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

June 25, 2019

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

RE: **Notice of Exempt Modification for Sprint DO Macro**
Crown Site#876399
Sprint Site ID: CT43XC084
60 South Main Street, East Granby, CT 06026
Latitude: 41° 56' 29.6"/ Longitude: -72° 44' 19.3"

Dear Ms. Bachman:

Sprint currently maintains six (6) antennas at the 98-foot level of the existing 98-foot monopole tower located at 60 South Main Street, East Granby, Connecticut 06026. The tower is owned by Global Signal Acquisitions (Crown Castle) and the property is owned by Galasso Holdings LLC. Sprint intends to replace six (6) antennas and four (4) lines as well as add twelve (12) remote radio heads. Sprint also intends to structurally modify the tower and foundation.

The Town of East Granby approved the cell tower for Sprint on November 28, 2000.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter and documents are being sent to The First Selectman, Mr. James Hayden of the Town of East Granby, Director of Community Development, Mr. Gary Haynes of the Town of East Granby and Galasso Holdings LLC as the property owner. Crown Castle is the tower owner.

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

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

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

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

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

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

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

Sincerely,

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

Attachments:

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

cc: First Selectman – Mr. James Hayden
Town of East Granby
9 Center Street
East Granby, CT 06026
860-653-2576

Director of Community Development- Mr. Gary Haynes
Town of East Granby
9 Center Street
East Granby, CT 06026
860-653-3444

Galasso Holdings LLC-Property owner
60 South Main Street
East Granby, CT 06026
860-653-2524

TOWN OF EAST GRANBY
PLANNING & ZONING COMMISSION
9 CENTER STREET
P.O. BOX 1858
EAST GRANBY, CT 06026
653-3444

November 29, 2000

Sprint Spectrum L.P. dba Sprint PCS
9 Barnes Industrial Road
Wallingford, CT 06492

CERTIFIED MAIL

Dear Sirs,

At its meeting on November 28, 2000, the East Granby Planning & Zoning Commission voted to approve your Application #00-20 for a communication tower on the Galasso Holdings property subject to the following conditions:

1. A letter of approval be provided from the FAA that the proposed tower meets their requirements (ref. section IX, G3d of the Zoning Regulations).
2. A $50,000 bond shall be posted prior to construction to be used to remove the tower if abandoned per section IX, G7 of the Zoning Regulations.

Sincerely,

Frederick O'Brien (RHC)

Frederick O'Brien
Chairman

Cc: Town Clerk
Building Official
Town Engineer
Assessor
Attorney Thomas Regan

Sprint PCS℠
Sprint Personal Communication Services℠

Site Development Northeast
Crossroads Corporate Center
1 International Boulevard, Suite 800
Mahwah, New Jersey 07495
Mailstop: NJMAHA0101
Telephone: 201-684-4000

Wayne Medlin, Property Specialist
Office: (201) 684-4063
Cell: (516) 850-5897
Fax: (201) 684-4070

December 26, 2000

VIA FEDEX
Rosalie McKenney
Town of East Granby
9 Center Street
P.O. Box 1858
East Granby, Connecticut 06026

Re: Tower removal bond for property located at 60 South Main Street, East Granby, CT 06026

Dear Rosalie:

Enclosed please a Tower removal bond, in the amount of ($50,000) fifty thousand dollars, prepared and executed in accordance with the conditions of zoning approved for Sprint's proposed site located at the above referenced location. Should you have any questions, or require something further, please do not hesitate to contact me.

Very truly yours,

Wayne Medlin
Property Specialist

Enclosures

Planimetrics

MEMORANDUM

To: East Granby Planning & Zoning Commission

From: Glenn Chalder, AICP

Date: October 8, 1997

Subject: **Adopted Zoning Regulation Changes**
Personal Communication Service (PCS) Towers

I am enclosing a copy of the PCS regulation as adopted by the Planning and Zoning Commission at their meeting on October 7, 1997.

It has been a pleasure working with the Commission on this. If we can be of additional service, please let us know.

The East Granby Planning & Zoning Commission approved the attached Zoning Regulation changes on 10/7/97 to be effective 10/17/97.

Frederick O'Brien

Frederick O'Brien, Chairman

10/22/97

Date

Planimetrics, LLP, Riverdale Farms, 136 Simsbury Road, Avon, CT 06001 Fax: 860-674-2693 Voice: 860-677-5267

ZONING REGULATION AMENDMENT

Personal Communication Service (PCS) Towers

(add the following)

II. INTERPRETATION

C. DEFINITIONS

Antenna - A device used to transmit or receive telecommunications or radio signals.

Concealed Antenna - A communication facility and associated antenna(s) that are designed to blend into the surrounding environment by being mounted and screened on buildings or being similarly disguised in the natural environment.

Communications Tower - A structure (including monopoles, guyed towers, or lattice structures) that is used to support one or more antenna as part of a communication facility.

Communication Facility - towers or antennas and accessory structures used in connection with the provision of telecommunication services such as cellular telephone service, personal communication services, paging services, radio or television broadcasting services, and similar broadcast services.

(modify the following)

III. GENERAL REGULATIONS

B. GENERAL PROVISIONS

4. Height Exceptions

The provisions of these Regulations limiting the maximum height of buildings shall not restrict the height of a spire, flagpole, (~~antenna~~), chimney, water tank, elevator bulkhead, solar panel or similar uses provided such uses shall not interfere with an airport approach surface.

(add the following)

III. GENERAL REGULATIONS

B. GENERAL PROVISIONS

6. Antennas

The provisions of these Regulations limiting the maximum height of buildings shall not restrict the height of an antenna that is erected solely for municipal purposes or that is clearly accessory to a permitted principal use in a residential zone, provided such antennae shall not interfere with an airport approach surface. The Commission may allow other proposed antennae in accordance with the requirements of Section IX. G. of these Regulations.

(add the following)

IX. SPECIAL REGULATIONS
G. ANTENNAE

1. Purpose

This section is intended to provide for telecommunications facilities within East Granby while protecting the public health, safety, and welfare and minimizing adverse visual and environmental impacts.

2. Application Process

a) An application for a new tower or a new antenna shall be processed as follows:

Zone Type	Communication Tower Type	Tower/Antenna Type	Application Type
Residential, Agricultural, and Quarry zones	No tower proposed	Concealed antenna on a non-residential building	Special Permit
		On an existing non-residential building or structure (such as a water tower or utility pole)	Special Permit
	Existing tower	New Antenna	Special Permit
	Concealed tower	Concealed Antenna	Special Permit
	New tower	Monopole (lower than or equal to 100 feet)	Special Permit
		Monopole (more than 100 feet)	Special Permit
		Lattice or Guyed	Special Permit
All other zones B Business P Professional I Industrial	No tower proposed	Concealed antenna	Site Plan
		On an existing non-residential building or structure (such as a water tower or utility pole)	Site Plan
	Existing tower	New Antenna	Site Plan
	Concealed tower	Concealed Antenna	Site Plan
	New tower	Monopole (lower than or equal to 100 feet)	Site Plan
		Monopole (more than 100 feet)	Special Permit
		Lattice or Guyed	Special Permit

b) The proposed height of an antenna shall be measured from the prevailing ground elevation at the base of the tower, antenna, or any other supporting structure (including existing buildings) to the top of any antenna or other appurtenances attached to the tower or antenna.

c) The Commission may retain its own experts, at the applicant's expense, to verify any information submitted in conjunction with any application.

d) The application fee for a tower or antenna proposed under this section as part of a communications facility shall be $250 plus the cost of any outside experts retained by the Commission. To cover these potential costs, the applicant shall submit a certified check for $250 plus $100 per foot of proposed tower/antenna height with the application. Any fees not utilized by the Commission shall be returned to the applicant following disposition of the application.

3. **Required Information**

a) The applicant shall submit documentation to demonstrate that it is a licensed provider authorized by the Federal Communications Commission to operate the proposed type of facility.

b) Any application under this section shall include the following site selection information:
- a map showing:
  - the extent of planned coverage in East Granby and in adjacent communities,
  - the location and service area of the proposed antenna and/or tower.
- a written statement describing:
  - the need for the proposed facility (coverage, signal strength, other),
  - the siting and design criteria used for the proposed facility,
  - the location of the site search area and sites identified (alternatives),
  - the process by which other possible sites in the search area were considered and/or eliminated for legal, technological, economic, or other reasons,
  - technological alternatives to the proposed facility and the economic or other implications associated with those alternatives, and
  - reasons for the selection of the proposed site and design (tower, antenna).

c) Any application under this section shall include the following design information:
- a description of the proposed tower, antennae and any associated equipment (transformer, generator),
- a site plan clearly locating the proposed facilities, proposed access, and any other activities on the proposed site,
- plan and elevation drawings showing the proposed tower, antenna, mounting locations (proposed and future), associated equipment, and other structures on the site,
- topographic profiles (running up/down slope and cross slope, at a minimum) showing the location of the proposed facilities in relation to surrounding areas and structures,
- architectural or photographic rendering of the proposed facility from a location designated by the Zoning Enforcement Officer, and
- a colored plan or plans clearly indicating the proposed color of any existing features or proposed facilities or equipment.

d) Any application under this section shall include the following additional information:
- a copy of any proposed lease(s) or agreements for the proposed facilities and required appurtenances,
- a written statement describing how the proposed facility complies with the concept of multiple use and/or concealment,
- written statements by competent professional describing the impact on public health and safety associated with the proposed activity with particular emphasis on radio emissions (signal frequency, intensity, and power density) and structural integrity, and
- a written statement describing any requirements of other government agencies regarding illumination, colors, airport approach surfaces, or other requirements.

6. Site & Building Design

a) Any facility shall be surrounded by a fence of appropriate design at least eight feet in height. Landscaping around the facility may be required by the Commission depending on site location and characteristics.

b) All utilities shall be located underground unless otherwise approved by the Commission.

c) Unless waived by the Commission, any accessory equipment building shall:
- shall not exceed 750 square feet of gross floor area,
- shall not exceed 12 feet in height, and
- shall have a gable roof and be architecturally finished to look like a residential or agricultural structure.

d) If located on the roof of a building, equipment building shall be screened or concealed.

7. Maintenance and Abandonment

a) The improvements associated with any facility shall be regularly inspected and maintained. Any facility that is not being maintained will be considered abandoned.

b) The facility owner shall submit an annual report (by the anniversary date of the approval of the application) to the Commission or its designee indicating:
- whether the facility is in use,
- that the facility has been inspected on a regular basis and the inspection dates of the facility during the past year,
- whether the facility is in compliance with governmental standards for radio frequency emissions at the designated frequencies and power levels,
- whether the facility is in compliance with the conditions of any approval, and
- that contact was made with the Building Department at Town Hall to identify any issues with regard to the tower, who was contacted, what the issues are, and detailing the proposed responses to any issues.

c) In the event that the Building Official shall determine that any component of a facility is unsafe, the applicant shall, within 30 days, repair or replace or remove the facility or the unsafe condition.

d) Any facility not in use for twelve months shall be considered abandoned. Any facility that fails to file an annual report shall be considered abandoned. An abandoned facility shall be removed within ninety days and the site restored.

e) A bond shall be required prior to the construction of any facility to ensure that any required repair, replacement, or removal shall be accomplished. Prior to using the bond to remove or repair the facility, the Commission shall notify the applicant that the bond will be utilized. Such bond or any remaining bond amount shall be returned to the applicant upon removal of the facility and restoration of the site.

Adopted: October 7, 1997
Effective Date: October 17, 1997

e) Any application for a new tower shall also include the following information:
- a description of the proposed tower and any associated equipment (including height, construction type, purpose, design features, means of power supply),
- a written statement describing the extent to which the proposed tower has been designed to be extended and/or accommodate additional service providers in the future,
- a plan showing the number and type of antennas that can be accommodated (proposed and future) as well as the proposed location of all mounting positions for co-located antennas and the minimum separating distances for antennas,
- a written statement that indicates how additional service providers will be accommodated on the proposed tower in the future, and
- a written statement indicating that local municipal and public safety departments were offered the opportunity to locate their facilities on the proposed tower.

4. Tower Location & Design

a) To maintain the natural state surrounding the public trail system and to avoid a negative visual impact on a large area of the town, no tower shall, unless modified by the Commission, be located within:
- 500 feet of the Metacomet Ridge if it extends above the existing tree line,
- one mile of the Metacomet Ridge if it extends above the top of the ridge,
- three miles of another tower.

b) In reviewing an application, the Commission may require the applicant to:
- simulate the tower height by balloon or other method that will evaluate scenic impact,
- investigate alternative locations and report back to the Commission on their feasibility.

c) Any proposed tower shall be located on a conforming lot. A tower shall be set back from property lines 125 percent of the height of the tower and all appendages unless the applicant has submitted, and the Commission has accepted, engineering data to show that the tower is collapsible and will fall within the property lines of the lot on which it is located.

d) Unless waived by the Commission, each tower shall be designed and built to accommodate the equipment of at least two other service providers:
- when initially built, or
- by vertically extension in the future.

e) No illumination of any tower shall be permitted unless specifically requested by the applicant and specifically approved by the Commission. Limitations on illumination shall be made a condition of any approval.

5. Antenna Limitations

a) Unless waived by the Commission:
- no more than two dish antennas shall be placed on any tower,
- all dish antenna be mesh design,
- no dish antenna shall be more than:
  - two feet in diameter in residential zones, or
  - six feet in diameter in non-residential zones.

60 SOUTH MAIN STREET

Location	60 SOUTH MAIN STREET	**Mblu**	11/ 11/ / /
Acct#	100819	**Owner**	GALASSO HOLDINGS LLC
Assessment	$1,365,600	**Appraisal**	$1,950,700
PID	341	**Building Count**	3

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$1,410,600	$540,100	$1,950,700
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$987,500	$378,100	$1,365,600

Owner of Record

Owner	GALASSO HOLDINGS LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	PO BOX 1776 EAST GRANBY, CT 06026	**Book & Page**	0112/0814
		Sale Date	03/06/1997

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
GALASSO HOLDINGS LLC	$0		0112/0814	03/06/1997

Building Information

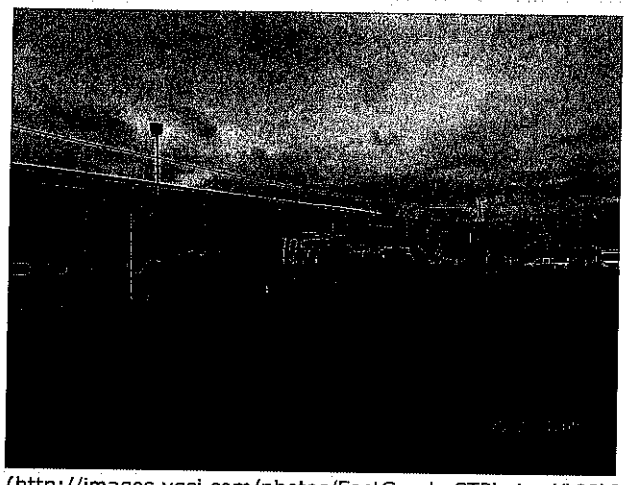
Building 1 : Section 1

Year Built:	1969
Living Area:	43,230
Replacement Cost:	$1,509,592
Building Percent Good:	61
Replacement Cost Less Depreciation:	$920,900

Building Attributes	
Field	**Description**

STYLE	Garage
MODEL	Industrial
Grade	Average
Stories:	1
Occupancy	1
Exterior Wall A	Concr/Cinder
Exterior Wall B	
Roof Structure	Gable/Hip
Roof Cover	Tar & Gravel
Interior Wall A	Unfin/Minimum
Interior Wall B	
Interior Floor A	Concr-Finished
Interior Floor B	
Heating Fuel	Oil
Heating Type	Steam
AC Type	None
Bldg Use	Industrial C
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	3-1C
Heat/AC	NONE
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	16
% Comn Wall	0

Building Photo



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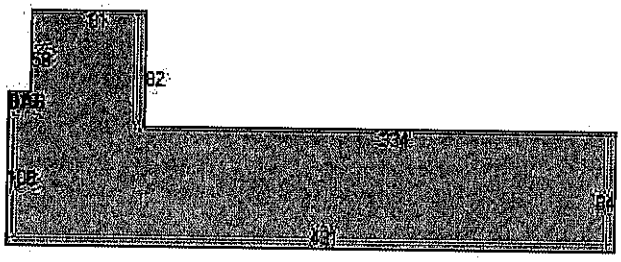
Building Layout



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Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	43,230	43,230
		43,230	43,230

Building 2 : Section 1

Year Built: 1969
Living Area: 5,720
Replacement Cost: $273,597
Building Percent Good: 61
Replacement Cost Less Depreciation: $166,900

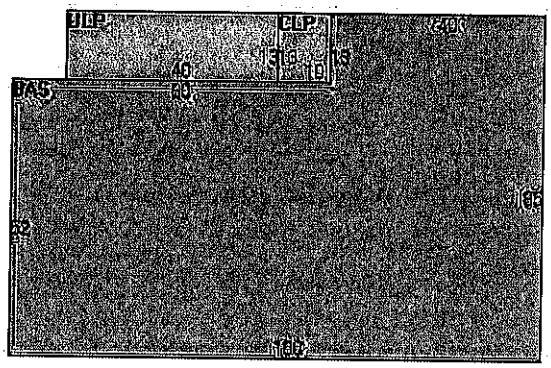
Building Attributes : Bldg 2 of 3	
Field	Description
STYLE	Service Shop
MODEL	Industrial
Grade	Below Average

Stories:	1
Occupancy	1
Exterior Wall A	Concr/Cinder
Exterior Wall B	
Roof Structure	Gable/Hip
Roof Cover	Asphalt
Interior Wall A	Unfin/Minimum
Interior Wall B	
Interior Floor A	Concr-Finished
Interior Floor B	Minimum/Plywd
Heating Fuel	Oil
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	Industrial C
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	3-1
Heat/AC	NONE
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	-DESCRIPTION-
Rooms/Prtns	AVERAGE
Wall Height	10
% Comn Wall	0

Building Photo

(http://images.vgsi.com/photos/EastGranbyCTPhotos//\00\01\17

Building Layout



(http://images.vgsi.com/photos/EastGranbyCTPhotos//Sketches/

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	5,720	5,720
CLP	Loading Platform, Finished	130	0
ULP	Loading Platform, Unfinished	520	0
		6,370	5,720

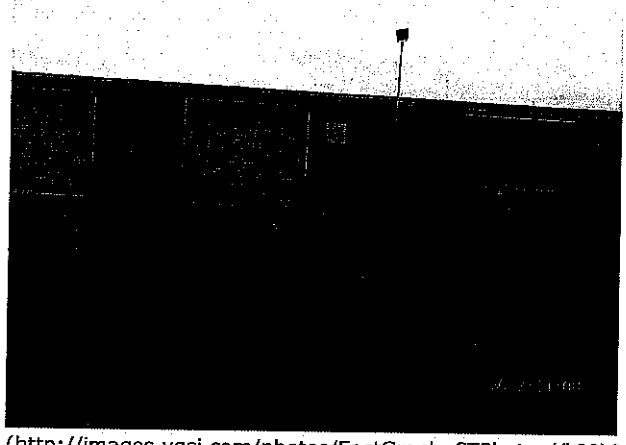
Building 3 : Section 1

Year Built: 1972
Living Area: 8,000
Replacement Cost: $404,000
Building Percent Good: 61
Replacement Cost Less Depreciation: $246,400

Building Attributes : Bldg 3 of 3	
Field	Description
STYLE	Light Indust

MODEL	Industrial
Grade	Average
Stories:	1
Occupancy	1
Exterior Wall A	Concr/Cinder
Exterior Wall B	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall A	Unfin/Minimum
Interior Wall B	
Interior Floor A	Concr-Finished
Interior Floor B	
Heating Fuel	Oil
Heating Type	Steam
AC Type	None
Bldg Use	Industrial C
Total Rooms	0
Total Bedrms	0
Total Baths	0
1st Floor Use:	
Heat/AC	NONE
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	16
% Comn Wall	0

Building Photo



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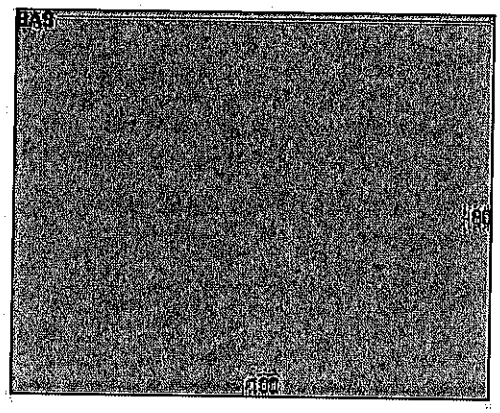
Building Layout



(http://images.vgsi.com/photos/EastGranbyCTPhotos//Sketches/

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	8,000	8,000
		8,000	8,000

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
MEZ	Mezzanine	960 S.F.	$8,800	3

Land

Land Use

Use Code	3-1
Description	Industrial C
Zone	I

Land Line Valuation

Size (Acres)	89.97
Frontage	0
Depth	0

Neighborhood		**Assessed Value**	$378,100
Alt Land Appr	No	**Appraised Value**	$540,100
Category			

Outbuildings

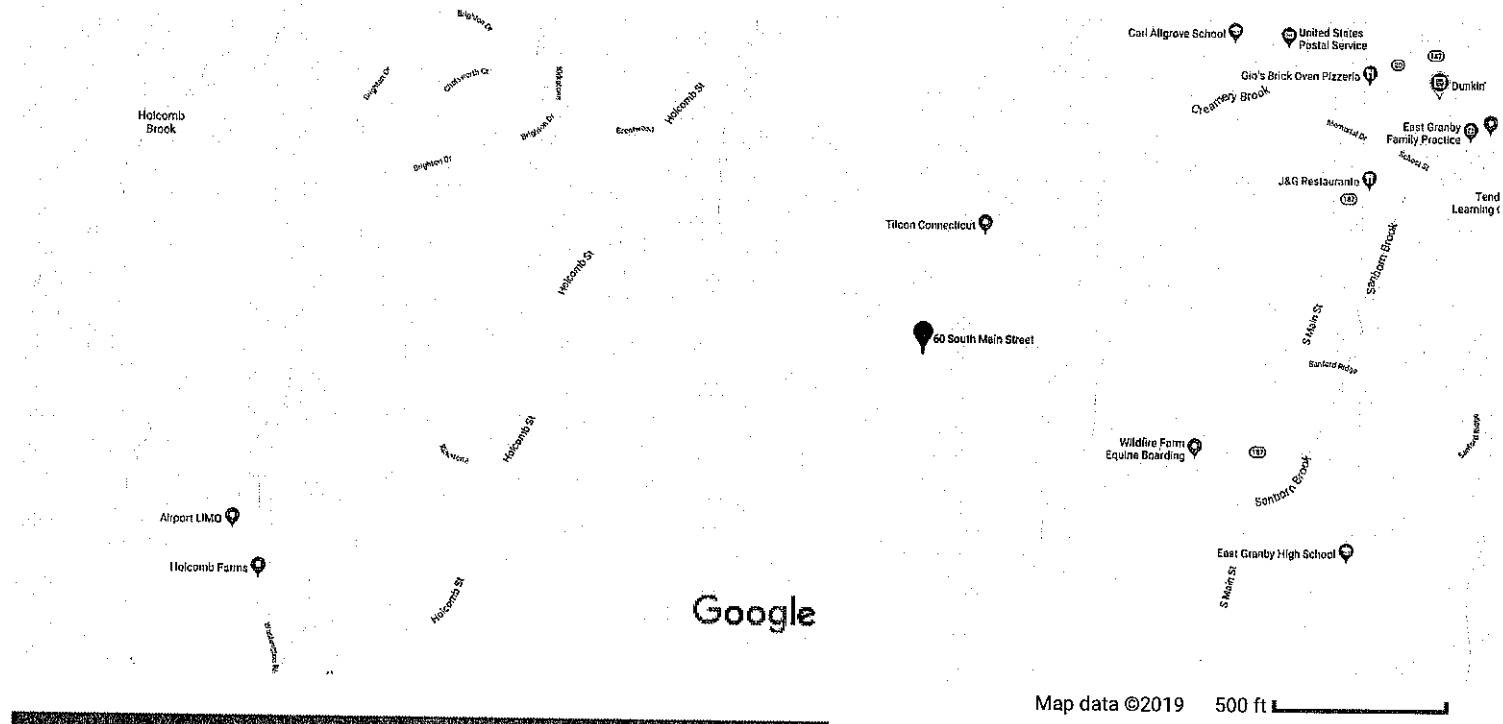
Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
SHED	Shed	A	Average	180 S.F.	$1,300	1
SHED	Shed	A	Average	640 S.F.	$3,500	2
LNT	Lean-To			350 S.F.	$1,400	1
SHED	Shed	A	Average	100 S.F.	$500	2
SHED	Shed	A	Average	200 S.F.	$2,200	3
LNT	Lean-To			240 S.F.	$1,000	2
SHED	Shed	A	Average	1250 S.F.	$11,300	1
GAR1	Garage	A	Average	1280 S.F.	$19,200	2
LNT	Lean-To			1472 S.F.	$8,800	1
SHED	Shed	A	Average	160 S.F.	$1,700	1
SHED	Shed	A	Average	252 S.F.	$1,400	2
SHED	Shed	A	Average	140 S.F.	$1,000	2
SHED	Shed	G	Good	360 S.F.	$5,200	1
SHED	Shed	A	Average	360 S.F.	$4,500	1
FNC	Chain Link Fence	06	6 Ft. Height	600 L.F.	$4,600	1

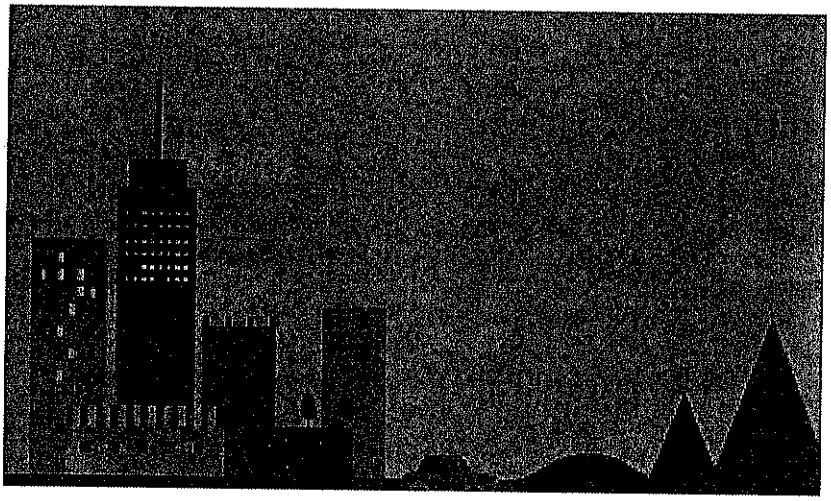
Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$1,293,500	$536,600	$1,830,100
2012	$1,409,400	$359,400	$1,768,800
2007	$818,700	$429,800	$1,248,500

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$905,600	$375,600	$1,281,200
2012	$986,700	$251,600	$1,238,300
2007	$573,100	$300,900	$874,000

Google Maps 60 S Main St





60 S Main St

East Granby, CT 06026

Directions Save Nearby Send to your phone Share

W7P6+V3 East Granby, Simsbury, CT

At this location

Galasso Materials LLC
4.0 ★★★★ (9)

Crushed stone supplier · 60 S Main St
Open until 5:00 PM

Tilcon Connecticut

Ready mix concrete supplier · 60 S Main St

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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.
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Date: **April 27, 2018**

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Infinigy Engineering, PLLC
1033 Watervliet Shaker Road
Albany, NY 12205
518-690-0790
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Elizabeth Sweeney
Crown Castle
3 Corporate Dr., St 101
Clifton Park, NY 12065

Subject:	**Mount Structural Analysis**	
Carrier Designation:	***Sprint PCS Co-Locate***	
	Carrier Site Number:	CT43XC804
	Carrier Site Name:	CT43XC804
Crown Castle Designation:	**Crown Castle BU Number:**	876399
	Crown Castle Site Name:	E. Granby 4Q2000 / Galasso
	Crown Castle JDE Job Number:	447217
	Crown Castle Application Number:	397084, Rev. 3
Engineering Firm Designation:	**Infinigy Report Designation:**	600-002
Site Data:	**60 South Main St, East Granby, CT 06026**	
	Latitude 41°56'29.59" Longitude -72°44'19.248"	
Structure Information:	**Tower Height & Type:**	**98.0 Foot Monopole**
	Mount Elevation:	**94.0 ft**
	Mount Type:	**14 Foot Platform**

Dear Elizabeth Sweeney,

Infinigy Engineering, PLLC is pleased to submit this **"Mount Structural Analysis Report"** to determine the structural integrity of Sprint's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

Based upon our analysis, we have determined the adequacy of the antenna mounting system that will support the existing and proposed loading to be:

Platform	**Sufficient***

***Pending installation of proposed modification detailed below.**

This analysis has been performed in accordance with the 2012 International Building Code with 2016 Connecticut Building Code and the Infinigy Engineering, PLLC wind speed requirement of a 90 mph nominal 3-second gust wind. Exposure Category C and Risk Category II were used in this analysis.

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

Mount structural analysis prepared by: Aaron Estabrooks

Respectfully Submitted by:

Joe Johnston, P.E.
VP Structural Engineering / Principal

TABLE OF CONTENTS

1) INTRODUCTION

The mount consists of a 14 Foot Platform at the **94.0** ft elevation. The existing and proposed antenna loading was obtained from the Application provided by CCI, Application Number 397084, Revision 3.

2) ANALYSIS CRITERIA

The structural analysis was performed in accordance with the requirements of TIA 222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second wind gust wind speed of 93 mph with no ice, 50 mph with 1.00 inch escalated ice thickness, Exposure Category C and Topographic Category 1. In addition, the 14 Foot Sector Frame been analyzed for a load combination consisting of a 500-pound man live load using a 3-second wind gustwind speed of 30 mph.

