T.S.

3 / E-2

PROTECTIVE GROUNDING SYSTEMS GENERAL NOTES:

1. GROUNDING SHALL BE IN ACCORDANCE WITH NEC ARTICLE 250-GROUNDING AND BONDING.
2. GROUNDING SHALL BE IN ACCORDANCE WITH SPRINT SSEO DOCUMENTS 3.018.02.004 "BONDING, GROUNDING AND TRANSIENT PROTECTION FOR CELL SITES" AND 3.018.10.002 "SITE RESISTANCE TO EARTH TESTING".
3. PROVIDE GROUND CONNECTIONS FOR ALL METALLIC STRUCTURES, ENCLOSURES, RACEWAYS AND OTHER CONDUCTIVE ITEMS ASSOCIATED WITH THE INSTALLATION OF CARRIER'S EQUIPMENT.
4. GROUND CONNECTIONS: CLEAN SURFACES THOROUGHLY BEFORE APPLYING GROUND LUGS OR CLAMPS. IF SURFACE IS COATED, REMOVE THE COATING, APPLY A NON-CORROSIVE APPROVED COMPOUND TO CLEAN SURFACE AND INSTALL LUGS OR CLAMPS. WHERE GALVANIZING IS REMOVED FROM METAL, IT SHALL BE PAINTED OR TOUCHED UP WITH "GALVAMOX" OR EQUAL.
5. ALL GROUNDING WIRES SHALL PROVIDE A STRAIGHT, DOWNWARD PATH TO GROUND WITH GRADUAL BENDS AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
6. ALL CLAMPS AND SUPPORTS USED TO SUPPORT THE GROUNDING SYSTEM CONDUCTORS AND PVC CONDUITS SHALL BE PVC TYPE (NON CONDUCTIVE). DO NOT USE METAL BRACKETS OR SUPPORTS WHICH WOULD FORM A COMPLETE RING AROUND ANY GROUNDING CONDUCTOR.
7. ALL GROUND WIRES SHALL BE #2 SOLID TINNED BCW UNLESS NOTED OTHERWISE.
8. PROVIDE DEDICATED #2 AWG COPPER GROUND WIRE FROM EACH ANTENNA MOUNTING PIPE TO ASSOCIATED CIGBE.
9. GROUND ANTENNA BASES, FRAMES, CABLE RACKS, AND OTHER METALLIC COMPONENTS WITH #2 INSULATED TINNED STRANDED COPPER GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.
10. EACH EQUIPMENT CABINET SHALL BE CONNECTED TO THE MASTER ISOLATION GROUND BAR (MGB) WITH #2 SOLID TINNED BCW EQUIPMENT CABINETS WALL HAVE (2) CONNECTIONS.
11. GROUND HYBRIFLEX SHIELD AT TOP, BOTTOM AND AT TRANSITION TO HYBRIFLEX JUMPER CABLES AT EQUIPMENT CABINET ENTRANCE USING MANUFACTURER'S GUIDELINES. WHEN HYBRIFLEX CABLE EXCEEDS 200', GROUND AT INTERVALS NOT EXCEEDING 100'.
12. THE CONTRACTOR SHALL VERIFY THAT THE EXISTING GROUND BARS HAVE ENOUGH SPACE/HOLES FOR ADDITIONAL TWO HOLE LUGS.
13. EXOTHERMIC WELDING IS RECOMMENDED FOR GROUNDING CONNECTION WHERE PRACTICAL OTHERWISE. THE CONNECTION SHALL BE MADE USING COMPRESSION TYPE-2 HOLES, LONG BARREL LUGS OR DOUBLE CRIMP "C" CLAMP. THE COPPER CABLES SHALL BE COATED WITH AN ANTI-OXIDANT (THOMAS BETTS KOPR-SHILD) BEFORE MAKING THE CRIMP CONNECTIONS THE CONTRACTOR SHALL FOLLOW MANUFACTURER'S RECOMMENDED TORQUES ON THE BOLT ASSEMBLY TO SECURE CONNECTIONS.
14. AT ALL TERMINATIONS AT EQUIPMENT ENCLOSURES, PANEL, AND FRAMES OF EQUIPMENT AND WHERE EXPOSED FOR GROUNDING. CONDUCTOR TERMINATION SHALL BE PERFORMED UTILIZING TWO HOLE BOLTED TONGUE COMPRESSION TYPE LUGS WITH STAINLESS STEEL SELF-TAPPING SCREWS.
15. THE MASTER GROUND BAR (MGB) SHALL BE MADE OF BARE 1/4"x2" COPPER (FOR OUTDOOR APPLICATIONS IT SHALL BE TINNED COPPER) AND LARGE ENOUGH TO ACCOMMODATE THE REQUIRED NUMBER OF GROUND CONNECTIONS. THE HARDWARE SECURING THE MGB SHALL ELECTRICAL INSULATE THE MGB FROM ANY STRUCTURE TO WHICH IT IS FASTENED.
16. ALL BOLTS, WASHERS, AND NUTS USED ON GROUNDING CONNECTIONS SHALL BE STAINLESS STEEL.
17. ALL GROUNDING CONNECTIONS SHALL BE COATED WITH A COPPER SHIELD ANTI-CORROSIVE AGENT SUCH AS T&B KOPR SHIELD. VERIFY PRODUCT WITH SPRINT CONSTRUCTION MANAGER.
18. FOR NEW OR REPAIRED GROUNDING EQUIPMENT. REFER TO SPRINT GROUNDING STANDARDS AND FOLLOWING (SUPPLEMENTS):
    -ANTI-THEFT UPDATE TO SPRINT GROUNDING DATED 08-24-12 (OR CURRENT VERSION)
    -SPRINT ENGINEERING LETTER EL-0504 DATED 04-20-12 (OR CURRENT VERSION)

Sprint
1 INTERNATIONAL BLVD, SUITE 800
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STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
FOR SCHEMATIC ONLY

CHECKED BY:	JMM/TEJ
APPROVED BY:	JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
3	11/12/19	CONSTRUCTION FINAL	PN
2	06/11/18	CONSTRUCTION REVISED	PN
1	05/15/18	CONSTRUCTION REVISED	JEB/PN
0	11/13/17	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT52XC028
SITE NAME:
SBA HILLARD
SITE ADDRESS:
640 HILLIARD STREET
MANCHESTER, CT 06040

SHEET TITLE
ELECTRICAL AND GROUNDING DETAILS

SHEET NUMBER
E-2

Augment ID: CT-HFD0042Q17.1

RFDS ID: 63856

SprintVision

RF Design Sheet

Site Identification	
Cascade	CT-HFD0042
SMS Schedule ID	72929372
SMS Schedule Name	DO Macro Upgrade
PID	DOMU_CT52XC028
RRU OEM	ALU
Switch OEM	Alcatel Lucent
RFDS Issue Date	
RFDS Revision Date	2018-06-08 19:36:17.0
RFDS Revision	6
Filter Analysis Complete	YES
RFDS - Issue Date	
Design Status	Complete
Project Description	DO Macro Upgrade- Add 800MHz (N1 + 4C) and 1900 MHz

Contact Information	
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Sprint Badged RF Engineer	Bill Hastings
RF Engineer Email	Bill.M.Hastings@sprint.com
RF Engineer Phone	978-590-9700
RF Manager	Jonathan Hull
RF Manager Email	Jonathan.B.Hull@Sprint.com
RF Manager Phone	617-233-2920

Carrier Count	
2500 LTE	3
1900 LTE	1
1900 EVDO	
1900 Voice	1
800 LTE	1
800 Voice	1

Location Details	
Latitude	41.7845
Longitude	-72.50060556
Market	Northern Connecticut
Region	Northeast
City	Manchester
State	CT
Zip Code	CT10042
County	Hartford

2500MHz	3
1900MHz	3
800MHz	3

Battery Backup Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

UE Relay Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
UE Relay Azimuth	
Manufacturer	
UE Relay CL Height (meters)	

GPS Antenna Model	
Model Number	GPS-C-SBW-26NMS
Weight (Lbs.)	1.2
Dimensions (In.)	5 x 3.2
Manufacturer	
GPS Antenna needed at site	1

Junction Box Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Junction Boxes needed at site	

ALU Top Hat Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Top Hat Quantity	

Repeater Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

BTS #2 Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Needed at site	1

Power Protection Cabinet Model	
Model Number	PPC w/AFE cabinet
Weight (Lbs.)	175
Dimensions (In.)	64.00 x 30.16 x 12.28
Manufacturer	
Power Protection Cabinet	1

Growth Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

BTS #1 Model	
Model Number	Ecab Eltek
Weight (Lbs.)	808
Dimensions (In.)	73.5 x 30 x 38
Manufacturer	Eltek
Number of BTS #1	1

A&E Drawing Requirements
06/01/2018: Remove MIMO from KSU Augment. 05/25/2018 (SS): CD reviewed and RFDS finalized.
03/14/2018 (SP): RFDS revised to include MIMO. 02/13/2018 (SP): RFDS revised to change to Dual Antennas due to KMW backorder. Provide Carrier Count information

Band: 1900	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	RRH-4x45-1900	RRH-4x45-1900	RRH-4x45-1900	N/A	N/A	N/A
Weight (lbs)	69.5	69.5	69.5	N/A	N/A	N/A
Dimensions	25 x 12 x 12	25 x 12 x 12	25 x 12 x 12	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A
Number of RRUs needed	1	1	1	0	0	0

Trunk Cable 1						
Model Number	1900 Hybrid_ALU	1900 Hybrid_ALU	1900 Hybrid_ALU	N/A	N/A	N/A
Weight (Lbs.)	1.1	1.1	1.1	N/A	N/A	N/A
Dimensions (In.)	1.25	1.25	1.25	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	RRH-2x50-800	RRH-2x50-800	RRH-2x50-800	N/A	N/A	N/A
Weight (lbs)	69.1	69.1	69.1	N/A	N/A	N/A
Dimensions	16 x 13 x 10	16 x 13 x 10	16 x 13 x 10	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A
Number of RRUs needed	2	2	2	0	0	0

Band: 1900	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1						
Model Number	NNVV-65B-R4	NNVV-65B-R4	NNVV-65B-R4			
Weight (lbs)	84.7	84.7	84.7	N/A	N/A	N/A
Dimensions	72 x 19.6 x 7.8	72 x 19.6 x 7.8	72 x 19.6 x 7.8	N/A	N/A	N/A
Manufacturer	CommScope	CommScope	CommScope	N/A	N/A	N/A
Ant1 Top Jumper Make/Mode/Qty	800/1900 Jumper 4	800/1900 Jumper 4	800/1900 Jumper 4	N/A 0	N/A 0	N/A 0
Ant 1 RF requested Diameter	1/2"	1/2"	1/2"	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	8	8	8	N/A	N/A	N/A
Antenna 1 Azimuth	0	120	240	N/A	N/A	N/A
Antenna 1 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Center Line (ft)	116.9947544	116.9947544	116.9947544	N/A	N/A	N/A
Antenna 1 Electrical DT	3	3	3	N/A	N/A	N/A
Antenna 1 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Twist	N/A	N/A	N/A	N/A	N/A	N/A

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1						
Model Number	Antenna assigned on a different band	Antenna assigned on a different band	Antenna assigned on a different band			
Weight (lbs)	0	0	0	N/A	N/A	N/A
Dimensions	0 x 0 x 0	0 x 0 x 0	0 x 0 x 0	N/A	N/A	N/A
Manufacturer	-	-	-	N/A	N/A	N/A
Ant1 Top Jumper Make/Mode/Qty	800/1900 Jumper 4	800/1900 Jumper 4	800/1900 Jumper 4	N/A 0	N/A 0	N/A 0
Ant 1 RF requested Diameter	1/2"	1/2"	1/2"	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	8	8	8	N/A	N/A	N/A
Antenna 1 Azimuth	0	120	240	N/A	N/A	N/A
Antenna 1 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Center Line (ft)	116.9947544	116.9947544	116.9947544	N/A	N/A	N/A
Antenna 1 Electrical DT	5	5	5	N/A	N/A	N/A
Antenna 1 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Twist	N/A	N/A	N/A	N/A	N/A	N/A

NOTE: RFDS PROVIDED BY SPRINT DATED 06/08/2019, (800MHz/1900MHz) & 10/11/2019 (2500MHz). EXCERPTS TAKEN DEPICT RELEVANT RF DESIGN INFORMATION. A&E VENDOR SCOPE OF WORK LIMITED TO DESIGN OF MECHANICAL/STRUCUTRAL EQUIPMENT ATTACHMENTS.

RF DATA SHEET

SCALE: N.T.S.

1 / RF-1

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION

SPRINT CONSTRUCTION STANDARDS:

GENERAL CONTRACTOR SHALL ADHERE TO THE FOLLOWING SPRINT CONSTRUCTION STANDARDS.

- CONSTRUCTION STANDARDS: INTEGRATED CONSTRUCTION STANDARDS FOR WIRELESS SITES – CURRENT VERSION, INCLUDING EXHIBITS A–M.
- CONSTRUCTION SPECIFICATIONS: CONSTRUCTION STANDARDS EXHIBIT A – STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES (CURRENT VERSION).
- GROUNDING STANDARDS: EXTERIOR GROUNDING SYSTEM DESIGN. GROUNDING STANDARDS (SUPPLEMENT): ANTI–THEFT UPDATE TO SPRINT GROUNDING 082412 AND SPRINT ENGINEERING LETTER EL–0504 DATED 04.20.12.
- WEATHER PROOFING STANDARDS: EXCERPT FROM CONSTRUCTION STANDARDS EXHIBIT A, SECTION 3.6 WEATHERPROOFING CONNECTORS AND GROUND KITS.
- COLOR CODING: SPRINT NEXTEL ANT AND LINE COLOR CODING PER SPRINT TS–0200 CURRENT VERSION.
- GENERAL CONTRACTOR TO FIELD VERIFY AZIMUTH AND CL HEIGHT AND MECHANICAL DOWNTILT. IF DIFFERENT THAN CALLED OUT IN RFDS, HALT ANTENNA WORK FOR ONE HOUR, CALL SPRINT RF ENGINEER (OR MANAGER IF RF ENGINEER DOES NOT ANSWER, BUT STILL LEAVE A MESSAGE TO RF ENGINEER) USING SPRINT–PROVIDED CONTACT INFORMATION FOR FURTHER INSTRUCTIONS. IF SPRINT DOES NOT RESPOND WITHIN ONE HOUR, PLACE ANTENNA AT SAME CL HEIGHT AS PLAN AND EMAIL CORRECT CL HEIGHT AND AZIMUTH TO SPRINT RF ENGINEER. UPDATE AS–BUILT DRAWING WITH CORRECT CL HEIGHT. ALSO EMAIL CORRECT ANTENNA CL HEIGHT, AZIMUTH AND MECHANICAL DOWNTILT TO RF ENGINEER.
- AISG TESTS TO VERIFY OPERATION IS TO BE PERFORMED AFTER FINAL INSTALLATION OF ANTENNAS AND AISG CABLES HAVE BEEN CONNECTED. VERIFY OPERATION OF ALL EXISTING SPRINT AISG EQUIPMENT INCLUDING 800MHZ, 1.9GHZ AND 2.5G. TEST INCLUDE COMPLETE DOWNTILT, AZIMUTH (IF APPLICABLE) AND BEAMWIDTH SWINGS (IF APPLICABLE). DOCUMENT AISG TEST RESULTS IN COAX SWEEP TEST SPREADSHEET.
- GENERAL CONTRACTOR MUST INSURE THAT NO OBJECT IS LOCATED IN FRONT OF ANTENNA. THIS MEANS NO OBJECT IS TO BE LOCATED 45 DEGREES LEFT AND RIGHT OF FRONT OF ANTENNA OR 7 DEGREES UP AND DOWN FROM CENTER OF ANTENNA. IF THIS IS NOT POSSIBLE, CONTACT RF ENGINEER FOR FURTHER INSTRUCTION.
- GENERAL CONTRACT IS REQUIRED TO USE A DIGITAL ALIGNMENT TOOL TO SET AZIMUTH, ROLL AND DOWNTILT. AZIMUTH ACCURACY IS TO BE WITHIN 1 DEGREES. DOWNTILT AND ROLL (LEFT TO RIGHT TILT) IS TO BE WITHIN 0.1 DEGREES. IF FOR SOME REASON THIS ACCURACY CANNOT BE ACHIEVED, UPDATE AS–BUILT DRAWINGS AND EMAIL SPRINT RF ENGINEER WITH AS–BUILT SETTINGS. USE 3Z RF ALIGNMENT TOOL OR EQUIVALENT TOOL. HTTP://WWW.3ZTELECOM.COM/ANTENNA–ALIGNMENT–TOOL/.

Augment ID: CT-HFD0042S18.1

RFDS ID: CT-HFD0042S18.1

SprintVision

RF Design Sheet

Site Identification	
Cascade	CT-HFD0042
SMS Schedule ID	
SMS Schedule Name	Massive MIMO
PID	
RRU OEM	Nokia Macro
Switch OEM	Alcatel Lucent
RFDS Issue Date	2018-06-04 13:18:50.0
RFDS Revision Date	2018-10-11 13:27:29.0
RFDS Revision	8
Filter Analysis Complete	YES
RFDS - Issue Date	06/04/2018
Design Status	Complete
Project Description	Massive MIMO - Separated from KSU Augment

Contact Information	
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RF Engineer Phone	978-590-9700
RF Manager	Jonathan Hull
RF Manager Email	Jonathan.B.Hull@Sprint.com
RF Manager Phone	617-233-2920

Carrier Count	
2500 LTE	3
1900 LTE	
1900 EVDO	
1900 Voice	
800 LTE	
800 Voice	

Location Details	
Latitude	41.7845
Longitude	-72.50060556
Market	Northern Connecticut
Region	Northeast
City	Manchester
State	CT
Zip Code	CT10042
County	Hartford

2500MHz	3
1900MHz	
800MHz	

A&E Drawing Requirements
Massive MIMO - Separated from KSU Augment

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	AAHC	AAHC	AAHC	N/A	N/A	N/A
Weight (lbs)	103.7	103.7	103.7	N/A	N/A	N/A
Dimensions	25.6 x 19.7 x 9.64	25.6 x 19.7 x 9.64	25.6 x 19.7 x 9.64	N/A	N/A	N/A
Manufacturer	Nokia	Nokia	Nokia	N/A	N/A	N/A
Number of RRUs needed	1	1	1	0	0	0

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1						
Model Number	AAHC_65degbeam	AAHC_65degbeam	AAHC_65degbeam			
Weight (lbs)	103.7	103.7	103.7	N/A	N/A	N/A
Dimensions	25.6 x 19.7 x 9.64	25.6 x 19.7 x 9.64	25.6 x 19.7 x 9.64	N/A	N/A	N/A
Manufacturer	NOKIA	NOKIA	NOKIA	N/A	N/A	N/A
Vendor Supplied	No	No	No	No	No	No
Ant1 Top Jumper Make/Mode/Qty	N/A 0	N/A 0	N/A 0	N/A 0	N/A 0	N/A 0
Ant 1 RF requested Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Azimuth	0	120	240	N/A	N/A	N/A
Antenna 1 Electrical Azimuth	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Center Line (ft)	116.9947544	116.9947544	116.9947544	N/A	N/A	N/A
Antenna 1 Electrical DT	2	2	2	N/A	N/A	N/A
Antenna 1 Electrical DT 2 (or 5G)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Twist	N/A	N/A	N/A	N/A	N/A	N/A
Repeater Donor Sector	N/A	N/A	N/A	N/A	N/A	N/A

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4 Bay Road, Building A
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Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
11/12/19

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
3	11/12/19	CONSTRUCTION FINAL	PN
2	06/11/18	CONSTRUCTION REVISED	PN
1	05/15/18	CONSTRUCTION REVISED	JEB/PN
0	11/13/17	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT52XC028
SITE NAME:
SBA HILLARD
SITE ADDRESS:
640 HILLIARD STREET
MANCHESTER, CT 06040

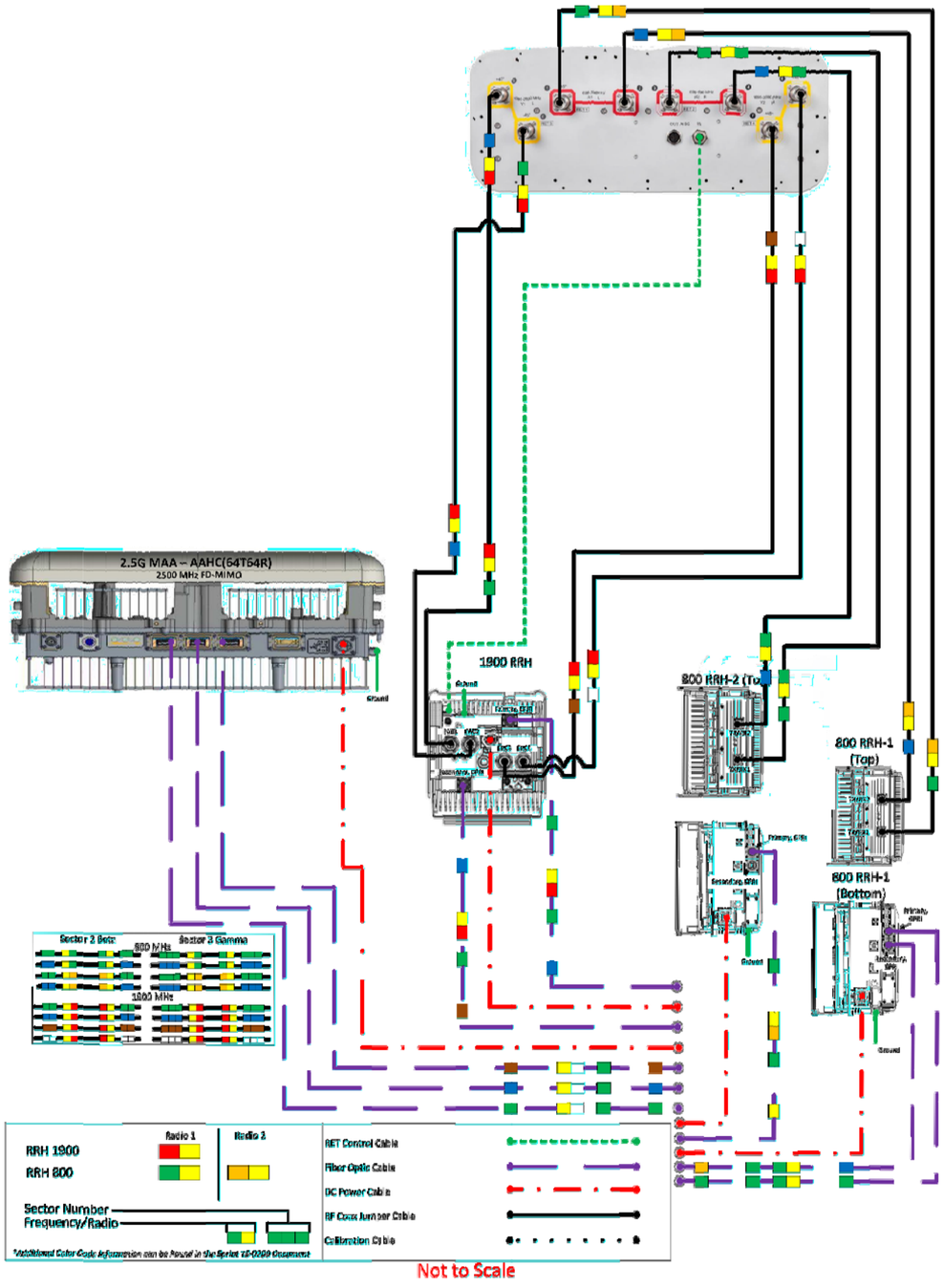
SHEET TITLE
RF DATA SHEET

SHEET NUMBER
RF-1

Prepared By	Revision Date	Revision Number	
Mark Elliott	March 13, 2018		R1
Approved By	Approval Date		
RAN Hardware & Antenna Teams	Final-Macro Generated		

Sprint

ALU 21-MIMO NNVV-65B-R4 wo Filters



Prepared By	Creation Date	Revision Number	
Mark Elliott	February 13, 2016		R-1
Approved By	Approval Date		
RAN Hardware & Antenna Teams	February 23, 2017		

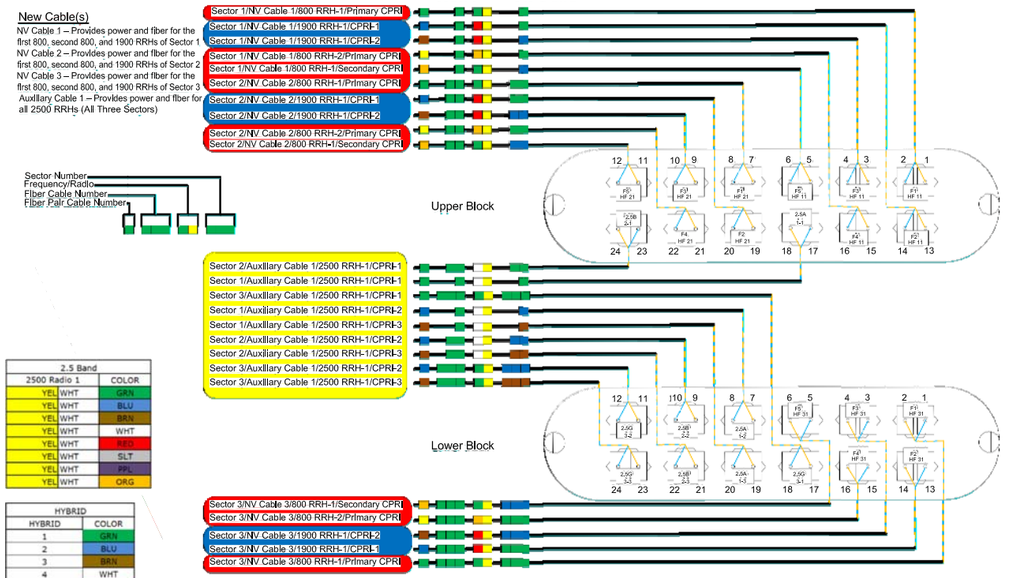
Nokia-A Tri-Band Fiber Connections
(Nokia-A Two-800, One-1900, & One-2500 RRH)