Table 1 - Proposed Equipment Loading Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Proposed Mount Type	Note
94.0	97.0	3	Commscope	NNVV-65B-R4	-	1,2
		3	RFS	APXVTM14-ALU-I20		
		6	Alcatel Lucent	RHH2x50-800		
		3	Alcatel Lucent	TD-RRH8X20-25		
		3	Alcatel Lucent	PCS 1900MHZ 4X45W - 65MHZ		

Notes:
1) Proposed Equipment
2) Existing Mount to Remain

Table 2 - Existing and Reserved Antenna and Cable Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Existing Mount Type	Note
94.0	--	--	--	--	Platform	1

Notes:
1) Existing Equipment to Remain

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	Sprint Application	397084, Rev 3	CCI Sites
Mount Photos	Photos	876399	CCI Sites

3.1) Analysis Method

RISA-3D (Version 16.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

Infinigy Mount Analysis Tool 3.0.2, a tool internally developed by Infinigy, was used to calculate member loading for various load cases. Selected output from the analysis is included in Appendix B.

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) 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.
4) Steel grades have been assumed as follows:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM A53 (GR B-35)
Pipe	ASTM A53 (GR B-35)
Connection Bolts	ASTM A325

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

4) ANALYSIS RESULTS

Table 4(a) - Mount Component Stresses vs. Capacity (Platform, Worse Case Sector)

Notes	Component	Mount Centerline (ft)	% Capacity	Pass / Fail
1,2	Standoff Arm	94.0	83.1	Pass
	Bracing		64.6	Pass
	Face Horizontal		55.3	Pass
	Mount Pipe		64.7	Pass

Structure Rating (max from all components) =	83.1%

Notes:

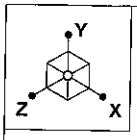
1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity consumed.
2) All sectors are typical

4.1) Recommendations

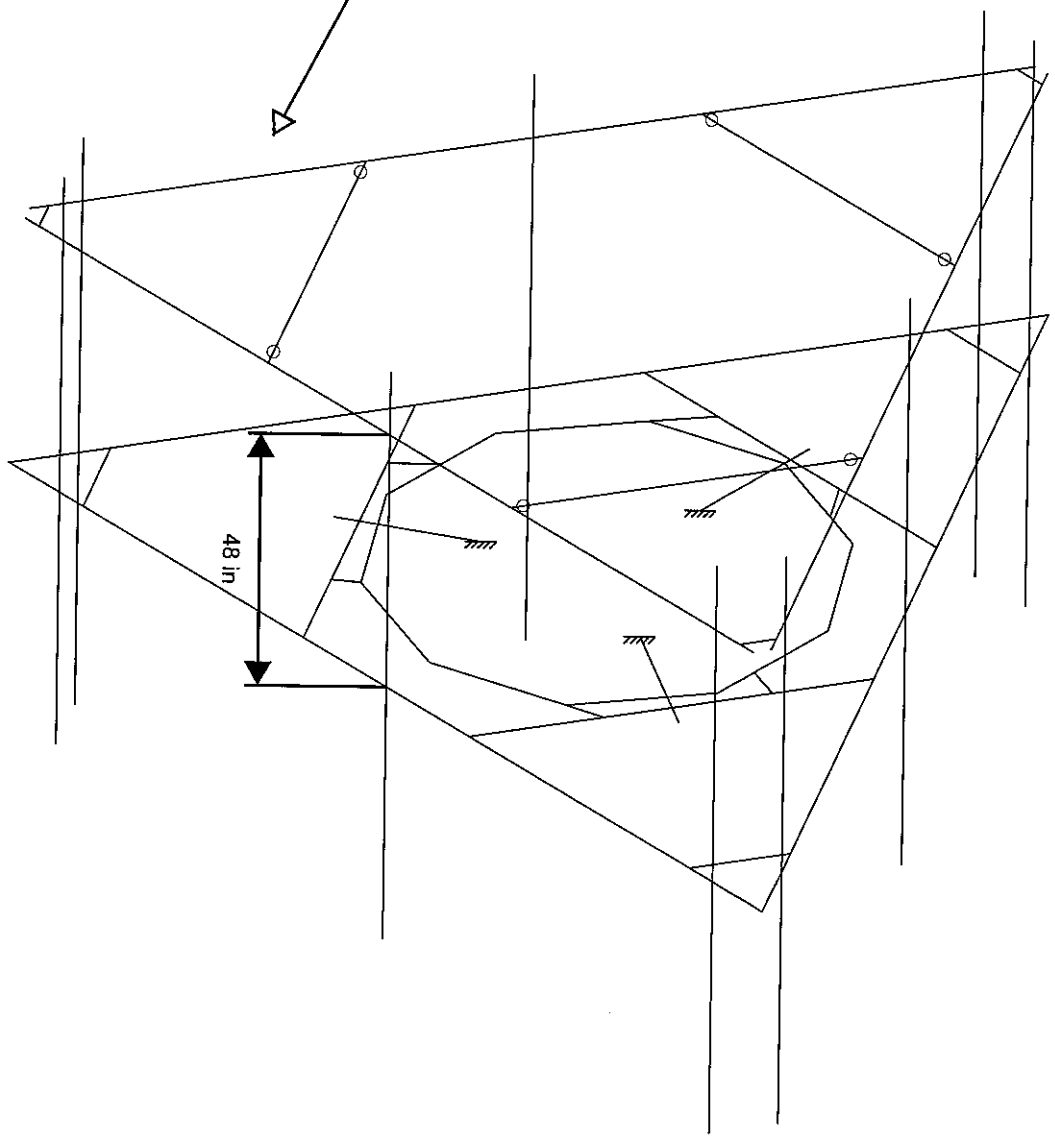
Prior to the installation of the proposed equipment (1) Site Pro 1 HRK14-HD handrail kit must be installed 48" above the existing platform horizontals.

APPENDIX A

WIRE FRAME AND RENDERED MODELS



Install (1) Site Pro 1 HRK14-HD Handrail kit prior to the installation of the proposed equipment.



Envelope Only Solution

Infinigy Engineering, PLLC	876399	Wireframe
ATE		Apr 27, 2018 at 12:34 PM
600-002		876399.r3d

Envelope Only Solution

Infinigy Engineering, PLLC	876399	Final Configuration
ATE		Apr 27, 2018 at 12:33 PM
600-002		876399.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Site Name:	876399
Client:	Crown
Carrier:	Sprint
Engineer:	ATE
Date:	4/27/2018

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INFINIGY WIND LOAD CALCULATOR 3.0.2

Site Information Inputs:

Adopted Building Code:	2012 IBC
Structure Load Standard:	ASCE 7-10
Antenna Load Standard:	ASCE 7-10
Structure Risk Category:	II
Structure Type:	Mount - Sector
Number of Sectors:	3
Structure Shape 1:	Flat
Structure Shape 2:	

Rooftop Inputs:

Rooftop Wind Speed-Up?: No

Wind Loading Inputs:

Design Wind Velocity:	93	mph (ultimate 3-second gust)
Wind Centerline 1 (z_1):	94.0	ft
Wind Centerline 2 (z_2):	94.0	ft
Side Face Angle (θ):	60	degrees
Exposure Category:	C	
Topographic Category:	1	

Wind with No Ice		
q_z (psf)	Gh	F_{ST} (psf)
26.28	1.00	**52.55**
26.28	1.00	**31.53**

Wind with Ice		
q_z (psf)	Gh	F_{ST} (psf)
7.60	1.00	**21.90**
7.60	1.00	**21.90**

Ice Loading Inputs:

Is Ice Loading Needed?:	Yes	
Ice Wind Velocity:	50	mph (ultimate 3-second gust)
Base Ice Thickness:	1.00	in

Input Appurtenance Information and Load Placements:

Appurtenance Name	Elevation (ft)	Total Quantity	Ka	Front Shape	Side Shape	q_z (psf)	EPA (ft^2)	Fz (lbs)	Fx (lbs)	Fz(60) (lbs)	Fx(30) (lbs)
Commscope NNVV-65B-R4	97.0	3	1.00	Flat	Flat	26.45	6.35	167.97	95.54	113.65	149.86
RFS APXVTM14-ALU-I20	97.0	3	1.00	Flat	Flat	26.45	12.27	324.59	152.10	195.22	281.46
Alcatel Lucent RRH2x50-800	97.0	3	1.00	Flat	Flat	26.45	1.70	44.99	33.92	36.68	42.22
Alcatel Lucent RRH2x50-800	97.0	3	1.00	Flat	Flat	26.45	1.70	44.99	33.92	36.68	42.22
Alcatel Lucent PCS 1900MHZ 4X45W-65MHZ	97.0	3	1.00	Flat	Flat	26.45	2.31	61.17	58.96	59.52	60.62
Alcatel Lucent TD-RRH8X20-25	97.0	3	1.00	Flat	Flat	26.45	3.70	97.98	34.23	50.16	82.04

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(de...	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N15			HSS3x3x5	Beam	Tube	A53 Gr.B	Typical
2	M2	N16	N17		180	PL 4 x 3/8"	Beam	RECT	A36 Gr.36	Typical
3	M3	N68	N67		180	C5x9	Beam	RECT	A36 Gr.36	Typical
4	M4	N49	N48			C5x9	Beam	RECT	A36 Gr.36	Typical
5	MP3	N8	N11			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
6	MP2	N6	N9			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
7	MP1	N7	N10			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
8	M8	N18	N19		180	PL 4 x 3/8"	Beam	RECT	A36 Gr.36	Typical
9	M9	N20	N21		180	PL 4 x 3/8"	Beam	RECT	A36 Gr.36	Typical
10	MP6	N35	N37			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
11	MP4	N34	N36			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
12	MP9	N43	N45			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
13	MP7	N42	N44			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
14	M14	N28	N27		90	PL 4 x 3/8"	Beam	RECT	A36 Gr.36	Typical
15	M15	N27	N26		90	PL 4 x 3/8"	Beam	RECT	A36 Gr.36	Typical
16	M16	N26	N25		90	PL 4 x 3/8"	Beam	RECT	A36 Gr.36	Typical
17	M17	N25	N24		90	PL 4 x 3/8"	Beam	RECT	A36 Gr.36	Typical
18	M18	N24	N23		90	PL 4 x 3/8"	Beam	RECT	A36 Gr.36	Typical
19	M19	N23	N22		90	PL 4 x 3/8"	Beam	RECT	A36 Gr.36	Typical
20	M20	N22	N31		90	PL 4 x 3/8"	Beam	RECT	A36 Gr.36	Typical
21	M21	N31	N30		90	PL 4 x 3/8"	Beam	RECT	A36 Gr.36	Typical
22	M22	N30	N29		90	PL 4 x 3/8"	Beam	RECT	A36 Gr.36	Typical
23	M23	N29	N28		90	PL 4 x 3/8"	Beam	RECT	A36 Gr.36	Typical
24	M24	N53	N54			HSS3x3x5	Beam	Tube	A53 Gr.B	Typical
25	M25	N56	N55			C5x9	Beam	RECT	A36 Gr.36	Typical
26	M26	N60	N61			HSS3x3x5	Beam	Tube	A53 Gr.B	Typical
27	M27	N63	N62			C5x9	Beam	RECT	A36 Gr.36	Typical
28	M28	N67	N69		180	C5x9	Beam	RECT	A36 Gr.36	Typical
29	M29	N69	N68		180	C5x9	Beam	RECT	A36 Gr.36	Typical
30	M30	N72	N73			RIGID	None	None	RIGID	Typical
31	M31	N31	N74			RIGID	None	None	RIGID	Typical
32	M32	N28	N75			RIGID	None	None	RIGID	Typical
33	M33	N76	N77			RIGID	None	None	RIGID	Typical
34	M34	N23	N78			RIGID	None	None	RIGID	Typical
35	M35	N79	N80			RIGID	None	None	RIGID	Typical
36	MP5	N82	N83			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
37	MP8	N86	N87			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
38	M38	N101	N102			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
39	M39	N105A	N106			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
40	M40	N109	N110			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
41	M41	N118	N113			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
42	M42	N112	N103			Site Pro	Beam	Single Angle	A36 Gr.36	Typical
43	M43	N114	N115			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
44	M44	N105	N107			Site Pro	Beam	Single Angle	A36 Gr.36	Typical
45	M45	N116	N117			2" STD Pipe	Beam	Single Angle	A53 Gr.B	Typical
46	M46	N108	N111			Site Pro	Beam	Single Angle	A36 Gr.36	Typical

Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[K]
1	General				
2	RIGID		6	44.6	0
3	Total General		6	44.6	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	C5x9	6	699	.5
7	A36 Gr.36	PL 4 x 3/8"	13	289.4	.1
8	A36 Gr.36	L2x2x3	3	17.4	0
9	A53 Gr.B	HSS3x3x5	3	71.4	0
10	A53 Gr.B	PIPE_2.0	15	1628.4	.5
11	Total HR Steel		40	2705.6	1.2

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
1	Self Weight	DL		-1			24		16	
2	Wind Load AZI 000	WLZ					24		3	
3	Wind Load AZI 090	WLX					24		3	
4	Ice Weight	OL1					24	46	16	
5	Wind + Ice Load AZI 000	OL2					24		1	
6	Wind + Ice Load AZI 090	OL3					24		1	
7	Service Live 1	LL				3				
8	BLC 1 Transient Area Loads	None						176		
9	BLC 2 Transient Area Loads	None						61		
10	BLC 3 Transient Area Loads	None						58		
11	BLC 4 Transient Area Loads	None						176		
12	BLC 5 Transient Area Loads	None						43		
13	BLC 6 Transient Area Loads	None						40		

Load Combinations

	Description	So..	P...	S...	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4D	Yes	Y		DL	1.4						
2	1.2D + 1.6W AZI 000	Yes	Y		DL	1.2	WLZ	1.6				
3	1.2D + 1.6W AZI 030	Yes	Y		DL	1.2	WLZ	1.386	WLX	.8		
4	1.2D + 1.6W AZI 060	Yes	Y		DL	1.2	WLZ	.8	WLX	1.386		
5	1.2D + 1.6W AZI 090	Yes	Y		DL	1.2			WLX	1.6		
6	1.2D + 1.6W AZI 120	Yes	Y		DL	1.2	WLZ	-.8	WLX	1.386		
7	1.2D + 1.6W AZI 150	Yes	Y		DL	1.2	WLZ	-1.386	WLX	.8		
8	1.2D + 1.6W AZI 180	Yes	Y		DL	1.2	WLZ	-1.6				
9	1.2D + 1.6W AZI 210	Yes	Y		DL	1.2	WLZ	-1.386	WLX	-.8		
10	1.2D + 1.6W AZI 240	Yes	Y		DL	1.2	WLZ	-.8	WLX	-1.386		
11	1.2D + 1.6W AZI 270	Yes	Y		DL	1.2			WLX	-1.6		
12	1.2D + 1.6W AZI 300	Yes	Y		DL	1.2	WLZ	.8	WLX	-1.386		
13	1.2D + 1.6W AZI 330	Yes	Y		DL	1.2	WLZ	1.386	WLX	-.8		
14	0.9D + 1.6W AZI 000	Yes	Y		DL	.9	WLZ	1.6				
15	0.9D + 1.6W AZI 030	Yes	Y		DL	.9	WLZ	1.386	WLX	.8		
16	0.9D + 1.6W AZI 060	Yes	Y		DL	.9	WLZ	.8	WLX	1.386		
17	0.9D + 1.6W AZI 090	Yes	Y		DL	.9			WLX	1.6		
18	0.9D + 1.6W AZI 120	Yes	Y		DL	.9	WLZ	-.8	WLX	1.386		

Load Combinations (Continued)

	Description	So..	P...	S...	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
19	0.9D + 1.6W AZI 150	Yes	Y		DL	.9	WLZ	-1.386	WLX	.8		
20	0.9D + 1.6W AZI 180	Yes	Y		DL	.9	WLZ	-1.6				
21	0.9D + 1.6W AZI 210	Yes	Y		DL	.9	WLZ	-1.386	WLX	-.8		
22	0.9D + 1.6W AZI 240	Yes	Y		DL	.9	WLZ	-.8	WLX	-1.386		
23	0.9D + 1.6W AZI 270	Yes	Y		DL	.9			WLX	-1.6		
24	0.9D + 1.6W AZI 300	Yes	Y		DL	.9	WLZ	.8	WLX	-1.386		
25	0.9D + 1.6W AZI 330	Yes	Y		DL	.9	WLZ	1.386	WLX	-.8		
26	1.2D + 1.0Di	Yes	Y		DL	1.2	OL1	1				
27	1.2D + 1.0Di + 1.0Wi AZI 000	Yes	Y		DL	1.2	OL1	1	OL2	1		
28	1.2D + 1.0Di + 1.0Wi AZI 030	Yes	Y		DL	1.2	OL1	1	OL2	.866	OL3	.5
29	1.2D + 1.0Di + 1.0Wi AZI 060	Yes	Y		DL	1.2	OL1	1	OL2	.5	OL3	.866
30	1.2D + 1.0Di + 1.0Wi AZI 090	Yes	Y		DL	1.2	OL1	1			OL3	1
31	1.2D + 1.0Di + 1.0Wi AZI 120	Yes	Y		DL	1.2	OL1	1	OL2	-.5	OL3	.866
32	1.2D + 1.0Di + 1.0Wi AZI 150	Yes	Y		DL	1.2	OL1	1	OL2	-.866	OL3	.5
33	1.2D + 1.0Di + 1.0Wi AZI 180	Yes	Y		DL	1.2	OL1	1	OL2	-1		
34	1.2D + 1.0Di + 1.0Wi AZI 210	Yes	Y		DL	1.2	OL1	1	OL2	-.866	OL3	-.5
35	1.2D + 1.0Di + 1.0Wi AZI 240	Yes	Y		DL	1.2	OL1	1	OL2	-.5	OL3	-.866
36	1.2D + 1.0Di + 1.0Wi AZI 270	Yes	Y		DL	1.2	OL1	1			OL3	-1
37	1.2D + 1.0Di + 1.0Wi AZI 300	Yes	Y		DL	1.2	OL1	1	OL2	.5	OL3	-.866
38	1.2D + 1.0Di + 1.0Wi AZI 330	Yes	Y		DL	1.2	OL1	1	OL2	.866	OL3	-.5
39	1.2D + 1.5L + 1.0WL (30 mph) AZI 000	Yes	Y		DL	1.2	LL	1.5	WLZ	.111		
40	1.2D + 1.5L + 1.0WL (30 mph) AZI 030	Yes	Y		DL	1.2	LL	1.5	WLZ	.096	WLX	.056
41	1.2D + 1.5L + 1.0WL (30 mph) AZI 060	Yes	Y		DL	1.2	LL	1.5	WLZ	.056	WLX	.096
42	1.2D + 1.5L + 1.0WL (30 mph) AZI 090	Yes	Y		DL	1.2	LL	1.5			WLX	.111
43	1.2D + 1.5L + 1.0WL (30 mph) AZI 120	Yes	Y		DL	1.2	LL	1.5	WLZ	-.056	WLX	.096
44	1.2D + 1.5L + 1.0WL (30 mph) AZI 150	Yes	Y		DL	1.2	LL	1.5	WLZ	-.096	WLX	.056
45	1.2D + 1.5L + 1.0WL (30 mph) AZI 180	Yes	Y		DL	1.2	LL	1.5	WLZ	-.111		
46	1.2D + 1.5L + 1.0WL (30 mph) AZI 210	Yes	Y		DL	1.2	LL	1.5	WLZ	-.096	WLX	-.056
47	1.2D + 1.5L + 1.0WL (30 mph) AZI 240	Yes	Y		DL	1.2	LL	1.5	WLZ	-.056	WLX	-.096
48	1.2D + 1.5L + 1.0WL (30 mph) AZI 270	Yes	Y		DL	1.2	LL	1.5			WLX	-.111
49	1.2D + 1.5L + 1.0WL (30 mph) AZI 300	Yes	Y		DL	1.2	LL	1.5	WLZ	.056	WLX	-.096
50	1.2D + 1.5L + 1.0WL (30 mph) AZI 330	Yes	Y		DL	1.2	LL	1.5	WLZ	.096	WLX	-.056

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N1	max	1844.528	17	3816.768	27	2066.456	2	6114.037	27	1736.465	23	461.427	11
2		min	-1844.408	23	-799.056	20	-2071.56	8	-1349.206	20	-1736.508	17	-460.156	17
3	N53	max	1760.889	6	3822.428	31	1758.215	13	709.735	25	865.111	14	1175.627	24
4		min	-1764.591	12	-806.21	24	-1755.334	7	-3068.349	32	-863.327	20	-5310.021	31
5	N60	max	2156.872	5	3818.462	35	1940.664	15	699.981	15	1237.379	19	5292.934	35
6		min	-2153.14	11	-805.722	16	-1937.377	21	-3073.897	34	-1237.237	25	-1183.623	16
7	Totals:	max	5703.81	5	9986.083	37	5538.827	14						
8		min	-5703.81	11	2287.486	18	-5538.827	20						

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Lo...	LC	Shear Check	Lo...		phi*...	phi*...	phi*...	phi*...	Eqn
1	M1	HSS3x3x5	.831	0	28	.171	0	y	903...	92610	761...	761...	H1...
2	M26	HSS3x3x5	.825	0	34	.172	0	y	903...	92610	761...	761...	H1...
3	M24	HSS3x3x5	.820	0	32	.171	0	y	903...	92610	761...	761...	H1...

Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Lo...	LC	Shear Check	Lo...			phi*...	phi*...	phi*...	phi*...		Eqn
4	MP6	PIPE_2.0	.647	59...	10	.093	59...			265...	32130	187...	187...		H1...
5	M27	C5x9	.646	16...	9	.117	32...	y		757...	85536	190...	114...	1	H1...
6	MP7	PIPE_2.0	.637	59...	6	.075	59...		6	265...	32130	187...	187...		H1...
7	MP4	PIPE_2.0	.629	59...	2	.077	59...		2	265...	32130	187...	187...		H1...
8	MP5	PIPE_2.0	.618	59...	9	.137	59...		9	265...	32130	187...	187...		H1...
9	MP3	PIPE_2.0	.594	59...	6	.091	59...		6	265...	32130	187...	187...		H1...
10	MP9	PIPE_2.0	.591	59...	2	.086	59...		2	265...	32130	187...	187...		H1...
11	MP1	PIPE_2.0	.590	59...	10	.082	59...			265...	32130	187...	187...		H1...
12	MP8	PIPE_2.0	.588	59...	13	.114	59...			265...	32130	187...	187...		H1...
13	M25	C5x9	.578	16...	5	.108	32...	y		757...	85536	190...	114...	1	H1...
14	M18	PL 4 x 3/8"	.577	8....	3	.064	8....	y	3	704...	48600	380.7	4050		H1...
15	MP2	PIPE_2.0	.566	59...	5	.114	59...		5	265...	32130	187...	187...		H1...
16	M4	C5x9	.555	16...	13	.117	32...	y		757...	85536	190...	114...	1	H1...
17	M28	C5x9	.553	66...	9	.261	15...	z	6	287...	85536	190...	102...	1	H1...
18	M46	L2x2x3	.515	0	5	.279	5....	y	5	231...	233...	557...	123...		H2-1
19	M44	L2x2x3	.512	0	2	.265	5....	y		231...	233...	557...	123...		H2-1
20	M21	PL 4 x 3/8"	.490	15...	12	.072	15...	y		704...	48600	380.7	4050		H1...
21	M3	C5x9	.478	66...	5	.273	15...	z	2	287...	85536	190...	102...	1	H1...
22	M29	C5x9	.468	66...	13	.237	15...	z		287...	85536	190...	102...	1	H1...
23	M42	L2x2x3	.459	5....	3	.252	5....	y	9	231...	233...	557...	123...		H2-1
24	M39	PIPE_2.0	.404	81	34	.238	15...		5	539...	32130	187...	187...		H1...
25	M40	PIPE_2.0	.401	81	38	.224	3....			539...	32130	187...	187...		H1...
26	M38	PIPE_2.0	.399	81	30	.226	15...			539...	32130	187...	187...		H1...
27	M17	PL 4 x 3/8"	.300	16...	3	.110	16...	y	4	704...	48600	380.7	4050		H1...
28	M15	PL 4 x 3/8"	.271	0	7	.068	16...	y	2	704...	48600	380.7	4050		H1...
29	M14	PL 4 x 3/8"	.238	24...	10	.047	24...	y	9	704...	48600	380.7	4050		H1...
30	M22	PL 4 x 3/8"	.226	12...	7	.071	12...	y	6	704...	48600	380.7	4050		H1...
31	M20	PL 4 x 3/8"	.223	24...	10	.046	24...	y		704...	48600	380.7	4050		H1...
32	M23	PL 4 x 3/8"	.218	24...	13	.056	24...	y	7	704...	48600	380.7	4050		H1...
33	M19	PL 4 x 3/8"	.196	0	8	.035	0	y	6	704...	48600	380.7	4050		H1...
34	M16	PL 4 x 3/8"	.171	0	2	.039	0	y	9	704...	48600	380.7	4050		H1...
35	M9	PL 4 x 3/8"	.102	0	13	.025	0	y	7	151...	48600	380.7	4050		H1...
36	M2	PL 4 x 3/8"	.100	0	5	.027	0	y		151...	48600	380.7	4050		H1...
37	M8	PL 4 x 3/8"	.089	0	9	.023	0	y	3	151...	48600	380.7	4050		H1...
38	M45	PIPE_2.0	.027	28...	27	.109	0			245...	32130	187...	187...		H1...
39	M41	PIPE_2.0	.027	28...	31	.102	56...		3	245...	32130	187...	187...		H1...
40	M43	PIPE_2.0	.027	28...	35	.105	0		7	245...	32130	187...	187...		H1...

Date: June 13, 2019

B+T GRP

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119

Mr. Charles Track
Crown Castle
3530 Toringdon WaySuite 300
Charlotte, NC 28277

Subject:	**Structural Modification Report**	
Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT43XC804
	Carrier Site Name:	CT43XC804
Crown Castle Designation:	**Crown Castle BU Number:**	876399
	Crown Castle Site Name:	(F) E. Granby 4Q2000 / Galasso
	Crown Castle JDE Job Number:	447217
	Crown Castle Work Order Number:	1669315
	Crown Castle Order Number:	397084 Rev. 4
Engineering Firm Designation:	**B+T Group Project Number:**	127643.003.01
Site Data:	**60 South Main St., East Granby, CT, Hartford County** **Latitude *41° 56' 29.59"*, Longitude *-72° 44' 19.248"*** **98 Ft - Monopole**	

Dear Mr. Charles,

B+T Group is pleased to submit this **"Structural Modification Report"** to determine the structural integrity of the above mentioned tower.

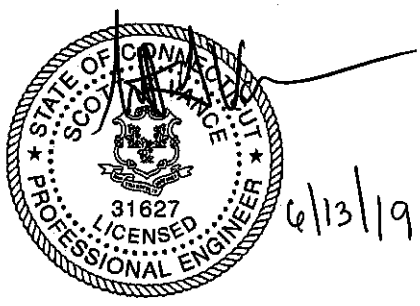
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC4.7: Modified Structure w/ Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut Building code and the 2015 International Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural modification prepared by: Kishore Machani

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564; Exp: 02/10/20



Scott S. Vance, P.E.

tnxTower Report - version 8.0.4.0

TABLE OF CONTENTS

1) INTRODUCTION

This is 98 ft. monopole designed by Engineered Endeavors, Inc. in September of 2000. The monopole was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. This monopole has been modified by IETS in November of 2009, PJF in June of 2012 and GPD in July of 2015 and those modifications were incorporated in this analysis.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.7 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
94.0	98.0	1	Site Pro 1	HRK14-HD Handrail Kit	3 1	1-1/4 7/8
	97.0	3	Alcatel Lucent	PCS 1900MHZ 4X45W-65MHZ		
		3	Alcatel Lucent	TD-RRH8X20-25		
		6	Alcatel Lucent	RRH2X50-800		
		3	Commscope	NNVV-65B-R4		
		3	RFS Celwave	APXVTM14-ALU-I20		
	94.0	1	--	Platform Mount [LP 714-1]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
89.0	90.0	3	RFS Celwave	APXVAARR24_43-U-NA20	1 11	1-3/8 7/8
		3	Ericsson	RADIO 4449 B12/B71		
		3	RFS Celwave	ATMPP1412D-1CWA		
		3	RFS Celwave	APXV18-209014-C		
	89.0	1	--	Platform Mount [LP 305-1]		
74.0	77.0	1	Raycap	DC6-48-60-18-8F	2 1 12 2 1	3/4 3/8 7/8 3/4 3/8
		1	Andrew	SBNH-1D6565C		
		3	CCI Antennas	TPA-65R-LCUUUU-H8		
		3	Ericsson	RRUS 11 B12		
		3	Ericsson	RRUS 32 B2		
		3	Ericsson	RRUS 32 B30		
		3	Kaelus	DBC0061F1V51-2		
		3	Powerwave Tech.	7770.00		
		2	Powerwave Tech.	P65-17-XLH-RR		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	Powerwave Tech.	TT19-08BP111-001		
		1	Raycap	DC6-48-60-18-8F		
	74.0	1	--	Platform Mount [LP 303-1]		
67.0	67.0	3	Alcatel Lucent	B13 RRH 4X30	2 12	1-3/8 1-5/8
		3	Alcatel Lucent	B66A RRH4X45		
		2	Commscope	RC2DC-3315-PF-48		
		6	Commscope	SBNHH-1D65B		
		1	--	Platform Mount [LP 303-1]		
		6	Antel	LPA-80063/6CFX2		
52.0	54.0	1	Lucent	KS24019-L112A	1	7/8
	52.0	1	--	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Online Order Information	Sprint/Nextel Property Services Co-Locate, Rev.4	397084	CCI Sites
Tower Manufacturer Drawing	Engineered Endeavors, Inc. Job No. 7832-E01	1613691	CCI Sites
Foundation Drawings	Engineered Endeavors, Inc. , Project No.7832 Rev.1	2066334	CCI Sites
Geotech Report	DR. Clarence Welti, P.E., P.C, Date:07/25/2000	1531971	CCI Sites
	Delta Oaks Group, Project No. Geo18-03201-01	Date: 10/19/2018	CCI Sites
Tower Modification Drawing	IETS Project No. 2009-70644	2529017	CCI Sites
	Paul J. Ford & Company, Project No. 32912-0138 MO	3713021	CCI Sites
	GPD, Project No .2015777.876399.01	5803194	CCI Sites
Modification Inspection Report	IETS Project No. 2010-70158	2682749	CCI Sites
	Paul J. Ford & Company, Project No. 32912-0138 MO	3713020	CCI Sites
	ETS Project No. 160019	6139057	CCI Sites
Antenna Configuration	Crown CAD-Package	Date: 07/18/18	CCI Sites

3.1) Analysis Method

tnxTower (version 8.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built and maintained in accordance with the manufacturer's specifications.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) Mount areas and weights are assumed based on photographs provided.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary) (Monopole) - LC4.7

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	98 - 93	Pole	TP13.078x12x0.1875	1	-3.421	-	11.1	Pass[1]
L2	93 - 88	Pole	TP14.156x13.078x0.1875	2	-5.621	-	29.0	Pass[1]
L3	88 - 85.21	Pole	TP15.28x14.156x0.1875	3	-5.770	-	40.0	Pass[1]
L4	85.21 - 80.21	Pole	TP15.445x14.383x0.25	4	-6.187	-	44.5	Pass[1]
L5	80.21 - 75.21	Pole	TP16.507x15.445x0.25	5	-6.571	-	53.9	Pass[1]
L6	75.21 - 70.21	Pole	TP17.568x16.507x0.25	6	-9.837	-	68.9	Pass[1]
L7	70.21 - 65.21	Pole	TP18.63x17.568x0.25	7	-12.847	-	81.4	Pass[1]
L8	65.21 - 60.21	Pole	TP19.692x18.63x0.25	8	-13.625	-	94.5	Pass[1]
L9	60.21 - 59.17	Pole	TP19.913x19.692x0.25	9	-13.788	-	96.8	Pass[1]
L10	59.17 - 58.9	Pole + Reinf.	TP19.97x19.913x0.5125	10	-13.866	-	87.7	Pass[1]
L11	58.9 - 58.75	Pole + Reinf.	TP20.002x19.97x0.5125	11	-13.895	-	88.1	Pass[1]
L12	58.75 - 54.08	Pole + Reinf.	TP20.993x20.002x0.5	12	-14.748	-	98.6	Pass[1]
L13	54.08 - 53.83	Pole + Reinf.	TP21.047x20.993x0.7	13	-14.824	-	74.2	Pass[1]
L14	53.83 - 52.91	Pole + Reinf.	TP21.242x21.047x0.7	14	-15.033	-	75.7	Pass[1]
L15	52.91 - 52.66	Pole + Reinf.	TP21.295x21.242x0.775	15	-15.105	-	68.5	Pass[1]
L16	52.66 - 52.17	Pole + Reinf.	TP21.399x21.295x0.775	16	-15.227	-	69.2	Pass[1]
L17	52.17 - 51.92	Pole + Reinf.	TP21.452x21.399x0.6875	17	-15.369	-	76.0	Pass[1]
L18	51.92 - 48.71	Pole + Reinf.	TP22.86x21.452x0.6625	18	-16.130	-	80.9	Pass[1]
L19	48.71 - 44.29	Pole + Reinf.	TP22.574x21.634x0.7375	19	-17.859	-	83.2	Pass[1]
L20	44.29 - 39.29	Pole + Reinf.	TP23.638x22.574x0.7125	20	-19.182	-	88.9	Pass[1]
L21	39.29 - 34.29	Pole + Reinf.	TP24.703x23.638x0.6875	21	-20.536	-	93.9	Pass[1]
L22	34.29 - 33.5	Pole + Reinf.	TP24.871x24.703x0.6875	22	-20.756	-	94.6	Pass[1]
L23	33.5 - 33.25	Pole + Reinf.	TP24.924x24.871x0.9875	23	-20.851	-	67.6	Pass[1]
L24	33.25 - 32	Pole + Reinf.	TP25.19x24.924x0.9875	24	-21.266	-	68.5	Pass[1]
L25	32 - 31.75	Pole + Reinf.	TP25.243x25.19x0.7625	25	-21.349	-	81.1	Pass[1]
L26	31.75 - 28.5	Pole + Reinf.	TP25.935x25.243x0.75	26	-22.293	-	83.6	Pass[1]
L27	28.5 - 28.25	Pole + Reinf.	TP25.988x25.935x1.0375	27	-22.397	-	62.6	Pass[1]
L28	28.25 - 27.75	Pole + Reinf.	TP26.094x25.988x1.0375	28	-22.576	-	63.0	Pass[1]
L29	27.75 - 27.5	Pole + Reinf.	TP26.148x26.094x1.2125	29	-22.677	-	59.9	Pass[1]
L30	27.5 - 27.25	Pole + Reinf.	TP26.201x26.148x0.9	30	-22.757	-	78.9	Pass[1]
L31	27.25 - 27.08	Pole + Reinf.	TP26.237x26.201x0.9	31	-22.813	-	79.0	Pass[1]
L32	27.08 - 26.83	Pole + Reinf.	TP26.29x26.237x0.7375	32	-22.883	-	84.8	Pass[1]
L33	26.83 - 21.83	Pole + Reinf.	TP27.354x26.29x0.725	33	-24.307	-	87.9	Pass[1]
L34	21.83 - 16.83	Pole + Reinf.	TP28.418x27.354x0.7	34	-25.771	-	90.7	Pass[1]
L35	16.83 - 15.45	Pole + Reinf.	TP28.712x28.418x0.7	35	-26.175	-	91.4	Pass[1]
L36	15.45 - 15.2	Pole + Reinf.	TP28.765x28.712x0.4875	36	-26.273	-	86.3	Pass[1]
L37	15.2 - 13.41	Pole + Reinf.	TP29.146x28.765x0.4875	37	-26.840	-	84.4	Pass[1]
L38	13.41 - 13.16	Pole + Reinf.	TP29.199x29.146x0.7125	38	-26.953	-	84.5	Pass[1]
L39	13.16 - 8.16	Pole + Reinf.	TP30.263x29.199x0.7	39	-28.567	-	86.9	Pass[1]
L40	8.16 - 6.5	Pole + Reinf.	TP30.617x30.263x0.4875	40	-29.073	-	87.6	Pass[1]
L41	6.5 - 6.25	Pole + Reinf.	TP30.67x30.617x0.4875	41	-29.179	-	84.6	Pass[1]

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L42	6.25 - 4.45	Pole + Reinf.	TP31.053x30.67x0.4875	42	-29.721	-	85.4	Pass[1]
L43	4.45 - 4.2	Pole + Reinf.	TP31.106x31.053x0.6625	43	-29.829	-	89.4	Pass[1]
L44	4.2 - 0	Pole + Reinf.	TP32x31.106x0.6625	44	-31.121	-	91.1	Pass[1]
							Summary	
						Pole (L12)	98.6	Pass[1]
						Rating =	**98.6**	**Pass[1]**

Table 5 - Tower Component Stresses vs. Capacity (Monopole) - LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	58.4	Pass
1	Base Plate	Base	90.4	Pass
1	Base Foundation (Soil Interaction)	Base	83.0	Pass
1	Base Foundation (Steel)	Base	59.3	Pass

Structure Rating (max from all components) =	**98.6%**

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.

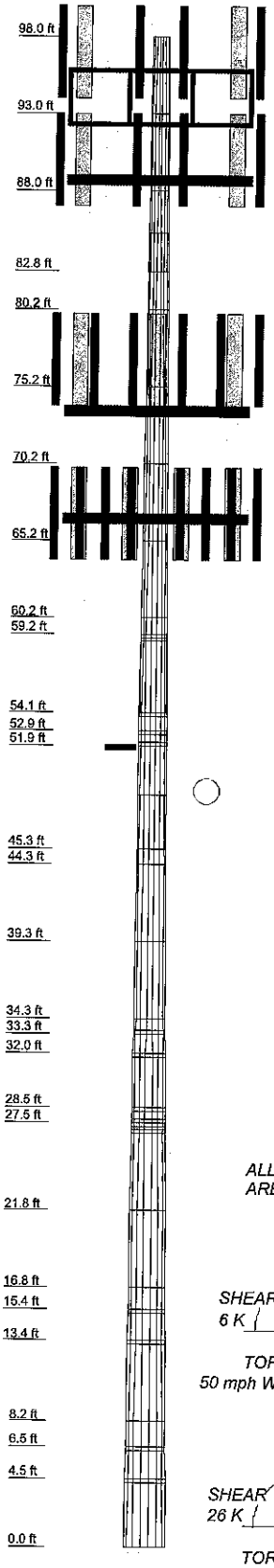
4.1) Recommendations

1. All modifications proposed in this report shall be installed in accordance with the attached drawings (Appendix D) for the determined capacity to be effective.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Length (ft)	5.000	5.000	5.210	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	4.670	5.000	5.000	5.000	5.000	5.000	4.200	4.200	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	4.200
Number of Sides	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.188	0.188	0.188	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.500	0.250	0.250	0.250	0.250	0.250	0.630	0.630	0.713	0.688	0.663	0.638	0.613	0.588	0.563	0.538	0.513	0.488	0.463	0.438	0.413	0.725	0.700	0.675	0.650	0.625	0.600	0.750	0.725	0.700	0.675	0.650	0.7750
Socket Length (ft)	2.420																	4.420		3.420																											
Top Dia (in)	12.000	13.078	14.156	14.383	15.445	16.507	17.568	18.630	19.692	20.754	21.816	22.920	23.982	25.044	26.106	27.168	28.230	21.452	21.684	22.574	23.638	24.703	25.767	26.831	27.895	28.959	30.023	31.087	32.151	33.215	34.279	35.343	26.290	27.354	28.418	29.482	30.546	31.610	29.201	30.266	31.330	32.394	33.458	34.522
Bot Dia (in)	13.078	14.156	15.280	15.445	16.507	17.568	18.630	19.692	20.754	21.816	22.920	23.982	25.044	26.106	27.168	28.230	29.292	22.860	22.574	23.638	24.703	25.767	26.831	27.895	28.959	30.023	31.087	32.151	33.215	34.279	35.343	36.407	27.354	28.418	29.482	30.546	31.610	32.674	30.266	31.330	32.394	33.458	34.522	35.586
Grade	A572-65																																											
Weight (K)	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.1	0.1	0.5	0.5	0.1	0.1	0.1	0.1	0.1	1.0	0.7	0.8	0.9	0.9	0.9	0.9	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.9	0.9	0.9	0.9	0.9	0.9	1.1	0.4	0.5	0.4	0.4	1.0



ALL REACTIONS ARE FACTORED

AXIAL 64 K
SHEAR 6 K
MOMENT 525 kip-ft
TORQUE 0 kip-ft
50 mph WIND - 1.700 in ICE

AXIAL 32 K
SHEAR 26 K
MOMENT 1860 kip-ft
TORQUE 0 kip-ft
REACTIONS - 120 mph WIND

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

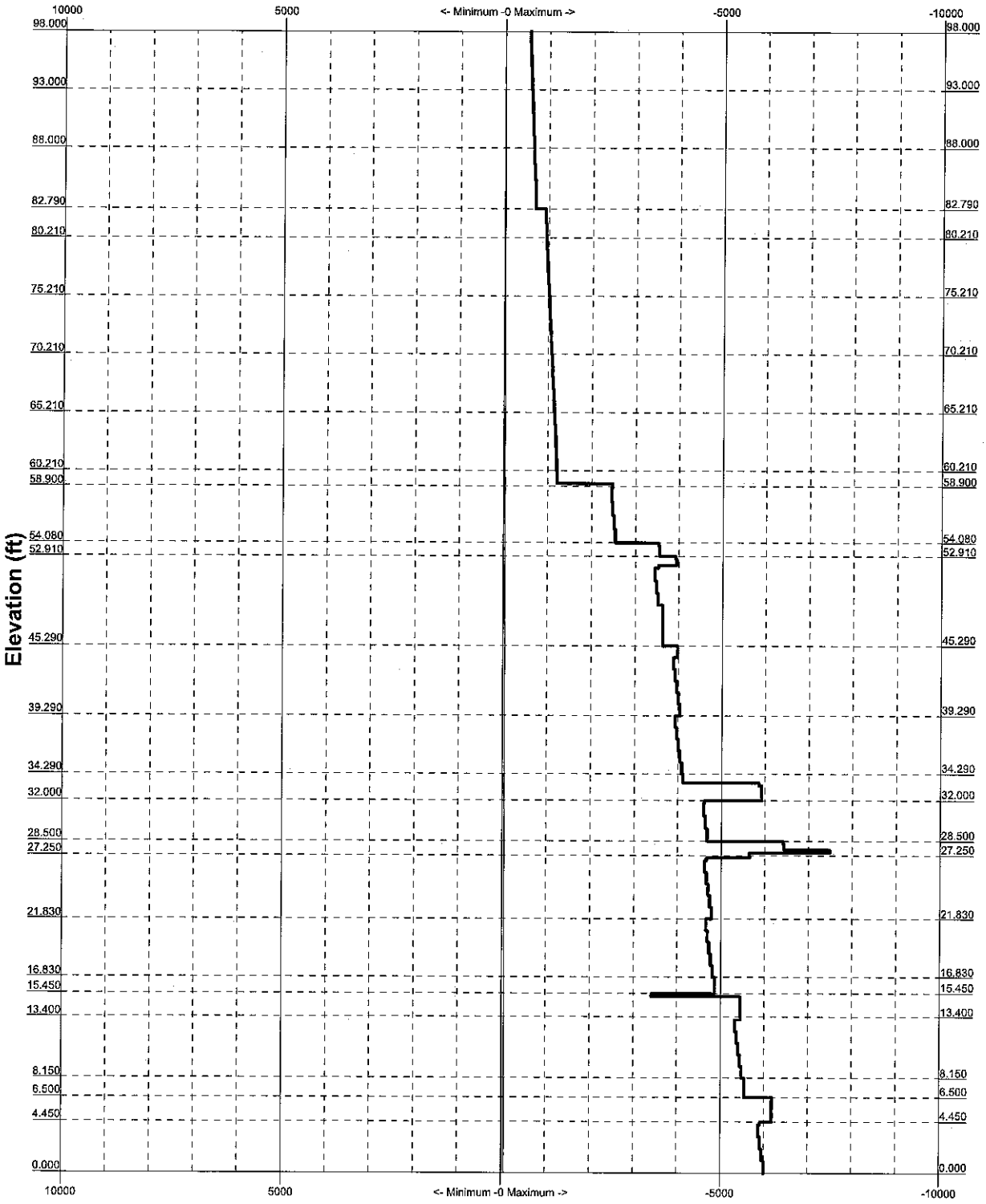
1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.70 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TIA-222-H Annex S
9. TOWER RATING: 98.6%

B+T Group
1717 S. Boulder, Suite 300.
Tulsa, OK 74119
B+T Group
Phone: (918) 587-4630
FAX: (918) 587- 0265

Job: *127643.003.01 - (F) E. GRANBY 4Q2000 / GALASSO, CT (BU# 87639*		
Project:		
Client: Crown Castle	Drawn by: kmachani	App'd:
Code: TIA-222-H	Date: 01/02/19	Scale: NTS
Path:		Dwg No. E-1

TIA-222-H - 120 mph/50 mph 1.700 in Ice Exposure C

Leg Capacity ——— **Leg Compression (K)**



B+T Group 1717 S. Boulder, Suite 300. Tulsa, OK 74119 B+T Group Phone: (918) 587-4630 FAX: (918) 587- 0265	Job: *127643.003.01 - (F) E. GRANBY 4Q2000 / GALASSO, CT (BU# 87639*		
	Project:		
	Client: Crown Castle	Drawn by: kmachani	App'd:
	Code: TIA-222-H	Date: 01/02/19	Scale: NTS
	Path:		Dwg No. E-3

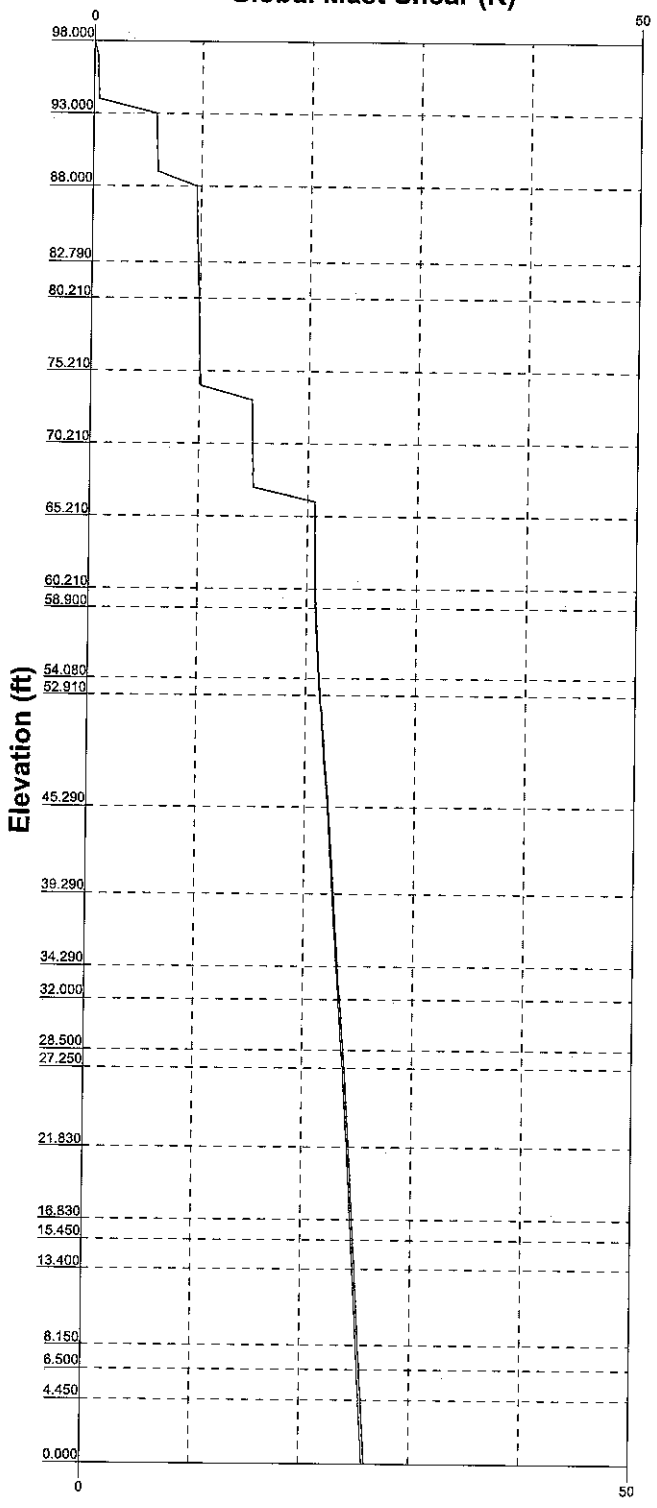
TIA-222-H - 120 mph/50 mph 1.700 in Ice Exposure C

Vx Vz

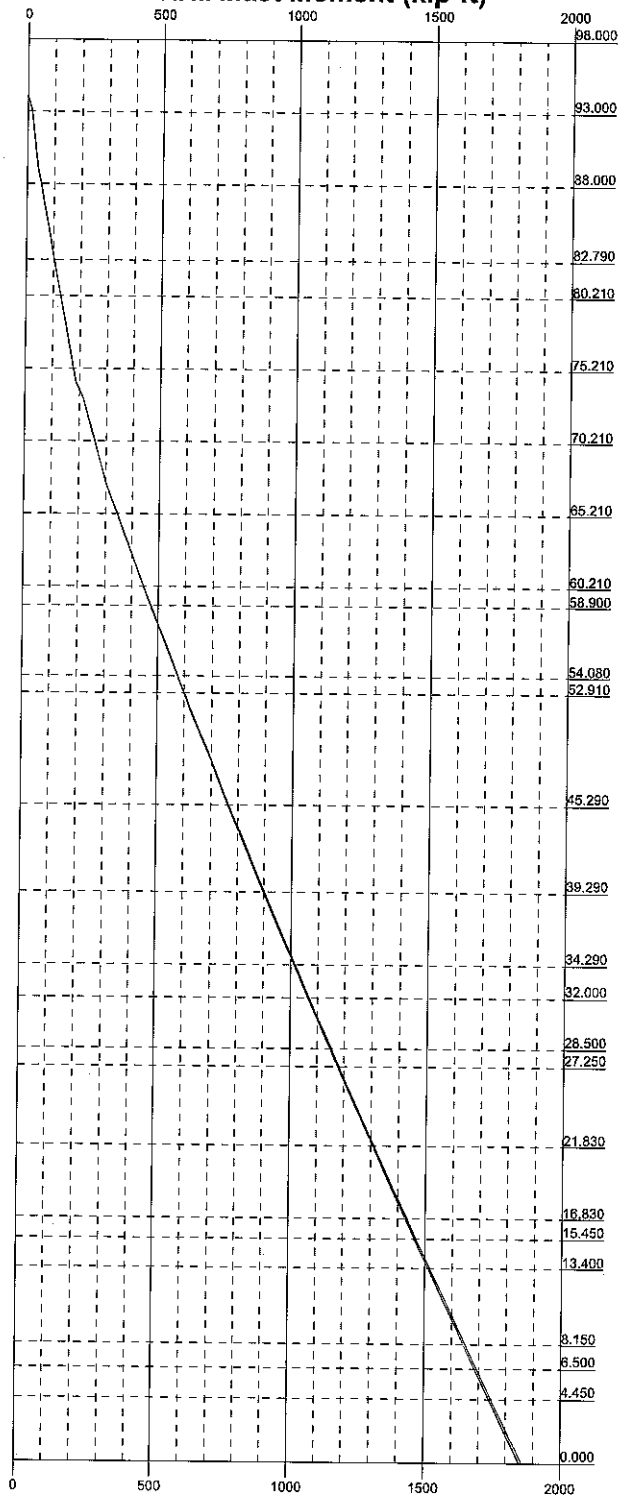
Maximum Values

Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)



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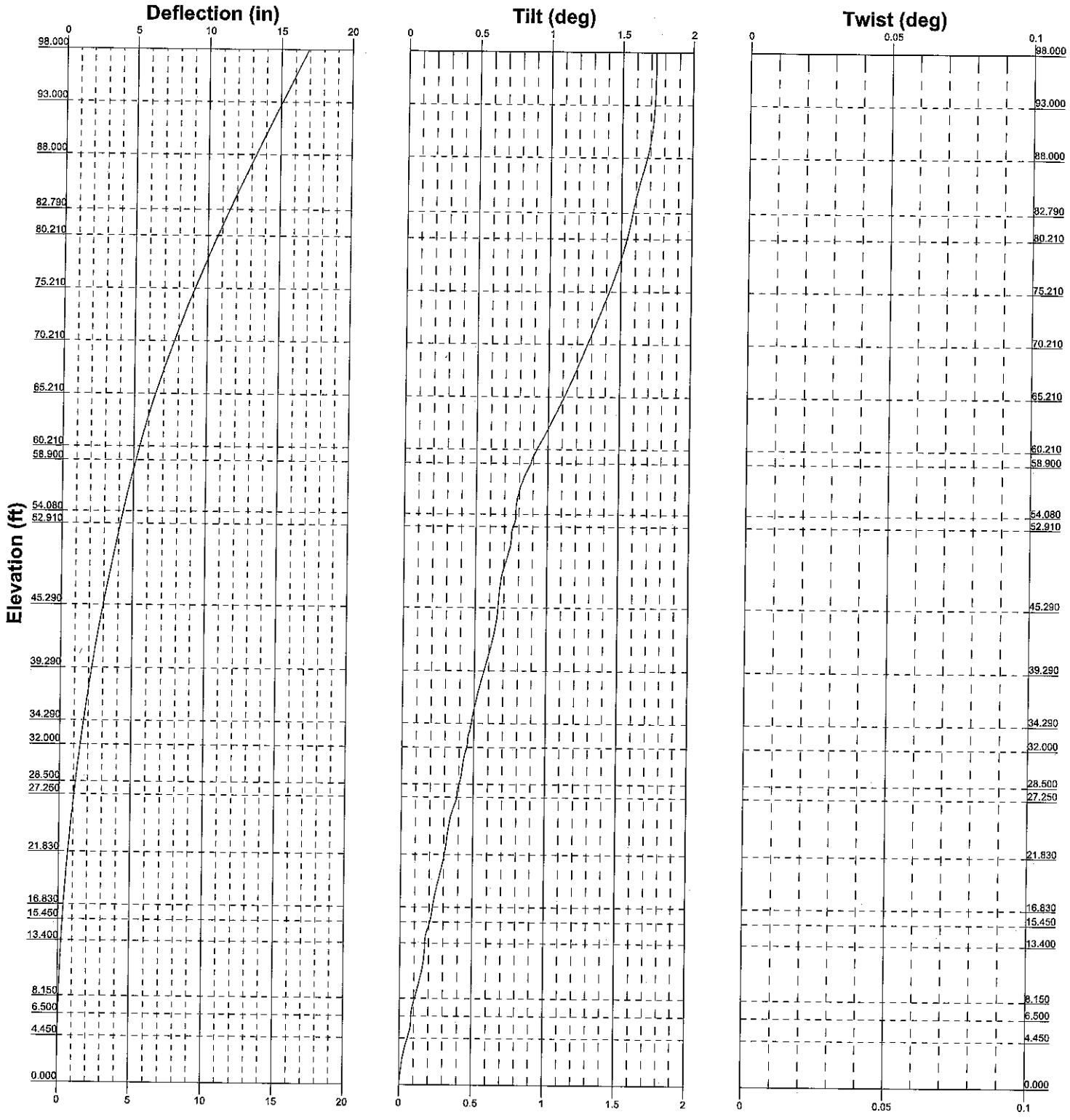
	Project:		
	Client: Crown Castle	Drawn by: kmachani	App'd:
	Code: TIA-222-H	Date: 01/02/19	Scale: NTS
	Path:		Dwg No. E-4

TIA-222-H - Service - 60 mph

Maximum Values



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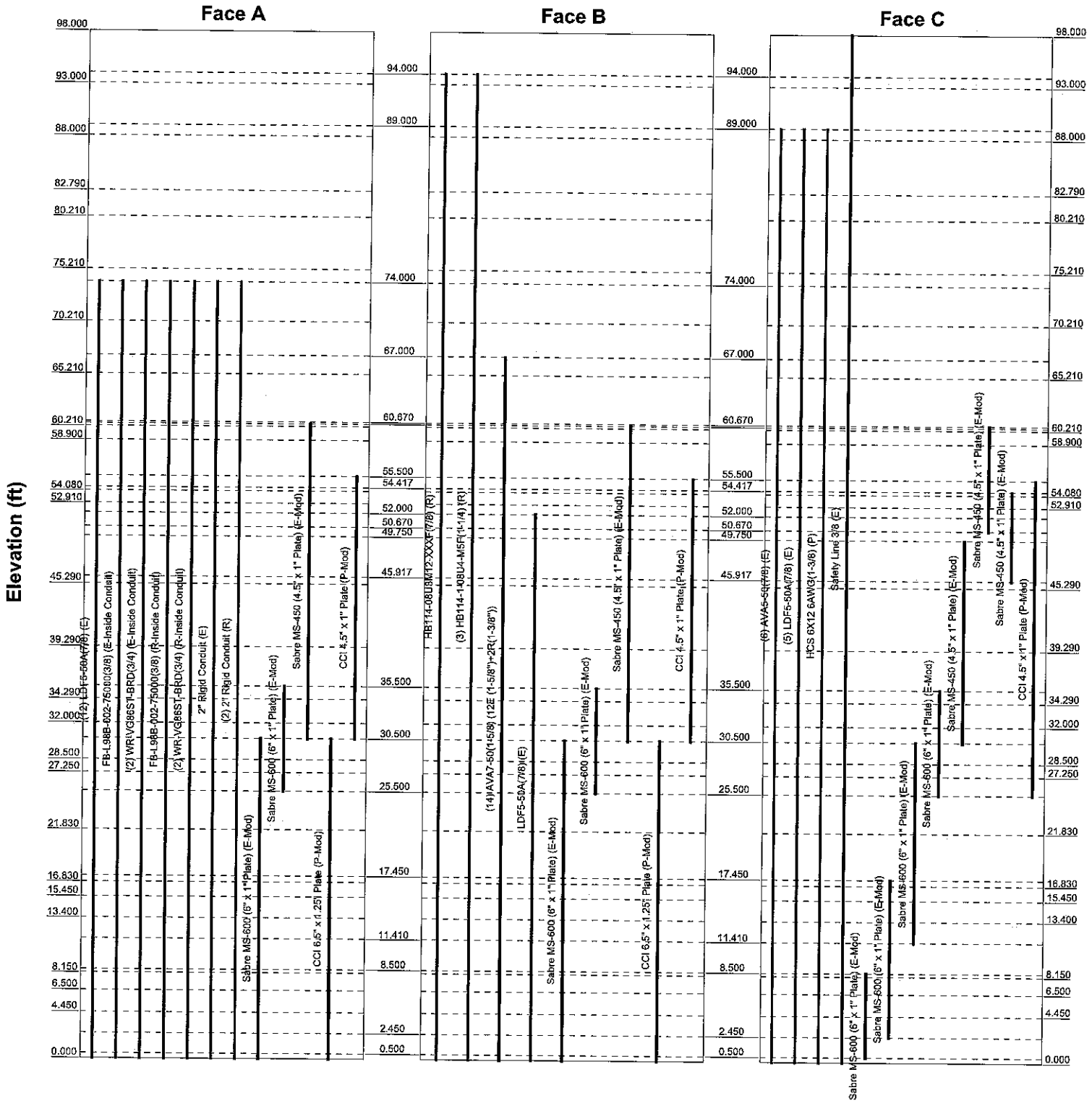
Job: *127643.003.01 - (F) E. GRANBY 4Q2000 / GALASSO, CT (BU# 87639*		
Project:		
Client: Crown Castle	Drawn by: kmachani	App'd:
Code: TIA-222-H	Date: 01/02/19	Scale: NTS
Path:		Dwg No. E-5