Sprint

Nokia-A New Build

New Cable(s)

NV Cable 1 – Provides power and fiber for the first 800, second 800, and 1900 RRHs of Sector 1
NV Cable 2 – Provides power and fiber for the first 800, second 800, and 1900 RRHs of Sector 2
NV Cable 3 – Provides power and fiber for the first 800, second 800, and 1900 RRHs of Sector 3
Auxiliary Cable 1 – Provides power and fiber for all 2500 RRHs (All Three Sectors)



2.5 Band	
2500 Radio 1	COLOR
YEL WHT	GRN
YEL WHT	BLU
YEL WHT	BRN
YEL WHT	WHT
YEL WHT	RED
YEL WHT	SLT
YEL WHT	PPL
YEL WHT	ORG

HYBRID	
HYBRID	COLOR
1	GRN
2	BLU
3	BRN
4	WHT
5	RED
6	SLT
7	PPL
8	ORG

NV CABLES			
BAND	INDICATOR	PORT	COLOR
800-1	YEL GRN	NV-1	GRN
1900-1	YEL RED	NV-2	BLU
1900-2	YEL BRN	NV-3	BRN
1900-3	YEL BLU	NV-4	WHT
1900-4	YEL SLT	NV-5	RED
800-2	YEL ORG	NV-6	SLT
SPARE	YEL WHT	NV-7	PPL
2500	YEL PPL	NV-8	ORG

Figure 1: Anterna Orientation

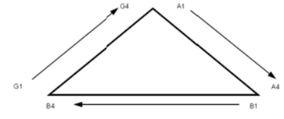


FIGURE 19–1

Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3	Brown	No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue	No Tape
2	3	Brown	Brown	No Tape
2	4	White	White	No Tape
2	5	Red	Red	No Tape
2	6	Grey	Grey	No Tape
2	7	Purple	Purple	No Tape
2	8	Orange	Orange	No Tape
3 Gamma	1	Green	Green	Green
3	2	Blue	Blue	Blue
3	3	Brown	Brown	Brown
3	4	White	White	White
3	5	Red	Red	Red
3	6	Grey	Grey	Grey
3	7	Purple	Purple	Purple
3	8	Orange	Orange	Orange

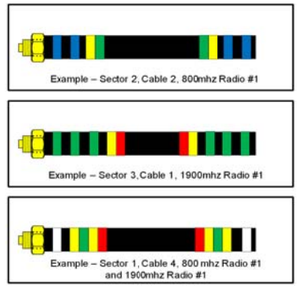
NOTES:

1. ALL CABLES SHALL BE MARKED AT THE TOP AND BOTTOM WITH 2" COLORED TAPE, STENCIL TAG COLORED TAPE, OR COLORED HEAT SHRINK TUBING
2. COLORED TAPE MAY BE OBTAINED FROM GRAYBAR ELECTRONIC. UV STABILIZED TAPE OR HEAT SHRINK ARE PREFERRED.
3. THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE, AND THERE SHALL BE A 1" SPACE BETWEEN EACH RING.
4. THE CABLE COLOR CODE SHALL BE APPLIED IN ACCORDANCE TO TABLE 19–1.
   a. TABLE 19–1 ONLY SHOWS 3 SECTORS, BUT ADDITIONAL SECTORS ARE EASILY SUPPORTED BY ADDING THE APPROPRIATE NUMBER OF COLORED RINGS TO THE CABLE COLOR CODE.
5. AFTER THE CABLE COLOR CODE IS APPLIED, THE FREQUENCY COLOR CODE, TABLE 19–2, MUST BE APPLIED FOR THE SPECIFIC FREQUENCY BAND IN USE ON A GIVEN LINE.
   a. 2" GAP SHALL SEPARATE THE CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE.
   b. THE 2" COLOR RINGS FOR THE FREQUENCY CODE SHALL BE PLACED NEXT TO EACH OTHER WITH NO SPACES.
6. WRAP 2" COLORED TAPE A MINIMUM OF 3 TIMES AROUND THE COAX, AND KEEP THE TAPE IN THE SAME AREA AS MUCH AS POSSIBLE. THIS WILL ALLOW REMOVAL OF TAPE THAT FADES OR DISCOLORS DUE TO WEATHER.
7. EXAMPLES OF THE CABLE AND FREQUENCY COLOR CODES ARE SHOWN IN FIGURE 19-1 AND FIGURE 19–2.

FIGURE 19–2

NV FREQUENCY	INDICATOR	ID
800-1	YEL	GRN
1900-1	YEL	RED
1900-2	YEL	BRN
1900-3	YEL	BLU
1900-4	YEL	SLT
800-1	YEL	ORG
RESERVED	YEL	WHT
RESERVED	YEL	PPL

2.5 FREQUENCY	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	RED
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	PPL



Sprint
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
TEL: (800) 357-7641

SBA
SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra
DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320–4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED
PROFESSIONAL ENGINEER
11/12/19

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
3	11/12/19	CONSTRUCTION FINAL	PN
2	06/11/18	CONSTRUCTION REVISED	PN
1	05/15/18	CONSTRUCTION REVISED	JEB/PN
0	11/13/17	ISSUED FOR CONSTRUCTION	JEB/PN

SITE NUMBER:
CT52XC028
SITE NAME:
SBA HILLARD
SITE ADDRESS:
640 HILLIARD STREET
MANCHESTER, CT 06040

SHEET TITLE
PLUMBING DIAGRAM AND RAN WIRING

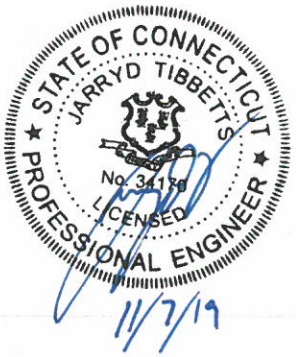
SHEET NUMBER
RF–2

EXHIBIT 7

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
1320 Greenway Drive, Suite 600, Irving, Texas 75038

Structural Analysis Report

Existing 149 ft SABRE Monopole
Customer Name: SBA Communications Corp
Customer Site Number: CT13063-A
Customer Site Name: Middle Turnpike
Carrier Name: Sprint Nextel (App#: 87668, V4)
Carrier Site ID / Name: CT52XC028 / Middle Turnpike
Site Location: 640 Hilliard Street
Manchester, Connecticut
Hartford County
Latitude: 41.784500
Longitude: -72.550806



Analysis Result:

Max Structural Usage: 79.8% [Pass]
Max Foundation Usage: 76.0% [Pass]
Additional Usage Caused by New Mount: +2.2%

Report Prepared By: Younus Alkarawi

Introduction

The purpose of this report is to summarize the analysis results on the 149 ft SABRE Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Sabre Towers & Poles, "Revised Stamped Permit Drawings," Job No. 08-01015 Revision A, Drawing No. 08-01015-PE, dated February 15, 2008
Foundation Drawing	Sabre Towers & Poles, "Revised Stamped Permit Drawings," Job No. 08-01015 Revision A, Drawing No. 08-01015-PE, dated February 15, 2008
Geotechnical Report	JGI Eastern, Inc., "Geotechnical Evaluation," Project No. J2085111, dated February 7, 2008
Modification Drawings	N/A

Analysis Criteria

The rigorous analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-G**.** In accordance with this standard, the structure was analyzed using **TESPoles,** a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Wind Speed Used in the Analysis:	Ultimate Design Wind Speed V_{ult} = 125.0 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 97.0 mph (3-Sec. Gust)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 1" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-G / 2015 IBC / 2018 Connecticut State Building Code
Exposure Category:	B
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft
Seismic Parameters:	S_S = 0.178, S_1 = 0.064

This structural analysis is based upon the tower being classified as a Structure Class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	148.0	3	Ericsson KRY 112 144 TMA	(3) T-Arms	(13) 1-5/8"	T-Mobile
2	147.0	3	Ericsson - AIR 21 B2A/B4P - Panel			
-	117.0	3	KMW - ETCR-654L12H6 - Panel	(2) ring-mounts, 3' Standoff Arms (2/sector), Back-to-Back RRH Mounts (2/sector), 8' Pipe Masts (2/Sector);	(4) 1-1/4" fiber (2) 1/2"	Sprint Nextel
-		2	Andrew - VHLP2.5-11 - Dish			
-		3	ALU 1900 Mhz RRUs			
-		6	ALU 800 Mhz RRUs			
-		3	ALU TD-RRH8x20-25 RRUs			

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
3	117.0	3	Nokia AAHC - Panel	(6) Sitepro UDS-NPL (T-Arm)	(4) 1 1/4" Fiber (2) 1/2"	Sprint Nextel
4		3	Commscope NNVV-65B-R4 - Panel			
5		3	ALU 1900 Mhz RRUs			
6		6	ALU 800 Mhz RRUs			
7		3	ALU TD-RRH8x20-25 RRUs			
8		2	Andrew VHLP2.5-11- Dish			

See the attached coax layout for the line placement considered in the analysis.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

	Pole shafts	Anchor Bolts	Base Plate	Flange Connection
Max. Usage:	**54.7%**	**49.5%**	**39.3%**	**79.8%**
Pass/Fail	**Pass**	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	1490.9	15.8	46.1

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

Operational Condition (Rigidity):

The maximum twist and sway of the microwave dishes under the operational wind speed as specified in the Analysis Criteria are listed in the table below:

Elevation (ft)	Antenna / Dish	Carrier	Twist (deg)	Sway (deg)
117.0	Andrew VHLP2.5-11- Dish	Sprint Nextel	0.000	0.918

It is recommended that the carriers review the twist and sway values of the microwave dishes.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the ANSI/TIA/EIA 222-G Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The structural analysis was performance based upon the evidence available at the time of this report. All information provided by the client is considered to be accurate.

3. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

4. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

5. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

6. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Usage Diagram - Max Ratio 54.71% at 53.3ft

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Gh:**	1.1		
Base Elev:	0.000 (ft)			Page: 1	

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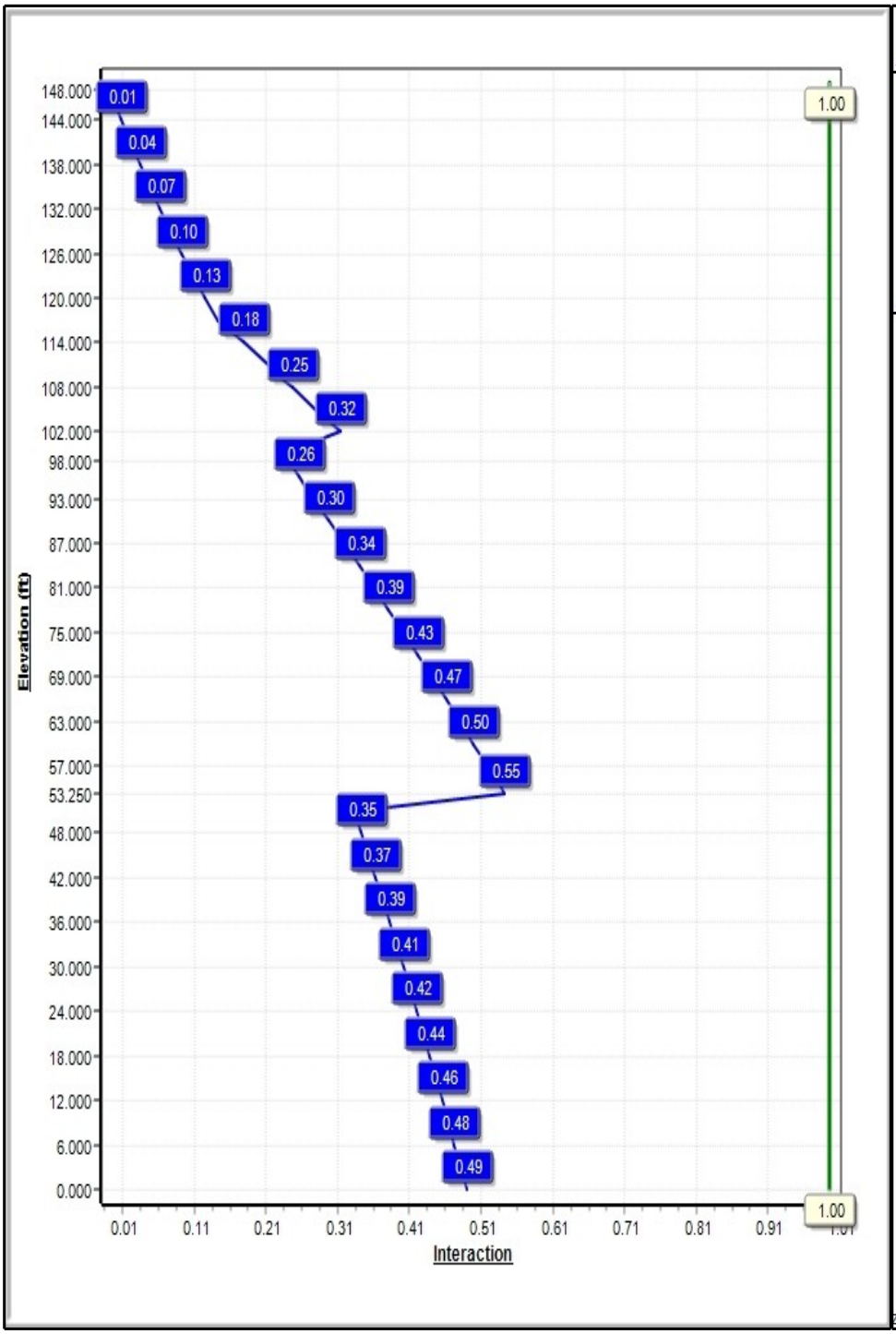
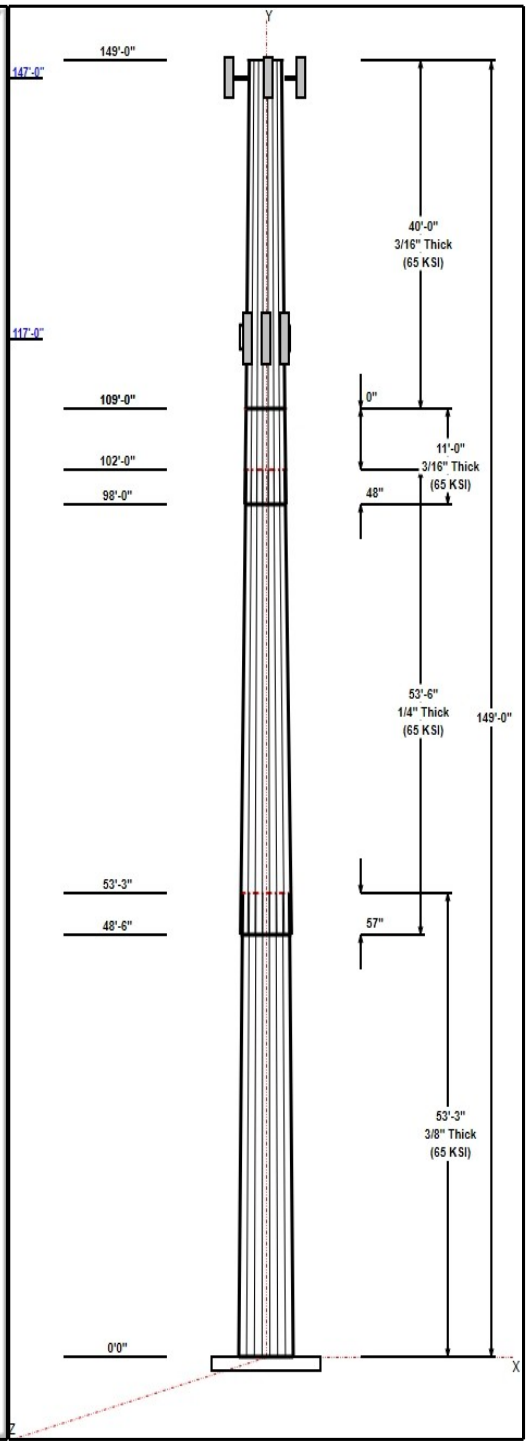
Dead Load Factor:	1.20	**Iterations:**	29
Wind Load Factor:	1.60		

Load Case : 1.2D + 1.6W 97 mph Wind





Structure: CT13063-A-SBA

Type: Tapered
Site Name: Middle Turnpike
Height: 149.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 16 Sided
Taper: 0.12852

11/7/2019

Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	53.25	35.51	42.35	0.375		0.12852	65
2	53.50	29.74	36.62	0.250	Slip	0.12852	65
3	11.00	29.22	30.63	0.188	Slip	0.12852	65
4	40.00	24.08	29.22	0.188	Butt	0.12852	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
148.00	148.00	3	KRY 112 144	T-Mobile
147.00	147.00	3	AIR 21 B2A/B4P	T-Mobile
147.00	147.00	3	T-Arms	T-Mobile
117.00	117.00	3	AAHC	Sprint Nextel
117.00	117.00	3	NNVV-65B-R4	Sprint Nextel
117.00	117.00	2	UDS-NPL	Sprint Nextel
117.00	117.00	3	ALU 1900 Mhz RRUs	Sprint Nextel
117.00	117.00	6	ALU 800 Mhz RRUs	Sprint Nextel
117.00	117.00	3	ALU TD-RRH8x20-25	Sprint Nextel
117.00	117.00	2	VHLP2.5-11	Sprint Nextel

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	147.00	Inside	1 5/8" Coax	T-Mobile
0.00	117.00	Inside	1-1/4" fiber	Sprint Nextel
0.00	117.00	Inside	1/2" Coax	Sprint Nextel

Anchor Bolts

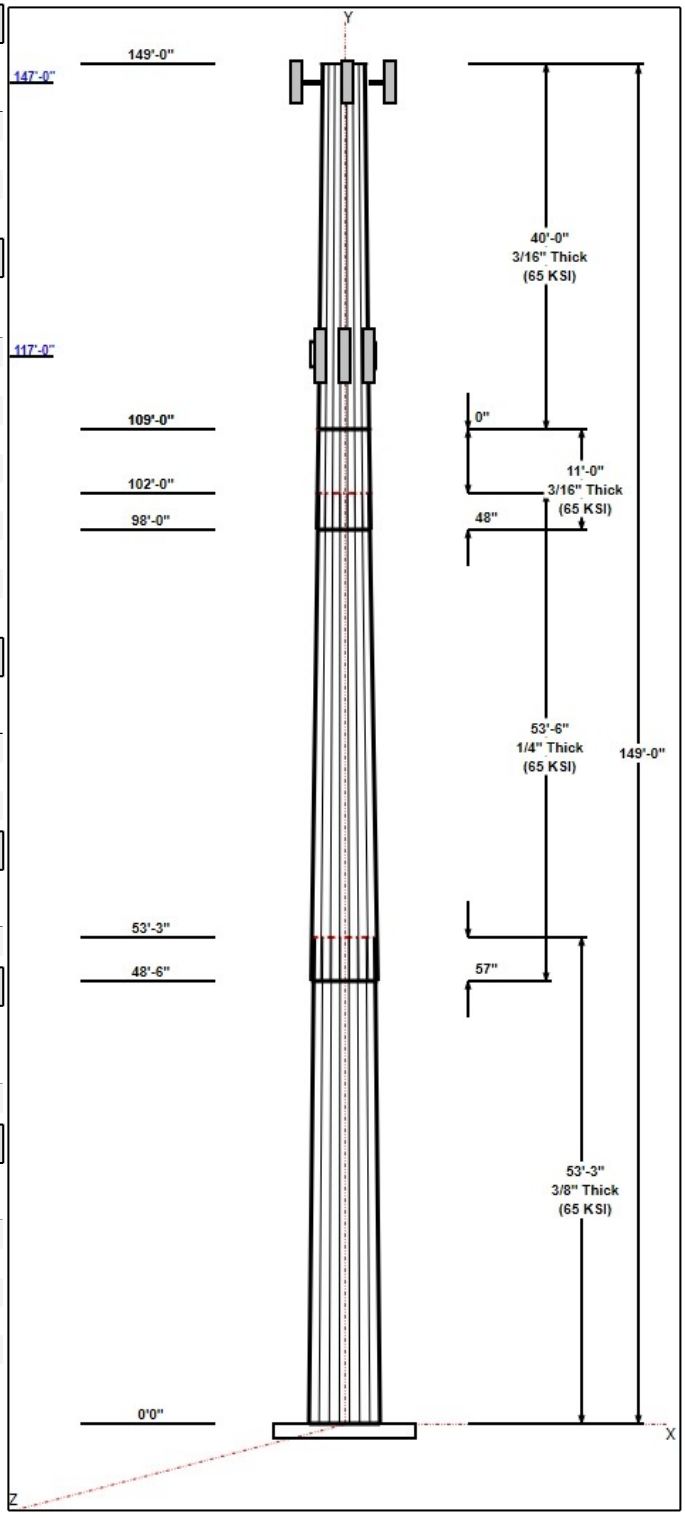
Qty	Specifications	Grade (ksi)	Arrangement
12	2.25" 18J	75.0	Cluster

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
2.7500	48.0	60.0	Clipped

Reactions

Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.6W 97 mph Wind	1490.9	15.8	26.3
0.9D + 1.6W 97 mph Wind	1475.9	15.8	19.7
1.2D + 1.0Di + 1.0Wi 50 mph Wind	451.4	4.6	46.1
1.2D + 1.0E	78.8	0.8	26.3
0.9D + 1.0E	78.0	0.8	19.7
1.0D + 1.0W 60 mph Wind	354.3	3.8	21.9



Structure: CT13063-A-SBA - Coax Line Placement

Type: Monopole
Site Name: Middle Turnpike
Height: 149.00 (ft)

11/7/2019

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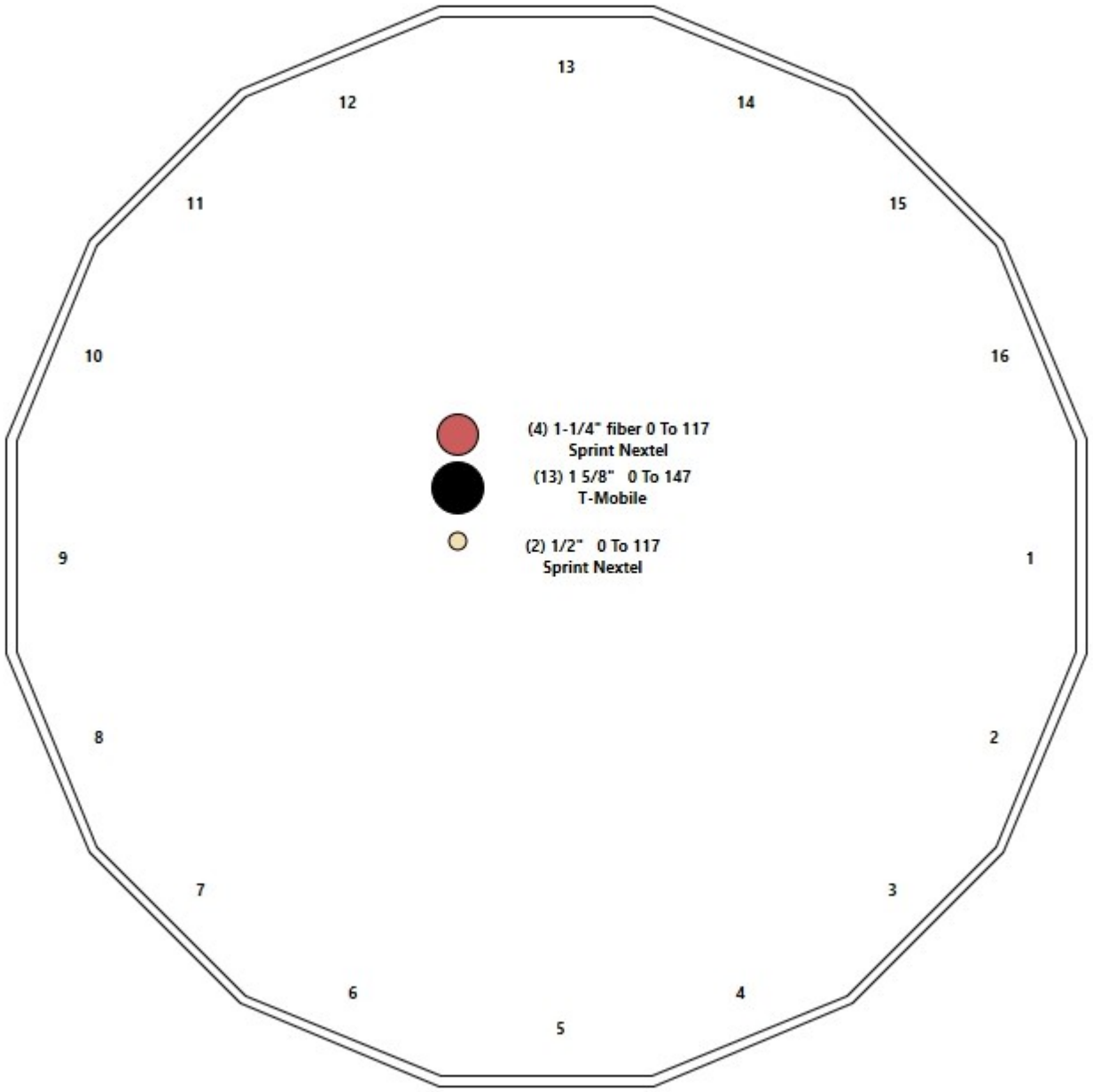