Feed Line Distribution Chart

0' - 98'

Round Flat App In Face App Out Face Truss Leg



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Phone: (918) 587-4630
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Job: *127643.003.01 - (F) E. GRANBY 4Q2000 / GALASSO, CT (BU# 87639*			
Project:			
Client: Crown Castle	Drawn by: kmachani	App'd:	
Code: TIA-222-H	Date: 01/02/19	Scale: NTS	
Path:		Dwg No. E-7	

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Tower base elevation above sea level: 256.000 ft.
Basic wind speed of 120 mph.
Risk Category II.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height 0.000 ft.
Nominal ice thickness of 1.700 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
TIA-222-H Annex S.
TOWER RATING: 98.6%.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.05.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	98.000-93.000	5.000	0.000	18	12.000	13.078	0.188	0.750	A572-65 (65 ksi)
L2	93.000-88.000	5.000	0.000	18	13.078	14.156	0.188	0.750	A572-65 (65 ksi)
L3	88.000-82.790	5.210	2.420	18	14.156	15.280	0.188	0.750	A572-65 (65 ksi)
L4	82.790-80.210	5.000	0.000	18	14.383	15.445	0.250	1.000	A572-65 (65 ksi)
L5	80.210-75.210	5.000	0.000	18	15.445	16.507	0.250	1.000	A572-65 (65 ksi)
L6	75.210-70.210	5.000	0.000	18	16.507	17.568	0.250	1.000	A572-65 (65 ksi)
L7	70.210-65.210	5.000	0.000	18	17.568	18.630	0.250	1.000	A572-65 (65 ksi)
L8	65.210-60.210	5.000	0.000	18	18.630	19.692	0.250	1.000	A572-65 (65 ksi)
L9	60.210-59.170	1.040	0.000	18	19.692	19.913	0.250	1.000	A572-65 (65 ksi)
L10	59.170-58.900	0.270	0.000	18	19.913	19.970	0.512	2.050	A572-65 (65 ksi)
L11	58.900-58.750	0.150	0.000	18	19.970	20.002	0.512	2.050	A572-65 (65 ksi)
L12	58.750-54.080	4.670	0.000	18	20.002	20.993	0.500	2.000	A572-65 (65 ksi)
L13	54.080-53.830	0.250	0.000	18	20.993	21.047	0.700	2.800	A572-65 (65 ksi)
L14	53.830-52.910	0.920	0.000	18	21.047	21.242	0.700	2.800	A572-65 (65 ksi)
L15	52.910-52.660	0.250	0.000	18	21.242	21.295	0.775	3.100	A572-65 (65 ksi)
L16	52.660-52.170	0.490	0.000	18	21.295	21.399	0.775	3.100	A572-65 (65 ksi)
L17	52.170-51.920	0.250	0.000	18	21.399	21.452	0.688	2.750	A572-65 (65 ksi)
L18	51.920-45.290	6.630	3.420	18	21.452	22.860	0.662	2.650	A572-65 (65 ksi)
L19	45.290-44.290	4.420	0.000	18	21.634	22.574	0.738	2.950	A572-65 (65 ksi)
L20	44.290-39.290	5.000	0.000	18	22.574	23.638	0.713	2.850	A572-65 (65 ksi)
L21	39.290-34.290	5.000	0.000	18	23.638	24.703	0.688	2.750	A572-65 (65 ksi)
L22	34.290-33.500	0.790	0.000	18	24.703	24.871	0.688	2.750	A572-65 (65 ksi)
L23	33.500-33.250	0.250	0.000	18	24.871	24.924	0.988	3.950	A572-65 (65 ksi)
L24	33.250-32.000	1.250	0.000	18	24.924	25.190	0.988	3.950	A572-65 (65 ksi)
L25	32.000-31.750	0.250	0.000	18	25.190	25.243	0.762	3.050	A572-65 (65 ksi)
L26	31.750-28.500	3.250	0.000	18	25.243	25.935	0.750	3.000	A572-65 (65 ksi)
L27	28.500-28.250	0.250	0.000	18	25.935	25.988	1.038	4.150	A572-65 (65 ksi)
L28	28.250-27.750	0.500	0.000	18	25.988	26.094	1.038	4.150	A572-65 (65 ksi)
L29	27.750-27.500	0.250	0.000	18	26.094	26.148	1.212	4.850	A572-65 (65 ksi)
L30	27.500-27.250	0.250	0.000	18	26.148	26.201	0.900	3.600	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L31	27.250-27.080	0.170	0.000	18	26.201	26.237	0.900	3.600	A572-65 (65 ksi)
L32	27.080-26.830	0.250	0.000	18	26.237	26.290	0.738	2.950	A572-65 (65 ksi)
L33	26.830-21.830	5.000	0.000	18	26.290	27.354	0.725	2.900	A572-65 (65 ksi)
L34	21.830-16.830	5.000	0.000	18	27.354	28.418	0.700	2.800	A572-65 (65 ksi)
L35	16.830-15.450	1.380	0.000	18	28.418	28.712	0.700	2.800	A572-65 (65 ksi)
L36	15.450-15.200	0.250	0.000	18	28.712	28.765	0.487	1.950	A572-65 (65 ksi)
L37	15.200-13.400	1.800	0.000	18	28.765	29.148	0.775	3.100	A572-65 (65 ksi)
L38	13.400-13.150	0.250	0.000	18	29.148	29.201	0.775	3.100	A572-65 (65 ksi)
L39	13.150-8.150	5.000	0.000	18	29.201	30.266	0.750	3.000	A572-65 (65 ksi)
L40	8.150-6.500	1.650	0.000	18	30.266	30.617	0.750	3.000	A572-65 (65 ksi)
L41	6.500-6.250	0.250	0.000	18	30.617	30.670	0.838	3.350	A572-65 (65 ksi)
L42	6.250-4.450	1.800	0.000	18	30.670	31.053	0.825	3.300	A572-65 (65 ksi)
L43	4.450-4.200	0.250	0.000	18	31.053	31.106	0.787	3.150	A572-65 (65 ksi)
L44	4.200-0.000	4.200		18	31.106	32.000	0.775	3.100	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	12.156	7.030	123.928	4.193	6.096	20.329	248.020	3.516	1.782	9.504
	13.251	7.672	161.057	4.576	6.644	24.242	322.325	3.837	1.972	10.516
L2	13.251	7.672	161.057	4.576	6.644	24.242	322.325	3.837	1.972	10.516
	14.346	8.313	204.946	4.959	7.191	28.498	410.162	4.157	2.162	11.528
L3	14.346	8.313	204.946	4.959	7.191	28.498	410.162	4.157	2.162	11.528
	15.487	8.982	258.481	5.358	7.762	33.300	517.303	4.492	2.359	12.583
L4	15.088	11.215	283.009	5.017	7.307	38.733	566.390	5.608	2.091	8.366
	15.645	12.057	351.702	5.394	7.846	44.826	703.867	6.030	2.278	9.113
L5	15.645	12.057	351.702	5.394	7.846	44.826	703.867	6.030	2.278	9.113
	16.723	12.900	430.698	5.771	8.385	51.363	861.964	6.451	2.465	9.861
L6	16.723	12.900	430.698	5.771	8.385	51.363	861.964	6.451	2.465	9.861
	17.801	13.742	520.718	6.148	8.925	58.346	1042.120	6.872	2.652	10.608
L7	17.801	13.742	520.718	6.148	8.925	58.346	1042.120	6.872	2.652	10.608
	18.879	14.585	622.480	6.525	9.464	65.773	1245.778	7.294	2.839	11.356
L8	18.879	14.585	622.480	6.525	9.464	65.773	1245.778	7.294	2.839	11.356
	19.957	15.427	736.704	6.902	10.003	73.645	1474.378	7.715	3.026	12.103
L9	19.957	15.427	736.704	6.902	10.003	73.645	1474.378	7.715	3.026	12.103
	20.181	15.602	762.095	6.980	10.116	75.338	1525.194	7.803	3.065	12.258
L10	20.141	31.558	1500.556	6.887	10.116	148.341	3003.087	15.782	2.603	5.078
	20.199	31.651	1513.900	6.907	10.145	149.230	3029.791	15.828	2.613	5.098
L11	20.199	31.651	1513.900	6.907	10.145	149.230	3029.791	15.828	2.613	5.098
	20.231	31.703	1521.347	6.919	10.161	149.725	3044.695	15.854	2.618	5.109
L12	20.233	30.949	1487.098	6.923	10.161	146.355	2976.153	15.478	2.640	5.281

tnxTower	Job: 127643.003.01 - (F) E. GRANBY 4Q2000 / GALASSO, CT (BU# 876399)	Page: 4 of 47
B+T Group 1717 S. Boulder, Suite 300. Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 587- 0265	Project	Date: 11:49:48 01/02/19
	Client: Crown Castle	Designed by: kmachani

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	21.240	32.523	1725.684	7.275	10.665	161.813	3453.638	16.265	2.815	5.63
L13	21.209	45.088	2345.912	7.204	10.665	219.970	4694.910	22.548	2.463	3.518
	21.263	45.206	2364.370	7.223	10.692	221.142	4731.852	22.607	2.472	3.532
L14	21.263	45.206	2364.370	7.223	10.692	221.142	4731.852	22.607	2.472	3.532
	21.462	45.640	2433.131	7.292	10.791	225.480	4869.465	22.824	2.507	3.581
L15	21.450	50.346	2664.426	7.266	10.791	246.914	5332.357	25.178	2.375	3.064
	21.504	50.476	2685.212	7.285	10.818	248.220	5373.957	25.243	2.384	3.076
L16	21.504	50.476	2685.212	7.285	10.818	248.220	5373.957	25.243	2.384	3.076
	21.610	50.732	2726.267	7.322	10.871	250.790	5456.121	25.371	2.402	3.1
L17	21.623	45.195	2449.375	7.353	10.871	225.319	4901.973	22.602	2.556	3.718
	21.677	45.311	2468.258	7.371	10.898	226.494	4939.763	22.660	2.566	3.732
L18	21.681	43.716	2387.104	7.380	10.898	219.047	4777.349	21.862	2.610	3.939
	23.110	46.676	2905.644	7.880	11.613	250.209	5815.112	23.343	2.857	4.313
L19	22.593	48.915	2698.442	7.418	10.990	245.537	5400.434	24.462	2.510	3.403
	22.809	51.116	3079.502	7.752	11.468	268.535	6163.055	25.563	2.675	3.627
L20	22.813	49.440	2985.342	7.761	11.468	260.324	5974.611	24.725	2.719	3.816
	23.893	51.847	3442.816	8.139	12.008	286.702	6890.161	25.928	2.906	4.079
L21	23.897	50.082	3332.895	8.148	12.008	277.548	6670.175	25.046	2.950	4.291
	24.978	52.404	3818.287	8.525	12.549	304.273	7641.599	26.207	3.138	4.564
L22	24.978	52.404	3818.287	8.525	12.549	304.273	7641.599	26.207	3.138	4.564
	25.148	52.771	3899.043	8.585	12.634	308.607	7803.216	26.390	3.167	4.607
L23	25.102	74.858	5394.592	8.479	12.634	426.980	10796.283	37.436	2.639	2.673
	25.156	75.024	5430.725	8.497	12.661	428.922	10868.596	37.519	2.649	2.682
L24	25.156	75.024	5430.725	8.497	12.661	428.922	10868.596	37.519	2.649	2.682
	25.426	75.858	5613.809	8.592	12.796	438.700	11235.005	37.936	2.695	2.73
L25	25.461	59.119	4456.735	8.672	12.796	348.278	8919.334	29.565	3.091	4.054
	25.515	59.247	4485.919	8.691	12.824	349.820	8977.741	29.629	3.101	4.067
L26	25.517	58.306	4419.142	8.695	12.824	344.613	8844.099	29.158	3.123	4.164
	26.219	59.952	4804.183	8.941	13.175	364.648	9614.688	29.982	3.245	4.326
L27	26.175	81.987	6420.777	8.839	13.175	487.351	12850.003	41.001	2.739	2.64
	26.229	82.163	6462.028	8.857	13.202	489.477	12932.559	41.089	2.748	2.649
L28	26.229	82.163	6462.028	8.857	13.202	489.477	12932.559	41.089	2.748	2.649
	26.337	82.513	6545.057	8.895	13.256	493.745	13098.727	41.264	2.767	2.667
L29	26.310	95.757	7489.894	8.833	13.256	565.022	14989.644	47.888	2.459	2.028
	26.364	95.962	7538.043	8.852	13.283	567.497	15086.005	47.990	2.468	2.035
L30	26.412	72.122	5808.264	8.963	13.283	437.271	11624.171	36.068	3.018	3.353
	26.466	72.274	5845.061	8.982	13.310	439.148	11697.812	36.144	3.027	3.364
L31	26.466	72.274	5845.061	8.982	13.310	439.148	11697.812	36.144	3.027	3.364
	26.503	72.378	5870.171	8.995	13.328	440.426	11748.066	36.196	3.034	3.371
L32	26.528	59.690	4903.427	9.052	13.328	367.894	9813.306	29.851	3.320	4.501
	26.582	59.814	4934.183	9.071	13.355	369.452	9874.859	29.913	3.329	4.514
L33	26.584	58.829	4857.675	9.076	13.355	363.723	9721.741	29.420	3.351	4.622
	27.664	61.278	5489.831	9.453	13.896	395.067	10986.886	30.645	3.538	4.88
L34	27.668	59.220	5315.469	9.462	13.896	382.519	10637.933	29.616	3.582	5.118
	28.749	61.585	5977.825	9.840	14.437	414.077	11963.516	30.798	3.770	5.385
L35	28.749	61.585	5977.825	9.840	14.437	414.077	11963.516	30.798	3.770	5.385
	29.047	62.237	6169.856	9.944	14.586	423.007	12347.831	31.124	3.821	5.459
L36	29.080	43.672	4395.396	10.020	14.586	301.350	8796.576	21.840	4.195	8.606
	29.134	43.755	4420.300	10.039	14.613	302.497	8846.415	21.882	4.205	8.625
L37	29.089	68.852	6814.979	9.937	14.613	466.373	13638.926	34.432	3.699	4.772
	29.478	69.794	7098.630	10.073	14.807	479.400	14206.602	34.904	3.766	4.859
L38	29.478	69.794	7098.630	10.073	14.807	479.400	14206.602	34.904	3.766	4.859
	29.532	69.925	7138.638	10.091	14.834	481.223	14286.670	34.969	3.775	4.872
L39	29.536	67.729	6926.603	10.100	14.834	466.930	13862.319	33.871	3.819	5.093
	30.617	70.262	7733.188	10.478	15.375	502.975	15476.552	35.138	4.007	5.342
L40	30.617	70.262	7733.188	10.478	15.375	502.975	15476.552	35.138	4.007	5.342
	30.973	71.098	8012.489	10.603	15.553	515.164	16035.521	35.556	4.069	5.425
L41	30.960	79.160	8868.871	10.572	15.553	570.225	17749.413	39.587	3.915	4.674
	31.014	79.301	8916.491	10.591	15.580	572.292	17844.715	39.658	3.924	4.685
L42	31.016	78.150	8794.455	10.595	15.580	564.459	17600.482	39.083	3.946	4.783
	31.405	79.153	9137.458	10.731	15.775	579.240	18286.939	39.584	4.013	4.865
L43	31.411	75.649	8754.621	10.744	15.775	554.971	17520.761	37.832	4.079	5.18

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L44	31.465	75.782	8800.871	10.763	15.802	556.949	17613.323	37.898	4.089	5.192
	31.466	74.610	8671.892	10.768	15.802	548.787	17355.195	37.312	4.111	5.304
	32.374	76.809	9461.357	11.085	16.256	582.022	18935.163	38.412	4.268	5.507

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 98.000-93.000				1	1	1			
L2 93.000-88.000				1	1	1			
L3 88.000-82.790				1	1	1			
L4 82.790-80.210				1	1	1			
L5 80.210-75.210				1	1	1			
L6 75.210-70.210				1	1	1			
L7 70.210-65.210				1	1	1			
L8 65.210-60.210				1	1	1			
L9 60.210-59.170				1	1	1			
L10 59.170-58.900				1	1	0.920928			
L11 58.900-58.750				1	1	0.920221			
L12 58.750-54.080				1	1	0.921203			
L13 54.080-53.830				1	1	0.962329			
L14 53.830-52.910				1	1	0.956574			
L15 52.910-52.660				1	1	0.954914			
L16 52.660-52.170				1	1	0.951723			
L17 52.170-51.920				1	1	0.967201			
L18 51.920-45.290				1	1	0.982646			
L19 45.290-44.290				1	1	0.960201			
L20 44.290-39.290				1	1	0.967035			
L21 39.290-34.290				1	1	0.976891			
L22 34.290-33.500				1	1	0.973259			
L23 33.500-33.250				1	1	0.925206			
L24 33.250-32.000				1	1	0.918515			
L25 32.000-31.750				1	1	0.949058			
L26 31.750-28.500				1	1	0.949341			

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L27 28.500-28.250				1	1	0.912443			
L28 28.250-27.750				1	1	0.909847			
L29 27.750-27.500				1	1	0.858435			
L30 27.500-27.250				1	1	0.891457			
L31 27.250-27.080				1	1	0.89068			
L32 27.080-26.830				1	1	0.903088			
L33 26.830-21.830				1	1	0.898743			
L34 21.830-16.830				1	1	0.911405			
L35 16.830-15.450				1	1	0.90653			
L36 15.450-15.200				1	1	1.42779			
L37 15.200-13.400				1	1	0.965024			
L38 13.400-13.150				1	1	0.963972			
L39 13.150-8.150				1	1	0.974372			
L40 8.150-6.500				1	1	0.967815			
L41 6.500-6.250				1	1	0.944025			
L42 6.250-4.450				1	1	0.950588			
L43 4.450-4.200				1	1	0.914394			
L44 4.200-0.000				1	1	0.913716			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
d AVA7-50(1-5/8) (12E (1-5/8")+2R(1-3/8")) *d*	B	No	Surface Ar (CaAa)	67.000 - 0.000	14	7	-0.100 0.300	2.010		0.001
Safety Line 3/8 (E) *d* **@C**	C	No	Surface Ar (CaAa)	98.000 - 0.000	1	1	0.100 0.100	0.375		0.000
Sabre MS-600 (6" x 1" Plate) (E-Mod)	A	No	Surface Af (CaAa)	30.500 - 0.000	1	1	-0.500 -0.500	6.000	14.000	0.000

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
Sabre MS-600 (6" x 1" Plate) (E-Mod)	B	No	Surface Af (CaAa)	30.500 - 0.000	1	1	-0.500 -0.500	6.000	14.000	0.000
Sabre MS-600 (6" x 1" Plate) (E-Mod)	C	No	Surface Af (CaAa)	8.500 - 0.500	1	1	-0.500 -0.500	6.000	14.000	0.000
Sabre MS-600 (6" x 1" Plate) (E-Mod)	C	No	Surface Af (CaAa)	17.450 - 2.450	1	1	-0.300 -0.300	6.000	14.000	0.000
Sabre MS-600 (6" x 1" Plate) (E-Mod) *d*	C	No	Surface Af (CaAa)	30.500 - 11.410	1	1	-0.500 -0.500	6.000	14.000	0.000
Sabre MS-600 (6" x 1" Plate) (E-Mod)	A	No	Surface Af (CaAa)	35.500 - 25.500	1	1	-0.300 -0.300	6.000	14.000	0.000
Sabre MS-600 (6" x 1" Plate) (E-Mod)	B	No	Surface Af (CaAa)	35.500 - 25.500	1	1	-0.300 -0.300	6.000	14.000	0.000
Sabre MS-600 (6" x 1" Plate) (E-Mod) *d*	C	No	Surface Af (CaAa)	35.500 - 25.500	1	1	-0.300 -0.300	6.000	14.000	0.000
Sabre MS-450 (4.5" x 1" Plate) (E-Mod)	C	No	Surface Af (CaAa)	49.750 - 30.500	1	1	-0.500 -0.500	4.500	11.000	0.000
Sabre MS-450 (4.5" x 1" Plate) (E-Mod)	A	No	Surface Af (CaAa)	60.500 - 30.500	1	1	-0.500 -0.500	4.500	11.000	0.000
Sabre MS-450 (4.5" x 1" Plate) (E-Mod)	B	No	Surface Af (CaAa)	60.500 - 30.500	1	1	-0.500 -0.500	4.500	11.000	0.000
Sabre MS-450 (4.5" x 1" Plate) (E-Mod)	C	No	Surface Af (CaAa)	60.670 - 50.670	1	1	-0.500 -0.500	4.500	11.000	0.000
Sabre MS-450 (4.5" x 1" Plate) (E-Mod) *d*	C	No	Surface Af (CaAa)	54.417 - 45.917	1	1	-0.300 -0.300	4.500	11.000	0.000
CCI 6.5" x 1.25" Plate (P-Mod)	A	No	Surface Af (CaAa)	30.500 - 0.000	1	1	0.200 0.200	6.500	15.500	0.000
CCI 6.5" x 1.25" Plate (P-Mod) *d*	B	No	Surface Af (CaAa)	30.500 - 0.000	1	1	0.000 0.000	6.500	15.500	0.000
CCI 4.5" x 1" Plate (P-Mod)	A	No	Surface Af (CaAa)	55.500 - 30.500	1	1	0.200 0.200	4.500	11.000	0.000
CCI 4.5" x 1" Plate (P-Mod)	B	No	Surface Af (CaAa)	55.500 - 30.500	1	1	0.000 0.000	4.500	11.000	0.000
CCI 4.5" x 1" Plate (P-Mod) *d*	C	No	Surface Af (CaAa)	55.500 - 25.500	1	1	0.200 0.200	4.500	11.000	0.000

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft²/ft	Weight klf
HB114-08U3M12-XXXF(7/8) (R)	B	No	No	Inside Pole	94.000 - 0.000	1	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
HB114-1-08U4-M5F(1-1/4) (R)	B	No	No	Inside Pole	94.000 - 0.000	3	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
d									
AVA5-50(7/8) (E)	C	No	No	Inside Pole	89.000 - 0.000	6	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
LDF5-50A(7/8) (E)	C	No	No	Inside Pole	89.000 - 0.000	5	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
HCS 6X12 6AWG(1-3/8) (P)	C	No	No	Inside Pole	89.000 - 0.000	1	No Ice	0.000	0.002
							I/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
							2" Ice	0.000	0.002
d									
LDF5-50A(7/8) (E)	A	No	No	Inside Pole	74.000 - 0.000	12	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
FB-L98B-002-75000 (3/8) (E-Inside Conduit)	A	No	No	Inside Pole	74.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
WR-VG86ST-BRD(3/4) (E-Inside Conduit)	A	No	No	Inside Pole	74.000 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
FB-L98B-002-75000 (3/8) (R-Inside Conduit)	A	No	No	Inside Pole	74.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
WR-VG86ST-BRD(3/4) (R-Inside Conduit)	A	No	No	Inside Pole	74.000 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
2" Rigid Conduit (E)	A	No	No	Inside Pole	74.000 - 0.000	1	No Ice	0.000	0.003
							1/2" Ice	0.000	0.003
							1" Ice	0.000	0.003
							2" Ice	0.000	0.003
2" Rigid Conduit (R)	A	No	No	Inside Pole	74.000 - 0.000	2	No Ice	0.000	0.003
							1/2" Ice	0.000	0.003
							1" Ice	0.000	0.003
							2" Ice	0.000	0.003
d									
LDF5-50A(7/8) (E)	B	No	No	Inside Pole	52.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
d									
d									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	98.000-93.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.005
		C	0.000	0.000	0.188	0.000	0.001
L2	93.000-88.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.023
		C	0.000	0.000	0.188	0.000	0.006
L3	88.000-82.790	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.024
		C	0.000	0.000	0.195	0.000	0.028
L4	82.790-80.210	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.012
		C	0.000	0.000	0.097	0.000	0.014
L5	80.210-75.210	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.023
		C	0.000	0.000	0.188	0.000	0.027
L6	75.210-70.210	A	0.000	0.000	0.000	0.000	0.056
		B	0.000	0.000	0.000	0.000	0.023
		C	0.000	0.000	0.188	0.000	0.027
L7	70.210-65.210	A	0.000	0.000	0.000	0.000	0.074
		B	0.000	0.000	2.519	0.000	0.040
		C	0.000	0.000	0.188	0.000	0.027
L8	65.210-60.210	A	0.000	0.000	0.218	0.000	0.074
		B	0.000	0.000	7.253	0.000	0.072
		C	0.000	0.000	0.532	0.000	0.027
L9	60.210-59.170	A	0.000	0.000	0.780	0.000	0.015
		B	0.000	0.000	2.243	0.000	0.015
		C	0.000	0.000	0.819	0.000	0.006
L10	59.170-58.900	A	0.000	0.000	0.203	0.000	0.004
		B	0.000	0.000	0.582	0.000	0.004
		C	0.000	0.000	0.213	0.000	0.001
L11	58.900-58.750	A	0.000	0.000	0.113	0.000	0.002
		B	0.000	0.000	0.324	0.000	0.002
		C	0.000	0.000	0.118	0.000	0.001
L12	58.750-54.080	A	0.000	0.000	4.567	0.000	0.069
		B	0.000	0.000	11.138	0.000	0.067
		C	0.000	0.000	4.983	0.000	0.025
L13	54.080-53.830	A	0.000	0.000	0.375	0.000	0.004
		B	0.000	0.000	0.727	0.000	0.004
		C	0.000	0.000	0.563	0.000	0.001
L14	53.830-52.910	A	0.000	0.000	1.380	0.000	0.014
		B	0.000	0.000	2.674	0.000	0.013
		C	0.000	0.000	2.071	0.000	0.005
L15	52.910-52.660	A	0.000	0.000	0.375	0.000	0.004
		B	0.000	0.000	0.727	0.000	0.004
		C	0.000	0.000	0.563	0.000	0.001
L16	52.660-52.170	A	0.000	0.000	0.735	0.000	0.007
		B	0.000	0.000	1.424	0.000	0.007
		C	0.000	0.000	1.103	0.000	0.003
L17	52.170-51.920	A	0.000	0.000	0.375	0.000	0.004
		B	0.000	0.000	0.727	0.000	0.004
		C	0.000	0.000	0.563	0.000	0.001
L18	51.920-45.290	A	0.000	0.000	9.945	0.000	0.098
		B	0.000	0.000	19.273	0.000	0.098
		C	0.000	0.000	13.790	0.000	0.036
L19	45.290-44.290	A	0.000	0.000	1.500	0.000	0.015

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	2.907	0.000	0.015
		C	0.000	0.000	1.538	0.000	0.005
L20	44.290-39.290	A	0.000	0.000	7.500	0.000	0.074
		B	0.000	0.000	14.535	0.000	0.074
		C	0.000	0.000	7.688	0.000	0.027
L21	39.290-34.290	A	0.000	0.000	8.604	0.000	0.074
		B	0.000	0.000	15.639	0.000	0.074
		C	0.000	0.000	8.791	0.000	0.027
L22	34.290-33.500	A	0.000	0.000	1.906	0.000	0.012
		B	0.000	0.000	3.017	0.000	0.012
		C	0.000	0.000	1.935	0.000	0.004
L23	33.500-33.250	A	0.000	0.000	0.603	0.000	0.004
		B	0.000	0.000	0.955	0.000	0.004
		C	0.000	0.000	0.612	0.000	0.001
L24	33.250-32.000	A	0.000	0.000	3.015	0.000	0.018
		B	0.000	0.000	4.774	0.000	0.018
		C	0.000	0.000	3.062	0.000	0.007
L25	32.000-31.750	A	0.000	0.000	0.603	0.000	0.004
		B	0.000	0.000	0.955	0.000	0.004
		C	0.000	0.000	0.612	0.000	0.001
L26	31.750-28.500	A	0.000	0.000	9.006	0.000	0.048
		B	0.000	0.000	13.579	0.000	0.048
		C	0.000	0.000	8.461	0.000	0.017
L27	28.500-28.250	A	0.000	0.000	0.749	0.000	0.004
		B	0.000	0.000	1.101	0.000	0.004
		C	0.000	0.000	0.675	0.000	0.001
L28	28.250-27.750	A	0.000	0.000	1.498	0.000	0.007
		B	0.000	0.000	2.201	0.000	0.007
		C	0.000	0.000	1.350	0.000	0.003
L29	27.750-27.500	A	0.000	0.000	0.749	0.000	0.004
		B	0.000	0.000	1.101	0.000	0.004
		C	0.000	0.000	0.675	0.000	0.001
L30	27.500-27.250	A	0.000	0.000	0.749	0.000	0.004
		B	0.000	0.000	1.101	0.000	0.004
		C	0.000	0.000	0.675	0.000	0.001
L31	27.250-27.080	A	0.000	0.000	0.509	0.000	0.003
		B	0.000	0.000	0.748	0.000	0.003
		C	0.000	0.000	0.459	0.000	0.001
L32	27.080-26.830	A	0.000	0.000	0.749	0.000	0.004
		B	0.000	0.000	1.101	0.000	0.004
		C	0.000	0.000	0.675	0.000	0.001
L33	26.830-21.830	A	0.000	0.000	11.630	0.000	0.074
		B	0.000	0.000	18.665	0.000	0.074
		C	0.000	0.000	7.398	0.000	0.027
L34	21.830-16.830	A	0.000	0.000	10.417	0.000	0.074
		B	0.000	0.000	17.452	0.000	0.074
		C	0.000	0.000	5.808	0.000	0.027
L35	16.830-15.450	A	0.000	0.000	2.875	0.000	0.020
		B	0.000	0.000	4.817	0.000	0.020
		C	0.000	0.000	2.812	0.000	0.007
L36	15.450-15.200	A	0.000	0.000	0.521	0.000	0.004
		B	0.000	0.000	0.873	0.000	0.004
		C	0.000	0.000	0.509	0.000	0.001
L37	15.200-13.400	A	0.000	0.000	3.750	0.000	0.027
		B	0.000	0.000	6.283	0.000	0.026
		C	0.000	0.000	3.668	0.000	0.010
L38	13.400-13.150	A	0.000	0.000	0.521	0.000	0.004
		B	0.000	0.000	0.873	0.000	0.004
		C	0.000	0.000	0.509	0.000	0.001
L39	13.150-8.150	A	0.000	0.000	10.417	0.000	0.074
		B	0.000	0.000	17.452	0.000	0.074