Shaft Properties

Structure:	CT13063-A-SBA		**Code:**	EIA/TIA-222-G	11/7/2019
Site Name:	Middle Turnpike		**Exposure:**	B	
Height:	149.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 4

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Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	16	53.250	0.3750	65		0.00	8,357
2	16	53.500	0.2500	65	Slip	57.00	4,781
3	16	11.000	0.1875	65	Slip	48.00	666
4	16	40.000	0.1875	65	Flange	0.00	2,154
					Total Shaft Weight:		**15,957**

	Bottom						Top						
Sec. No.	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Taper
1	42.35	0.00	50.21	11176.57	20.87	112.93	35.51	53.25	42.03	6552.63	17.24	94.68	0.128522
2	36.62	48.50	29.00	4845.70	27.54	146.47	29.74	102.00	23.52	2584.07	22.07	118.9	0.128522
3	30.63	98.00	18.21	2131.78	30.90	163.36	29.22	109.00	17.36	1848.36	29.40	155.8	0.128522
4	29.22	109.0	17.36	1848.36	29.40	155.82	24.08	149.00	14.29	1029.99	23.95	128.4	0.128522

Load Summary

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 5	

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Discrete Appurtenances

				No Ice			Ice				
No.	Elev (ft)	Description	Qty	Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)
1	148.00	KRY 112 144	3	11.00	0.41	0.70	25.36	1.043	0.70	0.00	0.00
2	147.00	AIR 21 B2A/B4P	3	117.00	6.30	0.86	356.34	7.582	0.86	0.00	0.00
3	147.00	T-Arms	3	250.00	8.00	1.00	482.23	17.289	1.00	0.00	0.00
4	117.00	AAHC	3	103.60	4.20	0.75	380.05	5.253	0.75	0.00	0.00
5	117.00	NNVV-65B-R4	3	77.40	12.27	0.74	448.80	14.164	0.74	0.00	0.00
6	117.00	UDS-NPL	2	576.00	12.79	0.75	1308.16	33.693	0.75	0.00	0.00
7	117.00	ALU 1900 Mhz RRUs	3	60.00	2.77	0.67	168.52	4.420	0.67	0.00	0.00
8	117.00	ALU 800 Mhz RRUs	6	53.00	2.49	0.67	149.19	3.978	0.67	0.00	0.00
9	117.00	ALU TD-RRH8x20-25 RRUs	3	70.00	4.05	0.67	222.84	5.132	0.67	0.00	0.00
10	117.00	VHLP2.5-11	2	48.00	8.02	1.00	272.62	10.132	1.00	0.00	0.00
		Totals:	**31**	**3,633.00**			**10,309.13**				

Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	Exposed Width	Exposed
0.00	147.00	(13) 1 5/8" Coax	0.00	Inside
0.00	117.00	(4) 1-1/4" fiber	0.00	Inside
0.00	117.00	(2) 1/2" Coax	0.00	Inside

Shaft Section Properties

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 6	

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Increment Length: **3 (ft)**

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
0.00		0.3750	42.350	50.213	11176.6	20.87	112.93	79.0	517.7	0.0
3.00		0.3750	41.964	49.751	10871.4	20.67	111.91	79.2	508.2	510.2
6.00		0.3750	41.579	49.290	10571.8	20.46	110.88	79.4	498.7	505.5
9.00		0.3750	41.193	48.829	10277.8	20.26	109.85	79.6	489.4	500.8
12.00		0.3750	40.808	48.368	9989.3	20.05	108.82	79.9	480.2	496.1
15.00		0.3750	40.422	47.906	9706.3	19.85	107.79	80.1	471.0	491.4
18.00		0.3750	40.037	47.445	9428.6	19.65	106.76	80.3	461.9	486.7
21.00		0.3750	39.651	46.984	9156.3	19.44	105.74	80.6	453.0	482.0
24.00		0.3750	39.265	46.523	8889.3	19.24	104.71	80.8	444.1	477.3
27.00		0.3750	38.880	46.062	8627.5	19.03	103.68	81.0	435.3	472.6
30.00		0.3750	38.494	45.600	8370.9	18.83	102.65	81.3	426.6	467.9
33.00		0.3750	38.109	45.139	8119.5	18.62	101.62	81.5	417.9	463.1
36.00		0.3750	37.723	44.678	7873.1	18.42	100.60	81.7	409.4	458.4
39.00		0.3750	37.338	44.217	7631.8	18.21	99.57	82.0	400.9	453.7
42.00		0.3750	36.952	43.755	7395.4	18.01	98.54	82.2	392.6	449.0
45.00		0.3750	36.567	43.294	7164.0	17.80	97.51	82.4	384.3	444.3
48.00		0.3750	36.181	42.833	6937.5	17.60	96.48	82.6	376.1	439.6
48.50	Bot - Section 2	0.3750	36.117	42.756	6900.2	17.57	96.31	82.6	374.8	72.8
51.00		0.3750	35.795	42.372	6715.8	17.40	95.45	82.6	368.0	607.7
53.25	Top - Section 1	0.2500	36.006	28.516	4605.7	27.06	144.02	0.0	0.0	542.3
54.00		0.2500	35.910	28.439	4568.6	26.98	143.64	72.0	249.6	72.7
57.00		0.2500	35.524	28.131	4422.0	26.67	142.10	72.4	244.2	288.7
60.00		0.2500	35.139	27.824	4278.6	26.37	140.55	72.7	238.8	285.6
63.00		0.2500	34.753	27.516	4138.3	26.06	139.01	73.1	233.6	282.5
66.00		0.2500	34.368	27.209	4001.1	25.75	137.47	73.4	228.4	279.3
69.00		0.2500	33.982	26.901	3867.0	25.45	135.93	73.8	223.2	276.2
72.00		0.2500	33.596	26.594	3735.9	25.14	134.39	74.1	218.1	273.0
75.00		0.2500	33.211	26.286	3607.8	24.83	132.84	74.5	213.1	269.9
78.00		0.2500	32.825	25.979	3482.7	24.53	131.30	74.8	208.1	266.8
81.00		0.2500	32.440	25.671	3360.5	24.22	129.76	75.2	203.2	263.6
84.00		0.2500	32.054	25.364	3241.1	23.91	128.22	75.5	198.3	260.5
87.00		0.2500	31.669	25.056	3124.7	23.61	126.67	75.9	193.5	257.4
90.00		0.2500	31.283	24.749	3011.1	23.30	125.13	76.2	188.8	254.2
93.00		0.2500	30.897	24.441	2900.2	22.99	123.59	76.6	184.1	251.1
96.00		0.2500	30.512	24.134	2792.1	22.69	122.05	76.9	179.5	247.9
98.00	Bot - Section 3	0.2500	30.255	23.929	2721.6	22.48	121.02	77.1	176.5	163.5
99.00		0.2500	30.126	23.826	2686.8	22.38	120.51	77.2	174.9	143.1
102.00	Top - Section 2	0.1875	30.116	17.901	2025.6	30.36	160.62	0.0	0.0	425.6
105.00		0.1875	29.730	17.670	1948.3	29.95	158.56	68.7	128.5	181.6
108.00		0.1875	29.345	17.440	1873.0	29.54	156.50	69.1	125.2	179.2
109.00	Top - Section 3	0.1875	29.216	17.363	1848.4	29.40	155.82	69.3	124.1	59.2
109.00	Bot - Section 4	0.1875	29.216	17.363	1848.4	29.40	155.82	69.3	124.1	
111.00		0.1875	28.959	17.209	1799.7	29.13	154.45	69.6	121.9	117.6
114.00		0.1875	28.574	16.978	1728.3	28.72	152.39	70.1	118.6	174.5
117.00		0.1875	28.188	16.748	1658.8	28.31	150.34	70.5	115.4	172.1
120.00		0.1875	27.802	16.517	1591.2	27.90	148.28	71.0	112.3	169.8
123.00		0.1875	27.417	16.287	1525.5	27.49	146.22	71.5	109.1	167.4
126.00		0.1875	27.031	16.056	1461.6	27.09	144.17	71.9	106.1	165.1
129.00		0.1875	26.646	15.825	1399.5	26.68	142.11	72.4	103.0	162.7
132.00		0.1875	26.260	15.595	1339.2	26.27	140.05	72.9	100.0	160.4

Increment Length: **3 (ft)**

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
135.00		0.1875	25.875	15.364	1280.7	25.86	138.00	73.3	97.1	158.0
138.00		0.1875	25.489	15.133	1223.9	25.45	135.94	73.8	94.2	155.7
141.00		0.1875	25.103	14.903	1168.8	25.04	133.89	74.2	91.3	153.3
144.00		0.1875	24.718	14.672	1115.4	24.63	131.83	74.7	88.5	151.0
147.00		0.1875	24.332	14.442	1063.6	24.22	129.77	75.2	85.7	148.6
148.00		0.1875	24.204	14.365	1046.7	24.09	129.09	75.3	84.8	49.0
149.00		0.1875	24.075	14.288	1030.0	23.95	128.40	75.5	83.9	48.7
										15957.1

Wind Loading - Shaft

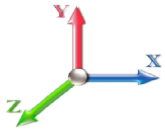
Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 29

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	16.018	17.62	292.02	0.750	0.000	0.00	0.000	0.00	0.0	0.0	0.0
3.00		1.00	0.70	16.018	17.62	289.37	0.750	0.000	3.00	10.746	8.06	227.2	0.0	612.3
6.00		1.00	0.70	16.018	17.62	286.71	0.750	0.000	3.00	10.648	7.99	225.1	0.0	606.6
9.00		1.00	0.70	16.018	17.62	284.05	0.750	0.000	3.00	10.549	7.91	223.0	0.0	601.0
12.00		1.00	0.70	16.018	17.62	281.39	0.750	0.000	3.00	10.451	7.84	221.0	0.0	595.3
15.00		1.00	0.70	16.018	17.62	278.73	0.750	0.000	3.00	10.353	7.76	218.9	0.0	589.7
18.00		1.00	0.70	16.018	17.62	276.07	0.750	0.000	3.00	10.254	7.69	216.8	0.0	584.0
21.00		1.00	0.70	16.018	17.62	273.41	0.750	0.000	3.00	10.156	7.62	214.7	0.0	578.4
24.00		1.00	0.70	16.018	17.62	270.75	0.750	0.000	3.00	10.058	7.54	212.7	0.0	572.7
27.00		1.00	0.70	16.018	17.62	268.10	0.750	0.000	3.00	9.960	7.47	210.6	0.0	567.1
30.00		1.00	0.70	16.031	17.63	265.55	0.750	0.000	3.00	9.861	7.40	208.7	0.0	561.4
33.00		1.00	0.72	16.474	18.12	266.49	0.750	0.000	3.00	9.763	7.32	212.3	0.0	555.8
36.00		1.00	0.74	16.889	18.58	267.10	0.750	0.000	3.00	9.665	7.25	215.5	0.0	550.1
39.00		1.00	0.76	17.279	19.01	267.41	0.750	0.000	3.00	9.566	7.17	218.2	0.0	544.5
42.00		1.00	0.77	17.649	19.41	267.46	0.750	0.000	3.00	9.468	7.10	220.6	0.0	538.8
45.00		1.00	0.79	18.000	19.80	267.29	0.750	0.000	3.00	9.370	7.03	222.6	0.0	533.2
48.00		1.00	0.80	18.335	20.17	266.92	0.750	0.000	3.00	9.272	6.95	224.4	0.0	527.5
48.50	Bot - Section 2	1.00	0.80	18.390	20.23	266.85	0.750	0.000	0.50	1.536	1.15	37.3	0.0	87.4
51.00		1.00	0.82	18.656	20.52	266.38	0.750	0.000	2.50	7.744	5.81	190.7	0.0	729.3
53.25	Top - Section 1	1.00	0.83	18.887	20.78	265.86	0.750	0.000	2.25	6.911	5.18	172.3	0.0	650.7
54.00		1.00	0.83	18.963	20.86	269.42	0.750	0.000	0.75	2.291	1.72	57.4	0.0	87.2
57.00		1.00	0.84	19.258	21.18	268.59	0.750	0.000	3.00	9.104	6.83	231.4	0.0	346.5
60.00		1.00	0.85	19.543	21.50	267.63	0.750	0.000	3.00	9.006	6.75	232.3	0.0	342.7
63.00		1.00	0.87	19.817	21.80	266.55	0.750	0.000	3.00	8.908	6.68	233.0	0.0	339.0
66.00		1.00	0.88	20.082	22.09	265.35	0.750	0.000	3.00	8.809	6.61	233.5	0.0	335.2
69.00		1.00	0.89	20.339	22.37	264.04	0.750	0.000	3.00	8.711	6.53	233.9	0.0	331.4
72.00		1.00	0.90	20.587	22.65	262.64	0.750	0.000	3.00	8.613	6.46	234.1	0.0	327.7
75.00		1.00	0.91	20.829	22.91	261.14	0.750	0.000	3.00	8.515	6.39	234.1	0.0	323.9
78.00		1.00	0.92	21.064	23.17	259.56	0.750	0.000	3.00	8.416	6.31	234.0	0.0	320.1
81.00		1.00	0.93	21.292	23.42	257.90	0.750	0.000	3.00	8.318	6.24	233.8	0.0	316.4
84.00		1.00	0.94	21.514	23.67	256.16	0.750	0.000	3.00	8.220	6.16	233.4	0.0	312.6
87.00		1.00	0.95	21.731	23.90	254.35	0.750	0.000	3.00	8.121	6.09	233.0	0.0	308.8
90.00		1.00	0.96	21.943	24.14	252.47	0.750	0.000	3.00	8.023	6.02	232.4	0.0	305.1
93.00		1.00	0.97	22.149	24.36	250.53	0.750	0.000	3.00	7.925	5.94	231.7	0.0	301.3
96.00		1.00	0.98	22.351	24.59	248.53	0.750	0.000	3.00	7.827	5.87	230.9	0.0	297.5
98.00	Bot - Section 3	1.00	0.98	22.483	24.73	247.17	0.750	0.000	2.00	5.163	3.87	153.2	0.0	196.3
99.00		1.00	0.99	22.549	24.80	246.47	0.750	0.000	1.00	2.597	1.95	77.3	0.0	171.7
102.00	Top - Section 2	1.00	0.99	22.742	25.02	244.36	0.750	0.000	3.00	7.726	5.79	231.9	0.0	510.7
105.00		1.00	1.00	22.931	25.22	245.29	0.750	0.000	3.00	7.627	5.72	230.9	0.0	217.9
108.00		1.00	1.01	23.116	25.43	243.08	0.750	0.000	3.00	7.529	5.65	229.7	0.0	215.0
109.00	Top - Section 3	1.00	1.01	23.177	25.49	242.33	0.750	0.000	1.00	2.488	1.87	76.1	0.0	71.1
111.00		1.00	1.02	23.298	25.63	240.83	0.750	0.000	2.00	4.943	3.71	152.0	0.0	141.2
114.00		1.00	1.03	23.476	25.82	238.53	0.750	0.000	3.00	7.332	5.50	227.2	0.0	209.4
117.00	Appurtenance(s)	1.00	1.03	23.651	26.02	236.18	0.750	0.000	3.00	7.234	5.43	225.8	0.0	206.6
120.00		1.00	1.04	23.823	26.20	233.80	0.750	0.000	3.00	7.136	5.35	224.4	0.0	203.7
123.00		1.00	1.05	23.991	26.39	231.37	0.750	0.000	3.00	7.038	5.28	222.9	0.0	200.9
126.00		1.00	1.06	24.157	26.57	228.90	0.750	0.000	3.00	6.939	5.20	221.3	0.0	198.1

Wind Loading - Shaft

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 9	

129.00		1.00	1.06	24.320	26.75	226.40	0.750	0.000	3.00	6.841	5.13	219.6	0.0	195.3
132.00		1.00	1.07	24.480	26.93	223.86	0.750	0.000	3.00	6.743	5.06	217.9	0.0	192.4
135.00		1.00	1.08	24.638	27.10	221.28	0.750	0.000	3.00	6.645	4.98	216.1	0.0	189.6
138.00		1.00	1.08	24.793	27.27	218.67	0.750	0.000	3.00	6.546	4.91	214.2	0.0	186.8
141.00		1.00	1.09	24.946	27.44	216.02	0.750	0.000	3.00	6.448	4.84	212.3	0.0	184.0
144.00		1.00	1.10	25.096	27.61	213.34	0.750	0.000	3.00	6.350	4.76	210.3	0.0	181.1
147.00	Appurtenance(s)	1.00	1.10	25.245	27.77	210.64	0.750	0.000	3.00	6.251	4.69	208.3	0.0	178.3
148.00	Appurtenance(s)	1.00	1.11	25.294	27.82	209.73	0.750	0.000	1.00	2.062	1.55	68.8	0.0	58.8
149.00		1.00	1.11	25.342	27.88	208.81	0.750	0.000	1.00	2.051	1.54	68.6	0.0	58.5
								Totals:	**149.00**			**11,120.4**		**19,148.6**

Discrete Appurtenance Forces

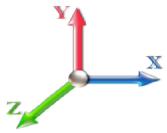
Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 10	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 29

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	148.00	KRY 112 144	3	25.294	27.823	0.56	0.80	0.69	39.60	0.000	0.000	30.66	0.00	0.00
2	147.00	AIR 21 B2A/B4P	3	25.245	27.769	0.69	0.80	13.00	421.20	0.000	0.000	577.74	0.00	0.00
3	147.00	T-Arms	3	25.245	27.769	0.75	0.75	18.00	900.00	0.000	0.000	799.75	0.00	0.00
4	117.00	AAHC	3	23.651	26.016	0.60	0.80	7.56	372.96	0.000	0.000	314.69	0.00	0.00
5	117.00	NNVV-65B-R4	3	23.651	26.016	0.59	0.80	21.79	278.64	0.000	0.000	907.08	0.00	0.00
6	117.00	UDS-NPL	2	23.651	26.016	0.56	0.75	14.39	1382.40	0.000	0.000	598.94	0.00	0.00
7	117.00	ALU 1900 Mhz RRUs	3	23.651	26.016	0.54	0.80	4.45	216.00	0.000	0.000	185.41	0.00	0.00
8	117.00	ALU 800 Mhz RRUs	6	23.651	26.016	0.54	0.80	8.01	381.60	0.000	0.000	333.33	0.00	0.00
9	117.00	ALU TD-RRH8x20-25	3	23.651	26.016	0.54	0.80	6.51	252.00	0.000	0.000	271.08	0.00	0.00
10	117.00	VHLP2.5-11	2	23.651	26.016	1.00	1.00	16.04	115.20	0.000	0.000	667.67	0.00	0.00
							Totals:		**4,359.60**			**4,686.36**		

Total Applied Force Summary

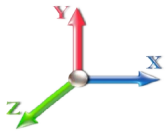
Structure:	CT13063-A-SBA		**Code:**	EIA/TIA-222-G	11/7/2019
Site Name:	Middle Turnpike		**Exposure:**	B	
Height:	149.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 11

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 29

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
3.00		227.20	671.61	0.00	0.00
6.00		225.13	665.96	0.00	0.00
9.00		223.05	660.31	0.00	0.00
12.00		220.97	654.66	0.00	0.00
15.00		218.89	649.01	0.00	0.00
18.00		216.81	643.36	0.00	0.00
21.00		214.74	637.71	0.00	0.00
24.00		212.66	632.06	0.00	0.00
27.00		210.58	626.41	0.00	0.00
30.00		208.68	620.76	0.00	0.00
33.00		212.30	615.11	0.00	0.00
36.00		215.46	609.46	0.00	0.00
39.00		218.20	603.81	0.00	0.00
42.00		220.58	598.16	0.00	0.00
45.00		222.63	592.51	0.00	0.00
48.00		224.40	586.86	0.00	0.00
48.50		37.28	97.26	0.00	0.00
51.00		190.70	778.70	0.00	0.00
53.25		172.30	695.24	0.00	0.00
54.00		57.36	102.04	0.00	0.00
57.00		231.44	405.82	0.00	0.00
60.00		232.32	402.05	0.00	0.00
63.00		233.01	398.29	0.00	0.00
66.00		233.52	394.52	0.00	0.00
69.00		233.87	390.75	0.00	0.00
72.00		234.06	386.99	0.00	0.00
75.00		234.10	383.22	0.00	0.00
78.00		234.01	379.45	0.00	0.00
81.00		233.78	375.69	0.00	0.00
84.00		233.43	371.92	0.00	0.00
87.00		232.96	368.15	0.00	0.00
90.00		232.39	364.38	0.00	0.00
93.00		231.70	360.62	0.00	0.00
96.00		230.91	356.85	0.00	0.00
98.00		153.23	235.81	0.00	0.00
99.00		77.30	191.47	0.00	0.00
102.00		231.91	570.02	0.00	0.00
105.00		230.87	277.20	0.00	0.00
108.00		229.74	274.38	0.00	0.00
109.00		76.11	90.83	0.00	0.00
111.00		152.01	180.72	0.00	0.00
114.00		227.22	268.73	0.00	0.00
117.00	(22) attachments	3504.05	3264.70	0.00	0.00
120.00		224.39	252.42	0.00	0.00
123.00		222.87	249.59	0.00	0.00
126.00		221.28	246.77	0.00	0.00

Total Applied Force Summary

Structure:	CT13063-A-SBA		**Code:**	EIA/TIA-222-G	11/7/2019
Site Name:	Middle Turnpike		**Exposure:**	B	
Height:	149.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 12

Tower Engineering Solutions

129.00		219.61	243.94	0.00	0.00
132.00		217.89	241.12	0.00	0.00
135.00		216.09	238.29	0.00	0.00
138.00		214.24	235.47	0.00	0.00
141.00		212.32	232.64	0.00	0.00
144.00		210.35	229.82	0.00	0.00
147.00	(6) attachments	1585.81	1548.19	0.00	0.00
148.00	(3) attachments	99.51	98.41	0.00	0.00
149.00		68.61	58.50	0.00	0.00
	Totals:	**15,806.81**	**26,308.68**	**0.00**	**0.00**

Calculated Forces

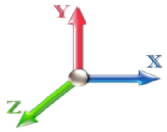
Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 29

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-26.29	-15.83	0.00	-1490.8	0.00	1490.87	3568.03	1784.01	6174.83	3065.44	0.00	0.000	0.000	0.494
3.00	-25.59	-15.65	0.00	-1443.3	0.00	1443.37	3545.62	1772.81	6079.18	3017.96	0.04	-0.112	0.000	0.486
6.00	-24.90	-15.48	0.00	-1396.4	0.00	1396.41	3523.01	1761.51	5983.92	2970.67	0.14	-0.224	0.000	0.477
9.00	-24.21	-15.30	0.00	-1349.9	0.00	1349.98	3500.21	1750.11	5889.06	2923.58	0.32	-0.334	0.000	0.469
12.00	-23.52	-15.12	0.00	-1304.0	0.00	1304.09	3477.22	1738.61	5794.62	2876.69	0.56	-0.445	0.000	0.460
15.00	-22.85	-14.94	0.00	-1258.7	0.00	1258.74	3454.04	1727.02	5700.59	2830.02	0.88	-0.554	0.000	0.451
18.00	-22.18	-14.75	0.00	-1213.9	0.00	1213.94	3430.67	1715.33	5607.00	2783.55	1.26	-0.663	0.000	0.443
21.00	-21.52	-14.57	0.00	-1169.6	0.00	1169.68	3407.10	1703.55	5513.84	2737.30	1.71	-0.771	0.000	0.434
24.00	-20.86	-14.39	0.00	-1125.9	0.00	1125.97	3383.34	1691.67	5421.14	2691.28	2.23	-0.878	0.000	0.425
27.00	-20.21	-14.20	0.00	-1082.8	0.00	1082.81	3359.39	1679.70	5328.89	2645.48	2.82	-0.984	0.000	0.415
30.00	-19.57	-14.02	0.00	-1040.1	0.00	1040.19	3335.25	1667.63	5237.10	2599.92	3.47	-1.089	0.000	0.406
33.00	-18.94	-13.83	0.00	-998.13	0.00	998.13	3310.92	1655.46	5145.79	2554.59	4.19	-1.193	0.000	0.397
36.00	-18.31	-13.63	0.00	-956.64	0.00	956.64	3286.39	1643.20	5054.97	2509.50	4.97	-1.295	0.000	0.387
39.00	-17.68	-13.43	0.00	-915.74	0.00	915.74	3261.67	1630.84	4964.64	2464.66	5.82	-1.397	0.000	0.377
42.00	-17.07	-13.23	0.00	-875.44	0.00	875.44	3236.76	1618.38	4874.82	2420.07	6.73	-1.497	0.000	0.367
45.00	-16.46	-13.02	0.00	-835.76	0.00	835.76	3211.66	1605.83	4785.51	2375.73	7.70	-1.596	0.000	0.357
48.00	-15.87	-12.79	0.00	-796.71	0.00	796.71	3182.27	1591.13	4690.68	2328.65	8.73	-1.693	0.000	0.347
48.50	-15.76	-12.76	0.00	-790.32	0.00	790.32	3176.56	1588.28	4673.77	2320.26	8.91	-1.709	0.000	0.346
51.00	-14.97	-12.57	0.00	-758.41	0.00	758.41	3148.00	1574.00	4589.69	2278.51	9.83	-1.789	0.000	0.338
53.25	-14.27	-12.39	0.00	-730.13	0.00	730.13	1846.69	923.35	2727.65	1354.12	10.69	-1.860	0.000	0.547
54.00	-14.16	-12.35	0.00	-720.84	0.00	720.84	1843.93	921.97	2716.18	1348.43	10.98	-1.884	0.000	0.542
57.00	-13.73	-12.13	0.00	-683.80	0.00	683.80	1832.78	916.39	2670.37	1325.68	12.21	-2.015	0.000	0.523
60.00	-13.31	-11.91	0.00	-647.41	0.00	647.41	1821.44	910.72	2624.63	1302.98	13.52	-2.143	0.000	0.504
63.00	-12.90	-11.69	0.00	-611.67	0.00	611.67	1809.91	904.95	2578.98	1280.32	14.90	-2.269	0.000	0.485
66.00	-12.49	-11.47	0.00	-576.59	0.00	576.59	1798.18	899.09	2533.44	1257.70	16.37	-2.391	0.000	0.466
69.00	-12.08	-11.25	0.00	-542.17	0.00	542.17	1786.27	893.13	2488.00	1235.15	17.91	-2.511	0.000	0.446
72.00	-11.69	-11.02	0.00	-508.44	0.00	508.44	1774.16	887.08	2442.68	1212.65	19.52	-2.627	0.000	0.426
75.00	-11.29	-10.79	0.00	-475.38	0.00	475.38	1761.85	880.93	2397.48	1190.21	21.21	-2.739	0.000	0.406
78.00	-10.91	-10.56	0.00	-443.02	0.00	443.02	1749.36	874.68	2352.43	1167.84	22.97	-2.848	0.000	0.386
81.00	-10.52	-10.32	0.00	-411.36	0.00	411.36	1736.67	868.34	2307.51	1145.55	24.79	-2.952	0.000	0.365
84.00	-10.15	-10.09	0.00	-380.39	0.00	380.39	1723.80	861.90	2262.76	1123.33	26.68	-3.053	0.000	0.345
87.00	-9.78	-9.85	0.00	-350.13	0.00	350.13	1710.73	855.36	2218.16	1101.19	28.63	-3.149	0.000	0.324
90.00	-9.41	-9.61	0.00	-320.58	0.00	320.58	1697.46	848.73	2173.74	1079.14	30.63	-3.241	0.000	0.303
93.00	-9.05	-9.37	0.00	-291.74	0.00	291.74	1684.01	842.00	2129.51	1057.18	32.70	-3.328	0.000	0.281
96.00	-8.70	-9.13	0.00	-263.62	0.00	263.62	1670.36	835.18	2085.46	1035.31	34.81	-3.409	0.000	0.260
98.00	-8.46	-8.97	0.00	-245.35	0.00	245.35	1661.16	830.58	2056.21	1020.79	36.25	-3.461	0.000	0.246
99.00	-8.27	-8.89	0.00	-236.38	0.00	236.38	1656.52	828.26	2041.62	1013.55	36.98	-3.486	0.000	0.238
102.00	-7.71	-8.63	0.00	-209.71	0.00	209.71	1099.11	549.56	1359.81	675.07	39.19	-3.557	0.000	0.318
105.00	-7.43	-8.39	0.00	-183.82	0.00	183.82	1092.31	546.16	1333.88	662.20	41.45	-3.622	0.000	0.285
108.00	-7.17	-8.15	0.00	-158.64	0.00	158.64	1085.32	542.66	1307.94	649.32	43.75	-3.697	0.000	0.251
109.00	-7.08	-8.08	0.00	-150.48	0.00	150.48	1082.95	541.47	1299.29	645.02	44.52	-3.721	0.000	0.240
109.00	-7.08	-8.08	0.00	-150.48	0.00	150.48	1082.95	541.47	1299.29	645.02	44.52	-3.721	0.000	0.240
111.00	-6.90	-7.92	0.00	-134.33	0.00	134.33	1078.13	539.07	1281.99	636.43	46.09	-3.765	0.000	0.218
114.00	-6.64	-7.68	0.00	-110.58	0.00	110.58	1070.76	535.38	1256.05	623.55	48.48	-3.823	0.000	0.184
117.00	-3.61	-3.97	0.00	-87.54	0.00	87.54	1063.19	531.60	1230.12	610.68	50.89	-3.872	0.000	0.147
120.00	-3.37	-3.73	0.00	-75.64	0.00	75.64	1055.43	527.72	1204.21	597.82	53.34	-3.913	0.000	0.130
123.00	-3.14	-3.49	0.00	-64.45	0.00	64.45	1047.48	523.74	1178.34	584.98	55.81	-3.951	0.000	0.113
126.00	-2.91	-3.25	0.00	-53.98	0.00	53.98	1039.33	519.67	1152.51	572.15	58.30	-3.984	0.000	0.097

Calculated Forces

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 14

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129.00	-2.68	-3.02	0.00	-44.22	0.00	44.22	1031.00	515.50	1126.73	559.36	60.81	-4.013	0.000	0.082
132.00	-2.45	-2.79	0.00	-35.16	0.00	35.16	1022.47	511.23	1101.01	546.59	63.34	-4.037	0.000	0.067
135.00	-2.23	-2.56	0.00	-26.80	0.00	26.80	1013.75	506.87	1075.36	533.85	65.88	-4.057	0.000	0.052
138.00	-2.01	-2.33	0.00	-19.13	0.00	19.13	1004.83	502.42	1049.79	521.16	68.43	-4.072	0.000	0.039
141.00	-1.79	-2.10	0.00	-12.16	0.00	12.16	995.73	497.86	1024.31	508.51	70.99	-4.083	0.000	0.026
144.00	-1.58	-1.87	0.00	-5.86	0.00	5.86	986.43	493.22	998.92	495.91	73.56	-4.090	0.000	0.013
147.00	-0.14	-0.18	0.00	-0.25	0.00	0.25	976.94	488.47	973.65	483.36	76.13	-4.092	0.000	0.001
148.00	-0.05	-0.07	0.00	-0.07	0.00	0.07	973.74	486.87	965.25	479.19	76.98	-4.092	0.000	0.000
149.00	0.00	-0.07	0.00	0.00	0.00	0.00	970.51	485.25	956.86	475.02	77.84	-4.092	0.000	0.000

Wind Loading - Shaft

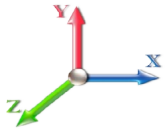
Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 15	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 28

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	16.018	17.62	292.02	0.750	0.000	0.00	0.000	0.00	0.0	0.0	0.0
3.00		1.00	0.70	16.018	17.62	289.37	0.750	0.000	3.00	10.746	8.06	227.2	0.0	459.2
6.00		1.00	0.70	16.018	17.62	286.71	0.750	0.000	3.00	10.648	7.99	225.1	0.0	455.0
9.00		1.00	0.70	16.018	17.62	284.05	0.750	0.000	3.00	10.549	7.91	223.0	0.0	450.7
12.00		1.00	0.70	16.018	17.62	281.39	0.750	0.000	3.00	10.451	7.84	221.0	0.0	446.5
15.00		1.00	0.70	16.018	17.62	278.73	0.750	0.000	3.00	10.353	7.76	218.9	0.0	442.3
18.00		1.00	0.70	16.018	17.62	276.07	0.750	0.000	3.00	10.254	7.69	216.8	0.0	438.0
21.00		1.00	0.70	16.018	17.62	273.41	0.750	0.000	3.00	10.156	7.62	214.7	0.0	433.8
24.00		1.00	0.70	16.018	17.62	270.75	0.750	0.000	3.00	10.058	7.54	212.7	0.0	429.5
27.00		1.00	0.70	16.018	17.62	268.10	0.750	0.000	3.00	9.960	7.47	210.6	0.0	425.3
30.00		1.00	0.70	16.031	17.63	265.55	0.750	0.000	3.00	9.861	7.40	208.7	0.0	421.1
33.00		1.00	0.72	16.474	18.12	266.49	0.750	0.000	3.00	9.763	7.32	212.3	0.0	416.8
36.00		1.00	0.74	16.889	18.58	267.10	0.750	0.000	3.00	9.665	7.25	215.5	0.0	412.6
39.00		1.00	0.76	17.279	19.01	267.41	0.750	0.000	3.00	9.566	7.17	218.2	0.0	408.4
42.00		1.00	0.77	17.649	19.41	267.46	0.750	0.000	3.00	9.468	7.10	220.6	0.0	404.1
45.00		1.00	0.79	18.000	19.80	267.29	0.750	0.000	3.00	9.370	7.03	222.6	0.0	399.9
48.00		1.00	0.80	18.335	20.17	266.92	0.750	0.000	3.00	9.272	6.95	224.4	0.0	395.6
48.50	Bot - Section 2	1.00	0.80	18.390	20.23	266.85	0.750	0.000	0.50	1.536	1.15	37.3	0.0	65.5
51.00		1.00	0.82	18.656	20.52	266.38	0.750	0.000	2.50	7.744	5.81	190.7	0.0	546.9
53.25	Top - Section 1	1.00	0.83	18.887	20.78	265.86	0.750	0.000	2.25	6.911	5.18	172.3	0.0	488.1
54.00		1.00	0.83	18.963	20.86	269.42	0.750	0.000	0.75	2.291	1.72	57.4	0.0	65.4
57.00		1.00	0.84	19.258	21.18	268.59	0.750	0.000	3.00	9.104	6.83	231.4	0.0	259.9
60.00		1.00	0.85	19.543	21.50	267.63	0.750	0.000	3.00	9.006	6.75	232.3	0.0	257.0
63.00		1.00	0.87	19.817	21.80	266.55	0.750	0.000	3.00	8.908	6.68	233.0	0.0	254.2
66.00		1.00	0.88	20.082	22.09	265.35	0.750	0.000	3.00	8.809	6.61	233.5	0.0	251.4
69.00		1.00	0.89	20.339	22.37	264.04	0.750	0.000	3.00	8.711	6.53	233.9	0.0	248.6
72.00		1.00	0.90	20.587	22.65	262.64	0.750	0.000	3.00	8.613	6.46	234.1	0.0	245.7
75.00		1.00	0.91	20.829	22.91	261.14	0.750	0.000	3.00	8.515	6.39	234.1	0.0	242.9
78.00		1.00	0.92	21.064	23.17	259.56	0.750	0.000	3.00	8.416	6.31	234.0	0.0	240.1
81.00		1.00	0.93	21.292	23.42	257.90	0.750	0.000	3.00	8.318	6.24	233.8	0.0	237.3
84.00		1.00	0.94	21.514	23.67	256.16	0.750	0.000	3.00	8.220	6.16	233.4	0.0	234.4
87.00		1.00	0.95	21.731	23.90	254.35	0.750	0.000	3.00	8.121	6.09	233.0	0.0	231.6
90.00		1.00	0.96	21.943	24.14	252.47	0.750	0.000	3.00	8.023	6.02	232.4	0.0	228.8
93.00		1.00	0.97	22.149	24.36	250.53	0.750	0.000	3.00	7.925	5.94	231.7	0.0	226.0
96.00		1.00	0.98	22.351	24.59	248.53	0.750	0.000	3.00	7.827	5.87	230.9	0.0	223.1
98.00	Bot - Section 3	1.00	0.98	22.483	24.73	247.17	0.750	0.000	2.00	5.163	3.87	153.2	0.0	147.2
99.00		1.00	0.99	22.549	24.80	246.47	0.750	0.000	1.00	2.597	1.95	77.3	0.0	128.8
102.00	Top - Section 2	1.00	0.99	22.742	25.02	244.36	0.750	0.000	3.00	7.726	5.79	231.9	0.0	383.0
105.00		1.00	1.00	22.931	25.22	245.29	0.750	0.000	3.00	7.627	5.72	230.9	0.0	163.4
108.00		1.00	1.01	23.116	25.43	243.08	0.750	0.000	3.00	7.529	5.65	229.7	0.0	161.3
109.00	Top - Section 3	1.00	1.01	23.177	25.49	242.33	0.750	0.000	1.00	2.488	1.87	76.1	0.0	53.3
111.00		1.00	1.02	23.298	25.63	240.83	0.750	0.000	2.00	4.943	3.71	152.0	0.0	105.9
114.00		1.00	1.03	23.476	25.82	238.53	0.750	0.000	3.00	7.332	5.50	227.2	0.0	157.0
117.00	Appurtenance(s)	1.00	1.03	23.651	26.02	236.18	0.750	0.000	3.00	7.234	5.43	225.8	0.0	154.9
120.00		1.00	1.04	23.823	26.20	233.80	0.750	0.000	3.00	7.136	5.35	224.4	0.0	152.8
123.00		1.00	1.05	23.991	26.39	231.37	0.750	0.000	3.00	7.038	5.28	222.9	0.0	150.7
126.00		1.00	1.06	24.157	26.57	228.90	0.750	0.000	3.00	6.939	5.20	221.3	0.0	148.6

Wind Loading - Shaft

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 16	

129.00		1.00	1.06	24.320	26.75	226.40	0.750	0.000	3.00	6.841	5.13	219.6	0.0	146.5
132.00		1.00	1.07	24.480	26.93	223.86	0.750	0.000	3.00	6.743	5.06	217.9	0.0	144.3
135.00		1.00	1.08	24.638	27.10	221.28	0.750	0.000	3.00	6.645	4.98	216.1	0.0	142.2
138.00		1.00	1.08	24.793	27.27	218.67	0.750	0.000	3.00	6.546	4.91	214.2	0.0	140.1
141.00		1.00	1.09	24.946	27.44	216.02	0.750	0.000	3.00	6.448	4.84	212.3	0.0	138.0
144.00		1.00	1.10	25.096	27.61	213.34	0.750	0.000	3.00	6.350	4.76	210.3	0.0	135.9
147.00	Appurtenance(s)	1.00	1.10	25.245	27.77	210.64	0.750	0.000	3.00	6.251	4.69	208.3	0.0	133.7
148.00	Appurtenance(s)	1.00	1.11	25.294	27.82	209.73	0.750	0.000	1.00	2.062	1.55	68.8	0.0	44.1
149.00		1.00	1.11	25.342	27.88	208.81	0.750	0.000	1.00	2.051	1.54	68.6	0.0	43.9
								Totals:	**149.00**			**11,120.4**		**14,361.4**

Discrete Appurtenance Forces

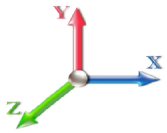
Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 28

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	148.00	KRY 112 144	3	25.294	27.823	0.56	0.80	0.69	29.70	0.000	0.000	30.66	0.00	0.00
2	147.00	AIR 21 B2A/B4P	3	25.245	27.769	0.69	0.80	13.00	315.90	0.000	0.000	577.74	0.00	0.00
3	147.00	T-Arms	3	25.245	27.769	0.75	0.75	18.00	675.00	0.000	0.000	799.75	0.00	0.00
4	117.00	AAHC	3	23.651	26.016	0.60	0.80	7.56	279.72	0.000	0.000	314.69	0.00	0.00
5	117.00	NNVV-65B-R4	3	23.651	26.016	0.59	0.80	21.79	208.98	0.000	0.000	907.08	0.00	0.00
6	117.00	UDS-NPL	2	23.651	26.016	0.56	0.75	14.39	1036.80	0.000	0.000	598.94	0.00	0.00
7	117.00	ALU 1900 Mhz RRUs	3	23.651	26.016	0.54	0.80	4.45	162.00	0.000	0.000	185.41	0.00	0.00
8	117.00	ALU 800 Mhz RRUs	6	23.651	26.016	0.54	0.80	8.01	286.20	0.000	0.000	333.33	0.00	0.00
9	117.00	ALU TD-RRH8x20-25	3	23.651	26.016	0.54	0.80	6.51	189.00	0.000	0.000	271.08	0.00	0.00
10	117.00	VHLP2.5-11	2	23.651	26.016	1.00	1.00	16.04	86.40	0.000	0.000	667.67	0.00	0.00
							Totals:		**3,269.70**			**4,686.36**		

Total Applied Force Summary

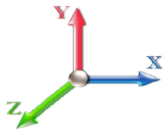
Structure:	CT13063-A-SBA		**Code:**	EIA/TIA-222-G	11/7/2019
Site Name:	Middle Turnpike		**Exposure:**	B	
Height:	149.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 18

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 28

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
3.00		227.20	503.71	0.00	0.00
6.00		225.13	499.47	0.00	0.00
9.00		223.05	495.23	0.00	0.00
12.00		220.97	490.99	0.00	0.00
15.00		218.89	486.76	0.00	0.00
18.00		216.81	482.52	0.00	0.00
21.00		214.74	478.28	0.00	0.00
24.00		212.66	474.04	0.00	0.00
27.00		210.58	469.80	0.00	0.00
30.00		208.68	465.57	0.00	0.00
33.00		212.30	461.33	0.00	0.00
36.00		215.46	457.09	0.00	0.00
39.00		218.20	452.85	0.00	0.00
42.00		220.58	448.62	0.00	0.00
45.00		222.63	444.38	0.00	0.00
48.00		224.40	440.14	0.00	0.00
48.50		37.28	72.94	0.00	0.00
51.00		190.70	584.03	0.00	0.00
53.25		172.30	521.43	0.00	0.00
54.00		57.36	76.53	0.00	0.00
57.00		231.44	304.36	0.00	0.00
60.00		232.32	301.54	0.00	0.00
63.00		233.01	298.71	0.00	0.00
66.00		233.52	295.89	0.00	0.00
69.00		233.87	293.06	0.00	0.00
72.00		234.06	290.24	0.00	0.00
75.00		234.10	287.41	0.00	0.00
78.00		234.01	284.59	0.00	0.00
81.00		233.78	281.76	0.00	0.00
84.00		233.43	278.94	0.00	0.00
87.00		232.96	276.11	0.00	0.00
90.00		232.39	273.29	0.00	0.00
93.00		231.70	270.46	0.00	0.00
96.00		230.91	267.64	0.00	0.00
98.00		153.23	176.86	0.00	0.00
99.00		77.30	143.60	0.00	0.00
102.00		231.91	427.51	0.00	0.00
105.00		230.87	207.90	0.00	0.00
108.00		229.74	205.78	0.00	0.00
109.00		76.11	68.12	0.00	0.00
111.00		152.01	135.54	0.00	0.00
114.00		227.22	201.54	0.00	0.00
117.00	(22) attachments	3504.05	2448.53	0.00	0.00
120.00		224.39	189.31	0.00	0.00
123.00		222.87	187.20	0.00	0.00
126.00		221.28	185.08	0.00	0.00

Total Applied Force Summary

Structure:	CT13063-A-SBA		**Code:**	EIA/TIA-222-G	11/7/2019
Site Name:	Middle Turnpike		**Exposure:**	B	
Height:	149.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 19

Tower Engineering Solutions

129.00		219.61	182.96	0.00	0.00
132.00		217.89	180.84	0.00	0.00
135.00		216.09	178.72	0.00	0.00
138.00		214.24	176.60	0.00	0.00
141.00		212.32	174.48	0.00	0.00
144.00		210.35	172.36	0.00	0.00
147.00	(6) attachments	1585.81	1161.15	0.00	0.00
148.00	(3) attachments	99.51	73.81	0.00	0.00
149.00		68.61	43.87	0.00	0.00
	Totals:	**15,806.81**	**19,731.51**	**0.00**	**0.00**

Calculated Forces

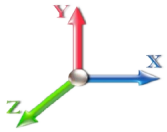
Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 20	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 28

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-19.72	-15.82	0.00	-1475.8	0.00	1475.89	3568.03	1784.01	6174.83	3065.44	0.00	0.000	0.000	0.487
3.00	-19.18	-15.63	0.00	-1428.4	0.00	1428.42	3545.62	1772.81	6079.18	3017.96	0.04	-0.111	0.000	0.479
6.00	-18.65	-15.44	0.00	-1381.5	0.00	1381.51	3523.01	1761.51	5983.92	2970.67	0.14	-0.221	0.000	0.470
9.00	-18.13	-15.25	0.00	-1335.1	0.00	1335.18	3500.21	1750.11	5889.06	2923.58	0.32	-0.331	0.000	0.462
12.00	-17.61	-15.06	0.00	-1289.4	0.00	1289.43	3477.22	1738.61	5794.62	2876.69	0.56	-0.440	0.000	0.453
15.00	-17.10	-14.87	0.00	-1244.2	0.00	1244.24	3454.04	1727.02	5700.59	2830.02	0.87	-0.548	0.000	0.445
18.00	-16.59	-14.68	0.00	-1199.6	0.00	1199.63	3430.67	1715.33	5607.00	2783.55	1.25	-0.656	0.000	0.436
21.00	-16.09	-14.49	0.00	-1155.5	0.00	1155.59	3407.10	1703.55	5513.84	2737.30	1.70	-0.762	0.000	0.427
24.00	-15.59	-14.30	0.00	-1112.1	0.00	1112.13	3383.34	1691.67	5421.14	2691.28	2.21	-0.868	0.000	0.418
27.00	-15.10	-14.11	0.00	-1069.2	0.00	1069.23	3359.39	1679.70	5328.89	2645.48	2.79	-0.973	0.000	0.409
30.00	-14.61	-13.92	0.00	-1026.9	0.00	1026.91	3335.25	1667.63	5237.10	2599.92	3.43	-1.076	0.000	0.399
33.00	-14.13	-13.72	0.00	-985.16	0.00	985.16	3310.92	1655.46	5145.79	2554.59	4.14	-1.179	0.000	0.390
36.00	-13.66	-13.52	0.00	-944.00	0.00	944.00	3286.39	1643.20	5054.97	2509.50	4.91	-1.280	0.000	0.380
39.00	-13.19	-13.31	0.00	-903.44	0.00	903.44	3261.67	1630.84	4964.64	2464.66	5.75	-1.380	0.000	0.371
42.00	-12.72	-13.10	0.00	-863.50	0.00	863.50	3236.76	1618.38	4874.82	2420.07	6.65	-1.479	0.000	0.361
45.00	-12.26	-12.89	0.00	-824.19	0.00	824.19	3211.66	1605.83	4785.51	2375.73	7.61	-1.577	0.000	0.351
48.00	-11.81	-12.66	0.00	-785.52	0.00	785.52	3182.27	1591.13	4690.68	2328.65	8.63	-1.672	0.000	0.341
48.50	-11.73	-12.64	0.00	-779.18	0.00	779.18	3176.56	1588.28	4673.77	2320.26	8.81	-1.688	0.000	0.340
51.00	-11.14	-12.44	0.00	-747.60	0.00	747.60	3148.00	1574.00	4589.69	2278.51	9.71	-1.767	0.000	0.332
53.25	-10.61	-12.26	0.00	-719.60	0.00	719.60	1846.69	923.35	2727.65	1354.12	10.56	-1.837	0.000	0.537
54.00	-10.52	-12.22	0.00	-710.41	0.00	710.41	1843.93	921.97	2716.18	1348.43	10.85	-1.860	0.000	0.533
57.00	-10.20	-12.00	0.00	-673.76	0.00	673.76	1832.78	916.39	2670.37	1325.68	12.07	-1.990	0.000	0.514
60.00	-9.88	-11.78	0.00	-637.77	0.00	637.77	1821.44	910.72	2624.63	1302.98	13.36	-2.116	0.000	0.495
63.00	-9.56	-11.55	0.00	-602.44	0.00	602.44	1809.91	904.95	2578.98	1280.32	14.73	-2.240	0.000	0.476
66.00	-9.25	-11.33	0.00	-567.79	0.00	567.79	1798.18	899.09	2533.44	1257.70	16.17	-2.361	0.000	0.457
69.00	-8.95	-11.10	0.00	-533.81	0.00	533.81	1786.27	893.13	2488.00	1235.15	17.69	-2.478	0.000	0.437
72.00	-8.65	-10.87	0.00	-500.51	0.00	500.51	1774.16	887.08	2442.68	1212.65	19.29	-2.592	0.000	0.418
75.00	-8.35	-10.64	0.00	-467.91	0.00	467.91	1761.85	880.93	2397.48	1190.21	20.95	-2.703	0.000	0.398
78.00	-8.06	-10.40	0.00	-436.00	0.00	436.00	1749.36	874.68	2352.43	1167.84	22.68	-2.810	0.000	0.378
81.00	-7.77	-10.17	0.00	-404.78	0.00	404.78	1736.67	868.34	2307.51	1145.55	24.48	-2.913	0.000	0.358
84.00	-7.49	-9.94	0.00	-374.27	0.00	374.27	1723.80	861.90	2262.76	1123.33	26.34	-3.012	0.000	0.338
87.00	-7.21	-9.70	0.00	-344.46	0.00	344.46	1710.73	855.36	2218.16	1101.19	28.27	-3.106	0.000	0.317
90.00	-6.94	-9.46	0.00	-315.36	0.00	315.36	1697.46	848.73	2173.74	1079.14	30.25	-3.197	0.000	0.296
93.00	-6.67	-9.23	0.00	-286.97	0.00	286.97	1684.01	842.00	2129.51	1057.18	32.28	-3.282	0.000	0.276
96.00	-6.40	-8.99	0.00	-259.29	0.00	259.29	1670.36	835.18	2085.46	1035.31	34.37	-3.362	0.000	0.254
98.00	-6.23	-8.83	0.00	-241.31	0.00	241.31	1661.16	830.58	2056.21	1020.79	35.79	-3.413	0.000	0.240
99.00	-6.08	-8.75	0.00	-232.48	0.00	232.48	1656.52	828.26	2041.62	1013.55	36.51	-3.438	0.000	0.233
102.00	-5.66	-8.50	0.00	-206.24	0.00	206.24	1099.11	549.56	1359.81	675.07	38.69	-3.508	0.000	0.311
105.00	-5.46	-8.26	0.00	-180.75	0.00	180.75	1092.31	546.16	1333.88	662.20	40.91	-3.572	0.000	0.278
108.00	-5.26	-8.02	0.00	-155.96	0.00	155.96	1085.32	542.66	1307.94	649.32	43.18	-3.645	0.000	0.245
109.00	-5.19	-7.95	0.00	-147.94	0.00	147.94	1082.95	541.47	1299.29	645.02	43.95	-3.668	0.000	0.234
109.00	-5.19	-7.95	0.00	-147.94	0.00	147.94	1082.95	541.47	1299.29	645.02	43.95	-3.668	0.000	0.234
111.00	-5.06	-7.79	0.00	-132.05	0.00	132.05	1078.13	539.07	1281.99	636.43	45.49	-3.712	0.000	0.212
114.00	-4.87	-7.55	0.00	-108.68	0.00	108.68	1070.76	535.38	1256.05	623.55	47.84	-3.769	0.000	0.179
117.00	-2.65	-3.90	0.00	-86.02	0.00	86.02	1063.19	531.60	1230.12	610.68	50.22	-3.817	0.000	0.143
120.00	-2.47	-3.66	0.00	-74.32	0.00	74.32	1055.43	527.72	1204.21	597.82	52.63	-3.858	0.000	0.127
123.00	-2.30	-3.43	0.00	-63.33	0.00	63.33	1047.48	523.74	1178.34	584.98	55.07	-3.895	0.000	0.111
126.00	-2.13	-3.20	0.00	-53.04	0.00	53.04	1039.33	519.67	1152.51	572.15	57.53	-3.927	0.000	0.095