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	7.224	0.000	0.027
L40	8.150-6.500	A	0.000	0.000	3.438	0.000	0.024
		B	0.000	0.000	5.759	0.000	0.024
		C	0.000	0.000	3.108	0.000	0.009
L41	6.500-6.250	A	0.000	0.000	0.521	0.000	0.004
		B	0.000	0.000	0.873	0.000	0.004
		C	0.000	0.000	0.471	0.000	0.001
L42	6.250-4.450	A	0.000	0.000	3.750	0.000	0.027
		B	0.000	0.000	6.283	0.000	0.026
		C	0.000	0.000	3.391	0.000	0.010
L43	4.450-4.200	A	0.000	0.000	0.521	0.000	0.004
		B	0.000	0.000	0.873	0.000	0.004
		C	0.000	0.000	0.471	0.000	0.001
L44	4.200-0.000	A	0.000	0.000	8.750	0.000	0.062
		B	0.000	0.000	14.659	0.000	0.062
		C	0.000	0.000	5.039	0.000	0.023

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	98.000-93.000	A	1.891	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.005
		C		0.000	0.000	2.078	0.000	0.027
L2	93.000-88.000	A	1.880	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.023
		C		0.000	0.000	2.068	0.000	0.032
L3	88.000-82.790	A	1.869	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.024
		C		0.000	0.000	2.143	0.000	0.055
L4	82.790-80.210	A	1.861	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.012
		C		0.000	0.000	1.061	0.000	0.027
L5	80.210-75.210	A	1.852	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.023
		C		0.000	0.000	2.039	0.000	0.052
L6	75.210-70.210	A	1.840	0.000	0.000	0.000	0.000	0.056
		B		0.000	0.000	0.000	0.000	0.023
		C		0.000	0.000	2.027	0.000	0.052
L7	70.210-65.210	A	1.827	0.000	0.000	0.000	0.000	0.074
		B		0.000	0.000	3.966	0.000	0.099
		C		0.000	0.000	2.014	0.000	0.051
L8	65.210-60.210	A	1.813	0.000	0.000	0.323	0.000	0.078
		B		0.000	0.000	11.382	0.000	0.239
		C		0.000	0.000	2.437	0.000	0.057
L9	60.210-59.170	A	1.804	0.000	0.000	1.155	0.000	0.028
		B		0.000	0.000	3.453	0.000	0.062
		C		0.000	0.000	1.402	0.000	0.024
L10	59.170-58.900	A	1.802	0.000	0.000	0.300	0.000	0.007
		B		0.000	0.000	0.896	0.000	0.016
		C		0.000	0.000	0.364	0.000	0.006
L11	58.900-58.750	A	1.801	0.000	0.000	0.167	0.000	0.004
		B		0.000	0.000	0.498	0.000	0.009
		C		0.000	0.000	0.202	0.000	0.003
L12	58.750-54.080	A	1.794	0.000	0.000	6.752	0.000	0.145
		B		0.000	0.000	17.059	0.000	0.294
		C		0.000	0.000	8.160	0.000	0.127

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L13	54.080-53.830	A	1.786	0.000	0.000	0.554	0.000	0.010
		B		0.000	0.000	1.105	0.000	0.018
		C		0.000	0.000	0.838	0.000	0.012
L14	53.830-52.910	A	1.784	0.000	0.000	2.036	0.000	0.036
		B		0.000	0.000	4.065	0.000	0.065
		C		0.000	0.000	3.082	0.000	0.043
L15	52.910-52.660	A	1.782	0.000	0.000	0.553	0.000	0.010
		B		0.000	0.000	1.104	0.000	0.018
		C		0.000	0.000	0.837	0.000	0.012
L16	52.660-52.170	A	1.781	0.000	0.000	1.084	0.000	0.019
		B		0.000	0.000	2.164	0.000	0.035
		C		0.000	0.000	1.640	0.000	0.023
L17	52.170-51.920	A	1.779	0.000	0.000	0.553	0.000	0.010
		B		0.000	0.000	1.104	0.000	0.018
		C		0.000	0.000	0.837	0.000	0.012
L18	51.920-45.290	A	1.767	0.000	0.000	14.631	0.000	0.259
		B		0.000	0.000	29.220	0.000	0.470
		C		0.000	0.000	21.410	0.000	0.289
L19	45.290-44.290	A	1.753	0.000	0.000	2.207	0.000	0.039
		B		0.000	0.000	4.407	0.000	0.071
		C		0.000	0.000	2.598	0.000	0.034
L20	44.290-39.290	A	1.741	0.000	0.000	10.981	0.000	0.193
		B		0.000	0.000	21.951	0.000	0.350
		C		0.000	0.000	12.909	0.000	0.168
L21	39.290-34.290	A	1.718	0.000	0.000	12.261	0.000	0.208
		B		0.000	0.000	23.202	0.000	0.362
		C		0.000	0.000	14.167	0.000	0.182
L22	34.290-33.500	A	1.705	0.000	0.000	2.587	0.000	0.041
		B		0.000	0.000	4.313	0.000	0.065
		C		0.000	0.000	2.886	0.000	0.037
L23	33.500-33.250	A	1.702	0.000	0.000	0.818	0.000	0.013
		B		0.000	0.000	1.364	0.000	0.021
		C		0.000	0.000	0.913	0.000	0.012
L24	33.250-32.000	A	1.698	0.000	0.000	4.089	0.000	0.064
		B		0.000	0.000	6.818	0.000	0.102
		C		0.000	0.000	4.560	0.000	0.058
L25	32.000-31.750	A	1.694	0.000	0.000	0.817	0.000	0.013
		B		0.000	0.000	1.363	0.000	0.020
		C		0.000	0.000	0.911	0.000	0.012
L26	31.750-28.500	A	1.685	0.000	0.000	11.775	0.000	0.175
		B		0.000	0.000	18.860	0.000	0.274
		C		0.000	0.000	12.320	0.000	0.153
L27	28.500-28.250	A	1.675	0.000	0.000	0.961	0.000	0.014
		B		0.000	0.000	1.505	0.000	0.021
		C		0.000	0.000	0.970	0.000	0.012
L28	28.250-27.750	A	1.672	0.000	0.000	1.921	0.000	0.028
		B		0.000	0.000	3.009	0.000	0.043
		C		0.000	0.000	1.939	0.000	0.024
L29	27.750-27.500	A	1.670	0.000	0.000	0.960	0.000	0.014
		B		0.000	0.000	1.504	0.000	0.021
		C		0.000	0.000	0.969	0.000	0.012
L30	27.500-27.250	A	1.669	0.000	0.000	0.960	0.000	0.014
		B		0.000	0.000	1.504	0.000	0.021
		C		0.000	0.000	0.969	0.000	0.012
L31	27.250-27.080	A	1.667	0.000	0.000	0.653	0.000	0.009
		B		0.000	0.000	1.022	0.000	0.015
		C		0.000	0.000	0.659	0.000	0.008
L32	27.080-26.830	A	1.666	0.000	0.000	0.960	0.000	0.014
		B		0.000	0.000	1.503	0.000	0.021
		C		0.000	0.000	0.968	0.000	0.012
L33	26.830-21.830	A	1.649	0.000	0.000	15.160	0.000	0.226

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	26.014	0.000	0.374
		C		0.000	0.000	11.360	0.000	0.144
L34	21.830-16.830	A	1.611	0.000	0.000	13.639	0.000	0.205
		B		0.000	0.000	24.447	0.000	0.350
		C		0.000	0.000	9.180	0.000	0.117
L35	16.830-15.450	A	1.583	0.000	0.000	3.749	0.000	0.056
		B		0.000	0.000	6.722	0.000	0.095
		C		0.000	0.000	4.016	0.000	0.047
L36	15.450-15.200	A	1.574	0.000	0.000	0.678	0.000	0.010
		B		0.000	0.000	1.216	0.000	0.017
		C		0.000	0.000	0.727	0.000	0.008
L37	15.200-13.400	A	1.564	0.000	0.000	4.876	0.000	0.072
		B		0.000	0.000	8.745	0.000	0.123
		C		0.000	0.000	5.222	0.000	0.060
L38	13.400-13.150	A	1.552	0.000	0.000	0.676	0.000	0.010
		B		0.000	0.000	1.213	0.000	0.017
		C		0.000	0.000	0.724	0.000	0.008
L39	13.150-8.150	A	1.518	0.000	0.000	13.453	0.000	0.195
		B		0.000	0.000	24.144	0.000	0.332
		C		0.000	0.000	10.494	0.000	0.127
L40	8.150-6.500	A	1.462	0.000	0.000	4.403	0.000	0.062
		B		0.000	0.000	7.908	0.000	0.106
		C		0.000	0.000	4.226	0.000	0.051
L41	6.500-6.250	A	1.442	0.000	0.000	0.665	0.000	0.009
		B		0.000	0.000	1.195	0.000	0.016
		C		0.000	0.000	0.638	0.000	0.008
L42	6.250-4.450	A	1.417	0.000	0.000	4.770	0.000	0.067
		B		0.000	0.000	8.574	0.000	0.113
		C		0.000	0.000	4.577	0.000	0.054
L43	4.450-4.200	A	1.387	0.000	0.000	0.660	0.000	0.009
		B		0.000	0.000	1.186	0.000	0.015
		C		0.000	0.000	0.633	0.000	0.007
L44	4.200-0.000	A	1.290	0.000	0.000	10.917	0.000	0.145
		B		0.000	0.000	19.659	0.000	0.244
		C		0.000	0.000	7.004	0.000	0.085

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	98.000-93.000	-0.062	0.292	-0.270	1.272
L2	93.000-88.000	-0.062	0.293	-0.277	1.305
L3	88.000-82.790	-0.062	0.293	-0.283	1.334
L4	82.790-80.210	-0.062	0.293	-0.286	1.347
L5	80.210-75.210	-0.062	0.293	-0.289	1.361
L6	75.210-70.210	-0.062	0.294	-0.294	1.381
L7	70.210-65.210	3.203	-0.850	2.110	0.243
L8	65.210-60.210	5.675	-1.713	4.092	-0.716
L9	60.210-59.170	2.708	-0.821	2.481	-0.414
L10	59.170-58.900	2.719	-0.824	2.492	-0.415
L11	58.900-58.750	2.722	-0.825	2.496	-0.416
L12	58.750-54.080	2.459	-0.985	2.275	-0.629
L13	54.080-53.830	2.556	-0.840	2.386	-0.653
L14	53.830-52.910	2.566	-0.843	2.396	-0.656
L15	52.910-52.660	2.576	-0.847	2.407	-0.659
L16	52.660-52.170	2.582	-0.849	2.413	-0.661

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L17	52.170-51.920	2.588	-0.851	2.419	-0.662
L18	51.920-45.290	2.437	-0.889	2.393	-0.715
L19	45.290-44.290	1.901	-1.433	1.964	-1.173
L20	44.290-39.290	1.933	-1.460	2.004	-1.200
L21	39.290-34.290	1.825	-1.383	1.944	-1.169
L22	34.290-33.500	1.485	-1.128	1.670	-1.006
L23	33.500-33.250	1.490	-1.132	1.676	-1.010
L24	33.250-32.000	1.495	-1.136	1.683	-1.015
L25	32.000-31.750	1.500	-1.141	1.691	-1.020
L26	31.750-28.500	1.538	-1.411	1.717	-1.238
L27	28.500-28.250	1.566	-1.569	1.740	-1.370
L28	28.250-27.750	1.569	-1.572	1.744	-1.374
L29	27.750-27.500	1.572	-1.576	1.748	-1.378
L30	27.500-27.250	1.573	-1.578	1.750	-1.380
L31	27.250-27.080	1.575	-1.579	1.753	-1.382
L32	27.080-26.830	1.576	-1.581	1.755	-1.383
L33	26.830-21.830	2.585	-2.592	2.775	-2.314
L34	21.830-16.830	3.318	-3.045	3.484	-2.720
L35	16.830-15.450	4.301	-2.243	4.457	-2.040
L36	15.450-15.200	4.318	-2.252	4.477	-2.049
L37	15.200-13.400	4.342	-2.264	4.505	-2.063
L38	13.400-13.150	4.364	-2.276	4.531	-2.075
L39	13.150-8.150	3.521	-2.163	3.665	-1.930
L40	8.150-6.500	4.256	-2.302	4.345	-2.086
L41	6.500-6.250	4.275	-2.312	4.370	-2.099
L42	6.250-4.450	4.295	-2.324	4.398	-2.114
L43	4.450-4.200	4.315	-2.335	4.427	-2.129
L44	4.200-0.000	3.496	-2.929	3.639	-2.670