Calculated Forces

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 21

Tower Engineering Solutions

129.00	-1.96	-2.97	0.00	-43.45	0.00	43.45	1031.00	515.50	1126.73	559.36	60.00	-3.956	0.000	0.080
132.00	-1.79	-2.74	0.00	-34.55	0.00	34.55	1022.47	511.23	1101.01	546.59	62.49	-3.979	0.000	0.065
135.00	-1.63	-2.51	0.00	-26.33	0.00	26.33	1013.75	506.87	1075.36	533.85	65.00	-3.999	0.000	0.051
138.00	-1.47	-2.28	0.00	-18.80	0.00	18.80	1004.83	502.42	1049.79	521.16	67.51	-4.014	0.000	0.038
141.00	-1.31	-2.06	0.00	-11.95	0.00	11.95	995.73	497.86	1024.31	508.51	70.04	-4.025	0.000	0.025
144.00	-1.15	-1.84	0.00	-5.76	0.00	5.76	986.43	493.22	998.92	495.91	72.57	-4.031	0.000	0.013
147.00	-0.11	-0.18	0.00	-0.25	0.00	0.25	976.94	488.47	973.65	483.36	75.10	-4.033	0.000	0.001
148.00	-0.04	-0.07	0.00	-0.07	0.00	0.07	973.74	486.87	965.25	479.19	75.94	-4.033	0.000	0.000
149.00	0.00	-0.07	0.00	0.00	0.00	0.00	970.51	485.25	956.86	475.02	76.79	-4.033	0.000	0.000

Wind Loading - Shaft

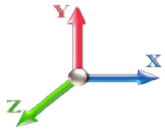
Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 22	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 28

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	4.256	4.68	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
3.00		1.00	0.70	4.256	4.68	0.00	1.200	1.574	3.00	11.533	13.84	64.8	259.8	872.1
6.00		1.00	0.70	4.256	4.68	0.00	1.200	1.687	3.00	11.491	13.79	64.6	276.7	883.3
9.00		1.00	0.70	4.256	4.68	0.00	1.200	1.756	3.00	11.427	13.71	64.2	286.0	887.0
12.00		1.00	0.70	4.256	4.68	0.00	1.200	1.808	3.00	11.355	13.63	63.8	292.1	887.4
15.00		1.00	0.70	4.256	4.68	0.00	1.200	1.848	3.00	11.277	13.53	63.4	296.2	885.9
18.00		1.00	0.70	4.256	4.68	0.00	1.200	1.882	3.00	11.196	13.43	62.9	299.2	883.2
21.00		1.00	0.70	4.256	4.68	0.00	1.200	1.912	3.00	11.112	13.33	62.4	301.2	879.6
24.00		1.00	0.70	4.256	4.68	0.00	1.200	1.937	3.00	11.026	13.23	61.9	302.6	875.3
27.00		1.00	0.70	4.256	4.68	0.00	1.200	1.960	3.00	10.940	13.13	61.5	303.5	870.6
30.00		1.00	0.70	4.260	4.69	0.00	1.200	1.981	3.00	10.852	13.02	61.0	304.0	865.4
33.00		1.00	0.72	4.377	4.81	0.00	1.200	2.000	3.00	10.763	12.92	62.2	304.1	859.9
36.00		1.00	0.74	4.487	4.94	0.00	1.200	2.017	3.00	10.673	12.81	63.2	303.9	854.1
39.00		1.00	0.76	4.591	5.05	0.00	1.200	2.034	3.00	10.583	12.70	64.1	303.5	848.0
42.00		1.00	0.77	4.689	5.16	0.00	1.200	2.049	3.00	10.493	12.59	64.9	302.9	841.7
45.00		1.00	0.79	4.783	5.26	0.00	1.200	2.063	3.00	10.401	12.48	65.7	302.1	835.3
48.00		1.00	0.80	4.872	5.36	0.00	1.200	2.076	3.00	10.310	12.37	66.3	301.1	828.6
48.50	Bot - Section 2	1.00	0.80	4.886	5.37	0.00	1.200	2.079	0.50	1.709	2.05	11.0	50.2	137.5
51.00		1.00	0.82	4.957	5.45	0.00	1.200	2.089	2.50	8.614	10.34	56.4	253.3	982.6
53.25	Top - Section 1	1.00	0.83	5.018	5.52	0.00	1.200	2.098	2.25	7.698	9.24	51.0	227.3	878.0
54.00		1.00	0.83	5.039	5.54	0.00	1.200	2.101	0.75	2.554	3.06	17.0	75.7	162.9
57.00		1.00	0.84	5.117	5.63	0.00	1.200	2.112	3.00	10.160	12.19	68.6	301.4	647.8
60.00		1.00	0.85	5.193	5.71	0.00	1.200	2.123	3.00	10.068	12.08	69.0	299.9	642.6
63.00		1.00	0.87	5.265	5.79	0.00	1.200	2.134	3.00	9.974	11.97	69.3	298.3	637.3
66.00		1.00	0.88	5.336	5.87	0.00	1.200	2.144	3.00	9.881	11.86	69.6	296.6	631.8
69.00		1.00	0.89	5.404	5.94	0.00	1.200	2.153	3.00	9.788	11.75	69.8	294.9	626.3
72.00		1.00	0.90	5.470	6.02	0.00	1.200	2.162	3.00	9.694	11.63	70.0	293.1	620.7
75.00		1.00	0.91	5.534	6.09	0.00	1.200	2.171	3.00	9.600	11.52	70.1	291.2	615.0
78.00		1.00	0.92	5.597	6.16	0.00	1.200	2.180	3.00	9.506	11.41	70.2	289.2	609.3
81.00		1.00	0.93	5.657	6.22	0.00	1.200	2.188	3.00	9.412	11.29	70.3	287.1	603.5
84.00		1.00	0.94	5.716	6.29	0.00	1.200	2.196	3.00	9.318	11.18	70.3	285.0	597.6
87.00		1.00	0.95	5.774	6.35	0.00	1.200	2.204	3.00	9.223	11.07	70.3	282.9	591.7
90.00		1.00	0.96	5.830	6.41	0.00	1.200	2.211	3.00	9.129	10.95	70.3	280.7	585.7
93.00		1.00	0.97	5.885	6.47	0.00	1.200	2.218	3.00	9.034	10.84	70.2	278.4	579.7
96.00		1.00	0.98	5.939	6.53	0.00	1.200	2.225	3.00	8.939	10.73	70.1	276.1	573.6
98.00	Bot - Section 3	1.00	0.98	5.974	6.57	0.00	1.200	2.230	2.00	5.906	7.09	46.6	183.0	379.3
99.00		1.00	0.99	5.991	6.59	0.00	1.200	2.232	1.00	2.969	3.56	23.5	92.3	264.0
102.00	Top - Section 2	1.00	0.99	6.043	6.65	0.00	1.200	2.239	3.00	8.845	10.61	70.5	274.5	785.2
105.00		1.00	1.00	6.093	6.70	0.00	1.200	2.245	3.00	8.750	10.50	70.4	272.1	490.0
108.00		1.00	1.01	6.142	6.76	0.00	1.200	2.252	3.00	8.655	10.39	70.2	269.6	484.7
109.00	Top - Section 3	1.00	1.01	6.158	6.77	0.00	1.200	2.254	1.00	2.863	3.44	23.3	89.6	160.6
111.00		1.00	1.02	6.190	6.81	0.00	1.200	2.258	2.00	5.696	6.83	46.5	178.1	319.2
114.00		1.00	1.03	6.238	6.86	0.00	1.200	2.264	3.00	8.464	10.16	69.7	264.5	473.9
117.00	Appurtenance(s)	1.00	1.03	6.284	6.91	0.00	1.200	2.270	3.00	8.369	10.04	69.4	262.0	468.5
120.00		1.00	1.04	6.330	6.96	0.00	1.200	2.276	3.00	8.274	9.93	69.1	259.3	463.1
123.00		1.00	1.05	6.375	7.01	0.00	1.200	2.281	3.00	8.178	9.81	68.8	256.7	457.6
126.00		1.00	1.06	6.419	7.06	0.00	1.200	2.287	3.00	8.083	9.70	68.5	254.0	452.1

Wind Loading - Shaft

Structure: CT13063-A-SBA | **Code:** EIA/TIA-222-G | 11/7/2019

Site Name: Middle Turnpike | **Exposure:** B

Height: 149.00 (ft) | **Crest Height:** 0.00

Base Elev: 0.000 (ft) | **Site Class:** D - Stiff Soil

Gh: 1.1 | **Topography:** 1 | **Struct Class:** II | Page: 23

Tower Engineering Solutions

129.00		1.00	1.06	6.462	7.11	0.00	1.200	2.292	3.00	7.987	9.58	68.1	251.3	446.6
132.00		1.00	1.07	6.504	7.15	0.00	1.200	2.297	3.00	7.891	9.47	67.8	248.6	441.0
135.00		1.00	1.08	6.546	7.20	0.00	1.200	2.303	3.00	7.796	9.35	67.4	245.8	435.4
138.00		1.00	1.08	6.588	7.25	0.00	1.200	2.308	3.00	7.700	9.24	67.0	243.0	429.8
141.00		1.00	1.09	6.628	7.29	0.00	1.200	2.313	3.00	7.604	9.13	66.5	240.2	424.2
144.00		1.00	1.10	6.668	7.34	0.00	1.200	2.317	3.00	7.508	9.01	66.1	237.4	418.5
147.00	Appurtenance(s)	1.00	1.10	6.708	7.38	0.00	1.200	2.322	3.00	7.413	8.90	65.6	234.5	412.8
148.00	Appurtenance(s)	1.00	1.11	6.721	7.39	0.00	1.200	2.324	1.00	2.449	2.94	21.7	77.8	136.7
149.00		1.00	1.11	6.734	7.41	0.00	1.200	2.325	1.00	2.439	2.93	21.7	77.5	136.0
								Totals:	**149.00**			**3,338.7**		**33,060.3**

Discrete Appurtenance Forces

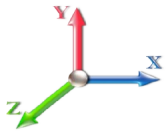
Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 24	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 28

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	148.00	KRY 112 144	3	6.721	7.393	0.56	0.80	1.75	73.37	0.000	0.000	12.95	0.00	0.00
2	147.00	AIR 21 B2A/B4P	3	6.708	7.378	0.69	0.80	15.65	1139.23	0.000	0.000	115.47	0.00	0.00
3	147.00	T-Arms	3	6.708	7.378	0.75	0.75	38.90	1446.68	0.000	0.000	287.02	0.00	0.00
4	117.00	AAHC	3	6.284	6.913	0.60	0.80	9.45	1127.31	0.000	0.000	65.35	0.00	0.00
5	117.00	NNVV-65B-R4	3	6.284	6.913	0.59	0.80	25.16	1195.44	0.000	0.000	173.88	0.00	0.00
6	117.00	UDS-NPL	2	6.284	6.913	0.56	0.75	37.90	2732.73	0.000	0.000	262.01	0.00	0.00
7	117.00	ALU 1900 Mhz RRUs	3	6.284	6.913	0.54	0.80	7.11	469.85	0.000	0.000	49.13	0.00	0.00
8	117.00	ALU 800 Mhz RRUs	6	6.284	6.913	0.54	0.80	12.79	832.16	0.000	0.000	88.42	0.00	0.00
9	117.00	ALU TD-RRH8x20-25	3	6.284	6.913	0.54	0.80	8.25	710.53	0.000	0.000	57.05	0.00	0.00
10	117.00	VHLP2.5-11	2	6.284	6.913	1.00	1.00	20.26	465.63	0.000	0.000	140.07	0.00	0.00
							Totals:		**10,192.93**			**1,251.36**		

Total Applied Force Summary

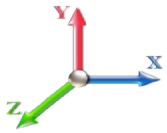
Structure:	CT13063-A-SBA		**Code:**	EIA/TIA-222-G	11/7/2019
Site Name:	Middle Turnpike		**Exposure:**	B	
Height:	149.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 25

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 28

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
3.00		64.79	931.40	0.00	0.00
6.00		64.55	942.63	0.00	0.00
9.00		64.20	946.32	0.00	0.00
12.00		63.79	946.72	0.00	0.00
15.00		63.35	945.23	0.00	0.00
18.00		62.90	942.52	0.00	0.00
21.00		62.43	938.93	0.00	0.00
24.00		61.95	934.68	0.00	0.00
27.00		61.46	929.91	0.00	0.00
30.00		61.02	924.73	0.00	0.00
33.00		62.19	919.21	0.00	0.00
36.00		63.22	913.39	0.00	0.00
39.00		64.14	907.33	0.00	0.00
42.00		64.95	901.06	0.00	0.00
45.00		65.67	894.60	0.00	0.00
48.00		66.30	887.97	0.00	0.00
48.50		11.02	147.42	0.00	0.00
51.00		56.36	1031.99	0.00	0.00
53.25		50.99	922.52	0.00	0.00
54.00		16.99	177.72	0.00	0.00
57.00		68.63	707.17	0.00	0.00
60.00		69.00	701.93	0.00	0.00
63.00		69.33	696.59	0.00	0.00
66.00		69.60	691.16	0.00	0.00
69.00		69.82	685.64	0.00	0.00
72.00		70.00	680.04	0.00	0.00
75.00		70.13	674.37	0.00	0.00
78.00		70.23	668.63	0.00	0.00
81.00		70.29	662.82	0.00	0.00
84.00		70.31	656.95	0.00	0.00
87.00		70.30	651.03	0.00	0.00
90.00		70.25	645.05	0.00	0.00
93.00		70.18	639.02	0.00	0.00
96.00		70.08	632.94	0.00	0.00
98.00		46.58	418.82	0.00	0.00
99.00		23.48	283.77	0.00	0.00
102.00		70.55	844.53	0.00	0.00
105.00		70.37	549.28	0.00	0.00
108.00		70.17	543.98	0.00	0.00
109.00		23.28	180.42	0.00	0.00
111.00		46.54	358.78	0.00	0.00
114.00		69.69	533.27	0.00	0.00
117.00	(22) attachments	905.34	8061.52	0.00	0.00
120.00		69.13	511.76	0.00	0.00
123.00		68.82	506.29	0.00	0.00
126.00		68.48	500.79	0.00	0.00

Total Applied Force Summary

Structure:	CT13063-A-SBA		**Code:**	EIA/TIA-222-G	11/7/2019
Site Name:	Middle Turnpike		**Exposure:**	B	
Height:	149.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 26

Tower Engineering Solutions

129.00		68.13	495.25	0.00	0.00
132.00		67.76	489.69	0.00	0.00
135.00		67.37	484.10	0.00	0.00
138.00		66.96	478.48	0.00	0.00
141.00		66.53	472.84	0.00	0.00
144.00		66.09	467.17	0.00	0.00
147.00	(6) attachments	468.12	3047.39	0.00	0.00
148.00	(3) attachments	34.68	210.02	0.00	0.00
149.00		21.67	136.02	0.00	0.00
	Totals:	**4,590.10**	**46,053.77**	**0.00**	**0.00**

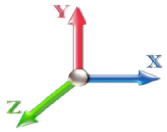
Calculated Forces

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 27	

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 28

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-46.05	-4.60	0.00	-451.39	0.00	451.39	3568.03	1784.01	6174.83	3065.44	0.00	0.000	0.000	0.160
3.00	-45.12	-4.56	0.00	-437.58	0.00	437.58	3545.62	1772.81	6079.18	3017.96	0.01	-0.034	0.000	0.158
6.00	-44.17	-4.53	0.00	-423.89	0.00	423.89	3523.01	1761.51	5983.92	2970.67	0.04	-0.068	0.000	0.155
9.00	-43.22	-4.49	0.00	-410.31	0.00	410.31	3500.21	1750.11	5889.06	2923.58	0.10	-0.101	0.000	0.153
12.00	-42.28	-4.44	0.00	-396.86	0.00	396.86	3477.22	1738.61	5794.62	2876.69	0.17	-0.135	0.000	0.150
15.00	-41.33	-4.40	0.00	-383.52	0.00	383.52	3454.04	1727.02	5700.59	2830.02	0.27	-0.168	0.000	0.147
18.00	-40.38	-4.36	0.00	-370.32	0.00	370.32	3430.67	1715.33	5607.00	2783.55	0.38	-0.201	0.000	0.145
21.00	-39.44	-4.32	0.00	-357.24	0.00	357.24	3407.10	1703.55	5513.84	2737.30	0.52	-0.234	0.000	0.142
24.00	-38.50	-4.27	0.00	-344.29	0.00	344.29	3383.34	1691.67	5421.14	2691.28	0.68	-0.267	0.000	0.139
27.00	-37.57	-4.23	0.00	-331.47	0.00	331.47	3359.39	1679.70	5328.89	2645.48	0.86	-0.300	0.000	0.136
30.00	-36.65	-4.18	0.00	-318.79	0.00	318.79	3335.25	1667.63	5237.10	2599.92	1.06	-0.332	0.000	0.134
33.00	-35.72	-4.13	0.00	-306.25	0.00	306.25	3310.92	1655.46	5145.79	2554.59	1.27	-0.364	0.000	0.131
36.00	-34.81	-4.08	0.00	-293.85	0.00	293.85	3286.39	1643.20	5054.97	2509.50	1.51	-0.395	0.000	0.128
39.00	-33.90	-4.03	0.00	-281.60	0.00	281.60	3261.67	1630.84	4964.64	2464.66	1.77	-0.426	0.000	0.125
42.00	-33.00	-3.98	0.00	-269.50	0.00	269.50	3236.76	1618.38	4874.82	2420.07	2.05	-0.457	0.000	0.122
45.00	-32.10	-3.92	0.00	-257.57	0.00	257.57	3211.66	1605.83	4785.51	2375.73	2.35	-0.487	0.000	0.118
48.00	-31.21	-3.86	0.00	-245.81	0.00	245.81	3182.27	1591.13	4690.68	2328.65	2.66	-0.517	0.000	0.115
48.50	-31.07	-3.85	0.00	-243.88	0.00	243.88	3176.56	1588.28	4673.77	2320.26	2.72	-0.523	0.000	0.115
51.00	-30.03	-3.80	0.00	-234.26	0.00	234.26	3148.00	1574.00	4589.69	2278.51	3.00	-0.547	0.000	0.112
53.25	-29.11	-3.75	0.00	-225.71	0.00	225.71	1846.69	923.35	2727.65	1354.12	3.26	-0.569	0.000	0.182
54.00	-28.93	-3.74	0.00	-222.90	0.00	222.90	1843.93	921.97	2716.18	1348.43	3.35	-0.576	0.000	0.181
57.00	-28.22	-3.68	0.00	-211.68	0.00	211.68	1832.78	916.39	2670.37	1325.68	3.72	-0.617	0.000	0.175
60.00	-27.52	-3.62	0.00	-200.64	0.00	200.64	1821.44	910.72	2624.63	1302.98	4.13	-0.657	0.000	0.169
63.00	-26.82	-3.57	0.00	-189.76	0.00	189.76	1809.91	904.95	2578.98	1280.32	4.55	-0.696	0.000	0.163
66.00	-26.13	-3.50	0.00	-179.07	0.00	179.07	1798.18	899.09	2533.44	1257.70	5.00	-0.734	0.000	0.157
69.00	-25.44	-3.44	0.00	-168.55	0.00	168.55	1786.27	893.13	2488.00	1235.15	5.47	-0.771	0.000	0.151
72.00	-24.76	-3.38	0.00	-158.23	0.00	158.23	1774.16	887.08	2442.68	1212.65	5.97	-0.807	0.000	0.144
75.00	-24.08	-3.31	0.00	-148.10	0.00	148.10	1761.85	880.93	2397.48	1190.21	6.49	-0.842	0.000	0.138
78.00	-23.41	-3.25	0.00	-138.16	0.00	138.16	1749.36	874.68	2352.43	1167.84	7.03	-0.876	0.000	0.132
81.00	-22.75	-3.18	0.00	-128.42	0.00	128.42	1736.67	868.34	2307.51	1145.55	7.59	-0.908	0.000	0.125
84.00	-22.09	-3.11	0.00	-118.89	0.00	118.89	1723.80	861.90	2262.76	1123.33	8.17	-0.940	0.000	0.119
87.00	-21.44	-3.04	0.00	-109.57	0.00	109.57	1710.73	855.36	2218.16	1101.19	8.77	-0.970	0.000	0.112
90.00	-20.80	-2.97	0.00	-100.45	0.00	100.45	1697.46	848.73	2173.74	1079.14	9.39	-0.999	0.000	0.105
93.00	-20.16	-2.90	0.00	-91.55	0.00	91.55	1684.01	842.00	2129.51	1057.18	10.02	-1.026	0.000	0.099
96.00	-19.53	-2.82	0.00	-82.86	0.00	82.86	1670.36	835.18	2085.46	1035.31	10.68	-1.051	0.000	0.092
98.00	-19.11	-2.77	0.00	-77.22	0.00	77.22	1661.16	830.58	2056.21	1020.79	11.12	-1.068	0.000	0.087
99.00	-18.82	-2.75	0.00	-74.45	0.00	74.45	1656.52	828.26	2041.62	1013.55	11.35	-1.076	0.000	0.085
102.00	-17.98	-2.67	0.00	-66.21	0.00	66.21	1099.11	549.56	1359.81	675.07	12.03	-1.098	0.000	0.114
105.00	-17.43	-2.59	0.00	-58.21	0.00	58.21	1092.31	546.16	1333.88	662.20	12.73	-1.119	0.000	0.104
108.00	-16.89	-2.52	0.00	-50.43	0.00	50.43	1085.32	542.66	1307.94	649.32	13.44	-1.142	0.000	0.093
109.00	-16.71	-2.49	0.00	-47.91	0.00	47.91	1082.95	541.47	1299.29	645.02	13.68	-1.150	0.000	0.090
109.00	-16.71	-2.49	0.00	-47.91	0.00	47.91	1082.95	541.47	1299.29	645.02	13.68	-1.150	0.000	0.090
111.00	-16.35	-2.44	0.00	-42.93	0.00	42.93	1078.13	539.07	1281.99	636.43	14.16	-1.164	0.000	0.083
114.00	-15.82	-2.37	0.00	-35.60	0.00	35.60	1070.76	535.38	1256.05	623.55	14.90	-1.182	0.000	0.072
117.00	-7.77	-1.30	0.00	-28.49	0.00	28.49	1063.19	531.60	1230.12	610.68	15.65	-1.198	0.000	0.054
120.00	-7.26	-1.22	0.00	-24.60	0.00	24.60	1055.43	527.72	1204.21	597.82	16.41	-1.212	0.000	0.048
123.00	-6.76	-1.14	0.00	-20.95	0.00	20.95	1047.48	523.74	1178.34	584.98	17.17	-1.224	0.000	0.042
126.00	-6.26	-1.06	0.00	-17.52	0.00	17.52	1039.33	519.67	1152.51	572.15	17.94	-1.235	0.000	0.037

Calculated Forces

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G
Site Name:	Middle Turnpike	**Exposure:**	B
Height:	149.00 (ft)	**Crest Height:**	0.00
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil
Gh:	1.1	**Topography:** 1	**Struct Class:** II

11/7/2019

Tower Engineering Solutions

129.00	-5.77	-0.98	0.00	-14.34	0.00	14.34	1031.00	515.50	1126.73	559.36	18.72	-1.244	0.000	0.031
132.00	-5.28	-0.91	0.00	-11.38	0.00	11.38	1022.47	511.23	1101.01	546.59	19.51	-1.252	0.000	0.026
135.00	-4.79	-0.83	0.00	-8.66	0.00	8.66	1013.75	506.87	1075.36	533.85	20.30	-1.258	0.000	0.021
138.00	-4.32	-0.75	0.00	-6.17	0.00	6.17	1004.83	502.42	1049.79	521.16	21.09	-1.263	0.000	0.016
141.00	-3.85	-0.68	0.00	-3.91	0.00	3.91	995.73	497.86	1024.31	508.51	21.88	-1.267	0.000	0.012
144.00	-3.38	-0.60	0.00	-1.89	0.00	1.89	986.43	493.22	998.92	495.91	22.68	-1.269	0.000	0.007
147.00	-0.34	-0.06	0.00	-0.09	0.00	0.09	976.94	488.47	973.65	483.36	23.48	-1.270	0.000	0.001
148.00	-0.14	-0.02	0.00	-0.02	0.00	0.02	973.74	486.87	965.25	479.19	23.74	-1.270	0.000	0.000
149.00	0.00	-0.02	0.00	0.00	0.00	0.00	970.51	485.25	956.86	475.02	24.01	-1.270	0.000	0.000

Seismic Segment Forces (Factored)

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 29	

Tower Engineering Solutions

Load Case:	1.2D + 1.0E					**Iterations**	25
Gust Response Factor	1.10			**Sds**	0.19	**Ss**	0.18
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.10	**S1**	0.06
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.35	**SA**	0.04	**Seismic Importance Factor**	1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
3.00		510.23	0.00	0.02	0.01	6.46	
6.00		505.52	0.00	0.04	0.02	10.24	
9.00		500.82	0.01	0.05	0.03	12.57	
12.00		496.11	0.01	0.06	0.03	14.02	
15.00		491.40	0.02	0.06	0.04	14.91	
18.00		486.69	0.03	0.07	0.04	15.44	
21.00		481.98	0.04	0.07	0.04	15.76	
24.00		477.27	0.05	0.07	0.04	15.95	
27.00		472.57	0.06	0.07	0.04	16.07	
30.00		467.86	0.08	0.07	0.04	16.15	
33.00		463.15	0.09	0.07	0.04	16.23	
36.00		458.44	0.11	0.07	0.04	16.30	
39.00		453.73	0.13	0.07	0.03	16.35	
42.00		449.02	0.15	0.07	0.03	16.37	
45.00		444.31	0.17	0.07	0.03	16.33	
48.00		439.61	0.20	0.06	0.02	16.18	
48.50	Bot - Section 2	72.81	0.20	0.06	0.02	2.68	
51.00		607.72	0.22	0.06	0.02	22.20	
53.25	Top - Section 1	542.29	0.24	0.06	0.02	19.52	
54.00		72.68	0.25	0.06	0.02	2.60	
57.00		288.74	0.28	0.05	0.01	9.91	
60.00		285.60	0.31	0.04	0.01	9.17	
63.00		282.46	0.34	0.04	0.01	8.16	
66.00		279.33	0.37	0.03	0.01	6.87	
69.00		276.19	0.41	0.02	0.01	5.29	
72.00		273.05	0.44	0.00	0.01	3.44	
75.00		269.91	0.48	-0.01	0.01	1.40	
78.00		266.77	0.52	-0.02	0.01	-0.74	
81.00		263.63	0.56	-0.04	0.01	-2.84	
84.00		260.49	0.60	-0.05	0.01	-4.77	
87.00		257.35	0.64	-0.07	0.02	-6.41	
90.00		254.21	0.69	-0.08	0.03	-7.66	
93.00		251.08	0.74	-0.10	0.04	-8.47	
96.00		247.94	0.78	-0.11	0.05	-8.82	
98.00	Bot - Section 3	163.55	0.82	-0.11	0.06	-5.85	
99.00		143.08	0.83	-0.12	0.06	-5.09	
102.00	Top - Section 2	425.57	0.89	-0.12	0.08	-14.31	
105.00		181.56	0.94	-0.12	0.10	-5.42	
108.00		179.21	0.99	-0.11	0.13	-4.33	
109.00	Top - Section 3	59.21	1.01	-0.11	0.14	-1.30	
111.00		117.64	1.05	-0.09	0.16	-1.96	
114.00		174.50	1.11	-0.07	0.19	-1.28	
117.00	Appurtenance(s)	2671.1	1.17	-0.03	0.23	10.22	
120.00		169.79	1.23	0.03	0.27	2.86	
123.00		167.44	1.29	0.10	0.33	5.30	

Seismic Segment Forces (Factored)

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 30	

126.00			165.08	1.35	0.20	0.38	7.98		
129.00			162.73	1.42	0.32	0.45	10.89		
132.00			160.37	1.48	0.46	0.52	14.01		
135.00			158.02	1.55	0.64	0.61	17.34		
138.00			155.66	1.62	0.85	0.70	20.87		
141.00			153.31	1.69	1.09	0.80	24.59		
144.00			150.96	1.77	1.39	0.92	28.48		
147.00	Appurtenance(s)		1249.6	1.84	1.72	1.05	273.60		
148.00	Appurtenance(s)		82.01	1.86	1.85	1.09	18.82		
149.00			48.75	1.89	1.98	1.14	11.71		
		Totals:	**19,590.1**				**694.0**	**Total Wind:**	**15,806.8**

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 31	

Tower Engineering Solutions

Load Case:	1.2D + 1.0E							**Iterations**	25
Gust Response Factor	1.10			**Sds**	0.19			**Ss**	0.18
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.10			**S1**	0.06
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.35	**SA**	0.04	**Seismic Importance Factor**			1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-26.31	-0.77	0.00	-78.84	0.00	78.84	3568.03	1784.01	6174.83	3065.44		0.00	0.00	0.033
3.00	-25.64	-0.77	0.00	-76.52	0.00	76.52	3545.62	1772.81	6079.18	3017.96		0.00	-0.01	0.033
6.00	-24.97	-0.76	0.00	-74.21	0.00	74.21	3523.01	1761.51	5983.92	2970.67		0.01	-0.01	0.032
9.00	-24.31	-0.75	0.00	-71.93	0.00	71.93	3500.21	1750.11	5889.06	2923.58		0.02	-0.02	0.032
12.00	-23.66	-0.74	0.00	-69.67	0.00	69.67	3477.22	1738.61	5794.62	2876.69		0.03	-0.02	0.031
15.00	-23.01	-0.73	0.00	-67.46	0.00	67.46	3454.04	1727.02	5700.59	2830.02		0.05	-0.03	0.030
18.00	-22.36	-0.71	0.00	-65.28	0.00	65.28	3430.67	1715.33	5607.00	2783.55		0.07	-0.04	0.030
21.00	-21.73	-0.70	0.00	-63.14	0.00	63.14	3407.10	1703.55	5513.84	2737.30		0.09	-0.04	0.029
24.00	-21.09	-0.68	0.00	-61.04	0.00	61.04	3383.34	1691.67	5421.14	2691.28		0.12	-0.05	0.029
27.00	-20.47	-0.67	0.00	-58.99	0.00	58.99	3359.39	1679.70	5328.89	2645.48		0.15	-0.05	0.028
30.00	-19.85	-0.66	0.00	-56.98	0.00	56.98	3335.25	1667.63	5237.10	2599.92		0.19	-0.06	0.028
33.00	-19.23	-0.64	0.00	-55.02	0.00	55.02	3310.92	1655.46	5145.79	2554.59		0.22	-0.06	0.027
36.00	-18.62	-0.63	0.00	-53.09	0.00	53.09	3286.39	1643.20	5054.97	2509.50		0.27	-0.07	0.027
39.00	-18.02	-0.61	0.00	-51.22	0.00	51.22	3261.67	1630.84	4964.64	2464.66		0.31	-0.08	0.026
42.00	-17.42	-0.59	0.00	-49.39	0.00	49.39	3236.76	1618.38	4874.82	2420.07		0.36	-0.08	0.026
45.00	-16.83	-0.58	0.00	-47.61	0.00	47.61	3211.66	1605.83	4785.51	2375.73		0.41	-0.09	0.025
48.00	-16.24	-0.56	0.00	-45.87	0.00	45.87	3182.27	1591.13	4690.68	2328.65		0.47	-0.09	0.025
48.50	-16.14	-0.56	0.00	-45.59	0.00	45.59	3176.56	1588.28	4673.77	2320.26		0.48	-0.09	0.025
51.00	-15.36	-0.54	0.00	-44.19	0.00	44.19	3148.00	1574.00	4589.69	2278.51		0.53	-0.10	0.024
53.25	-14.67	-0.52	0.00	-42.98	0.00	42.98	1846.69	923.35	2727.65	1354.12		0.58	-0.10	0.040
54.00	-14.57	-0.52	0.00	-42.59	0.00	42.59	1843.93	921.97	2716.18	1348.43		0.59	-0.10	0.039
57.00	-14.16	-0.51	0.00	-41.04	0.00	41.04	1832.78	916.39	2670.37	1325.68		0.66	-0.11	0.039
60.00	-13.76	-0.50	0.00	-39.52	0.00	39.52	1821.44	910.72	2624.63	1302.98		0.73	-0.12	0.038
63.00	-13.36	-0.49	0.00	-38.02	0.00	38.02	1809.91	904.95	2578.98	1280.32		0.81	-0.13	0.037
66.00	-12.97	-0.49	0.00	-36.54	0.00	36.54	1798.18	899.09	2533.44	1257.70		0.89	-0.13	0.036
69.00	-12.58	-0.48	0.00	-35.08	0.00	35.08	1786.27	893.13	2488.00	1235.15		0.98	-0.14	0.035
72.00	-12.19	-0.48	0.00	-33.64	0.00	33.64	1774.16	887.08	2442.68	1212.65		1.07	-0.15	0.035
75.00	-11.80	-0.48	0.00	-32.20	0.00	32.20	1761.85	880.93	2397.48	1190.21		1.17	-0.16	0.034
78.00	-11.43	-0.48	0.00	-30.76	0.00	30.76	1749.36	874.68	2352.43	1167.84		1.27	-0.16	0.033
81.00	-11.05	-0.48	0.00	-29.33	0.00	29.33	1736.67	868.34	2307.51	1145.55		1.37	-0.17	0.032
84.00	-10.68	-0.48	0.00	-27.89	0.00	27.89	1723.80	861.90	2262.76	1123.33		1.48	-0.18	0.031
87.00	-10.31	-0.48	0.00	-26.45	0.00	26.45	1710.73	855.36	2218.16	1101.19		1.60	-0.19	0.030
90.00	-9.94	-0.48	0.00	-25.02	0.00	25.02	1697.46	848.73	2173.74	1079.14		1.72	-0.19	0.029
93.00	-9.58	-0.48	0.00	-23.58	0.00	23.58	1684.01	842.00	2129.51	1057.18		1.84	-0.20	0.028
96.00	-9.23	-0.48	0.00	-22.14	0.00	22.14	1670.36	835.18	2085.46	1035.31		1.97	-0.21	0.027
98.00	-8.99	-0.48	0.00	-21.18	0.00	21.18	1661.16	830.58	2056.21	1020.79		2.06	-0.21	0.026
99.00	-8.80	-0.48	0.00	-20.70	0.00	20.70	1656.52	828.26	2041.62	1013.55		2.10	-0.21	0.026
102.00	-8.23	-0.48	0.00	-19.27	0.00	19.27	1099.11	549.56	1359.81	675.07		2.24	-0.22	0.036
105.00	-7.95	-0.48	0.00	-17.83	0.00	17.83	1092.31	546.16	1333.88	662.20		2.38	-0.23	0.034
108.00	-7.68	-0.48	0.00	-16.40	0.00	16.40	1085.32	542.66	1307.94	649.32		2.52	-0.23	0.032
109.00	-7.59	-0.48	0.00	-15.92	0.00	15.92	1082.95	541.47	1299.29	645.02		2.57	-0.24	0.032
109.00	-7.59	-0.48	0.00	-15.92	0.00	15.92	1082.95	541.47	1299.29	645.02		2.57	-0.24	0.032
111.00	-7.41	-0.48	0.00	-14.97	0.00	14.97	1078.13	539.07	1281.99	636.43		2.67	-0.24	0.030
114.00	-7.14	-0.48	0.00	-13.54	0.00	13.54	1070.76	535.38	1256.05	623.55		2.83	-0.25	0.028
117.00	-3.87	-0.45	0.00	-12.11	0.00	12.11	1063.19	531.60	1230.12	610.68		2.98	-0.25	0.023
120.00	-3.62	-0.45	0.00	-10.75	0.00	10.75	1055.43	527.72	1204.21	597.82		3.15	-0.26	0.021
123.00	-3.37	-0.44	0.00	-9.40	0.00	9.40	1047.48	523.74	1178.34	584.98		3.31	-0.27	0.019

Calculated Forces

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 32

Tower Engineering Solutions

126.00	-3.12	-0.43	0.00	-8.07	0.00	8.07	1039.33	519.67	1152.51	572.15	3.48	-0.27	0.017
129.00	-2.88	-0.42	0.00	-6.77	0.00	6.77	1031.00	515.50	1126.73	559.36	3.65	-0.27	0.015
132.00	-2.64	-0.41	0.00	-5.50	0.00	5.50	1022.47	511.23	1101.01	546.59	3.82	-0.28	0.013
135.00	-2.40	-0.39	0.00	-4.28	0.00	4.28	1013.75	506.87	1075.36	533.85	4.00	-0.28	0.010
138.00	-2.17	-0.37	0.00	-3.11	0.00	3.11	1004.83	502.42	1049.79	521.16	4.18	-0.28	0.008
141.00	-1.93	-0.34	0.00	-2.01	0.00	2.01	995.73	497.86	1024.31	508.51	4.36	-0.29	0.006
144.00	-1.70	-0.31	0.00	-0.98	0.00	0.98	986.43	493.22	998.92	495.91	4.54	-0.29	0.004
147.00	-0.16	-0.03	0.00	-0.04	0.00	0.04	976.94	488.47	973.65	483.36	4.72	-0.29	0.000
148.00	-0.06	-0.01	0.00	-0.01	0.00	0.01	973.74	486.87	965.25	479.19	4.78	-0.29	0.000
149.00	0.00	-0.01	0.00	0.00	0.00	0.00	970.51	485.25	956.86	475.02	4.84	-0.29	0.000

Seismic Segment Forces (Factored)

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 33	

IES Tower Engineering Solutions

Load Case:	0.9D + 1.0E							**Iterations**	25
Gust Response Factor	1.10				**Sds**	0.19		**Ss**	0.18
Dead Load Factor	0.90	**Seismic Load Factor**	1.00		**Sd1**	0.10		**S1**	0.06
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.35		**SA**	0.04	**Seismic Importance Factor**		1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
3.00		510.23	0.00	0.02	0.01	6.46	
6.00		505.52	0.00	0.04	0.02	10.24	
9.00		500.82	0.01	0.05	0.03	12.57	
12.00		496.11	0.01	0.06	0.03	14.02	
15.00		491.40	0.02	0.06	0.04	14.91	
18.00		486.69	0.03	0.07	0.04	15.44	
21.00		481.98	0.04	0.07	0.04	15.76	
24.00		477.27	0.05	0.07	0.04	15.95	
27.00		472.57	0.06	0.07	0.04	16.07	
30.00		467.86	0.08	0.07	0.04	16.15	
33.00		463.15	0.09	0.07	0.04	16.23	
36.00		458.44	0.11	0.07	0.04	16.30	
39.00		453.73	0.13	0.07	0.03	16.35	
42.00		449.02	0.15	0.07	0.03	16.37	
45.00		444.31	0.17	0.07	0.03	16.33	
48.00		439.61	0.20	0.06	0.02	16.18	
48.50	Bot - Section 2	72.81	0.20	0.06	0.02	2.68	
51.00		607.72	0.22	0.06	0.02	22.20	
53.25	Top - Section 1	542.29	0.24	0.06	0.02	19.52	
54.00		72.68	0.25	0.06	0.02	2.60	
57.00		288.74	0.28	0.05	0.01	9.91	
60.00		285.60	0.31	0.04	0.01	9.17	
63.00		282.46	0.34	0.04	0.01	8.16	
66.00		279.33	0.37	0.03	0.01	6.87	
69.00		276.19	0.41	0.02	0.01	5.29	
72.00		273.05	0.44	0.00	0.01	3.44	
75.00		269.91	0.48	-0.01	0.01	1.40	
78.00		266.77	0.52	-0.02	0.01	-0.74	
81.00		263.63	0.56	-0.04	0.01	-2.84	
84.00		260.49	0.60	-0.05	0.01	-4.77	
87.00		257.35	0.64	-0.07	0.02	-6.41	
90.00		254.21	0.69	-0.08	0.03	-7.66	
93.00		251.08	0.74	-0.10	0.04	-8.47	
96.00		247.94	0.78	-0.11	0.05	-8.82	
98.00	Bot - Section 3	163.55	0.82	-0.11	0.06	-5.85	
99.00		143.08	0.83	-0.12	0.06	-5.09	
102.00	Top - Section 2	425.57	0.89	-0.12	0.08	-14.31	
105.00		181.56	0.94	-0.12	0.10	-5.42	
108.00		179.21	0.99	-0.11	0.13	-4.33	
109.00	Top - Section 3	59.21	1.01	-0.11	0.14	-1.30	
111.00		117.64	1.05	-0.09	0.16	-1.96	
114.00		174.50	1.11	-0.07	0.19	-1.28	
117.00	Appurtenance(s)	2671.1	1.17	-0.03	0.23	10.22	
120.00		169.79	1.23	0.03	0.27	2.86	
123.00		167.44	1.29	0.10	0.33	5.30	

Seismic Segment Forces (Factored)

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 34	

126.00			165.08	1.35	0.20	0.38	7.98		
129.00			162.73	1.42	0.32	0.45	10.89		
132.00			160.37	1.48	0.46	0.52	14.01		
135.00			158.02	1.55	0.64	0.61	17.34		
138.00			155.66	1.62	0.85	0.70	20.87		
141.00			153.31	1.69	1.09	0.80	24.59		
144.00			150.96	1.77	1.39	0.92	28.48		
147.00	Appurtenance(s)		1249.6	1.84	1.72	1.05	273.60		
148.00	Appurtenance(s)		82.01	1.86	1.85	1.09	18.82		
149.00			48.75	1.89	1.98	1.14	11.71		
		Totals:	**19,590.1**				**694.0**	**Total Wind:**	**15,806.8**

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 35	

Tower Engineering Solutions

Load Case:	0.9D + 1.0E							**Iterations**	25
Gust Response Factor	1.10			**Sds**	0.19			**Ss**	0.18
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.10			**S1**	0.06
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.35	**SA**	0.04	**Seismic Importance Factor**			1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-19.73	-0.77	0.00	-77.98	0.00	77.98	3568.03	1784.01	6174.83	3065.44		0.00	0.00	0.031
3.00	-19.23	-0.77	0.00	-75.66	0.00	75.66	3545.62	1772.81	6079.18	3017.96		0.00	-0.01	0.030
6.00	-18.73	-0.76	0.00	-73.35	0.00	73.35	3523.01	1761.51	5983.92	2970.67		0.01	-0.01	0.030
9.00	-18.23	-0.75	0.00	-71.08	0.00	71.08	3500.21	1750.11	5889.06	2923.58		0.02	-0.02	0.030
12.00	-17.74	-0.74	0.00	-68.83	0.00	68.83	3477.22	1738.61	5794.62	2876.69		0.03	-0.02	0.029
15.00	-17.25	-0.72	0.00	-66.62	0.00	66.62	3454.04	1727.02	5700.59	2830.02		0.05	-0.03	0.029
18.00	-16.77	-0.71	0.00	-64.45	0.00	64.45	3430.67	1715.33	5607.00	2783.55		0.07	-0.03	0.028
21.00	-16.29	-0.69	0.00	-62.32	0.00	62.32	3407.10	1703.55	5513.84	2737.30		0.09	-0.04	0.028
24.00	-15.82	-0.68	0.00	-60.24	0.00	60.24	3383.34	1691.67	5421.14	2691.28		0.12	-0.05	0.027
27.00	-15.35	-0.66	0.00	-58.20	0.00	58.20	3359.39	1679.70	5328.89	2645.48		0.15	-0.05	0.027
30.00	-14.88	-0.65	0.00	-56.21	0.00	56.21	3335.25	1667.63	5237.10	2599.92		0.18	-0.06	0.026
33.00	-14.42	-0.63	0.00	-54.26	0.00	54.26	3310.92	1655.46	5145.79	2554.59		0.22	-0.06	0.026
36.00	-13.97	-0.62	0.00	-52.35	0.00	52.35	3286.39	1643.20	5054.97	2509.50		0.26	-0.07	0.025
39.00	-13.51	-0.60	0.00	-50.50	0.00	50.50	3261.67	1630.84	4964.64	2464.66		0.31	-0.07	0.025
42.00	-13.06	-0.59	0.00	-48.69	0.00	48.69	3236.76	1618.38	4874.82	2420.07		0.36	-0.08	0.024
45.00	-12.62	-0.57	0.00	-46.92	0.00	46.92	3211.66	1605.83	4785.51	2375.73		0.41	-0.09	0.024
48.00	-12.18	-0.56	0.00	-45.21	0.00	45.21	3182.27	1591.13	4690.68	2328.65		0.46	-0.09	0.023
48.50	-12.11	-0.55	0.00	-44.93	0.00	44.93	3176.56	1588.28	4673.77	2320.26		0.47	-0.09	0.023
51.00	-11.52	-0.53	0.00	-43.55	0.00	43.55	3148.00	1574.00	4589.69	2278.51		0.52	-0.10	0.023
53.25	-11.00	-0.51	0.00	-42.35	0.00	42.35	1846.69	923.35	2727.65	1354.12		0.57	-0.10	0.037
54.00	-10.92	-0.51	0.00	-41.97	0.00	41.97	1843.93	921.97	2716.18	1348.43		0.59	-0.10	0.037
57.00	-10.62	-0.50	0.00	-40.44	0.00	40.44	1832.78	916.39	2670.37	1325.68		0.65	-0.11	0.036
60.00	-10.32	-0.49	0.00	-38.94	0.00	38.94	1821.44	910.72	2624.63	1302.98		0.72	-0.12	0.036
63.00	-10.02	-0.48	0.00	-37.46	0.00	37.46	1809.91	904.95	2578.98	1280.32		0.80	-0.12	0.035
66.00	-9.72	-0.48	0.00	-36.01	0.00	36.01	1798.18	899.09	2533.44	1257.70		0.88	-0.13	0.034
69.00	-9.43	-0.47	0.00	-34.57	0.00	34.57	1786.27	893.13	2488.00	1235.15		0.97	-0.14	0.033
72.00	-9.14	-0.47	0.00	-33.15	0.00	33.15	1774.16	887.08	2442.68	1212.65		1.06	-0.15	0.032
75.00	-8.85	-0.47	0.00	-31.74	0.00	31.74	1761.85	880.93	2397.48	1190.21		1.15	-0.15	0.032
78.00	-8.57	-0.47	0.00	-30.33	0.00	30.33	1749.36	874.68	2352.43	1167.84		1.25	-0.16	0.031
81.00	-8.29	-0.47	0.00	-28.92	0.00	28.92	1736.67	868.34	2307.51	1145.55		1.36	-0.17	0.030
84.00	-8.01	-0.47	0.00	-27.51	0.00	27.51	1723.80	861.90	2262.76	1123.33		1.46	-0.18	0.029
87.00	-7.73	-0.47	0.00	-26.10	0.00	26.10	1710.73	855.36	2218.16	1101.19		1.58	-0.18	0.028
90.00	-7.46	-0.47	0.00	-24.69	0.00	24.69	1697.46	848.73	2173.74	1079.14		1.70	-0.19	0.027
93.00	-7.19	-0.47	0.00	-23.27	0.00	23.27	1684.01	842.00	2129.51	1057.18		1.82	-0.20	0.026
96.00	-6.92	-0.47	0.00	-21.86	0.00	21.86	1670.36	835.18	2085.46	1035.31		1.94	-0.20	0.025
98.00	-6.74	-0.47	0.00	-20.92	0.00	20.92	1661.16	830.58	2056.21	1020.79		2.03	-0.21	0.025
99.00	-6.60	-0.47	0.00	-20.45	0.00	20.45	1656.52	828.26	2041.62	1013.55		2.07	-0.21	0.024
102.00	-6.17	-0.47	0.00	-19.04	0.00	19.04	1099.11	549.56	1359.81	675.07		2.21	-0.22	0.034
105.00	-5.96	-0.47	0.00	-17.63	0.00	17.63	1092.31	546.16	1333.88	662.20		2.35	-0.22	0.032
108.00	-5.76	-0.47	0.00	-16.23	0.00	16.23	1085.32	542.66	1307.94	649.32		2.49	-0.23	0.030
109.00	-5.69	-0.47	0.00	-15.76	0.00	15.76	1082.95	541.47	1299.29	645.02		2.54	-0.23	0.030
109.00	-5.69	-0.47	0.00	-15.76	0.00	15.76	1082.95	541.47	1299.29	645.02		2.54	-0.23	0.030
111.00	-5.55	-0.47	0.00	-14.82	0.00	14.82	1078.13	539.07	1281.99	636.43		2.64	-0.24	0.028
114.00	-5.35	-0.47	0.00	-13.41	0.00	13.41	1070.76	535.38	1256.05	623.55		2.79	-0.24	0.027
117.00	-2.90	-0.45	0.00	-12.01	0.00	12.01	1063.19	531.60	1230.12	610.68		2.94	-0.25	0.022
120.00	-2.72	-0.45	0.00	-10.66	0.00	10.66	1055.43	527.72	1204.21	597.82		3.10	-0.26	0.020
123.00	-2.53	-0.44	0.00	-9.33	0.00	9.33	1047.48	523.74	1178.34	584.98		3.27	-0.26	0.018