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	25	Safety Line 3/8	93.00 - 98.00	1.0000	1.0000
L2	25	Safety Line 3/8	88.00 - 93.00	1.0000	1.0000
L3	25	Safety Line 3/8	82.79 - 88.00	1.0000	1.0000
L5	25	Safety Line 3/8	75.21 - 80.21	1.0000	1.0000
L6	25	Safety Line 3/8	70.21 - 75.21	1.0000	1.0000
L7	20	AVA7-50(1-5/8)	65.21 - 67.00	1.0000	1.0000
L7	25	Safety Line 3/8	65.21 - 70.21	1.0000	1.0000
L8	20	AVA7-50(1-5/8)	60.21 - 65.21	1.0000	1.0000
L8	25	Safety Line 3/8	60.21 - 65.21	1.0000	1.0000
L8	39	Sabre MS-450 (4.5" x 1" Plate)	60.21 - 60.50	1.0000	1.0000
L8	40	Sabre MS-450 (4.5" x 1" Plate)	60.21 - 60.50	1.0000	1.0000
L8	41	Sabre MS-450 (4.5" x 1" Plate)	60.21 - 60.67	1.0000	1.0000
L9	20	AVA7-50(1-5/8)	59.17 - 60.21	1.0000	1.0000
L9	25	Safety Line 3/8	59.17 - 60.21	1.0000	1.0000
L9	39	Sabre MS-450 (4.5" x 1" Plate)	59.17 - 60.21	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L9	40	Sabre MS-450 (4.5" x 1" Plate)	59.17 - 60.21	1.0000	1.0000
L9	41	Sabre MS-450 (4.5" x 1" Plate)	59.17 - 60.21	1.0000	1.0000
L10	20	AVA7-50(1-5/8)	58.90 - 59.17	1.0000	1.0000
L10	25	Safety Line 3/8	58.90 - 59.17	1.0000	1.0000
L10	39	Sabre MS-450 (4.5" x 1" Plate)	58.90 - 59.17	1.0000	1.0000
L10	40	Sabre MS-450 (4.5" x 1" Plate)	58.90 - 59.17	1.0000	1.0000
L10	41	Sabre MS-450 (4.5" x 1" Plate)	58.90 - 59.17	1.0000	1.0000
L11	20	AVA7-50(1-5/8)	58.75 - 58.90	1.0000	1.0000
L11	25	Safety Line 3/8	58.75 - 58.90	1.0000	1.0000
L11	39	Sabre MS-450 (4.5" x 1" Plate)	58.75 - 58.90	1.0000	1.0000
L11	40	Sabre MS-450 (4.5" x 1" Plate)	58.75 - 58.90	1.0000	1.0000
L11	41	Sabre MS-450 (4.5" x 1" Plate)	58.75 - 58.90	1.0000	1.0000
L12	20	AVA7-50(1-5/8)	54.08 - 58.75	1.0000	1.0000
L12	25	Safety Line 3/8	54.08 - 58.75	1.0000	1.0000
L12	39	Sabre MS-450 (4.5" x 1" Plate)	54.08 - 58.75	1.0000	1.0000
L12	40	Sabre MS-450 (4.5" x 1" Plate)	54.08 - 58.75	1.0000	1.0000
L12	41	Sabre MS-450 (4.5" x 1" Plate)	54.08 - 58.75	1.0000	1.0000
L12	42	Sabre MS-450 (4.5" x 1" Plate)	54.08 - 54.42	1.0000	1.0000
L12	47	CCI 4.5" x 1" Plate	54.08 - 55.50	1.0000	1.0000
L12	48	CCI 4.5" x 1" Plate	54.08 - 55.50	1.0000	1.0000
L12	49	CCI 4.5" x 1" Plate	54.08 - 55.50	1.0000	1.0000
L13	20	AVA7-50(1-5/8)	53.83 - 54.08	1.0000	1.0000
L13	25	Safety Line 3/8	53.83 - 54.08	1.0000	1.0000
L13	39	Sabre MS-450 (4.5" x 1" Plate)	53.83 - 54.08	1.0000	1.0000
L13	40	Sabre MS-450 (4.5" x 1" Plate)	53.83 - 54.08	1.0000	1.0000
L13	41	Sabre MS-450 (4.5" x 1" Plate)	53.83 - 54.08	1.0000	1.0000
L13	42	Sabre MS-450 (4.5" x 1" Plate)	53.83 - 54.08	1.0000	1.0000
L13	47	CCI 4.5" x 1" Plate	53.83 - 54.08	1.0000	1.0000
L13	48	CCI 4.5" x 1" Plate	53.83 - 54.08	1.0000	1.0000
L13	49	CCI 4.5" x 1" Plate	53.83 - 54.08	1.0000	1.0000
L14	20	AVA7-50(1-5/8)	52.91 - 53.83	1.0000	1.0000
L14	25	Safety Line 3/8	52.91 - 53.83	1.0000	1.0000
L14	39	Sabre MS-450 (4.5" x 1" Plate)	52.91 - 53.83	1.0000	1.0000
L14	40	Sabre MS-450 (4.5" x 1" Plate)	52.91 - 53.83	1.0000	1.0000
L14	41	Sabre MS-450 (4.5" x 1" Plate)	52.91 - 53.83	1.0000	1.0000
L14	42	Sabre MS-450 (4.5" x 1" Plate)	52.91 - 53.83	1.0000	1.0000
L14	47	CCI 4.5" x 1" Plate	52.91 - 53.83	1.0000	1.0000
L14	48	CCI 4.5" x 1" Plate	52.91 - 53.83	1.0000	1.0000
L14	49	CCI 4.5" x 1" Plate	52.91 - 53.83	1.0000	1.0000
L15	20	AVA7-50(1-5/8)	52.66 - 52.91	1.0000	1.0000
L15	25	Safety Line 3/8	52.66 - 52.91	1.0000	1.0000
L15	39	Sabre MS-450 (4.5" x 1"	52.66 - 52.91	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		Plate)			
L15	40	Sabre MS-450 (4.5" x 1" Plate)	52.66 - 52.91	1.0000	1.0000
L15	41	Sabre MS-450 (4.5" x 1" Plate)	52.66 - 52.91	1.0000	1.0000
L15	42	Sabre MS-450 (4.5" x 1" Plate)	52.66 - 52.91	1.0000	1.0000
L15	47	CCI 4.5" x 1" Plate	52.66 - 52.91	1.0000	1.0000
L15	48	CCI 4.5" x 1" Plate	52.66 - 52.91	1.0000	1.0000
L15	49	CCI 4.5" x 1" Plate	52.66 - 52.91	1.0000	1.0000
L16	20	AVA7-50(1-5/8)	52.17 - 52.66	1.0000	1.0000
L16	25	Safety Line 3/8	52.17 - 52.66	1.0000	1.0000
L16	39	Sabre MS-450 (4.5" x 1" Plate)	52.17 - 52.66	1.0000	1.0000
L16	40	Sabre MS-450 (4.5" x 1" Plate)	52.17 - 52.66	1.0000	1.0000
L16	41	Sabre MS-450 (4.5" x 1" Plate)	52.17 - 52.66	1.0000	1.0000
L16	42	Sabre MS-450 (4.5" x 1" Plate)	52.17 - 52.66	1.0000	1.0000
L16	47	CCI 4.5" x 1" Plate	52.17 - 52.66	1.0000	1.0000
L16	48	CCI 4.5" x 1" Plate	52.17 - 52.66	1.0000	1.0000
L16	49	CCI 4.5" x 1" Plate	52.17 - 52.66	1.0000	1.0000
L17	20	AVA7-50(1-5/8)	51.92 - 52.17	1.0000	1.0000
L17	25	Safety Line 3/8	51.92 - 52.17	1.0000	1.0000
L17	39	Sabre MS-450 (4.5" x 1" Plate)	51.92 - 52.17	1.0000	1.0000
L17	40	Sabre MS-450 (4.5" x 1" Plate)	51.92 - 52.17	1.0000	1.0000
L17	41	Sabre MS-450 (4.5" x 1" Plate)	51.92 - 52.17	1.0000	1.0000
L17	42	Sabre MS-450 (4.5" x 1" Plate)	51.92 - 52.17	1.0000	1.0000
L17	47	CCI 4.5" x 1" Plate	51.92 - 52.17	1.0000	1.0000
L17	48	CCI 4.5" x 1" Plate	51.92 - 52.17	1.0000	1.0000
L17	49	CCI 4.5" x 1" Plate	51.92 - 52.17	1.0000	1.0000
L18	20	AVA7-50(1-5/8)	45.29 - 51.92	1.0000	1.0000
L18	25	Safety Line 3/8	45.29 - 51.92	1.0000	1.0000
L18	38	Sabre MS-450 (4.5" x 1" Plate)	45.29 - 49.75	1.0000	1.0000
L18	39	Sabre MS-450 (4.5" x 1" Plate)	45.29 - 51.92	1.0000	1.0000
L18	40	Sabre MS-450 (4.5" x 1" Plate)	45.29 - 51.92	1.0000	1.0000
L18	41	Sabre MS-450 (4.5" x 1" Plate)	50.67 - 51.92	1.0000	1.0000
L18	42	Sabre MS-450 (4.5" x 1" Plate)	45.92 - 51.92	1.0000	1.0000
L18	47	CCI 4.5" x 1" Plate	45.29 - 51.92	1.0000	1.0000
L18	48	CCI 4.5" x 1" Plate	45.29 - 51.92	1.0000	1.0000
L18	49	CCI 4.5" x 1" Plate	45.29 - 51.92	1.0000	1.0000
L20	20	AVA7-50(1-5/8)	39.29 - 44.29	1.0000	1.0000
L20	25	Safety Line 3/8	39.29 - 44.29	1.0000	1.0000
L20	38	Sabre MS-450 (4.5" x 1" Plate)	39.29 - 44.29	1.0000	1.0000
L20	39	Sabre MS-450 (4.5" x 1" Plate)	39.29 - 44.29	1.0000	1.0000
L20	40	Sabre MS-450 (4.5" x 1" Plate)	39.29 - 44.29	1.0000	1.0000
L20	47	CCI 4.5" x 1" Plate	39.29 - 44.29	1.0000	1.0000
L20	48	CCI 4.5" x 1" Plate	39.29 - 44.29	1.0000	1.0000
L20	49	CCI 4.5" x 1" Plate	39.29 - 44.29	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L21	20	AVA7-50(1-5/8)	34.29 - 39.29	1.0000	1.0000
L21	25	Safety Line 3/8	34.29 - 39.29	1.0000	1.0000
L21	34	Sabre MS-600 (6" x 1" Plate)	34.29 - 35.50	1.0000	1.0000
L21	35	Sabre MS-600 (6" x 1" Plate)	34.29 - 35.50	1.0000	1.0000
L21	36	Sabre MS-600 (6" x 1" Plate)	34.29 - 35.50	1.0000	1.0000
L21	38	Sabre MS-450 (4.5" x 1" Plate)	34.29 - 39.29	1.0000	1.0000
L21	39	Sabre MS-450 (4.5" x 1" Plate)	34.29 - 39.29	1.0000	1.0000
L21	40	Sabre MS-450 (4.5" x 1" Plate)	34.29 - 39.29	1.0000	1.0000
L21	47	CCI 4.5" x 1" Plate	34.29 - 39.29	1.0000	1.0000
L21	48	CCI 4.5" x 1" Plate	34.29 - 39.29	1.0000	1.0000
L21	49	CCI 4.5" x 1" Plate	34.29 - 39.29	1.0000	1.0000
L22	20	AVA7-50(1-5/8)	33.50 - 34.29	1.0000	1.0000
L22	25	Safety Line 3/8	33.50 - 34.29	1.0000	1.0000
L22	34	Sabre MS-600 (6" x 1" Plate)	33.50 - 34.29	1.0000	1.0000
L22	35	Sabre MS-600 (6" x 1" Plate)	33.50 - 34.29	1.0000	1.0000
L22	36	Sabre MS-600 (6" x 1" Plate)	33.50 - 34.29	1.0000	1.0000
L22	38	Sabre MS-450 (4.5" x 1" Plate)	33.50 - 34.29	1.0000	1.0000
L22	39	Sabre MS-450 (4.5" x 1" Plate)	33.50 - 34.29	1.0000	1.0000
L22	40	Sabre MS-450 (4.5" x 1" Plate)	33.50 - 34.29	1.0000	1.0000
L22	47	CCI 4.5" x 1" Plate	33.50 - 34.29	1.0000	1.0000
L22	48	CCI 4.5" x 1" Plate	33.50 - 34.29	1.0000	1.0000
L22	49	CCI 4.5" x 1" Plate	33.50 - 34.29	1.0000	1.0000
L23	20	AVA7-50(1-5/8)	33.25 - 33.50	1.0000	1.0000
L23	25	Safety Line 3/8	33.25 - 33.50	1.0000	1.0000
L23	34	Sabre MS-600 (6" x 1" Plate)	33.25 - 33.50	1.0000	1.0000
L23	35	Sabre MS-600 (6" x 1" Plate)	33.25 - 33.50	1.0000	1.0000
L23	36	Sabre MS-600 (6" x 1" Plate)	33.25 - 33.50	1.0000	1.0000
L23	38	Sabre MS-450 (4.5" x 1" Plate)	33.25 - 33.50	1.0000	1.0000
L23	39	Sabre MS-450 (4.5" x 1" Plate)	33.25 - 33.50	1.0000	1.0000
L23	40	Sabre MS-450 (4.5" x 1" Plate)	33.25 - 33.50	1.0000	1.0000
L23	47	CCI 4.5" x 1" Plate	33.25 - 33.50	1.0000	1.0000
L23	48	CCI 4.5" x 1" Plate	33.25 - 33.50	1.0000	1.0000
L23	49	CCI 4.5" x 1" Plate	33.25 - 33.50	1.0000	1.0000
L24	20	AVA7-50(1-5/8)	32.00 - 33.25	1.0000	1.0000
L24	25	Safety Line 3/8	32.00 - 33.25	1.0000	1.0000
L24	34	Sabre MS-600 (6" x 1" Plate)	32.00 - 33.25	1.0000	1.0000
L24	35	Sabre MS-600 (6" x 1" Plate)	32.00 - 33.25	1.0000	1.0000
L24	36	Sabre MS-600 (6" x 1" Plate)	32.00 - 33.25	1.0000	1.0000
L24	38	Sabre MS-450 (4.5" x 1" Plate)	32.00 - 33.25	1.0000	1.0000
L24	39	Sabre MS-450 (4.5" x 1" Plate)	32.00 - 33.25	1.0000	1.0000
L24	40	Sabre MS-450 (4.5" x 1" Plate)	32.00 - 33.25	1.0000	1.0000
L24	47	CCI 4.5" x 1" Plate	32.00 - 33.25	1.0000	1.0000
L24	48	CCI 4.5" x 1" Plate	32.00 - 33.25	1.0000	1.0000
L24	49	CCI 4.5" x 1" Plate	32.00 - 33.25	1.0000	1.0000
L25	20	AVA7-50(1-5/8)	31.75 - 32.00	1.0000	1.0000
L25	25	Safety Line 3/8	31.75 - 32.00	1.0000	1.0000
L25	34	Sabre MS-600 (6" x 1" Plate)	31.75 - 32.00	1.0000	1.0000
L25	35	Sabre MS-600 (6" x 1" Plate)	31.75 - 32.00	1.0000	1.0000
L25	36	Sabre MS-600 (6" x 1" Plate)	31.75 - 32.00	1.0000	1.0000
L25	38	Sabre MS-450 (4.5" x 1"	31.75 - 32.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		Plate)			
L25	39	Sabre MS-450 (4.5" x 1" Plate)	31.75 - 32.00	1.0000	1.0000
L25	40	Sabre MS-450 (4.5" x 1" Plate)	31.75 - 32.00	1.0000	1.0000
L25	47	CCI 4.5" x 1" Plate	31.75 - 32.00	1.0000	1.0000
L25	48	CCI 4.5" x 1" Plate	31.75 - 32.00	1.0000	1.0000
L25	49	CCI 4.5" x 1" Plate	31.75 - 32.00	1.0000	1.0000
L26	20	AVA7-50(1-5/8)	28.50 - 31.75	1.0000	1.0000
L26	25	Safety Line 3/8	28.50 - 31.75	1.0000	1.0000
L26	28	Sabre MS-600 (6" x 1" Plate)	28.50 - 30.50	1.0000	1.0000
L26	29	Sabre MS-600 (6" x 1" Plate)	28.50 - 30.50	1.0000	1.0000
L26	32	Sabre MS-600 (6" x 1" Plate)	28.50 - 30.50	1.0000	1.0000
L26	34	Sabre MS-600 (6" x 1" Plate)	28.50 - 31.75	1.0000	1.0000
L26	35	Sabre MS-600 (6" x 1" Plate)	28.50 - 31.75	1.0000	1.0000
L26	36	Sabre MS-600 (6" x 1" Plate)	28.50 - 31.75	1.0000	1.0000
L26	38	Sabre MS-450 (4.5" x 1" Plate)	30.50 - 31.75	1.0000	1.0000
L26	39	Sabre MS-450 (4.5" x 1" Plate)	30.50 - 31.75	1.0000	1.0000
L26	40	Sabre MS-450 (4.5" x 1" Plate)	30.50 - 31.75	1.0000	1.0000
L26	44	CCI 6.5" x 1.25" Plate	28.50 - 30.50	1.0000	1.0000
L26	45	CCI 6.5" x 1.25" Plate	28.50 - 30.50	1.0000	1.0000
L26	47	CCI 4.5" x 1" Plate	30.50 - 31.75	1.0000	1.0000
L26	48	CCI 4.5" x 1" Plate	30.50 - 31.75	1.0000	1.0000
L26	49	CCI 4.5" x 1" Plate	28.50 - 31.75	1.0000	1.0000
L27	20	AVA7-50(1-5/8)	28.25 - 28.50	1.0000	1.0000
L27	25	Safety Line 3/8	28.25 - 28.50	1.0000	1.0000
L27	28	Sabre MS-600 (6" x 1" Plate)	28.25 - 28.50	1.0000	1.0000
L27	29	Sabre MS-600 (6" x 1" Plate)	28.25 - 28.50	1.0000	1.0000
L27	32	Sabre MS-600 (6" x 1" Plate)	28.25 - 28.50	1.0000	1.0000
L27	34	Sabre MS-600 (6" x 1" Plate)	28.25 - 28.50	1.0000	1.0000
L27	35	Sabre MS-600 (6" x 1" Plate)	28.25 - 28.50	1.0000	1.0000
L27	36	Sabre MS-600 (6" x 1" Plate)	28.25 - 28.50	1.0000	1.0000
L27	44	CCI 6.5" x 1.25" Plate	28.25 - 28.50	1.0000	1.0000
L27	45	CCI 6.5" x 1.25" Plate	28.25 - 28.50	1.0000	1.0000
L27	49	CCI 4.5" x 1" Plate	28.25 - 28.50	1.0000	1.0000
L28	20	AVA7-50(1-5/8)	27.75 - 28.25	1.0000	1.0000
L28	25	Safety Line 3/8	27.75 - 28.25	1.0000	1.0000
L28	28	Sabre MS-600 (6" x 1" Plate)	27.75 - 28.25	1.0000	1.0000
L28	29	Sabre MS-600 (6" x 1" Plate)	27.75 - 28.25	1.0000	1.0000
L28	32	Sabre MS-600 (6" x 1" Plate)	27.75 - 28.25	1.0000	1.0000
L28	34	Sabre MS-600 (6" x 1" Plate)	27.75 - 28.25	1.0000	1.0000
L28	35	Sabre MS-600 (6" x 1" Plate)	27.75 - 28.25	1.0000	1.0000
L28	36	Sabre MS-600 (6" x 1" Plate)	27.75 - 28.25	1.0000	1.0000
L28	44	CCI 6.5" x 1.25" Plate	27.75 - 28.25	1.0000	1.0000
L28	45	CCI 6.5" x 1.25" Plate	27.75 - 28.25	1.0000	1.0000
L28	49	CCI 4.5" x 1" Plate	27.75 - 28.25	1.0000	1.0000
L29	20	AVA7-50(1-5/8)	27.50 - 27.75	1.0000	1.0000
L29	25	Safety Line 3/8	27.50 - 27.75	1.0000	1.0000
L29	28	Sabre MS-600 (6" x 1" Plate)	27.50 - 27.75	1.0000	1.0000
L29	29	Sabre MS-600 (6" x 1" Plate)	27.50 - 27.75	1.0000	1.0000
L29	32	Sabre MS-600 (6" x 1" Plate)	27.50 - 27.75	1.0000	1.0000
L29	34	Sabre MS-600 (6" x 1" Plate)	27.50 - 27.75	1.0000	1.0000
L29	35	Sabre MS-600 (6" x 1" Plate)	27.50 - 27.75	1.0000	1.0000
L29	36	Sabre MS-600 (6" x 1" Plate)	27.50 - 27.75	1.0000	1.0000
L29	44	CCI 6.5" x 1.25" Plate	27.50 - 27.75	1.0000	1.0000
L29	45	CCI 6.5" x 1.25" Plate	27.50 - 27.75	1.0000	1.0000
L29	49	CCI 4.5" x 1" Plate	27.50 - 27.75	1.0000	1.0000
L30	20	AVA7-50(1-5/8)	27.25 - 27.50	1.0000	1.0000
L30	25	Safety Line 3/8	27.25 - 27.50	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L30	28	Sabre MS-600 (6" x 1" Plate)	27.25 - 27.50	1.0000	1.0000
L30	29	Sabre MS-600 (6" x 1" Plate)	27.25 - 27.50	1.0000	1.0000
L30	32	Sabre MS-600 (6" x 1" Plate)	27.25 - 27.50	1.0000	1.0000
L30	34	Sabre MS-600 (6" x 1" Plate)	27.25 - 27.50	1.0000	1.0000
L30	35	Sabre MS-600 (6" x 1" Plate)	27.25 - 27.50	1.0000	1.0000
L30	36	Sabre MS-600 (6" x 1" Plate)	27.25 - 27.50	1.0000	1.0000
L30	44	CCI 6.5" x 1.25" Plate	27.25 - 27.50	1.0000	1.0000
L30	45	CCI 6.5" x 1.25" Plate	27.25 - 27.50	1.0000	1.0000
L30	49	CCI 4.5" x 1" Plate	27.25 - 27.50	1.0000	1.0000
L31	20	AVA7-50(1-5/8)	27.08 - 27.25	1.0000	1.0000
L31	25	Safety Line 3/8	27.08 - 27.25	1.0000	1.0000
L31	28	Sabre MS-600 (6" x 1" Plate)	27.08 - 27.25	1.0000	1.0000
L31	29	Sabre MS-600 (6" x 1" Plate)	27.08 - 27.25	1.0000	1.0000
L31	32	Sabre MS-600 (6" x 1" Plate)	27.08 - 27.25	1.0000	1.0000
L31	34	Sabre MS-600 (6" x 1" Plate)	27.08 - 27.25	1.0000	1.0000
L31	35	Sabre MS-600 (6" x 1" Plate)	27.08 - 27.25	1.0000	1.0000
L31	36	Sabre MS-600 (6" x 1" Plate)	27.08 - 27.25	1.0000	1.0000
L31	44	CCI 6.5" x 1.25" Plate	27.08 - 27.25	1.0000	1.0000
L31	45	CCI 6.5" x 1.25" Plate	27.08 - 27.25	1.0000	1.0000
L31	49	CCI 4.5" x 1" Plate	27.08 - 27.25	1.0000	1.0000
L32	20	AVA7-50(1-5/8)	26.83 - 27.08	1.0000	1.0000
L32	25	Safety Line 3/8	26.83 - 27.08	1.0000	1.0000
L32	28	Sabre MS-600 (6" x 1" Plate)	26.83 - 27.08	1.0000	1.0000
L32	29	Sabre MS-600 (6" x 1" Plate)	26.83 - 27.08	1.0000	1.0000
L32	32	Sabre MS-600 (6" x 1" Plate)	26.83 - 27.08	1.0000	1.0000
L32	34	Sabre MS-600 (6" x 1" Plate)	26.83 - 27.08	1.0000	1.0000
L32	35	Sabre MS-600 (6" x 1" Plate)	26.83 - 27.08	1.0000	1.0000
L32	36	Sabre MS-600 (6" x 1" Plate)	26.83 - 27.08	1.0000	1.0000
L32	44	CCI 6.5" x 1.25" Plate	26.83 - 27.08	1.0000	1.0000
L32	45	CCI 6.5" x 1.25" Plate	26.83 - 27.08	1.0000	1.0000
L32	49	CCI 4.5" x 1" Plate	26.83 - 27.08	1.0000	1.0000
L33	20	AVA7-50(1-5/8)	21.83 - 26.83	1.0000	1.0000
L33	25	Safety Line 3/8	21.83 - 26.83	1.0000	1.0000
L33	28	Sabre MS-600 (6" x 1" Plate)	21.83 - 26.83	1.0000	1.0000
L33	29	Sabre MS-600 (6" x 1" Plate)	21.83 - 26.83	1.0000	1.0000
L33	32	Sabre MS-600 (6" x 1" Plate)	21.83 - 26.83	1.0000	1.0000
L33	34	Sabre MS-600 (6" x 1" Plate)	25.50 - 26.83	1.0000	1.0000
L33	35	Sabre MS-600 (6" x 1" Plate)	25.50 - 26.83	1.0000	1.0000
L33	36	Sabre MS-600 (6" x 1" Plate)	25.50 - 26.83	1.0000	1.0000
L33	44	CCI 6.5" x 1.25" Plate	21.83 - 26.83	1.0000	1.0000
L33	45	CCI 6.5" x 1.25" Plate	21.83 - 26.83	1.0000	1.0000
L33	49	CCI 4.5" x 1" Plate	25.50 - 26.83	1.0000	1.0000
L34	20	AVA7-50(1-5/8)	16.83 - 21.83	1.0000	1.0000
L34	25	Safety Line 3/8	16.83 - 21.83	1.0000	1.0000
L34	28	Sabre MS-600 (6" x 1" Plate)	16.83 - 21.83	1.0000	1.0000
L34	29	Sabre MS-600 (6" x 1" Plate)	16.83 - 21.83	1.0000	1.0000
L34	31	Sabre MS-600 (6" x 1" Plate)	16.83 - 17.45	1.0000	1.0000
L34	32	Sabre MS-600 (6" x 1" Plate)	16.83 - 21.83	1.0000	1.0000
L34	44	CCI 6.5" x 1.25" Plate	16.83 - 21.83	1.0000	1.0000
L34	45	CCI 6.5" x 1.25" Plate	16.83 - 21.83	1.0000	1.0000
L35	20	AVA7-50(1-5/8)	15.45 - 16.83	1.0000	1.0000
L35	25	Safety Line 3/8	15.45 - 16.83	1.0000	1.0000
L35	28	Sabre MS-600 (6" x 1" Plate)	15.45 - 16.83	1.0000	1.0000
L35	29	Sabre MS-600 (6" x 1" Plate)	15.45 - 16.83	1.0000	1.0000
L35	31	Sabre MS-600 (6" x 1" Plate)	15.45 - 16.83	1.0000	1.0000
L35	32	Sabre MS-600 (6" x 1" Plate)	15.45 - 16.83	1.0000	1.0000
L35	44	CCI 6.5" x 1.25" Plate	15.45 - 16.83	1.0000	1.0000
L35	45	CCI 6.5" x 1.25" Plate	15.45 - 16.83	1.0000	1.0000
L36	20	AVA7-50(1-5/8)	15.20 - 15.45	1.0000	1.0000
L36	25	Safety Line 3/8	15.20 - 15.45	1.0000	1.0000
L36	28	Sabre MS-600 (6" x 1" Plate)	15.20 - 15.45	1.0000	1.0000
L36	29	Sabre MS-600 (6" x 1" Plate)	15.20 - 15.45	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L36	31	Sabre MS-600 (6" x 1" Plate)	15.20 - 15.45	1.0000	1.0000
L36	32	Sabre MS-600 (6" x 1" Plate)	15.20 - 15.45	1.0000	1.0000
L36	44	CCI 6.5" x 1.25" Plate	15.20 - 15.45	1.0000	1.0000
L36	45	CCI 6.5" x 1.25" Plate	15.20 - 15.45	1.0000	1.0000
L37	20	AVA7-50(1-5/8)	13.40 - 15.20	1.0000	1.0000
L37	25	Safety Line 3/8	13.40 - 15.20	1.0000	1.0000
L37	28	Sabre MS-600 (6" x 1" Plate)	13.40 - 15.20	1.0000	1.0000
L37	29	Sabre MS-600 (6" x 1" Plate)	13.40 - 15.20	1.0000	1.0000
L37	31	Sabre MS-600 (6" x 1" Plate)	13.40 - 15.20	1.0000	1.0000
L37	32	Sabre MS-600 (6" x 1" Plate)	13.40 - 15.20	1.0000	1.0000
L37	44	CCI 6.5" x 1.25" Plate	13.40 - 15.20	1.0000	1.0000
L37	45	CCI 6.5" x 1.25" Plate	13.40 - 15.20	1.0000	1.0000
L38	20	AVA7-50(1-5/8)	13.15 - 13.40	1.0000	1.0000
L38	25	Safety Line 3/8	13.15 - 13.40	1.0000	1.0000
L38	28	Sabre MS-600 (6" x 1" Plate)	13.15 - 13.40	1.0000	1.0000
L38	29	Sabre MS-600 (6" x 1" Plate)	13.15 - 13.40	1.0000	1.0000
L38	31	Sabre MS-600 (6" x 1" Plate)	13.15 - 13.40	1.0000	1.0000
L38	32	Sabre MS-600 (6" x 1" Plate)	13.15 - 13.40	1.0000	1.0000
L38	44	CCI 6.5" x 1.25" Plate	13.15 - 13.40	1.0000	1.0000
L38	45	CCI 6.5" x 1.25" Plate	13.15 - 13.40	1.0000	1.0000
L39	20	AVA7-50(1-5/8)	8.15 - 13.15	1.0000	1.0000
L39	25	Safety Line 3/8	8.15 - 13.15	1.0000	1.0000
L39	28	Sabre MS-600 (6" x 1" Plate)	8.15 - 13.15	1.0000	1.0000
L39	29	Sabre MS-600 (6" x 1" Plate)	8.15 - 13.15	1.0000	1.0000
L39	30	Sabre MS-600 (6" x 1" Plate)	8.15 - 8.50	1.0000	1.0000
L39	31	Sabre MS-600 (6" x 1" Plate)	8.15 - 13.15	1.0000	1.0000
L39	32	Sabre MS-600 (6" x 1" Plate)	11.41 - 13.15	1.0000	1.0000
L39	44	CCI 6.5" x 1.25" Plate	8.15 - 13.15	1.0000	1.0000
L39	45	CCI 6.5" x 1.25" Plate	8.15 - 13.15	1.0000	1.0000
L40	20	AVA7-50(1-5/8)	6.50 - 8.15	1.0000	1.0000
L40	25	Safety Line 3/8	6.50 - 8.15	1.0000	1.0000
L40	28	Sabre MS-600 (6" x 1" Plate)	6.50 - 8.15	1.0000	1.0000
L40	29	Sabre MS-600 (6" x 1" Plate)	6.50 - 8.15	1.0000	1.0000
L40	30	Sabre MS-600 (6" x 1" Plate)	6.50 - 8.15	1.0000	1.0000
L40	31	Sabre MS-600 (6" x 1" Plate)	6.50 - 8.15	1.0000	1.0000
L40	44	CCI 6.5" x 1.25" Plate	6.50 - 8.15	1.0000	1.0000
L40	45	CCI 6.5" x 1.25" Plate	6.50 - 8.15	1.0000	1.0000
L41	20	AVA7-50(1-5/8)	6.25 - 6.50	1.0000	1.0000
L41	25	Safety Line 3/8	6.25 - 6.50	1.0000	1.0000
L41	28	Sabre MS-600 (6" x 1" Plate)	6.25 - 6.50	1.0000	1.0000
L41	29	Sabre MS-600 (6" x 1" Plate)	6.25 - 6.50	1.0000	1.0000
L41	30	Sabre MS-600 (6" x 1" Plate)	6.25 - 6.50	1.0000	1.0000
L41	31	Sabre MS-600 (6" x 1" Plate)	6.25 - 6.50	1.0000	1.0000
L41	44	CCI 6.5" x 1.25" Plate	6.25 - 6.50	1.0000	1.0000
L41	45	CCI 6.5" x 1.25" Plate	6.25 - 6.50	1.0000	1.0000
L42	20	AVA7-50(1-5/8)	4.45 - 6.25	1.0000	1.0000
L42	25	Safety Line 3/8	4.45 - 6.25	1.0000	1.0000
L42	28	Sabre MS-600 (6" x 1" Plate)	4.45 - 6.25	1.0000	1.0000
L42	29	Sabre MS-600 (6" x 1" Plate)	4.45 - 6.25	1.0000	1.0000
L42	30	Sabre MS-600 (6" x 1" Plate)	4.45 - 6.25	1.0000	1.0000
L42	31	Sabre MS-600 (6" x 1" Plate)	4.45 - 6.25	1.0000	1.0000
L42	44	CCI 6.5" x 1.25" Plate	4.45 - 6.25	1.0000	1.0000
L42	45	CCI 6.5" x 1.25" Plate	4.45 - 6.25	1.0000	1.0000
L43	20	AVA7-50(1-5/8)	4.20 - 4.45	1.0000	1.0000
L43	25	Safety Line 3/8	4.20 - 4.45	1.0000	1.0000
L43	28	Sabre MS-600 (6" x 1" Plate)	4.20 - 4.45	1.0000	1.0000
L43	29	Sabre MS-600 (6" x 1" Plate)	4.20 - 4.45	1.0000	1.0000
L43	30	Sabre MS-600 (6" x 1" Plate)	4.20 - 4.45	1.0000	1.0000
L43	31	Sabre MS-600 (6" x 1" Plate)	4.20 - 4.45	1.0000	1.0000
L43	44	CCI 6.5" x 1.25" Plate	4.20 - 4.45	1.0000	1.0000
L43	45	CCI 6.5" x 1.25" Plate	4.20 - 4.45	1.0000	1.0000
L44	20	AVA7-50(1-5/8)	0.00 - 4.20	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L44	25	Safety Line 3/8	0.00 - 4.20	1.0000	1.0000
L44	28	Sabre MS-600 (6" x 1" Plate)	0.00 - 4.20	1.0000	1.0000
L44	29	Sabre MS-600 (6" x 1" Plate)	0.00 - 4.20	1.0000	1.0000
L44	30	Sabre MS-600 (6" x 1" Plate)	0.50 - 4.20	1.0000	1.0000
L44	31	Sabre MS-600 (6" x 1" Plate)	2.45 - 4.20	1.0000	1.0000
L44	44	CCI 6.5" x 1.25" Plate	0.00 - 4.20	1.0000	1.0000
L44	45	CCI 6.5" x 1.25" Plate	0.00 - 4.20	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVTM14-ALU-I20 w/ Mount Pipe (R)	A	From Leg	4.000 0.000 3.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.580 7.031 7.473 8.385	4.959 5.754 6.472 7.941	0.077 0.132 0.193 0.339
APXVTM14-ALU-I20 w/ Mount Pipe (R)	B	From Leg	4.000 0.000 3.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.580 7.031 7.473 8.385	4.959 5.754 6.472 7.941	0.077 0.132 0.193 0.339
APXVTM14-ALU-I20 w/ Mount Pipe (R)	C	From Leg	4.000 0.000 3.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.580 7.031 7.473 8.385	4.959 5.754 6.472 7.941	0.077 0.132 0.193 0.339
NNVV-65B-R4 w/ Mount Pipe (R)	A	From Leg	4.000 0.000 3.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	12.509 13.108 13.672 14.822	7.412 8.598 9.496 11.328	0.103 0.194 0.293 0.520
NNVV-65B-R4 w/ Mount Pipe (R)	B	From Leg	4.000 0.000 3.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	12.509 13.108 13.672 14.822	7.412 8.598 9.496 11.328	0.103 0.194 0.293 0.520
NNVV-65B-R4 w/ Mount Pipe (R)	C	From Leg	4.000 0.000 3.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	12.509 13.108 13.672 14.822	7.412 8.598 9.496 11.328	0.103 0.194 0.293 0.520
(2) RRH2X50-800 (R)	A	From Leg	4.000 0.000 3.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.701 1.864 2.035 2.398	1.282 1.428 1.580 1.908	0.053 0.070 0.090 0.138
(2) RRH2X50-800 (R)	B	From Leg	4.000 0.000 3.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.701 1.864 2.035 2.398	1.282 1.428 1.580 1.908	0.053 0.070 0.090 0.138
(2) RRH2X50-800 (R)	C	From Leg	4.000 0.000 3.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.701 1.864 2.035 2.398	1.282 1.428 1.580 1.908	0.053 0.070 0.090 0.138
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	2.322 2.527	2.238 2.441	0.060 0.083

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(R)			3.000			1" Ice	2.739	2.651	0.110
						2" Ice	3.185	3.093	0.173
PCS 1900MHz 4x45W-65MHz (R)	B	From Leg	4.000 0.000 3.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.322 2.527 2.739 3.185	2.238 2.441 2.651 3.093	0.060 0.083 0.110 0.173
PCS 1900MHz 4x45W-65MHz (R)	C	From Leg	4.000 0.000 3.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.322 2.527 2.739 3.185	2.238 2.441 2.651 3.093	0.060 0.083 0.110 0.173
TD-RRH8x20-25 (R)	A	From Leg	4.000 0.000 3.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.045 4.298 4.557 5.098	1.535 1.714 1.901 2.295	0.070 0.097 0.128 0.201
TD-RRH8x20-25 (R)	B	From Leg	4.000 0.000 3.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.045 4.298 4.557 5.098	1.535 1.714 1.901 2.295	0.070 0.097 0.128 0.201
TD-RRH8x20-25 (R)	C	From Leg	4.000 0.000 3.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.045 4.298 4.557 5.098	1.535 1.714 1.901 2.295	0.070 0.097 0.128 0.201
9' x 2" Pipe Mount (E-per Photo)	A	From Leg	4.000 0.000 0.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.138 3.066 4.010 5.131	2.138 3.066 4.010 5.131	0.065 0.081 0.103 0.165
9' x 2" Pipe Mount (E-per Photo)	B	From Leg	4.000 0.000 0.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.138 3.066 4.010 5.131	2.138 3.066 4.010 5.131	0.065 0.081 0.103 0.165
9' x 2" Pipe Mount (E-per Photo)	C	From Leg	4.000 0.000 0.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.138 3.066 4.010 5.131	2.138 3.066 4.010 5.131	0.065 0.081 0.103 0.165
4'x2" Horizontal Mount Pipe (R-Handrail Support)	A	From Leg	2.000 0.000 4.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.866 1.111 1.365 1.901	0.866 1.111 1.365 1.901	0.060 0.068 0.078 0.107
4'x2" Horizontal Mount Pipe (R-Handrail Support)	B	From Leg	2.000 0.000 4.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.866 1.111 1.365 1.901	0.866 1.111 1.365 1.901	0.060 0.068 0.078 0.107
4'x2" Horizontal Mount Pipe (R-Handrail Support)	C	From Leg	2.000 0.000 4.000	0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.866 1.111 1.365 1.901	0.866 1.111 1.365 1.901	0.060 0.068 0.078 0.107
Miscellaneous [NA 510-1] (R-Handrail Kit)	C	None		0.000	98.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.000 8.500 11.000 16.000	6.000 8.500 11.000 16.000	0.256 0.340 0.423 0.591
Platform Mount [LP 714-1] (E-Area changed to 14' Mount)	C	None		0.000	94.000	No Ice 1/2" Ice 1" Ice 2" Ice	34.972 41.281 47.590 60.208	34.972 41.281 47.590 60.208	1.493 1.904 2.315 3.137
d									
APXV18-209014-C w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	89.000	No Ice 1/2" Ice	3.722 4.134	3.311 4.017	0.038 0.072

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(E)			1.000			1" Ice	4.541	4.684	0.112
						2" Ice	5.356	6.066	0.212
APXV18-209014-C w/ Mount Pipe	B	From Leg	4.000	0.000	89.000	No Ice	3.722	3.311	0.038
(E)			0.000			1/2" Ice	4.134	4.017	0.072
			1.000			1" Ice	4.541	4.684	0.112
						2" Ice	5.356	6.066	0.212
APXV18-209014-C w/ Mount Pipe	C	From Leg	4.000	0.000	89.000	No Ice	3.722	3.311	0.038
(E)			0.000			1/2" Ice	4.134	4.017	0.072
			1.000			1" Ice	4.541	4.684	0.112
						2" Ice	5.356	6.066	0.212
ATMPP1412D-1CWA	A	From Leg	4.000	0.000	89.000	No Ice	1.000	0.382	0.013
(E)			0.000			1/2" Ice	1.129	0.477	0.020
			1.000			1" Ice	1.265	0.578	0.028
						2" Ice	1.560	0.802	0.052
ATMPP1412D-1CWA	B	From Leg	4.000	0.000	89.000	No Ice	1.000	0.382	0.013
(E)			0.000			1/2" Ice	1.129	0.477	0.020
			1.000			1" Ice	1.265	0.578	0.028
						2" Ice	1.560	0.802	0.052
ATMPP1412D-1CWA	C	From Leg	4.000	0.000	89.000	No Ice	1.000	0.382	0.013
(E)			0.000			1/2" Ice	1.129	0.477	0.020
			1.000			1" Ice	1.265	0.578	0.028
						2" Ice	1.560	0.802	0.052
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000	0.000	89.000	No Ice	20.480	11.024	0.161
(P)			0.000			1/2" Ice	21.231	12.550	0.297
			1.000			1" Ice	21.990	14.099	0.444
						2" Ice	23.444	16.451	0.775
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000	0.000	89.000	No Ice	20.480	11.024	0.161
(P)			0.000			1/2" Ice	21.231	12.550	0.297
			1.000			1" Ice	21.990	14.099	0.444
						2" Ice	23.444	16.451	0.775
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000	0.000	89.000	No Ice	20.480	11.024	0.161
(P)			0.000			1/2" Ice	21.231	12.550	0.297
			1.000			1" Ice	21.990	14.099	0.444
						2" Ice	23.444	16.451	0.775
RADIO 4449 B12/B71	A	From Leg	4.000	0.000	89.000	No Ice	1.650	1.300	0.075
(P)			0.000			1/2" Ice	1.810	1.445	0.092
			1.000			1" Ice	1.978	1.597	0.112
						2" Ice	2.336	1.924	0.161
RADIO 4449 B12/B71	B	From Leg	4.000	0.000	89.000	No Ice	1.650	1.300	0.075
(P)			0.000			1/2" Ice	1.810	1.445	0.092
			1.000			1" Ice	1.978	1.597	0.112
						2" Ice	2.336	1.924	0.161
RADIO 4449 B12/B71	C	From Leg	4.000	0.000	89.000	No Ice	1.650	1.300	0.075
(P)			0.000			1/2" Ice	1.810	1.445	0.092
			1.000			1" Ice	1.978	1.597	0.112
						2" Ice	2.336	1.924	0.161
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	89.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	89.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	89.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Platform Mount [LP 305-1] (E)	C	None		0.000	89.000	2" Ice	3.060	3.060	0.090
						No Ice	18.010	18.010	1.121
						1/2" Ice	23.330	23.330	1.352
						1" Ice	28.650	28.650	1.584
						2" Ice	39.290	39.290	2.046
d									
7770.00 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice	5.746	4.254	0.055
						1/2" Ice	6.179	5.014	0.103
						1" Ice	6.607	5.711	0.157
						2" Ice	7.488	7.155	0.287
7770.00 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice	5.746	4.254	0.055
						1/2" Ice	6.179	5.014	0.103
						1" Ice	6.607	5.711	0.157
						2" Ice	7.488	7.155	0.287
7770.00 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice	5.746	4.254	0.055
						1/2" Ice	6.179	5.014	0.103
						1" Ice	6.607	5.711	0.157
						2" Ice	7.488	7.155	0.287
P65-17-XLH-RR w/ Mount Pipe (E)	A	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice	11.704	8.938	0.092
						1/2" Ice	12.424	10.450	0.178
						1" Ice	13.153	11.986	0.273
						2" Ice	14.517	14.313	0.498
P65-17-XLH-RR w/ Mount Pipe (E)	C	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice	11.704	8.938	0.092
						1/2" Ice	12.424	10.450	0.178
						1" Ice	13.153	11.986	0.273
						2" Ice	14.517	14.313	0.498
TT19-08BP111-001 (E)	A	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice	0.545	0.442	0.016
						1/2" Ice	0.641	0.530	0.022
						1" Ice	0.743	0.626	0.029
						2" Ice	0.971	0.840	0.049
TT19-08BP111-001 (E)	B	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice	0.545	0.442	0.016
						1/2" Ice	0.641	0.530	0.022
						1" Ice	0.743	0.626	0.029
						2" Ice	0.971	0.840	0.049
TT19-08BP111-001 (E)	C	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice	0.545	0.442	0.016
						1/2" Ice	0.641	0.530	0.022
						1" Ice	0.743	0.626	0.029
						2" Ice	0.971	0.840	0.049
DC6-48-60-18-8F (E)	B	From Leg	2.000 0.000 3.000	0.000	74.000	No Ice	0.917	0.917	0.019
						1/2" Ice	1.458	1.458	0.037
						1" Ice	1.643	1.643	0.057
						2" Ice	2.042	2.042	0.105
TPA-65R-LCUUUU-H8 w/ Mount Pipe (R)	A	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice	13.535	10.960	0.114
						1/2" Ice	14.238	12.486	0.218
						1" Ice	14.949	14.037	0.331
						2" Ice	16.308	16.391	0.593
TPA-65R-LCUUUU-H8 w/ Mount Pipe (R)	B	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice	13.535	10.960	0.114
						1/2" Ice	14.238	12.486	0.218
						1" Ice	14.949	14.037	0.331
						2" Ice	16.308	16.391	0.593
TPA-65R-LCUUUU-H8 w/ Mount Pipe (R)	C	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice	13.535	10.960	0.114
						1/2" Ice	14.238	12.486	0.218
						1" Ice	14.949	14.037	0.331
						2" Ice	16.308	16.391	0.593
SBNH-1D6565C w/ Mount Pipe (R)	B	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice	11.683	9.842	0.099
						1/2" Ice	12.404	11.366	0.189
						1" Ice	13.135	12.914	0.288

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRUS 11 B12 (R)	A	From Leg	4.000 0.000 3.000	0.000	74.000	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	14.512 2.833 3.043 3.259 3.715	15.267 1.182 1.330 1.485 1.826	0.522 0.051 0.072 0.095 0.153
RRUS 11 B12 (R)	B	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.833 3.043 3.259 3.715	1.182 1.330 1.485 1.826	0.051 0.072 0.095 0.153
RRUS 11 B12 (R)	C	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.833 3.043 3.259 3.715	1.182 1.330 1.485 1.826	0.051 0.072 0.095 0.153
RRUS 32 B30 (R)	A	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.692 2.912 3.138 3.614	1.573 1.756 1.945 2.346	0.060 0.080 0.104 0.161
RRUS 32 B30 (R)	B	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.692 2.912 3.138 3.614	1.573 1.756 1.945 2.346	0.060 0.080 0.104 0.161
RRUS 32 B30 (R)	C	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.692 2.912 3.138 3.614	1.573 1.756 1.945 2.346	0.060 0.080 0.104 0.161
RRUS 32 B2 (R)	A	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.731 2.953 3.182 3.663	1.668 1.855 2.049 2.458	0.053 0.074 0.098 0.157
RRUS 32 B2 (R)	B	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.731 2.953 3.182 3.663	1.668 1.855 2.049 2.458	0.053 0.074 0.098 0.157
RRUS 32 B2 (R)	C	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.731 2.953 3.182 3.663	1.668 1.855 2.049 2.458	0.053 0.074 0.098 0.157
DBC0061F1V51-2 (R)	A	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.433 0.518 0.609 0.815	0.413 0.496 0.586 0.788	0.025 0.031 0.038 0.057
DBC0061F1V51-2 (R)	B	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.433 0.518 0.609 0.815	0.413 0.496 0.586 0.788	0.025 0.031 0.038 0.057
DBC0061F1V51-2 (R)	C	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.433 0.518 0.609 0.815	0.413 0.496 0.586 0.788	0.025 0.031 0.038 0.057
DC6-48-60-18-8F (R)	A	From Leg	4.000 0.000 3.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.917 1.458 1.643 2.042	0.917 1.458 1.643 2.042	0.019 0.037 0.057 0.105
3' x 2" Pipe Mount (E-For DC6 Per Photo)	B	From Leg	1.000 0.000 0.000	0.000	74.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.583 0.770 0.967 1.388	0.583 0.770 0.967 1.388	0.011 0.017 0.024 0.047

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Platform Mount [LP 303-1] (E)	C	None		0.000	74.000	No Ice	14.660	14.660	1.250
						1/2" Ice	18.870	18.870	1.481
						1" Ice	23.080	23.080	1.713
d						2" Ice	31.500	31.500	2.175
(2) LPA-80063/6CFX2 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	67.000	No Ice	9.831	10.215	0.052
						1/2" Ice	10.400	11.384	0.145
						1" Ice	10.933	12.269	0.246
						2" Ice	12.026	14.086	0.476
(2) LPA-80063/6CFX2 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	67.000	No Ice	9.831	10.215	0.052
						1/2" Ice	10.400	11.384	0.145
						1" Ice	10.933	12.269	0.246
						2" Ice	12.026	14.086	0.476
(2) LPA-80063/6CFX2 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	67.000	No Ice	9.831	10.215	0.052
						1/2" Ice	10.400	11.384	0.145
						1" Ice	10.933	12.269	0.246
						2" Ice	12.026	14.086	0.476
(2) SBNHH-1D65B w/ Mount Pipe (R)	A	From Leg	4.000 0.000 0.000	0.000	67.000	No Ice	8.397	7.071	0.066
						1/2" Ice	8.960	8.260	0.135
						1" Ice	9.490	9.170	0.212
						2" Ice	10.569	11.006	0.394
(2) SBNHH-1D65B w/ Mount Pipe (R)	B	From Leg	4.000 0.000 0.000	0.000	67.000	No Ice	8.397	7.071	0.066
						1/2" Ice	8.960	8.260	0.135
						1" Ice	9.490	9.170	0.212
						2" Ice	10.569	11.006	0.394
(2) SBNHH-1D65B w/ Mount Pipe (R)	C	From Leg	4.000 0.000 0.000	0.000	67.000	No Ice	8.397	7.071	0.066
						1/2" Ice	8.960	8.260	0.135
						1" Ice	9.490	9.170	0.212
						2" Ice	10.569	11.006	0.394
B13 RRH 4X30 (R)	A	From Leg	4.000 0.000 0.000	0.000	67.000	No Ice	2.055	1.320	0.056
						1/2" Ice	2.241	1.475	0.073
						1" Ice	2.433	1.638	0.093
						2" Ice	2.841	1.997	0.142
B13 RRH 4X30 (R)	B	From Leg	4.000 0.000 0.000	0.000	67.000	No Ice	2.055	1.320	0.056
						1/2" Ice	2.241	1.475	0.073
						1" Ice	2.433	1.638	0.093
						2" Ice	2.841	1.997	0.142
B13 RRH 4X30 (R)	C	From Leg	4.000 0.000 0.000	0.000	67.000	No Ice	2.055	1.320	0.056
						1/2" Ice	2.241	1.475	0.073
						1" Ice	2.433	1.638	0.093
						2" Ice	2.841	1.997	0.142
B66A RRH4X45 (R)	A	From Leg	4.000 0.000 0.000	0.000	67.000	No Ice	2.580	1.630	0.057
						1/2" Ice	2.794	1.811	0.077
						1" Ice	3.015	1.999	0.101
						2" Ice	3.479	2.396	0.158
B66A RRH4X45 (R)	B	From Leg	4.000 0.000 0.000	0.000	67.000	No Ice	2.580	1.630	0.057
						1/2" Ice	2.794	1.811	0.077
						1" Ice	3.015	1.999	0.101
						2" Ice	3.479	2.396	0.158
B66A RRH4X45 (R)	C	From Leg	4.000 0.000 0.000	0.000	67.000	No Ice	2.580	1.630	0.057
						1/2" Ice	2.794	1.811	0.077
						1" Ice	3.015	1.999	0.101
						2" Ice	3.479	2.396	0.158
RC2DC-3315-PF-48 (R)	A	From Leg	4.000 0.000 0.000	0.000	67.000	No Ice	3.792	2.512	0.032
						1/2" Ice	4.044	2.725	0.063
						1" Ice	4.303	2.945	0.099
						2" Ice	4.844	3.414	0.181

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RC2DC-3315-PF-48	B	From Leg	4.000	0.000	67.000	No Ice	3.792	2.512	0.032
(R)			0.000			1/2" Ice	4.044	2.725	0.063
			0.000			1" Ice	4.303	2.945	0.099
						2" Ice	4.844	3.414	0.181
Platform Mount [LP 303-1]	C	None		0.000	67.000	No Ice	14.660	14.660	1.250
(E)						1/2" Ice	18.870	18.870	1.481
						1" Ice	23.080	23.080	1.713
						2" Ice	31.500	31.500	2.175
Miscellaneous [NA 509-3]	C	None		0.000	67.000	No Ice	11.840	11.840	0.275
(E-Photo)						1/2" Ice	16.960	16.960	0.296
						1" Ice	22.080	22.080	0.317
						2" Ice	32.320	32.320	0.360
d									
KS24019-L112A	C	From Leg	3.000	0.000	52.000	No Ice	0.141	0.141	0.005
(E)			0.000			1/2" Ice	0.198	0.198	0.007
			2.000			1" Ice	0.262	0.262	0.009
						2" Ice	0.415	0.415	0.018
Side Arm Mount [SO 701-1]	C	From Leg	1.500	0.000	52.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
d									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice

Comb. No.	Description
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	98 - 93	Pole	Max Tension	39	0.000	0.000	-0.000
			Max. Compression	26	-9.761	-0.004	-0.013
			Max. Mx	8	-3.447	-16.496	-0.000
			Max. My	14	-3.446	-0.002	-16.497
			Max. Vy	8	5.821	-16.496	-0.000
			Max. Vx	2	-5.822	-0.002	16.497
			Max. Torque	24			0.001
L2	93 - 88	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-16.239	-0.021	-0.021
			Max. Mx	8	-5.648	-51.965	0.001
			Max. My	2	-5.645	-0.007	51.969
			Max. Vy	8	9.584	-51.965	0.001
			Max. Vx	2	-9.585	-0.007	51.969
			Max. Torque	24			0.001
L3	88 - 82.79	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-16.490	-0.035	-0.025
			Max. Mx	8	-5.797	-78.839	0.001
			Max. My	2	-5.795	-0.010	78.846
			Max. Vy	8	9.690	-78.839	0.001
			Max. Vx	2	-9.691	-0.010	78.846
			Max. Torque	24			0.001
L4	82.79 - 80.21	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-17.188	-0.060	-0.030
			Max. Mx	8	-6.216	-127.819	0.003
			Max. My	2	-6.213	-0.017	127.832
			Max. Vy	8	9.903	-127.819	0.003
			Max. Vx	2	-9.905	-0.017	127.832

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	24			0.001
L5	80.21 - 75.21	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-17.732	-0.086	-0.036
			Max. Mx	8	-6.601	-177.765	0.004
			Max. My	2	-6.599	-0.023	177.785
			Max. Vy	8	10.090	-177.765	0.004
			Max. Vx	2	-10.091	-0.023	177.785
			Max. Torque	24			0.002
L6	75.21 - 70.21	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-26.768	-0.522	0.208
			Max. Mx	8	-9.878	-257.483	0.145
			Max. My	2	-9.873	-0.209	257.559
			Max. Vy	8	14.937	-257.483	0.145
			Max. Vx	2	-14.955	-0.209	257.559
			Max. Torque	15			0.230
L7	70.21 - 65.21	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-36.478	-1.340	0.657
			Max. Mx	8	-13.188	-342.601	0.266
			Max. My	2	-13.181	-0.397	342.732
			Max. Vy	8	20.641	-342.601	0.266
			Max. Vx	2	-20.682	-0.397	342.732
			Max. Torque	13			0.609
L8	65.21 - 60.21	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-37.427	-1.567	0.761
			Max. Mx	8	-13.976	-446.001	0.271
			Max. My	2	-13.969	-0.428	446.313
			Max. Vy	8	20.734	-446.001	0.271
			Max. Vx	2	-20.775	-0.428	446.313
			Max. Torque	13			0.608
L9	60.21 - 59.17	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-37.664	-1.613	0.783
			Max. Mx	8	-14.141	-467.579	0.272
			Max. My	2	-14.134	-0.434	467.932
			Max. Vy	8	20.786	-467.579	0.272
			Max. Vx	2	-20.832	-0.434	467.932
			Max. Torque	13			0.607
L10	59.17 - 58.9	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-37.741	-1.626	0.789
			Max. Mx	8	-14.220	-473.191	0.272
			Max. My	2	-14.212	-0.436	473.555
			Max. Vy	8	20.786	-473.191	0.272
			Max. Vx	2	-20.834	-0.436	473.555
			Max. Torque	13			0.607
L11	58.9 - 58.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-37.783	-1.633	0.792
			Max. Mx	8	-14.250	-476.311	0.272
			Max. My	2	-14.242	-0.437	476.681
			Max. Vy	8	20.797	-476.311	0.272
			Max. Vx	2	-20.846	-0.437	476.681
			Max. Torque	13			0.607
L12	58.75 - 54.08	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-39.169	-1.842	0.892
			Max. Mx	8	-15.113	-574.278	0.278
			Max. My	2	-15.105	-0.466	574.904
			Max. Vy	8	21.157	-574.278	0.278
			Max. Vx	2	-21.227	-0.466	574.904
			Max. Torque	13			0.607
L13	54.08 - 53.83	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-39.267	-1.856	0.896
			Max. Mx	8	-15.190	-579.570	0.278
			Max. My	2	-15.182	-0.468	580.211

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	21.168	-579.570	0.278
			Max. Vx	2	-21.239	-0.468	580.211
			Max. Torque	13			0.607
L14	53.83 - 52.91	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-39.628	-1.901	0.908
			Max. Mx	8	-15.401	-599.090	0.279
			Max. My	2	-15.392	-0.473	599.796
			Max. Vy	8	21.259	-599.090	0.279
			Max. Vx	2	-21.335	-0.473	599.796
			Max. Torque	13			0.607
L15	52.91 - 52.66	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-39.731	-1.914	0.912
			Max. Mx	8	-15.473	-604.409	0.279
			Max. My	2	-15.465	-0.475	605.132
			Max. Vy	8	21.276	-604.409	0.279
			Max. Vx	2	-21.354	-0.475	605.132
			Max. Torque	13			0.607
L16	52.66 - 52.17	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-39.933	-1.938	0.918
			Max. Mx	8	-15.596	-614.849	0.280
			Max. My	2	-15.587	-0.478	615.609
			Max. Vy	8	21.324	-614.849	0.280
			Max. Vx	2	-21.405	-0.478	615.609
			Max. Torque	13			0.607
L17	52.17 - 51.92	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-40.176	-1.629	0.736
			Max. Mx	8	-15.740	-620.019	0.179
			Max. My	2	-15.730	-0.306	620.876
			Max. Vy	8	21.398	-620.019	0.179
			Max. Vx	2	-21.497	-0.306	620.876
			Max. Torque	13			0.607
L18	51.92 - 45.29	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-41.431	-1.785	0.789
			Max. Mx	8	-16.505	-689.192	0.138
			Max. My	2	-16.495	-0.282	690.370
			Max. Vy	8	21.693	-689.192	0.138
			Max. Vx	2	-21.805	-0.282	690.370
			Max. Torque	12			0.428
L19	45.29 - 44.29	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-44.039	-1.997	0.873
			Max. Mx	8	-18.238	-786.157	0.082
			Max. My	2	-18.228	-0.250	787.846
			Max. Vy	8	22.165	-786.157	0.082
			Max. Vx	2	-22.291	-0.250	787.846
			Max. Torque	12			0.428
L20	44.29 - 39.29	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-46.052	-2.221	1.004
			Max. Mx	8	-19.567	-898.056	0.019
			Max. My	2	-19.558	-0.215	900.353
			Max. Vy	8	22.598	-898.056	0.019
			Max. Vx	2	-22.725	-0.215	900.353
			Max. Torque	12			0.428
L21	39.29 - 34.29	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-48.135	-2.445	1.135
			Max. Mx	8	-20.928	-1012.110	-0.043
			Max. My	2	-20.919	-0.181	1015.033
			Max. Vy	8	23.027	-1012.110	-0.043
			Max. Vx	2	-23.162	-0.181	1015.033
			Max. Torque	12			0.428
L22	34.29 - 33.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-48.492	-2.478	1.155

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-21.149	-1030.328	-0.053
			Max. My	2	-21.141	-0.176	1033.356
			Max. Vy	8	23.096	-1030.328	-0.053
			Max. Vx	2	-23.235	-0.176	1033.356
			Max. Torque	12			0.428
L23	33.5 - 33.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-48.624	-2.490	1.162
			Max. Mx	8	-21.244	-1036.106	-0.056
			Max. My	2	-21.236	-0.174	1039.167
			Max. Vy	8	23.113	-1036.106	-0.056
			Max. Vx	2	-23.254	-0.174	1039.167
			Max. Torque	12			0.428
L24	33.25 - 32	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-49.280	-2.541	1.193
			Max. Mx	8	-21.661	-1065.086	-0.071
			Max. My	2	-21.653	-0.166	1068.322
			Max. Vy	8	23.247	-1065.086	-0.071
			Max. Vx	2	-23.397	-0.166	1068.322
			Max. Torque	12			0.428
L25	32 - 31.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-49.398	-2.553	1.199
			Max. Mx	8	-21.745	-1070.900	-0.075
			Max. My	2	-21.737	-0.164	1074.173
			Max. Vy	8	23.261	-1070.900	-0.075
			Max. Vx	2	-23.412	-0.164	1074.173
			Max. Torque	12			0.428
L26	31.75 - 28.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-50.952	-2.692	1.290
			Max. Mx	8	-22.693	-1147.017	-0.114
			Max. My	2	-22.685	-0.144	1150.788
			Max. Vy	8	23.574	-1147.017	-0.114
			Max. Vx	2	-23.740	-0.144	1150.788
			Max. Torque	12			0.428
L27	28.5 - 28.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-51.091	-2.704	1.298
			Max. Mx	8	-22.797	-1152.913	-0.117
			Max. My	2	-22.789	-0.143	1156.724
			Max. Vy	8	23.588	-1152.913	-0.117
			Max. Vx	2	-23.755	-0.143	1156.724
			Max. Torque	12			0.427
L28	28.25 - 27.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-51.371	-2.725	1.313
			Max. Mx	8	-22.977	-1164.724	-0.123
			Max. My	2	-22.968	-0.140	1168.617
			Max. Vy	8	23.641	-1164.724	-0.123
			Max. Vx	2	-23.810	-0.140	1168.617
			Max. Torque	12			0.427
L29	27.75 - 27.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-51.518	-2.737	1.321
			Max. Mx	8	-23.078	-1170.640	-0.126
			Max. My	2	-23.070	-0.138	1174.573
			Max. Vy	8	23.665	-1170.640	-0.126
			Max. Vx	2	-23.835	-0.138	1174.573
			Max. Torque	12			0.427
L30	27.5 - 27.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-51.646	-2.747	1.328
			Max. Mx	8	-23.158	-1176.562	-0.129
			Max. My	2	-23.150	-0.137	1180.536
			Max. Vy	8	23.690	-1176.562	-0.129
			Max. Vx	2	-23.861	-0.137	1180.536
			Max. Torque	12			0.427

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L31	27.25 - 27.08	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-51.734	-2.755	1.334
			Max. Mx	8	-23.214	-1180.592	-0.131
			Max. My	2	-23.206	-0.136	1184.595
			Max. Vy	8	23.706	-1180.592	-0.131
			Max. Vx	2	-23.878	-0.136	1184.595
			Max. Torque	12			0.427
L32	27.08 - 26.83	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-51.852	-2.766	1.341
			Max. Mx	8	-23.285	-1186.524	-0.134
			Max. My	2	-23.277	-0.134	1190.568
			Max. Vy	8	23.730	-1186.524	-0.134
			Max. Vx	2	-23.903	-0.134	1190.568
			Max. Torque	12			0.427
L33	26.83 - 21.83	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-54.023	-3.005	1.541
			Max. Mx	8	-24.714	-1306.230	-0.193
			Max. My	2	-24.707	-0.105	1311.122
			Max. Vy	8	24.146	-1306.230	-0.193
			Max. Vx	2	-24.324	-0.105	1311.122
			Max. Torque	12			0.427
L34	21.83 - 16.83	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-56.147	-3.262	1.753
			Max. Mx	8	-26.183	-1427.870	-0.251
			Max. My	2	-26.178	-0.078	1433.624
			Max. Vy	8	24.514	-1427.870	-0.251
			Max. Vx	2	-24.693	-0.078	1433.624
			Max. Torque	12			0.427
L35	16.83 - 15.45	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-56.751	-3.344	1.793
			Max. Mx	8	-26.589	-1461.764	-0.267
			Max. My	2	-26.584	-0.071	1467.761
			Max. Vy	8	24.617	-1461.764	-0.267
			Max. Vx	2	-24.804	-0.071	1467.761
			Max. Torque	12			0.427
L36	15.45 - 15.2	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-56.867	-3.359	1.800
			Max. Mx	8	-26.688	-1467.918	-0.269
			Max. My	2	-26.683	-0.070	1473.961
			Max. Vy	8	24.616	-1467.918	-0.269
			Max. Vx	2	-24.803	-0.070	1473.961
			Max. Torque	12			0.427
L37	15.2 - 13.4	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-57.732	-3.466	1.853
			Max. Mx	8	-27.280	-1512.361	-0.290
			Max. My	2	-27.276	-0.061	1518.738
			Max. Vy	8	24.767	-1512.361	-0.290
			Max. Vx	2	-24.964	-0.061	1518.738
			Max. Torque	12			0.427
L38	13.4 - 13.15	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-57.852	-3.481	1.861
			Max. Mx	8	-27.386	-1518.552	-0.293
			Max. My	2	-27.381	-0.059	1524.977
			Max. Vy	8	24.764	-1518.552	-0.293
			Max. Vx	2	-24.962	-0.059	1524.977
			Max. Torque	12			0.427
L39	13.15 - 8.15	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-60.207	-3.737	2.052
			Max. Mx	8	-29.086	-1643.322	-0.348
			Max. My	2	-29.083	-0.036	1650.728
			Max. Vy	8	25.136	-1643.322	-0.348

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-25.343	-0.036	1650.728
			Max. Torque	12			0.427
L40	8.15 - 6.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-60.994	-3.835	2.101
			Max. Mx	8	-29.649	-1684.894	-0.366
			Max. My	2	-29.647	-0.029	1692.638
			Max. Vy	8	25.266	-1684.894	-0.366
			Max. Vx	2	-25.482	-0.029	1692.638
			Max. Torque	12			0.427
L41	6.5 - 6.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-61.119	-3.850	2.108
			Max. Mx	8	-29.760	-1691.210	-0.369
			Max. My	2	-29.758	-0.028	1699.007
			Max. Vy	8	25.263	-1691.210	-0.369
			Max. Vx	2	-25.480	-0.028	1699.007
			Max. Torque	12			0.427
L42	6.25 - 4.45	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-62.016	-3.955	2.161
			Max. Mx	8	-30.408	-1736.827	-0.389
			Max. My	2	-30.406	-0.020	1745.011
			Max. Vy	8	25.422	-1736.827	-0.389
			Max. Vx	2	-25.648	-0.020	1745.011
			Max. Torque	12			0.427
L43	4.45 - 4.2	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-62.134	-3.969	2.168
			Max. Mx	8	-30.514	-1743.182	-0.391
			Max. My	2	-30.512	-0.019	1751.421
			Max. Vy	8	25.419	-1743.182	-0.391
			Max. Vx	2	-25.646	-0.019	1751.421
			Max. Torque	12			0.427
L44	4.2 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-64.044	-4.178	2.325
			Max. Mx	8	-31.971	-1850.641	-0.436
			Max. My	2	-31.970	-0.002	1859.818
			Max. Vy	8	25.743	-1850.641	-0.436
			Max. Vx	2	-25.975	-0.002	1859.818
			Max. Torque	12			0.427

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	30	64.044	-6.467	-0.008
	Max. H_x	20	31.984	25.726	0.019
	Max. H_z	2	31.984	0.019	25.959
	Max. M_x	2	1859.818	0.019	25.959
	Max. M_z	8	1850.641	-25.726	-0.019
	Max. Torsion	12	0.427	-12.767	-22.142
	Min. Vert	13	23.988	-12.767	-22.142
	Min. H_x	8	31.984	-25.726	-0.019
	Min. H_z	14	31.984	-0.019	-25.955
	Min. M_x	14	-1855.309	-0.019	-25.955
	Min. M_z	20	-1848.758	25.726	0.019
	Min. Torsion	24	-0.425	12.767	22.142

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	26.653	0.000	0.000	-0.404	-0.758	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	31.984	-0.019	-25.959	-1859.818	-0.002	0.420
0.9 Dead+1.0 Wind 0 deg - No Ice	23.988	-0.019	-25.959	-1840.585	0.235	0.419
1.2 Dead+1.0 Wind 30 deg - No Ice	31.984	12.934	-22.468	-1607.215	-926.208	0.301
0.9 Dead+1.0 Wind 30 deg - No Ice	23.988	12.934	-22.468	-1590.566	-916.446	0.301
1.2 Dead+1.0 Wind 60 deg - No Ice	31.984	22.270	-12.874	-926.366	-1602.358	0.101
0.9 Dead+1.0 Wind 60 deg - No Ice	23.988	22.270	-12.874	-916.705	-1585.627	0.101
1.2 Dead+1.0 Wind 90 deg - No Ice	31.984	25.726	0.019	0.436	-1850.641	-0.126
0.9 Dead+1.0 Wind 90 deg - No Ice	23.988	25.726	0.019	0.561	-1831.357	-0.126
1.2 Dead+1.0 Wind 120 deg - No Ice	31.984	22.493	13.024	929.661	-1607.927	-0.320
0.9 Dead+1.0 Wind 120 deg - No Ice	23.988	22.493	13.024	920.239	-1591.172	-0.319
1.2 Dead+1.0 Wind 150 deg - No Ice	31.984	12.767	22.142	1599.595	-923.470	-0.427
0.9 Dead+1.0 Wind 150 deg - No Ice	23.988	12.767	22.142	1583.226	-913.716	-0.426
1.2 Dead+1.0 Wind 180 deg - No Ice	31.984	0.019	25.955	1855.309	-1.877	-0.419
0.9 Dead+1.0 Wind 180 deg - No Ice	23.988	0.019	25.955	1836.360	-1.630	-0.419
1.2 Dead+1.0 Wind 210 deg - No Ice	31.984	-12.934	22.468	1606.211	924.328	-0.299
0.9 Dead+1.0 Wind 210 deg - No Ice	23.988	-12.934	22.468	1589.820	915.051	-0.299
1.2 Dead+1.0 Wind 240 deg - No Ice	31.984	-22.569	13.046	929.463	1607.579	-0.100
0.9 Dead+1.0 Wind 240 deg - No Ice	23.988	-22.569	13.046	920.041	1591.301	-0.100
1.2 Dead+1.0 Wind 270 deg - No Ice	31.984	-25.726	-0.019	-1.439	1848.758	0.126
0.9 Dead+1.0 Wind 270 deg - No Ice	23.988	-25.726	-0.019	-1.305	1829.959	0.126
1.2 Dead+1.0 Wind 300 deg - No Ice	31.984	-22.384	-12.961	-929.414	1603.883	0.318
0.9 Dead+1.0 Wind 300 deg - No Ice	23.988	-22.384	-12.961	-919.737	1587.619	0.317
1.2 Dead+1.0 Wind 330 deg - No Ice	31.984	-12.767	-22.142	-1600.596	921.590	0.425
0.9 Dead+1.0 Wind 330 deg - No Ice	23.988	-12.767	-22.142	-1583.970	912.320	0.425
1.2 Dead+1.0 Ice+1.0 Temp	64.044	0.000	-0.000	-2.325	-4.178	-0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	64.044	-0.008	-6.482	-523.829	-3.853	0.077
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	64.044	3.227	-5.610	-453.761	-264.156	0.053
1.2 Dead+1.0 Wind 60 deg+1.0	64.044	5.597	-3.234	-262.744	-454.821	0.014

Load Combination	Vertical K	Shear$_x$ K	Shear$_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Ice+1.0 Temp						
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	64.044	6.467	0.008	-1.960	-524.759	-0.028
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	64.044	5.605	3.248	258.714	-455.231	-0.063
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	64.044	3.240	5.617	449.432	-264.866	-0.081
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	64.044	0.008	6.482	519.090	-4.672	-0.077
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	64.044	-3.227	5.610	449.023	255.632	-0.053
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	64.044	-5.597	3.234	258.006	446.298	-0.014
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	64.044	-6.467	-0.008	-2.779	516.236	0.028
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	64.044	-5.605	-3.248	-263.454	446.707	0.063
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	64.044	-3.240	-5.617	-454.172	256.341	0.081
Dead+Wind 0 deg - Service	26.653	-0.004	-5.810	-414.530	-0.574	0.095
Dead+Wind 30 deg - Service	26.653	2.895	-5.029	-358.268	-206.861	0.068
Dead+Wind 60 deg - Service	26.653	4.985	-2.881	-206.626	-357.453	0.023
Dead+Wind 90 deg - Service	26.653	5.758	0.004	-0.208	-412.749	-0.029
Dead+Wind 120 deg - Service	26.653	5.034	2.915	206.752	-358.697	-0.072
Dead+Wind 150 deg - Service	26.653	2.858	4.956	355.956	-206.249	-0.097
Dead+Wind 180 deg - Service	26.653	0.004	5.809	412.913	-0.992	-0.095
Dead+Wind 210 deg - Service	26.653	-2.895	5.029	357.434	205.295	-0.068
Dead+Wind 240 deg - Service	26.653	-5.051	2.920	206.708	357.473	-0.023
Dead+Wind 270 deg - Service	26.653	-5.758	-0.004	-0.626	411.182	0.029
Dead+Wind 300 deg - Service	26.653	-5.010	-2.901	-207.307	356.647	0.072
Dead+Wind 330 deg - Service	26.653	-2.858	-4.956	-356.790	204.683	0.097