Calculated Forces

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 36

Tower Engineering Solutions

126.00	-2.34	-0.43	0.00	-8.01	0.00	8.01	1039.33	519.67	1152.51	572.15	3.43	-0.27	0.016
129.00	-2.16	-0.42	0.00	-6.72	0.00	6.72	1031.00	515.50	1126.73	559.36	3.60	-0.27	0.014
132.00	-1.98	-0.40	0.00	-5.46	0.00	5.46	1022.47	511.23	1101.01	546.59	3.77	-0.27	0.012
135.00	-1.80	-0.39	0.00	-4.25	0.00	4.25	1013.75	506.87	1075.36	533.85	3.95	-0.28	0.010
138.00	-1.62	-0.36	0.00	-3.09	0.00	3.09	1004.83	502.42	1049.79	521.16	4.12	-0.28	0.008
141.00	-1.45	-0.34	0.00	-1.99	0.00	1.99	995.73	497.86	1024.31	508.51	4.30	-0.28	0.005
144.00	-1.28	-0.31	0.00	-0.97	0.00	0.97	986.43	493.22	998.92	495.91	4.48	-0.28	0.003
147.00	-0.12	-0.03	0.00	-0.04	0.00	0.04	976.94	488.47	973.65	483.36	4.65	-0.28	0.000
148.00	-0.04	-0.01	0.00	-0.01	0.00	0.01	973.74	486.87	965.25	479.19	4.71	-0.28	0.000
149.00	0.00	-0.01	0.00	0.00	0.00	0.00	970.51	485.25	956.86	475.02	4.77	-0.28	0.000

Wind Loading - Shaft

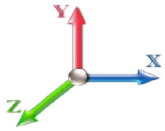
Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 37	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 27

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.70	6.129	6.74	180.63	0.750	0.000	0.00	0.000	0.00	0.0	0.0	0.0
3.00		1.00	0.70	6.129	6.74	178.99	0.750	0.000	3.00	10.746	8.06	54.3	0.0	510.2
6.00		1.00	0.70	6.129	6.74	177.34	0.750	0.000	3.00	10.648	7.99	53.8	0.0	505.5
9.00		1.00	0.70	6.129	6.74	175.70	0.750	0.000	3.00	10.549	7.91	53.3	0.0	500.8
12.00		1.00	0.70	6.129	6.74	174.06	0.750	0.000	3.00	10.451	7.84	52.8	0.0	496.1
15.00		1.00	0.70	6.129	6.74	172.41	0.750	0.000	3.00	10.353	7.76	52.3	0.0	491.4
18.00		1.00	0.70	6.129	6.74	170.77	0.750	0.000	3.00	10.254	7.69	51.8	0.0	486.7
21.00		1.00	0.70	6.129	6.74	169.12	0.750	0.000	3.00	10.156	7.62	51.4	0.0	482.0
24.00		1.00	0.70	6.129	6.74	167.48	0.750	0.000	3.00	10.058	7.54	50.9	0.0	477.3
27.00		1.00	0.70	6.129	6.74	165.83	0.750	0.000	3.00	9.960	7.47	50.4	0.0	472.6
30.00		1.00	0.70	6.134	6.75	164.26	0.750	0.000	3.00	9.861	7.40	49.9	0.0	467.9
33.00		1.00	0.72	6.303	6.93	164.84	0.750	0.000	3.00	9.763	7.32	50.8	0.0	463.1
36.00		1.00	0.74	6.462	7.11	165.21	0.750	0.000	3.00	9.665	7.25	51.5	0.0	458.4
39.00		1.00	0.76	6.611	7.27	165.41	0.750	0.000	3.00	9.566	7.17	52.2	0.0	453.7
42.00		1.00	0.77	6.753	7.43	165.44	0.750	0.000	3.00	9.468	7.10	52.7	0.0	449.0
45.00		1.00	0.79	6.887	7.58	165.34	0.750	0.000	3.00	9.370	7.03	53.2	0.0	444.3
48.00		1.00	0.80	7.015	7.72	165.11	0.750	0.000	3.00	9.272	6.95	53.7	0.0	439.6
48.50	Bot - Section 2	1.00	0.80	7.036	7.74	165.06	0.750	0.000	0.50	1.536	1.15	8.9	0.0	72.8
51.00		1.00	0.82	7.138	7.85	164.77	0.750	0.000	2.50	7.744	5.81	45.6	0.0	607.7
53.25	Top - Section 1	1.00	0.83	7.227	7.95	164.45	0.750	0.000	2.25	6.911	5.18	41.2	0.0	542.3
54.00		1.00	0.83	7.255	7.98	166.65	0.750	0.000	0.75	2.291	1.72	13.7	0.0	72.7
57.00		1.00	0.84	7.368	8.11	166.14	0.750	0.000	3.00	9.104	6.83	55.3	0.0	288.7
60.00		1.00	0.85	7.477	8.22	165.55	0.750	0.000	3.00	9.006	6.75	55.6	0.0	285.6
63.00		1.00	0.87	7.582	8.34	164.87	0.750	0.000	3.00	8.908	6.68	55.7	0.0	282.5
66.00		1.00	0.88	7.684	8.45	164.13	0.750	0.000	3.00	8.809	6.61	55.8	0.0	279.3
69.00		1.00	0.89	7.782	8.56	163.33	0.750	0.000	3.00	8.711	6.53	55.9	0.0	276.2
72.00		1.00	0.90	7.877	8.66	162.46	0.750	0.000	3.00	8.613	6.46	56.0	0.0	273.0
75.00		1.00	0.91	7.969	8.77	161.53	0.750	0.000	3.00	8.515	6.39	56.0	0.0	269.9
78.00		1.00	0.92	8.059	8.87	160.55	0.750	0.000	3.00	8.416	6.31	56.0	0.0	266.8
81.00		1.00	0.93	8.147	8.96	159.53	0.750	0.000	3.00	8.318	6.24	55.9	0.0	263.6
84.00		1.00	0.94	8.232	9.05	158.45	0.750	0.000	3.00	8.220	6.16	55.8	0.0	260.5
87.00		1.00	0.95	8.315	9.15	157.33	0.750	0.000	3.00	8.121	6.09	55.7	0.0	257.4
90.00		1.00	0.96	8.396	9.24	156.17	0.750	0.000	3.00	8.023	6.02	55.6	0.0	254.2
93.00		1.00	0.97	8.475	9.32	154.97	0.750	0.000	3.00	7.925	5.94	55.4	0.0	251.1
96.00		1.00	0.98	8.552	9.41	153.73	0.750	0.000	3.00	7.827	5.87	55.2	0.0	247.9
98.00	Bot - Section 3	1.00	0.98	8.602	9.46	152.89	0.750	0.000	2.00	5.163	3.87	36.6	0.0	163.5
99.00		1.00	0.99	8.627	9.49	152.46	0.750	0.000	1.00	2.597	1.95	18.5	0.0	143.1
102.00	Top - Section 2	1.00	0.99	8.701	9.57	151.15	0.750	0.000	3.00	7.726	5.79	55.5	0.0	425.6
105.00		1.00	1.00	8.774	9.65	151.72	0.750	0.000	3.00	7.627	5.72	55.2	0.0	181.6
108.00		1.00	1.01	8.845	9.73	150.36	0.750	0.000	3.00	7.529	5.65	54.9	0.0	179.2
109.00	Top - Section 3	1.00	1.01	8.868	9.75	149.90	0.750	0.000	1.00	2.488	1.87	18.2	0.0	59.2
111.00		1.00	1.02	8.914	9.81	148.97	0.750	0.000	2.00	4.943	3.71	36.4	0.0	117.6
114.00		1.00	1.03	8.982	9.88	147.54	0.750	0.000	3.00	7.332	5.50	54.3	0.0	174.5
117.00	Appurtenance(s)	1.00	1.03	9.049	9.95	146.09	0.750	0.000	3.00	7.234	5.43	54.0	0.0	172.1
120.00		1.00	1.04	9.115	10.03	144.62	0.750	0.000	3.00	7.136	5.35	53.7	0.0	169.8
123.00		1.00	1.05	9.179	10.10	143.12	0.750	0.000	3.00	7.038	5.28	53.3	0.0	167.4
126.00		1.00	1.06	9.243	10.17	141.59	0.750	0.000	3.00	6.939	5.20	52.9	0.0	165.1

Wind Loading - Shaft

Structure: CT13063-A-SBA | **Code:** EIA/TIA-222-G | 11/7/2019

Site Name: Middle Turnpike | **Exposure:** B

Height: 149.00 (ft) | **Crest Height:** 0.00

Base Elev: 0.000 (ft) | **Site Class:** D - Stiff Soil

Gh: 1.1 | **Topography:** 1 | **Struct Class:** II | Page: 38

129.00		1.00	1.06	9.305	10.24	140.04	0.750	0.000	3.00	6.841	5.13	52.5	0.0	162.7
132.00		1.00	1.07	9.366	10.30	138.47	0.750	0.000	3.00	6.743	5.06	52.1	0.0	160.4
135.00		1.00	1.08	9.427	10.37	136.87	0.750	0.000	3.00	6.645	4.98	51.7	0.0	158.0
138.00		1.00	1.08	9.486	10.43	135.26	0.750	0.000	3.00	6.546	4.91	51.2	0.0	155.7
141.00		1.00	1.09	9.545	10.50	133.62	0.750	0.000	3.00	6.448	4.84	50.8	0.0	153.3
144.00		1.00	1.10	9.602	10.56	131.97	0.750	0.000	3.00	6.350	4.76	50.3	0.0	151.0
147.00	Appurtenance(s)	1.00	1.10	9.659	10.62	130.29	0.750	0.000	3.00	6.251	4.69	49.8	0.0	148.6
148.00	Appurtenance(s)	1.00	1.11	9.678	10.65	129.73	0.750	0.000	1.00	2.062	1.55	16.5	0.0	49.0
149.00		1.00	1.11	9.696	10.67	129.16	0.750	0.000	1.00	2.051	1.54	16.4	0.0	48.7
								Totals:	**149.00**			**2,659.3**		**15,957.1**

Discrete Appurtenance Forces

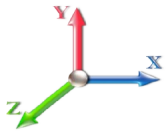
Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 39	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 27

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	148.00	KRY 112 144	3	9.678	10.645	0.56	0.80	0.69	33.00	0.000	0.000	7.33	0.00	0.00
2	147.00	AIR 21 B2A/B4P	3	9.659	10.625	0.69	0.80	13.00	351.00	0.000	0.000	138.16	0.00	0.00
3	147.00	T-Arms	3	9.659	10.625	0.75	0.75	18.00	750.00	0.000	0.000	191.25	0.00	0.00
4	117.00	AAHC	3	9.049	9.954	0.60	0.80	7.56	310.80	0.000	0.000	75.25	0.00	0.00
5	117.00	NNVV-65B-R4	3	9.049	9.954	0.59	0.80	21.79	232.20	0.000	0.000	216.91	0.00	0.00
6	117.00	UDS-NPL	2	9.049	9.954	0.56	0.75	14.39	1152.00	0.000	0.000	143.23	0.00	0.00
7	117.00	ALU 1900 Mhz RRUs	3	9.049	9.954	0.54	0.80	4.45	180.00	0.000	0.000	44.34	0.00	0.00
8	117.00	ALU 800 Mhz RRUs	6	9.049	9.954	0.54	0.80	8.01	318.00	0.000	0.000	79.71	0.00	0.00
9	117.00	ALU TD-RRH8x20-25	3	9.049	9.954	0.54	0.80	6.51	210.00	0.000	0.000	64.82	0.00	0.00
10	117.00	VHLP2.5-11	2	9.049	9.954	1.00	1.00	16.04	96.00	0.000	0.000	159.66	0.00	0.00
							Totals:		**3,633.00**			**1,120.66**		

Total Applied Force Summary

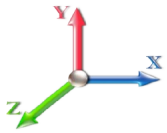
Structure:	CT13063-A-SBA		**Code:**	EIA/TIA-222-G	11/7/2019
Site Name:	Middle Turnpike		**Exposure:**	B	
Height:	149.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 40

IES Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 27

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
3.00		54.33	559.67	0.00	0.00
6.00		53.84	554.96	0.00	0.00
9.00		53.34	550.26	0.00	0.00
12.00		52.84	545.55	0.00	0.00
15.00		52.34	540.84	0.00	0.00
18.00		51.85	536.13	0.00	0.00
21.00		51.35	531.42	0.00	0.00
24.00		50.85	526.71	0.00	0.00
27.00		50.36	522.01	0.00	0.00
30.00		49.90	517.30	0.00	0.00
33.00		50.77	512.59	0.00	0.00
36.00		51.52	507.88	0.00	0.00
39.00		52.18	503.17	0.00	0.00
42.00		52.75	498.46	0.00	0.00
45.00		53.24	493.75	0.00	0.00
48.00		53.66	489.05	0.00	0.00
48.50		8.91	81.05	0.00	0.00
51.00		45.60	648.92	0.00	0.00
53.25		41.20	579.37	0.00	0.00
54.00		13.72	85.04	0.00	0.00
57.00		55.34	338.18	0.00	0.00
60.00		55.55	335.04	0.00	0.00
63.00		55.72	331.90	0.00	0.00
66.00		55.84	328.77	0.00	0.00
69.00		55.93	325.63	0.00	0.00
72.00		55.97	322.49	0.00	0.00
75.00		55.98	319.35	0.00	0.00
78.00		55.96	316.21	0.00	0.00
81.00		55.90	313.07	0.00	0.00
84.00		55.82	309.93	0.00	0.00
87.00		55.71	306.79	0.00	0.00
90.00		55.57	303.65	0.00	0.00
93.00		55.41	300.52	0.00	0.00
96.00		55.22	297.38	0.00	0.00
98.00		36.64	196.51	0.00	0.00
99.00		18.48	159.56	0.00	0.00
102.00		55.46	475.01	0.00	0.00
105.00		55.21	231.00	0.00	0.00
108.00		54.94	228.65	0.00	0.00
109.00		18.20	75.69	0.00	0.00
111.00		36.35	150.60	0.00	0.00
114.00		54.34	223.94	0.00	0.00
117.00	(22) attachments	837.93	2720.58	0.00	0.00
120.00		53.66	210.35	0.00	0.00
123.00		53.30	208.00	0.00	0.00
126.00		52.91	205.64	0.00	0.00

Total Applied Force Summary

Structure:	CT13063-A-SBA		**Code:**	EIA/TIA-222-G	11/7/2019
Site Name:	Middle Turnpike		**Exposure:**	B	
Height:	149.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 41

Tower Engineering Solutions

129.00		52.52	203.29	0.00	0.00
132.00		52.10	200.93	0.00	0.00
135.00		51.67	198.58	0.00	0.00
138.00		51.23	196.22	0.00	0.00
141.00		50.77	193.87	0.00	0.00
144.00		50.30	191.52	0.00	0.00
147.00	(6) attachments	379.22	1290.16	0.00	0.00
148.00	(3) attachments	23.80	82.01	0.00	0.00
149.00		16.41	48.75	0.00	0.00
	Totals:	**3,779.93**	**21,923.90**	**0.00**	**0.00**

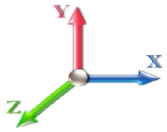
Calculated Forces

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 42	

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 27

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-21.92	-3.78	0.00	-354.29	0.00	354.29	3568.03	1784.01	6174.83	3065.44	0.00	0.000	0.000	0.122
3.00	-21.36	-3.74	0.00	-342.94	0.00	342.94	3545.62	1772.81	6079.18	3017.96	0.01	-0.027	0.000	0.120
6.00	-20.80	-3.69	0.00	-331.72	0.00	331.72	3523.01	1761.51	5983.92	2970.67	0.03	-0.053	0.000	0.118
9.00	-20.25	-3.65	0.00	-320.64	0.00	320.64	3500.21	1750.11	5889.06	2923.58	0.08	-0.079	0.000	0.115
12.00	-19.71	-3.61	0.00	-309.69	0.00	309.69	3477.22	1738.61	5794.62	2876.69	0.13	-0.106	0.000	0.113
15.00	-19.16	-3.56	0.00	-298.87	0.00	298.87	3454.04	1727.02	5700.59	2830.02	0.21	-0.132	0.000	0.111
18.00	-18.63	-3.52	0.00	-288.19	0.00	288.19	3430.67	1715.33	5607.00	2783.55	0.30	-0.157	0.000	0.109
21.00	-18.09	-3.47	0.00	-277.64	0.00	277.64	3407.10	1703.55	5513.84	2737.30	0.41	-0.183	0.000	0.107
24.00	-17.57	-3.43	0.00	-267.23	0.00	267.23	3383.34	1691.67	5421.14	2691.28	0.53	-0.208	0.000	0.104
27.00	-17.04	-3.38	0.00	-256.95	0.00	256.95	3359.39	1679.70	5328.89	2645.48	0.67	-0.234	0.000	0.102
30.00	-16.52	-3.34	0.00	-246.81	0.00	246.81	3335.25	1667.63	5237.10	2599.92	0.82	-0.259	0.000	0.100
33.00	-16.01	-3.29	0.00	-236.80	0.00	236.80	3310.92	1655.46	5145.79	2554.59	0.99	-0.283	0.000	0.098
36.00	-15.50	-3.24	0.00	-226.93	0.00	226.93	3286.39	1643.20	5054.97	2509.50	1.18	-0.308	0.000	0.095
39.00	-15.00	-3.19	0.00	-217.21	0.00	217.21	3261.67	1630.84	4964.64	2464.66	1.38	-0.332	0.000	0.093
42.00	-14.50	-3.14	0.00	-207.63	0.00	207.63	3236.76	1618.38	4874.82	2420.07	1.60	-0.355	0.000	0.090
45.00	-14.00	-3.09	0.00	-198.20	0.00	198.20	3211.66	1605.83	4785.51	2375.73	1.83	-0.379	0.000	0.088
48.00	-13.51	-3.04	0.00	-188.92	0.00	188.92	3182.27	1591.13	4690.68	2328.65	2.07	-0.402	0.000	0.085
48.50	-13.43	-3.03	0.00	-187.40	0.00	187.40	3176.56	1588.28	4673.77	2320.26	2.12	-0.406	0.000	0.085
51.00	-12.78	-2.99	0.00	-179.82	0.00	179.82	3148.00	1574.00	4589.69	2278.51	2.33	-0.425	0.000	0.083
53.25	-12.20	-2.94	0.00	-173.10	0.00	173.10	1846.69	923.35	2727.65	1354.12	2.54	-0.441	0.000	0.134
54.00	-12.12	-2.93	0.00	-170.89	0.00	170.89	1843.93	921.97	2716.18	1348.43	2.61	-0.447	0.000	0.133
57.00	-11.78	-2.88	0.00	-162.10	0.00	162.10	1832.78	916.39	2670.37	1325.68	2.90	-0.478	0.000	0.129
60.00	-11.44	-2.83	0.00	-153.45	0.00	153.45	1821.44	910.72	2624.63	1302.98	3.21	-0.509	0.000	0.124
63.00	-11.11	-2.78	0.00	-144.97	0.00	144.97	1809.91	904.95	2578.98	1280.32	3.54	-0.538	0.000	0.119
66.00	-10.78	-2.72	0.00	-136.65	0.00	136.65	1798.18	899.09	2533.44	1257.70	3.89	-0.567	0.000	0.115
69.00	-10.45	-2.67	0.00	-128.48	0.00	128.48	1786.27	893.13	2488.00	1235.15	4.25	-0.596	0.000	0.110
72.00	-10.13	-2.61	0.00	-120.48	0.00	120.48	1774.16	887.08	2442.68	1212.65	4.64	-0.623	0.000	0.105
75.00	-9.81	-2.56	0.00	-112.64	0.00	112.64	1761.85	880.93	2397.48	1190.21	5.04	-0.650	0.000	0.100
78.00	-9.49	-2.50	0.00	-104.97	0.00	104.97	1749.36	874.68	2352.43	1167.84	5.45	-0.676	0.000	0.095
81.00	-9.18	-2.45	0.00	-97.46	0.00	97.46	1736.67	868.34	2307.51	1145.55	5.88	-0.700	0.000	0.090
84.00	-8.87	-2.39	0.00	-90.12	0.00	90.12	1723.80	861.90	2262.76	1123.33	6.33	-0.724	0.000	0.085
87.00	-8.56	-2.33	0.00	-82.95	0.00	82.95	1710.73	855.36	2218.16	1101.19	6.79	-0.747	0.000	0.080
90.00	-8.26	-2.28	0.00	-75.95	0.00	75.95	1697.46	848.73	2173.74	1079.14	7.27	-0.769	0.000	0.075
93.00	-7.96	-2.22	0.00	-69.11	0.00	69.11	1684.01	842.00	2129.51	1057.18	7.76	-0.789	0.000	0.070
96.00	-7.66	-2.16	0.00	-62.45	0.00	62.45	1670.36	835.18	2085.46	1035.31	8.26	-0.809	0.000	0.065
98.00	-7.46	-2.13	0.00	-58.12	0.00	58.12	1661.16	830.58	2056.21	1020.79	8.60	-0.821	0.000	0.061
99.00	-7.30	-2.11	0.00	-56.00	0.00	56.00	1656.52	828.26	2041.62	1013.55	8.78	-0.827	0.000	0.060
102.00	-6.83	-2.05	0.00	-49.68	0.00	49.68	1099.11	549.56	1359.81	675.07	9.30	-0.844	0.000	0.080
105.00	-6.60	-1.99	0.00	-43.54	0.00	43.54	1092.31	546.16	1333.88	662.20	9.84	-0.859	0.000	0.072
108.00	-6.37	-1.93	0.00	-37.57	0.00	37.57	1085.32	542.66	1307.94	649.32	10.38	-0.877	0.000	0.064
109.00	-6.30	-1.91	0.00	-35.64	0.00	35.64	1082.95	541.47	1299.29	645.02	10.57	-0.882	0.000	0.061
109.00	-6.30	-1.91	0.00	-35.64	0.00	35.64	1082.95	541.47	1299.29	645.02	10.57	-0.882	0.000	0.061
111.00	-6.15	-1.88	0.00	-31.82	0.00	31.82	1078.13	539.07	1281.99	636.43	10.94	-0.893	0.000	0.056
114.00	-5.92	-1.82	0.00	-26.19	0.00	26.19	1070.76	535.38	1256.05	623.55	11.51	-0.906	0.000	0.048
117.00	-3.21	-0.94	0.00	-20.73	0.00	20.73	1063.19	531.60	1230.12	610.68	12.08	-0.918	0.000	0.037
120.00	-3.00	-0.88	0.00	-17.91	0.00	17.91	1055.43	527.72	1204.21	597.82	12.66	-0.928	0.000	0.033
123.00	-2.80	-0.83	0.00	-15.26	0.00	15.26	1047.48	523.74	1178.34	584.98	13.25	-0.937	0.000	0.029
126.00	-2.59	-0.77	0.00	-12.78	0.00	12.78	1039.33	519.67	1152.51	572.15	13.84	-0.945	0.000	0.025

Calculated Forces

Structure:	CT13063-A-SBA	**Code:**	EIA/TIA-222-G	11/7/2019	
Site Name:	Middle Turnpike	**Exposure:**	B		
Height:	149.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 43

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129.00	-2.39	-0.72	0.00	-10.47	0.00	10.47	1031.00	515.50	1126.73	559.36	14.43	-0.952	0.000	0.021
132.00	-2.19	-0.66	0.00	-8.33	0.00	8.33	1022.47	511.23	1101.01	546.59	15.03	-0.957	0.000	0.017
135.00	-1.99	-0.61	0.00	-6.35	0.00	6.35	1013.75	506.87	1075.36	533.85	15.64	-0.962	0.000	0.014
138.00	-1.80	-0.55	0.00	-4.53	0.00	4.53	1004.83	502.42	1049.79	521.16	16.24	-0.966	0.000	0.010
141.00	-1.60	-0.50	0.00	-2.88	0.00	2.88	995.73	497.86	1024.31	508.51	16.85	-0.968	0.000	0.007
144.00	-1.41	-0.44	0.00	-1.39	0.00	1.39	986.43	493.22	998.92	495.91	17.46	-0.970	0.000	0.004
147.00	-0.13	-0.04	0.00	-0.06	0.00	0.06	976.94	488.47	973.65	483.36	18.07	-0.970	0.000	0.000
148.00	-0.05	-0.02	0.00	-0.02	0.00	0.02	973.74	486.87	965.25	479.19	18.27	-0.970	0.000	0.000
149.00	0.00	-0.02	0.00	0.00	0.00	0.00	970.51	485.25	956.86	475.02	18.47	-0.970	0.000	0.000

Final Analysis Summary

Structure:	CT13063-A-SBA		**Code:**	EIA/TIA-222-G	11/7/2019
Site Name:	Middle Turnpike		**Exposure:**	B	
Height:	149.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 44

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Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.6W 97 mph Wind	15.8	0.00	26.29	0.00	0.00	1490.87
0.9D + 1.6W 97 mph Wind	15.8	0.00	19.72	0.00	0.00	1475.89
1.2D + 1.0Di + 1.0Wi 50 mph Wind	4.6	0.00	46.05	0.00	0.00	451.39
1.2D + 1.0E	0.8	0.00	26.31	0.00	0.00	78.84
0.9D + 1.0E	0.8	0.00	19.73	0.00	0.00	77.98
1.0D + 1.0W 60 mph Wind	3.8	0.00	21.92	0.00	0.00	354.29

Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.6W 97 mph Wind	-14.27	-12.39	0.00	-730.13	0.00	-730.13	1846.69	923.35	2727.65	1354.12	53.25	0.547
0.9D + 1.6W 97 mph Wind	-10.61	-12.26	0.00	-719.60	0.00	-719.60	1846.69	923.35	2727.65	1354.12	53.25	0.537
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-29.11	-3.75	0.00	-225.71	0.00	-225.71	1846.69	923.35	2727.65	1354.12	53.25	0.182
1.2D + 1.0E	-14.67	-0.52	0.00	-42.98	0.00	-42.98	1846.69	923.35	2727.65	1354.12	53.25	0.040
0.9D + 1.0E	-11.00	-0.51	0.00	-42.35	0.00	-42.35	1846.69	923.35	2727.65	1354.12	53.25	0.037
1.0D + 1.0W 60 mph Wind	-12.20	-2.94	0.00	-173.10	0.00	-173.10	1846.69	923.35	2727.65	1354.12	53.25	0.134

Base Plate Summary

Structure:	CT13063-A-SB		**Code:**	EIA/TIA-222-G	11/7/2019
Site Name:	Middle Turnpike		**Exposure:**	B	
Height:	149.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 45

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Reactions	
Original Design	
Moment (kip-ft):	1715.83
Axial (kip):	37.14
Shear (kip):	19.57
Analysis	
Moment (kip-ft):	1490.87
Axial (kip):	46.05
Shear (kip):	15.83
Moment Design %:	86.89

Base Plate	
Yield (ksi):	60.00
Width (in):	48.00
Style:	Clipped
Polygon Sides:	0.00
Clip Length (in):	8.00
Effective Len (in):	10.06
Moment (kip-in):	403.73
Allow Stress (ksi):	81.00
Applied Stress (ksi):	0.00
Stress Ratio:	0.39

Anchor Bolts	
Bolt Circle:	48.75
Number Bolts:	12.00
Bolt Type:	2.25" 18J
Bolt Diameter (in):	2.25
Yield (ksi):	75.00
Ultimate (ksi):	100.00
Arrangement:	Clustered
Cluster Dist (in):	6.00
Start Angle (deg):	45.00
Compression	
Force (kip):	126.17
Allowable (kip):	260.00
Ratio:	0.50
Tension	
Force (kip):	118.49
Allowable (kip):	260.00
Ratio:	0.47

Monopole Mat Foundation Design

				Date
				11/7/2019
Customer Name:	Sprint Nextel	**EIA/TIA Standard:**	EIA-222-G
Site Name:		**Structure Height (Ft.):**	149
Site Number:	CT13063-A-SBA	**Engineer Name:**	T. Alajaj
Engr. Number:	89244	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

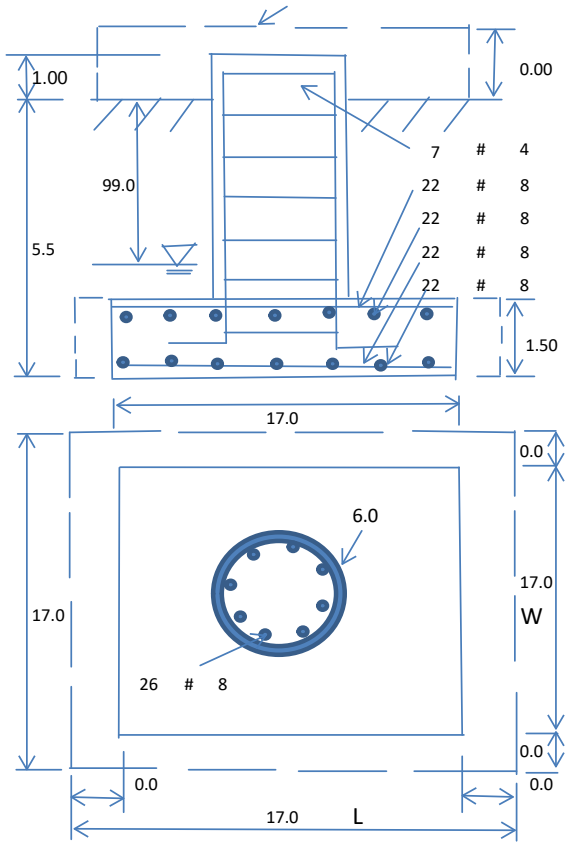
Analysis or Design? Analysis

Base Reactions (Factored):

Axial Load (Kips):	46.1	Shear Force (Kips):	15.8
Uplift Force (Kips):	0.0	Moment (Kips-ft):	1490.9
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	6.0	Depth of Base BG (ft.):	5.5
Pier Height A. G. (ft.):	1.00	Thickness of Pad (ft):	1.50
Length of Pad (ft.):	17	Width of Pad (ft.):	17
Final Length of pad (ft)	17.0	Final width of pad (ft):	17.0



Material Properties and Reabr Info:

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	8	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	26	Tie Spacing (in):	12.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	8	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf

Rebar at the bottom of the concrete pad:

Qty. of Rebar in Pad (L):	22	Qty. of Rebar in Pad (W):	22

Rebar at the top of the concrete pad:

Qty. of Rebar in Pad (L):	22	Qty. of Rebar in Pad (W):	22
Apply 1.35 factor for e/w Per G:	1.35		

Soil Design Parameters:

Soil Unit Weight (pcf):	120.0	Soil Buoyant Weight:	50.0	Pcf		
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Ultimate Bearing Pressure (psf):	10667	Ultimate Skin Friction:	0	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	Yes	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hor. resist. for OTM.:	Yes	Reduction factor on the maximum soil bearing pressure:	1.00			

Foundation Analysis and Design: Uplift Strength Reduction Factor: 0.75 — Compression Strength Reduction Factor: 0.75

Total Dry Soil Volume (cu. Ft.):	1042.90	Total Dry Soil Weight (Kips):	125.15
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	125.15	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	574.87	Total Dry Concrete Weight (Kips):	86.23
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	86.23	Total Vertical Load on Base (Kips):	257.48

Check Soil Capacities:

					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	3682	<	Allowable Factored Soil Bearing (psf):	8000	0.46	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	2008.9	>	Design Factored Momont (kips-ft):	1534	0.76	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	1.31	OK!				

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90		Strength reduction factor (Shear):	0.75		
Strength reduction factor (Axial compresion):	0.65		Wind Load Factor on Concrete Design:	1.00		
					Load/ Capacity Ratio	
(1) Concrete Pier:						
Vertical Steel Rebar Area (sq. in./each):	0.79		Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	2994.3	>	Design Factored Moment (Mu, Kips-F	1569.9	0.52	OK!
Calculated Shear Capacity (Kips):	501.5	>	Design Factored Shear (Kips):	15.8	0.03	OK!
Calculated Tension Capacity (Tn, Kips):	1109.2	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	7162.1	>	Design Factored Axial Load (Pu Kips):	46.1	0.01	OK!
Moment & Axial Strength Combination:	0.52	OK!	Check Tie Spacing (Design/Required):		1	OK!
Pier Reinforcement Ratio:	0.005		Reinforcement Ratio is satisfied per ACI			
(2).Concrete Pad:						
One-Way Design Shear Capacity (L-Direction, Kips):	280.6	>	One-Way Factored Shear (L-D. Kips):	135.5	0.48	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	280.6	>	One-Way Factored Shear (W-D., Kips)	135.5	0.48	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	257.9	>	One-Way Factored Shear (C-C, Kips):	136.9	0.53	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0059	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0059		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	1075.3	>	Moment at Bottom (L-Dir. K-Ft):	422.4	0.39	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	1075.3	>	Moment at Bottom (W-Dir. K-Ft):	422.4	0.39	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	1493.0	>	Moment at Bottom (C-C Dir. K-Ft):	597.4	0.40	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0059	OK!	Upper Steel Reinf. Ratio (W-Dir.):	0.0059		
Upper Steel Pad Moment Capacity (L-Direc. Kips-ft):	1075.3	>	Moment at the top (L-Dir K-Ft):	166.1	0.15	OK!
Upper Steel Pad Moment Capacity (W-Direc. Kips-ft):	1075.3	>	Moment at the top (W-Dir K-Ft):	166.1	0.15	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	1493.0	>	Moment at the top (C-C Dir. K-Ft):	158.1	0.11	OK!
(3).Check Punching Shear Capacity due to Moment in the Pier:						
Moment transferred by punching shear:	596.4	k-ft.	Max. factored shear stress v_{u_CD}:		2.7	Psi
Max. factored shear stress v_{u_AB}:	17.3	Psi	Factored shear Strength ϕv_n:		189.7	Psi
Max. factored shear stress v_u:	17.3	Psi	Check Usage of Punching Shear Capacity:		0.09	OK!

EXHIBIT 8

Date: 6/18/2018

To: Mr. James Brasted
ProTerra Design Group, LLC
4 Bay Road, Suite 200
Hadley, MA 01035

Subject: Mount Structural Analysis Report

Sprint Designation: **Site Number:** CT52XC028

Destek Designation: **Project Number:** 1878010

Site Data: **640 Hillard Street, Manchester, CT 06040**
Latitude 41° 47' 04.20", Longitude -72° 33' 02.90"

Dear Mr. Brasted,

Destek Engineering, LLC is pleased to submit this **"Mount Structural Analysis Report"** to determine the structural capacity of the antenna mount utilized by Sprint at the above referenced site.

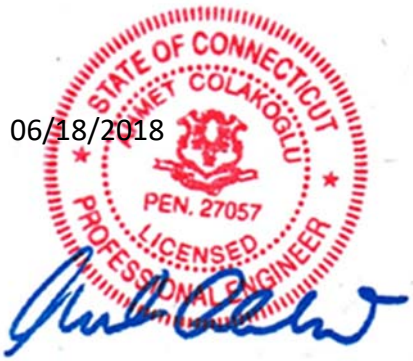
The purpose of the analysis is to determine acceptability of the mount stress level for the changes proposed by Sprint. Under the following load case we have determined the mount to have:

Existing + Proposed Equipment **Adequate Capacity (< 20%)**
Note: See Analysis Criteria for loading configuration

The analysis has been performed in accordance with the TIA-222-G Standard and the 2016 Connecticut State Building Code (2012 IBC).

We at *Destek Engineering, LLC* 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.

Sincerely,
Destek Engineering, LLC
License No: PEC0001429



06/18/2018

Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: 27057

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Suite 100, Marietta, GA 30066 - Tel: (770) 693-0835

1) ANALYSIS CRITERIA

The analysis was performed for the existing and proposed appurtenances as specified in the loading information referenced below, and per the following loading criteria of Table 1.

Table 1 – Loading and Analysis Criteria

Rad Center	117 ft.
Structure Type	Monopole
Exposure Category	B
Ultimate Wind Speed (3-Second Gust)	125 * √0.6 = 97 mph (ASD)
Risk Category	II
Topographic Factor	Kzt=1.0

Table 1.1 –Existing Appurtenance Configuration for Sprint

Qty	Model
6	LLP3106R – Antennas
3	RRH – RRUs
1	Andrew VHLP2.5-11 Dish

Table 1.2 – Proposed and Final Appurtenance Configuration for Sprint

Qty	Model
3	Nokia AAHC 64T64R – Antennas*
3	Commscope NNVV-65B-R4 – Antennas
6	Nokia 800MHz 2x50W – RRUs
3	Nokia 1900 4x45 65MHz – RRUs
1	Andrew VHLP2.5-11 Dish

***Tip height to match Commscope Antenna**

Table 1.4 – Assumed Material Properties

Member Type	ASTM Material Designation	Fy (ksi)	Fu (ksi)
Pipes	A53 Gr. B	35	60
Angles/Channels	A36	36	58
Rectangular HSS	A500 Gr. B - 46	46	58
Round HSS	A500 Gr. B - 42	42	58
Others (UNO)	A572 Gr. 50	50	65

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2) ANALYSIS PROCEDURE

The analysis is based on the following information:

Table 2 – Documents

Document	Provided By	Date
RFDS	Sprint	04/30/2018
Construction Drawings	Pro Terra Design Group, LLC	05/16/2018
Structural Analysis Report	Tower Engineering Solutions	10/12/2017

2.1) Analysis Method

Risa-3D, a commercially available analysis software package, was used to create a three-dimensional model of the mount and calculate member stresses for various loading cases. Selected output from the analysis is included in the Appendix.

2.2) Analysis Conditions and Assumptions

1) The mount was built and installed in accordance with the manufacturer's specifications.
2) The mount has been maintained and will be maintained in accordance with the manufacturer's specifications. All structural members and connections of the mount are in good condition and can achieve theoretical strength.
3) The configuration of antennas is as specified in "1) Analysis Criteria".
4) The analysis was performed for the subject mount only. It does not include an evaluation of the other mounts or the tank, which should be analyzed by others.
5) The evaluation does not include any antenna rigging loads. The equipment should not be rigged using the subject antenna mount as the support.
6) The analysis includes a 250 lbf point load for sector frames and 500 lbf point load for platforms.
7) Any steel grating represented in this model is for loading purposes only and it is not considered to provide any structural restraint or support.
8) Member sizes per the available photos, mapping report and assumed based on our experience with similar structures. Please refer to calculation output in the appendix of this report for sizes and lengths assumed.
9) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.

Destek Engineering, LLC must be notified immediately if any of these assumptions are discovered to be incorrect. The results of this analysis may be affected if any of the assumptions are not valid or have been made in error.

3) ANALYSIS RESULTS AND CONCLUSION

The analysis results are shown on the table below.

Table 3.1 – Mount Component Stresses vs. Capacity

Component	% Capacity	Pass / Fail
Top Face Pipe	<20	Pass
Bottom Face Pipe	<20	Pass
Tube Arm	<20	Pass
Mount Pipe	<20	Pass

T-Arm Mount: The proposed sector mounts (Site Pro 1/Valmont: (2) UDS-NPL, (2) BBPM-K2 per sector) have **adequate** capacity for the proposed changes by Sprint. For the code specified load combinations and as a maximum, the members are stressed less than **20%** of their structural capacity.

The proposed mount should be attached directly to the tower using hardware provided by the manufacturer. The proposed mount arms should be located at 3.0 feet above and below the proposed RAD center. The antennas and equipment should be connected directly to the new mount pipes.

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APPENDIX

INPUT LOADS
ANALYSIS OUTPUT
MOUNT SPECIFICATION

DESTEK ENGINEERING, LLC
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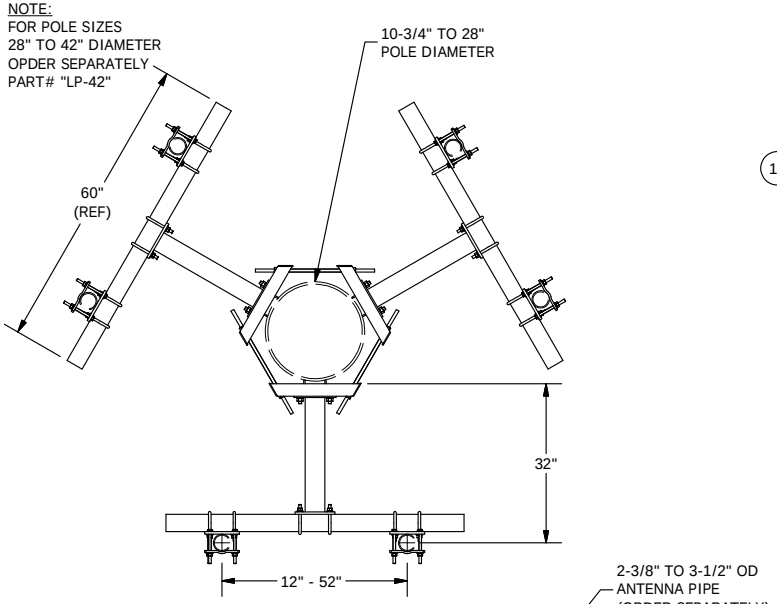
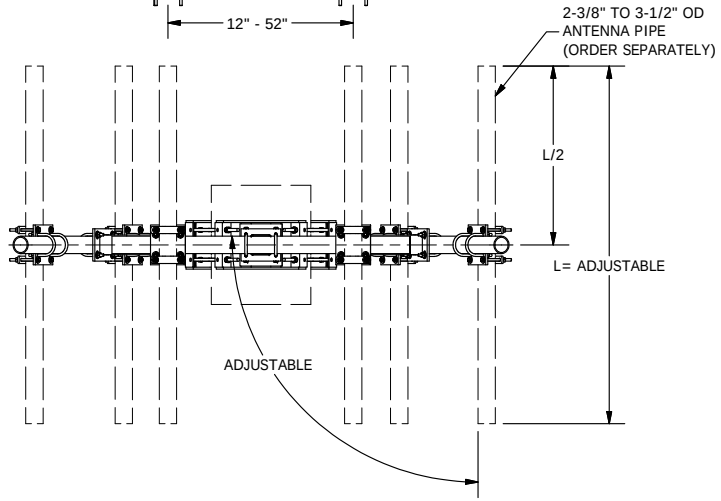
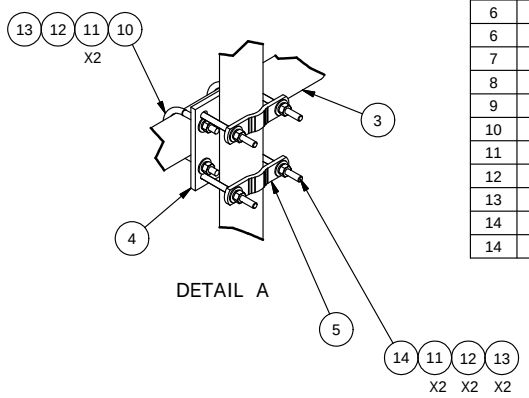
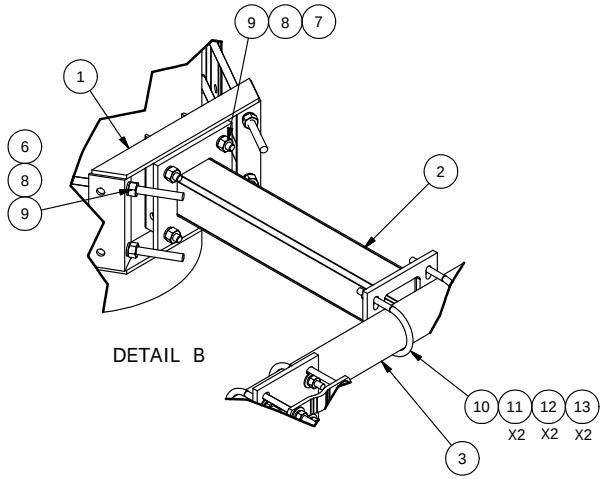
NOTE:
FOR POLE SIZES
28" TO 42" DIAMETER
OPDER SEPARATELY
PART# "LP-42"



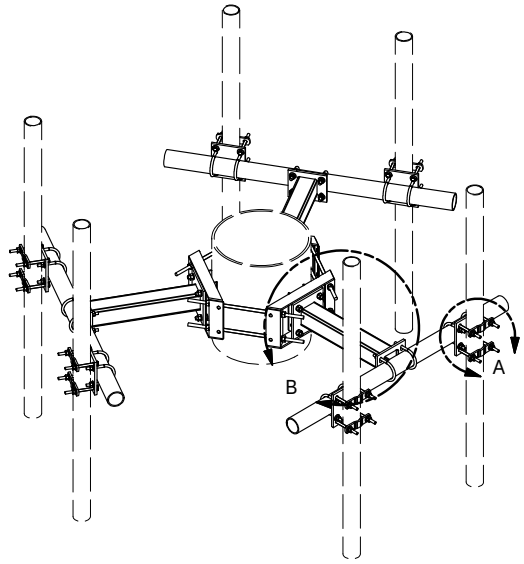




DETAIL A



DETAIL B



PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	X-UGLM	MINI RING MOUNT WELDMENT		21.67	65.00
2	3	X-WWM02	2' STAND-OFF ARM / WALL MOUNT		30.70	92.11
3	3	P360	3-1/2" X 60" SCH 40 GALVANIZED PIPE	60 in	37.97	113.90
4	6	SCX7	CROSSOVER PLATE	8 in	7.55	45.29
5	12	X-115765	5" V-CLAMP		1.02	12.22
6	6	G58R-14	5/8" x 14" THREADED ROD (HDG.)	14 in	1.22	7.32
6	6	G58R-24	5/8" x 24" THREADED ROD (HDG.)	24 in	2.09	12.54
7	12	G5802	5/8" x 2" HDG HEX BOLT GR5	2 in	0.27	3.26
8	24	G58LW	5/8" HDG LOCKWASHER		0.03	0.63
9	24	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	3.12
10	18	X-UB1358	1/2" X 3-5/8" x 5-1/2" X 3" U-BOLT	5 1/2 in	0.77	13.90
11	84	G12FW	1/2" HDG USS FLATWASHER		0.03	2.86
12	60	G12LW	1/2" HDG LOCKWASHER		0.01	0.83
13	60	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	4.30
14	24	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	9.83
14	24	G12045	1/2" x 4.5" HDG HEX BOLT GR5 FULL THREAD	4 1/2 in	0.30	7.15
					TOTAL WT. #	393.45

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	REDRAWN IN INV.		KC8	8/27/2012

REVISION HISTORY

DESCRIPTION
DUAL ANTENNA POLE MOUNT ASSEMBLY
32" STANDOFF
10-3/4" TO 28" MONOPOLE DIAMETER

SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	BMC 1/24/2011		UDS-NPL

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	CEK 8/27/2012	UDS-NPL

EXHIBIT 9

EBI Consulting

environmental | engineering | due diligence

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

Sprint Existing Facility

Site ID: CT52XC028

SBA Hillard
640 Hillard Street
Manchester, Connecticut 06040

November 18, 2019

EBI Project Number: 6219005993

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**4.95%**

November 18, 2019

Sprint
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, New Jersey 07495

Emissions Analysis for Site: CT52XC028 - SBA Hillard

EBI Consulting was directed to analyze the proposed Sprint facility located at **640 Hillard Street** in **Manchester, Connecticut** for the purpose of determining whether the emissions from the Proposed Sprint Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed Sprint Wireless antenna facility located at 640 Hillard Street in Manchester, Connecticut 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 manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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) 4 CDMA channels (800 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 50 Watts per Channel.

2) 4 PCS channels (1900 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 45 Watts per Channel.

3) 8 BRS channels (2500 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

4) 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.

5) 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 manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

6) The antennas used in this modeling are the Commscope NNVV-65BR4 for the 800 MHz / 1900 MHz channel(s), the Nokia AAHC for the 2500 MHz channel(s) in Sector A, the Commscope NNVV-65BR4 for the 800 MHz / 1900 MHz channel(s), the Nokia AAHC for the 2500 MHz channel(s) in Sector B, the Commscope NNVV-65BR4 for the 800 MHz / 1900 MHz channel(s), the Nokia AAHC for the 2500 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

7) The antenna mounting height centerline of the proposed antennas is 117 feet above ground level (AGL).

8) 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.

9) All calculations were done with respect to uncontrolled / general population threshold limits.

Sprint Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Commscope NNVV-65BR4	Make / Model:	Commscope NNVV-65BR4	Make / Model:	Commscope NNVV-65BR4
Frequency Bands:	800 MHz / 1900 MHz	Frequency Bands:	800 MHz / 1900 MHz	Frequency Bands:	800 MHz / 1900 MHz
Gain:	12.35 dBd / 15.05 dBd	Gain:	12.35 dBd / 15.05 dBd	Gain:	12.35 dBd / 15.05 dBd
Height (AGL):	117 feet	Height (AGL):	117 feet	Height (AGL):	117 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts
ERP (W):	9,193.83	ERP (W):	9,193.83	ERP (W):	9,193.83
Antenna A1 MPE %:	**3.21%**	Antenna B1 MPE %:	**3.21%**	Antenna C1 MPE %:	**3.21%**
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Nokia AAHC	Make / Model:	Nokia AAHC	Make / Model:	Nokia AAHC
Frequency Bands:	2500 MHz	Frequency Bands:	2500 MHz	Frequency Bands:	2500 MHz
Gain:	13.05 dBd	Gain:	13.05 dBd	Gain:	13.05 dBd
Height (AGL):	117 feet	Height (AGL):	117 feet	Height (AGL):	117 feet
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):	3,229.39	ERP (W):	3,229.39	ERP (W):	3,229.39
Antenna A2 MPE %:	**0.85%**	Antenna B2 MPE %:	**0.85%**	Antenna C2 MPE %:	**0.85%**

Site Composite MPE %	
Carrier	**MPE %**
Sprint (Max at Sector A):	4.05%
T-Mobile	0.01%
Clearwire	0.06%
Metro PCS	0.83%
Site Total MPE % :	4.95%

Sprint MPE % Per Sector	
Sprint Sector A Total:	4.05%
Sprint Sector B Total:	4.05%
Sprint Sector C Total:	4.05%
Site Total MPE % :	4.95%

Sprint Maximum MPE Power Values (Sector A)

Sprint Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
Sprint 800 MHz CDMA	4	858.95	117.0	9.02	800 MHz CDMA	533	1.69%
Sprint 1900 MHz PCS	4	1439.50	117.0	15.12	1900 MHz PCS	1000	1.51%
Sprint 2500 MHz BRS	8	403.67	117.0	8.48	2500 MHz BRS	1000	0.85%
						Total:	**4.05%**

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

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:	4.05%
Sector B:	4.05%
Sector C:	4.05%
Sprint Maximum MPE % (Sector A):	4.05%
Site Total:	4.95%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **4.95%** 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.