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.000	-26.653	0.000	0.000	26.653	0.000	0.000%
2	-0.019	-31.984	-25.959	0.019	31.984	25.959	0.000%
3	-0.019	-23.988	-25.959	0.019	23.988	25.959	0.000%
4	12.934	-31.984	-22.468	-12.934	31.984	22.468	0.000%
5	12.934	-23.988	-22.468	-12.934	23.988	22.468	0.000%
6	22.270	-31.984	-12.874	-22.270	31.984	12.874	0.000%
7	22.270	-23.988	-12.874	-22.270	23.988	12.874	0.000%
8	25.726	-31.984	0.019	-25.726	31.984	-0.019	0.000%
9	25.726	-23.988	0.019	-25.726	23.988	-0.019	0.000%
10	22.493	-31.984	13.024	-22.493	31.984	-13.024	0.000%
11	22.493	-23.988	13.024	-22.493	23.988	-13.024	0.000%
12	12.767	-31.984	22.142	-12.767	31.984	-22.142	0.000%
13	12.767	-23.988	22.142	-12.767	23.988	-22.142	0.000%
14	0.019	-31.984	25.955	-0.019	31.984	-25.955	0.000%
15	0.019	-23.988	25.955	-0.019	23.988	-25.955	0.000%
16	-12.934	-31.984	22.468	12.934	31.984	-22.468	0.000%
17	-12.934	-23.988	22.468	12.934	23.988	-22.468	0.000%
18	-22.569	-31.984	13.046	22.569	31.984	-13.046	0.000%
19	-22.569	-23.988	13.046	22.569	23.988	-13.046	0.000%
20	-25.726	-31.984	-0.019	25.726	31.984	0.019	0.000%
21	-25.726	-23.988	-0.019	25.726	23.988	0.019	0.000%

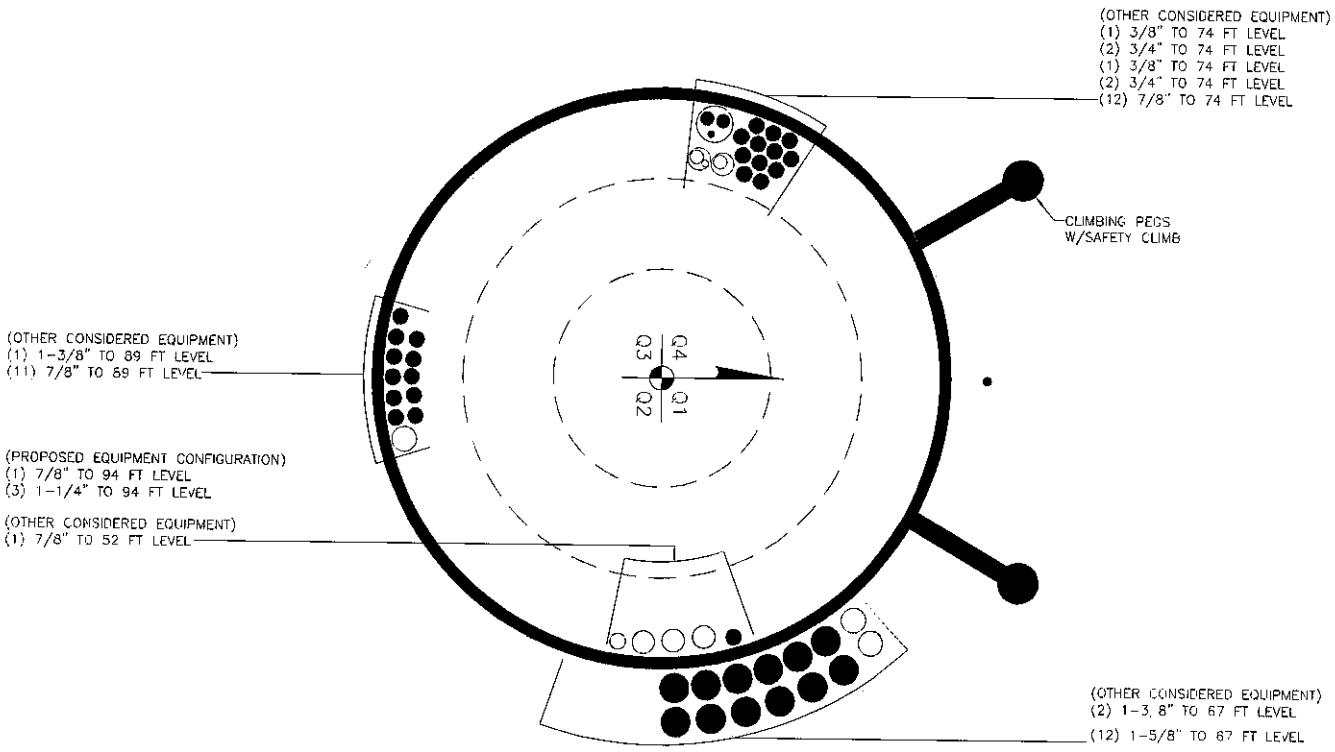
Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
22	-22.384	-31.984	-12.961	22.384	31.984	12.961	0.000%
23	-22.384	-23.988	-12.961	22.384	23.988	12.961	0.000%
24	-12.767	-31.984	-22.142	12.767	31.984	22.142	0.000%
25	-12.767	-23.988	-22.142	12.767	23.988	22.142	0.000%
26	0.000	-64.044	0.000	-0.000	64.044	0.000	0.000%
27	-0.008	-64.044	-6.482	0.008	64.044	6.482	0.000%
28	3.227	-64.044	-5.610	-3.227	64.044	5.610	0.000%
29	5.597	-64.044	-3.234	-5.597	64.044	3.234	0.000%
30	6.467	-64.044	0.008	-6.467	64.044	-0.008	0.000%
31	5.605	-64.044	3.248	-5.605	64.044	-3.248	0.000%
32	3.240	-64.044	5.617	-3.240	64.044	-5.617	0.000%
33	0.008	-64.044	6.482	-0.008	64.044	-6.482	0.000%
34	-3.227	-64.044	5.610	3.227	64.044	-5.610	0.000%
35	-5.597	-64.044	3.234	5.597	64.044	-3.234	0.000%
36	-6.467	-64.044	-0.008	6.467	64.044	0.008	0.000%
37	-5.605	-64.044	-3.248	5.605	64.044	3.248	0.000%
38	-3.240	-64.044	-5.617	3.240	64.044	5.617	0.000%
39	-0.004	-26.653	-5.810	0.004	26.653	5.810	0.000%
40	2.895	-26.653	-5.029	-2.895	26.653	5.029	0.000%
41	4.985	-26.653	-2.881	-4.985	26.653	2.881	0.000%
42	5.758	-26.653	0.004	-5.758	26.653	-0.004	0.000%
43	5.034	-26.653	2.915	-5.034	26.653	-2.915	0.000%
44	2.858	-26.653	4.956	-2.858	26.653	-4.956	0.000%
45	0.004	-26.653	5.809	-0.004	26.653	-5.809	0.000%
46	-2.895	-26.653	5.029	2.895	26.653	-5.029	0.000%
47	-5.051	-26.653	2.920	5.051	26.653	-2.920	0.000%
48	-5.758	-26.653	-0.004	5.758	26.653	0.004	0.000%
49	-5.010	-26.653	-2.901	5.010	26.653	2.901	0.000%
50	-2.858	-26.653	-4.956	2.858	26.653	4.956	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4		

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876399 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- H

Site BU: 876399

Work Order: 1663795

CROWN CASTLE

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	98	15.21	2.42	18	12	15.28	0.1875	Auto	A572-65
2	85.21	39.92	3.42	18	14.38	22.86	0.25	Auto	A572-65
3	48.71	48.71	0	18	21.63	32	0.3125	Auto	A572-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	6.5	plate	MS-600 W(1.1875")	1												E1						
2	0	28.5	plate	MS-600 W(1.1875")	1																		E1
3	0	28.5	plate	MS-600 (1.1875")	1						E1												
4	4.45	15.45	plate	MS-600 (1.1875")	1											E1							
5	13.41	28.5	plate	MS-600 (1.1875")	1												E1						
6	27.5	33.5	plate	MS-600 (1.1875")	3					E1						E1						E1	
7	32	48.25	plate	MS-450 (1.1875")	1												E1						
8	32	59	plate	MS-450 (1.1875")	2						E1												E1
9	47.41	52.91	plate	MS-450 (1.1875")	1											E1							
10	52.17	59.17	plate	MS-450 (1.1875")	1												E1						
11	0	27.75	plate	CCI-SFP-065125	2		P													P			
12	27.08	54.08	plate	CCI-SFP-045100	1								P										
13	27.75	54.08	plate	CCI-SFP-045100	2		P													P			
14	0	13.5	plate	CCI-SFP-045100	1							P											
15																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	6	1	6	0.5	n/a	24.000	16.375	4.750	1.1875	A572-65
2	6	1	6	0.5	n/a	24.000	16.375	4.750	1.1875	A572-65
3	6	1	6	0.5	24.000	24.000	16.375	4.750	1.1875	A572-65
4	6	1	6	0.5	24.000	24.000	16.375	4.750	1.1875	A572-65
5	6	1	6	0.5	24.000	24.000	16.375	4.750	1.1875	A572-65
6	6	1	6	0.5	24.000	24.000	16.375	4.750	1.1875	A572-65
7	4.5	1	4.5	0.5	18.000	18.000	20.625	3.250	1.1875	A572-65
8	4.5	1	4.5	0.5	18.000	18.000	20.625	3.250	1.1875	A572-65
9	4.5	1	4.5	0.5	18.000	18.000	20.625	3.250	1.1875	A572-65
10	4.5	1	4.5	0.5	18.000	18.000	20.625	3.250	1.1875	A572-65
11	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.563	1.1875	A572-65
12	4.5	1	4.5	0.5	18.000	18.000	20.000	3.250	1.1875	A572-65
13	4.5	1	4.5	0.5	18.000	18.000	20.000	3.250	1.1875	A572-65
14	4.5	1	4.5	0.5	18.000	18.000	20.000	3.250	1.1875	A572-65

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	98 - 93	5		18	12.000	13.078	0.1875	A572-65	1.000
2	93 - 88	5		18	13.078	14.156	0.1875	A572-65	1.000
3	88 - 85.21	5.21	2.42	18	14.156	15.280	0.1875	A572-65	1.000
4	85.21 - 80.21	5		18	14.383	15.445	0.25	A572-65	1.000
5	80.21 - 75.21	5		18	15.445	16.507	0.25	A572-65	1.000
6	75.21 - 70.21	5		18	16.507	17.568	0.25	A572-65	1.000
7	70.21 - 65.21	5		18	17.568	18.630	0.25	A572-65	1.000
8	65.21 - 60.21	5		18	18.630	19.692	0.25	A572-65	1.000
9	60.21 - 59.17	1.04		18	19.692	19.913	0.25	A572-65	1.000
10	59.17 - 58.9	0.27		18	19.913	19.970	0.5125	A572-65	0.921
11	58.9 - 58.75	0.15		18	19.970	20.002	0.5125	A572-65	0.920
12	58.75 - 54.08	4.67		18	20.002	20.993	0.5	A572-65	0.921
13	54.08 - 53.83	0.25		18	20.993	21.047	0.7	A572-65	0.962
14	53.83 - 52.91	0.92		18	21.047	21.242	0.7	A572-65	0.957
15	52.91 - 52.66	0.25		18	21.242	21.295	0.775	A572-65	0.955
16	52.66 - 52.17	0.49		18	21.295	21.399	0.775	A572-65	0.952
17	52.17 - 51.92	0.25		18	21.399	21.452	0.6875	A572-65	0.967
18	51.92 - 48.71	6.63	3.42	18	21.452	22.860	0.6625	A572-65	0.983
19	48.71 - 44.29	4.42		18	21.634	22.574	0.7375	A572-65	0.960
20	44.29 - 39.29	5		18	22.574	23.638	0.7125	A572-65	0.967
21	39.29 - 34.29	5		18	23.638	24.703	0.6875	A572-65	0.977
22	34.29 - 33.5	0.79		18	24.703	24.871	0.6875	A572-65	0.973
23	33.5 - 33.25	0.25		18	24.871	24.924	0.9875	A572-65	0.925
24	33.25 - 32	1.25		18	24.924	25.190	0.9875	A572-65	0.919
25	32 - 31.75	0.25		18	25.190	25.243	0.7625	A572-65	0.949
26	31.75 - 28.5	3.25		18	25.243	25.935	0.75	A572-65	0.949
27	28.5 - 28.25	0.25		18	25.935	25.988	1.0375	A572-65	0.912
28	28.25 - 27.75	0.5		18	25.988	26.094	1.0375	A572-65	0.910
29	27.75 - 27.5	0.25		18	26.094	26.148	1.2125	A572-65	0.858
30	27.5 - 27.25	0.25		18	26.148	26.201	0.9	A572-65	0.891
31	27.25 - 27.08	0.17		18	26.201	26.237	0.9	A572-65	0.891
32	27.08 - 26.83	0.25		18	26.237	26.290	0.7375	A572-65	0.903
33	26.83 - 21.83	5		18	26.290	27.354	0.725	A572-65	0.899
34	21.83 - 16.83	5		18	27.354	28.418	0.7	A572-65	0.911
35	16.83 - 15.45	1.38		18	28.418	28.712	0.7	A572-65	0.907
36	15.45 - 15.2	0.25		18	28.712	28.765	0.4875	A572-65	1.428
37	15.2 - 13.4	1.8		18	28.765	29.148	0.775	A572-65	0.965
38	13.4 - 13.15	0.25		18	29.148	29.201	0.775	A572-65	0.964
39	13.15 - 8.15	5		18	29.201	30.266	0.75	A572-65	0.974
40	8.15 - 6.5	1.65		18	30.266	30.617	0.75	A572-65	0.968
41	6.5 - 6.25	0.25		18	30.617	30.670	0.8375	A572-65	0.944
42	6.25 - 4.45	1.8		18	30.670	31.053	0.825	A572-65	0.951
43	4.45 - 4.2	0.25		18	31.053	31.106	0.7875	A572-65	0.914
44	4.2 - 0	4.2		18	31.106	32.000	0.775	A572-65	0.914

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	98 - 93	3.45	16.50	5.82
2	93 - 88	5.65	51.97	9.59
3	88 - 85.21	5.79	78.85	9.69
4	85.21 - 80.21	6.21	127.83	9.90
5	80.21 - 75.21	6.60	177.78	10.09
6	75.21 - 70.21	9.87	257.65	14.96
7	70.21 - 65.21	13.18	342.89	20.67
8	65.21 - 60.21	13.97	446.41	20.76
9	60.21 - 59.17	14.14	468.02	20.81
10	59.17 - 58.9	14.22	473.64	20.81
11	58.9 - 58.75	14.25	476.76	20.83
12	58.75 - 54.08	15.11	574.90	21.23
13	54.08 - 53.83	15.18	580.21	21.24
14	53.83 - 52.91	15.39	599.80	21.33
15	52.91 - 52.66	15.46	605.13	21.35
16	52.66 - 52.17	15.59	615.61	21.40
17	52.17 - 51.92	15.73	620.88	21.50
18	51.92 - 48.71	16.50	690.37	21.80
19	48.71 - 44.29	18.23	787.85	22.29
20	44.29 - 39.29	19.56	900.35	22.72
21	39.29 - 34.29	20.92	1015.03	23.16
22	34.29 - 33.5	21.14	1033.36	23.24
23	33.5 - 33.25	21.24	1039.17	23.25
24	33.25 - 32	21.65	1068.32	23.40
25	32 - 31.75	21.74	1074.17	23.41
26	31.75 - 28.5	22.68	1150.79	23.74
27	28.5 - 28.25	22.79	1156.72	23.76
28	28.25 - 27.75	22.97	1168.62	23.81
29	27.75 - 27.5	23.07	1174.57	23.83
30	27.5 - 27.25	23.15	1180.54	23.86
31	27.25 - 27.08	23.21	1184.59	23.88
32	27.08 - 26.83	23.28	1190.57	23.90
33	26.83 - 21.83	24.71	1311.12	24.32
34	21.83 - 16.83	26.18	1433.62	24.69
35	16.83 - 15.45	26.58	1467.76	24.80
36	15.45 - 15.2	26.68	1473.96	24.80
37	15.2 - 13.4	27.28	1518.74	24.96
38	13.4 - 13.15	27.38	1524.98	24.96
39	13.15 - 8.15	29.08	1650.73	25.34
40	8.15 - 6.5	29.65	1692.64	25.48
41	6.5 - 6.25	29.76	1699.01	25.48
42	6.25 - 4.45	30.41	1745.01	25.65
43	4.45 - 4.2	30.51	1751.42	25.65
44	4.2 - 0	31.97	1859.82	25.98

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
98 - 93	Pole	TP13.078x12x0.1875	Pole	11.1%	Pass
93 - 88	Pole	TP14.156x13.078x0.1875	Pole	29.0%	Pass
88 - 85.21	Pole	TP15.28x14.156x0.1875	Pole	40.0%	Pass
85.21 - 80.21	Pole	TP15.445x14.383x0.25	Pole	44.5%	Pass
80.21 - 75.21	Pole	TP16.507x15.445x0.25	Pole	53.9%	Pass
75.21 - 70.21	Pole	TP17.568x16.507x0.25	Pole	68.9%	Pass
70.21 - 65.21	Pole	TP18.63x17.568x0.25	Pole	81.4%	Pass
65.21 - 60.21	Pole	TP19.692x18.63x0.25	Pole	94.5%	Pass
60.21 - 59.17	Pole	TP19.913x19.692x0.25	Pole	96.8%	Pass
59.17 - 58.9	Pole + Reinf.	TP19.97x19.913x0.5125	Reinf. 10 Compression	87.7%	Pass
58.9 - 58.75	Pole + Reinf.	TP20.002x19.97x0.5125	Reinf. 10 Compression	88.1%	Pass
58.75 - 54.08	Pole + Reinf.	TP20.993x20.002x0.5	Reinf. 10 Compression	98.6%	Pass
54.08 - 53.83	Pole + Reinf.	TP21.047x20.993x0.7	Reinf. 10 Compression	74.2%	Pass
53.83 - 52.91	Pole + Reinf.	TP21.242x21.047x0.7	Reinf. 10 Compression	75.7%	Pass
52.91 - 52.66	Pole + Reinf.	TP21.295x21.242x0.775	Reinf. 8 Compression	68.5%	Pass
52.66 - 52.17	Pole + Reinf.	TP21.399x21.295x0.775	Reinf. 8 Compression	69.2%	Pass
52.17 - 51.92	Pole + Reinf.	TP21.452x21.399x0.6875	Reinf. 9 Compression	76.0%	Pass
51.92 - 48.71	Pole + Reinf.	TP22.86x21.452x0.6625	Reinf. 9 Compression	80.9%	Pass
48.71 - 44.29	Pole + Reinf.	TP22.574x21.634x0.7375	Reinf. 7 Compression	83.2%	Pass
44.29 - 39.29	Pole + Reinf.	TP23.638x22.574x0.7125	Reinf. 7 Compression	88.9%	Pass
39.29 - 34.29	Pole + Reinf.	TP24.703x23.638x0.6875	Reinf. 7 Compression	93.9%	Pass
34.29 - 33.5	Pole + Reinf.	TP24.871x24.703x0.6875	Reinf. 7 Compression	94.6%	Pass
33.5 - 33.25	Pole + Reinf.	TP24.924x24.871x0.9875	Reinf. 7 Compression	67.6%	Pass
33.25 - 32	Pole + Reinf.	TP25.19x24.924x0.9875	Reinf. 7 Compression	68.5%	Pass
32 - 31.75	Pole + Reinf.	TP25.243x25.19x0.7625	Reinf. 13 Tension Rupture	81.1%	Pass
31.75 - 28.5	Pole + Reinf.	TP25.935x25.243x0.75	Reinf. 13 Tension Rupture	83.6%	Pass
28.5 - 28.25	Pole + Reinf.	TP25.988x25.935x1.0375	Reinf. 13 Tension Rupture	62.6%	Pass
28.25 - 27.75	Pole + Reinf.	TP26.094x25.988x1.0375	Reinf. 13 Tension Rupture	63.0%	Pass
27.75 - 27.5	Pole + Reinf.	TP26.148x26.094x1.2125	Reinf. 12 Tension Rupture	59.9%	Pass
27.5 - 27.25	Pole + Reinf.	TP26.201x26.148x0.9	Reinf. 12 Tension Rupture	78.9%	Pass
27.25 - 27.08	Pole + Reinf.	TP26.237x26.201x0.9	Reinf. 12 Tension Rupture	79.0%	Pass
27.08 - 26.83	Pole + Reinf.	TP26.29x26.237x0.7375	Reinf. 3 Tension Rupture	84.8%	Pass
26.83 - 21.83	Pole + Reinf.	TP27.354x26.29x0.725	Reinf. 3 Tension Rupture	87.9%	Pass
21.83 - 16.83	Pole + Reinf.	TP28.418x27.354x0.7	Reinf. 3 Tension Rupture	90.7%	Pass
16.83 - 15.45	Pole + Reinf.	TP28.712x28.418x0.7	Reinf. 3 Tension Rupture	91.4%	Pass
15.45 - 15.2	Pole + Reinf.	TP28.765x28.712x0.4875	Pole	86.3%	Pass
15.2 - 13.4	Pole + Reinf.	TP29.148x28.765x0.775	Reinf. 4 Tension Rupture	84.4%	Pass
13.4 - 13.15	Pole + Reinf.	TP29.201x29.148x0.775	Reinf. 4 Tension Rupture	84.5%	Pass
13.15 - 8.15	Pole + Reinf.	TP30.266x29.201x0.75	Reinf. 4 Tension Rupture	86.9%	Pass
8.15 - 6.5	Pole + Reinf.	TP30.617x30.266x0.75	Reinf. 4 Tension Rupture	87.6%	Pass
6.5 - 6.25	Pole + Reinf.	TP30.67x30.617x0.8375	Reinf. 14 Tension Rupture	84.6%	Pass
6.25 - 4.45	Pole + Reinf.	TP31.053x30.67x0.825	Reinf. 14 Tension Rupture	85.4%	Pass
4.45 - 4.2	Pole + Reinf.	TP31.106x31.053x0.7875	Reinf. 14 Tension Rupture	89.4%	Pass
4.2 - 0	Pole + Reinf.	TP32x31.106x0.775	Reinf. 14 Tension Rupture	91.1%	Pass
				Summary	
			Pole	96.8%	Pass
			Reinforcement	98.6%	Pass
			Overall	98.6%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity*													
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
98 - 93	161	n/a	161	7.67	n/a	7.67	11.1%														
93 - 88	205	n/a	205	8.31	n/a	8.31	29.0%														
88 - 85.21	233	n/a	233	8.67	n/a	8.67	40.0%														
85.21 - 80.21	352	n/a	352	12.06	n/a	12.06	44.5%														
80.21 - 75.21	431	n/a	431	12.90	n/a	12.90	53.9%														
75.21 - 70.21	521	n/a	521	13.74	n/a	13.74	68.9%														
70.21 - 65.21	622	n/a	622	14.58	n/a	14.58	81.4%														
65.21 - 60.21	736	n/a	736	15.43	n/a	15.43	94.5%														
60.21 - 59.17	762	n/a	762	15.60	n/a	15.60	96.8%														
59.17 - 58.9	769	754	1523	15.65	13.50	29.15	48.6%								87.7%		87.7%				
58.9 - 58.75	772	756	1529	15.67	13.50	29.17	48.8%								88.1%		88.1%				
58.75 - 54.08	895	828	1723	16.46	13.50	29.96	54.7%								98.8%		98.8%				
54.08 - 53.83	903	1477	2380	16.50	27.00	43.50	41.2%								66.2%		74.2%		63.9%	67.8%	
53.83 - 52.91	929	1503	2431	16.66	27.00	43.66	42.1%								67.6%		75.7%		65.2%	69.2%	
52.91 - 52.66	936	1778	2709	16.70	31.50	48.20	38.6%								58.5%	56.1%	58.8%		60.5%	64.5%	
52.66 - 52.17	950	1789	2739	16.78	31.50	48.28	39.0%								59.2%	56.7%	59.6%		61.1%	65.2%	
52.17 - 51.92	957	1504	2461	16.82	27.00	43.82	44.1%								71.3%	76.6%			61.8%	75.2%	
51.92 - 48.71	1053	1595	2648	17.36	27.00	44.36	47.0%								75.9%	80.9%			65.9%	80.0%	
48.71 - 44.29	1384	1686	3069	22.08	27.00	49.08	46.3%							83.2%	75.1%				72.7%	76.7%	
44.29 - 39.29	1592	1839	3431	23.14	27.00	50.14	49.6%							88.9%	80.4%				77.8%	82.0%	
39.29 - 34.29	1820	1999	3819	24.19	27.00	51.19	52.4%							93.9%	85.1%				82.3%	86.7%	
34.29 - 33.5	1858	2025	3882	24.36	27.00	51.36	52.8%							94.6%	85.8%				83.0%	87.4%	
33.5 - 33.25	1869	3575	5444	24.41	45.00	69.41	37.8%						60.5%	67.6%	62.9%				61.3%	63.6%	
33.25 - 32	1930	3648	5578	24.67	45.00	69.67	38.3%						61.3%	68.5%	63.8%				62.1%	64.5%	
32 - 31.75	1944	2542	4485	24.73	31.50	56.23	48.9%						77.9%						77.4%	81.1%	
31.75 - 28.5	2110	2675	4785	25.41	31.50	56.91	50.4%						80.2%						79.8%	83.6%	
28.5 - 28.25	2122	4355	6477	25.47	49.50	74.97	37.3%		54.2%	56.1%		60.0%	59.4%						60.6%	62.6%	
28.25 - 27.75	2148	4389	6537	25.57	49.50	75.07	37.5%		54.5%	56.4%		60.3%	59.7%						60.9%	63.0%	
27.75 - 27.5	2185	5387	7573	25.62	56.75	82.37	34.4%		47.9%	53.0%		55.0%	55.9%					49.7%	59.9%		
27.5 - 27.25	2215	3677	5892	25.68	38.75	64.43	45.4%		60.9%	69.1%		72.5%						64.0%	78.9%		
27.25 - 27.08	2224	3686	5911	25.71	38.75	64.46	45.4%		61.0%	69.2%		72.6%						64.1%	79.0%		
27.08 - 25.83	2304	2758	5062	25.77	28.25	54.02	55.6%		69.6%	84.8%								75.4%			
25.83 - 21.83	2593	2978	5571	25.82	28.25	55.07	57.8%		72.4%	87.9%								78.3%			
21.83 - 16.83	2906	3206	6113	27.88	28.25	56.13	59.6%		74.9%	90.7%								80.9%			
16.83 - 15.45	2997	3271	6268	28.17	28.25	56.42	60.1%		75.6%	91.4%								81.6%			
15.45 - 15.2	3158	1549	4747	28.22	34.25	62.47	88.3%		72.4%		72.7%	83.5%						85.2%			
15.2 - 13.4	3049	4079	7128	28.60	38.75	67.35	52.6%		67.1%	73.3%	84.4%							72.5%			80.8%
13.4 - 13.15	3066	4093	7159	28.65	38.75	67.40	52.6%		67.2%	73.4%	84.5%							72.6%			80.9%
13.15 - 8.15	3415	4382	7798	29.71	38.75	68.46	54.3%		69.3%	75.7%	86.9%							74.7%			83.3%
8.15 - 6.5	3536	4480	8017	30.06	38.75	68.81	54.9%		70.0%	76.3%	87.6%							75.4%			84.1%
6.5 - 6.25	3522	3338	8860	30.11	44.75	74.86	48.4%	67.5%	68.6%	76.4%	89.1%							68.8%			84.6%
6.25 - 4.45	3657	5466	9122	30.49	44.75	75.24	49.0%	68.1%	70.3%	77.1%	89.8%							69.3%			85.4%
4.45 - 4.2	3707	5190	8896	30.54	38.75	69.29	52.8%	67.7%	74.2%	77.2%								75.8%			89.4%
4.2 - 0	4087	5480	9517	31.43	38.75	70.18	54.3%	69.3%	75.7%	78.8%								77.4%			91.1%

Note: Section capacity checked in 5 degree increments.
Rating per TIA-222-H Section 15.5.

Monopole Base Plate Connection

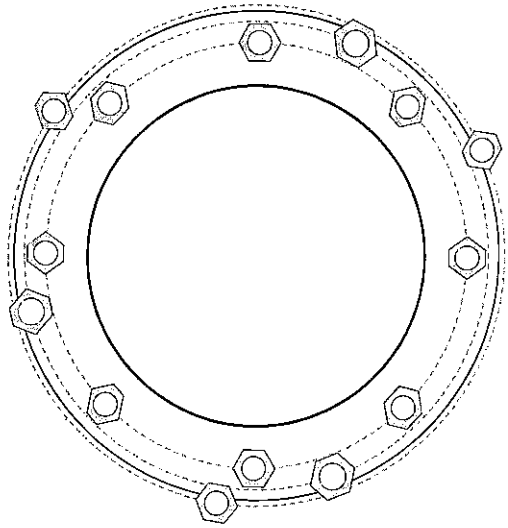
CROWN CASTLE

Site Info	
BU #	876399
Site Name	RANBY 4Q2000 /GALAS
Order #	444519 Rev.# 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0

Applied Loads	
Moment (kip-ft)	1859.82
Axial Force (kips)	31.97
Shear Force (kips)	25.98

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

GROUP 1: (8) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 40" BC

GROUP 2: (3) 2-1/2" ø bolts (Williams N; Fy=127 ksi, Fu=80 ksi) on 44" BC

pos. (deg): 65.4, 194.6, 290

GROUP 3: (3) 2-1/4" ø bolts (A193 Gr. B7 N; Fy=105 ksi, Fu=125 ksi) on 47.1" BC

pos. (deg): 25.5, 145.5, 261.5

Base Plate Data

46" OD x 1.5" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

32" x 0.775" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

GROUP 1:		
Pu_c = 148.96	ϕPn_c = 243.75	**Stress Rating**
Vu = 3.25	ϕVn = 73.13	**58.4%**
Mu = n/a	ϕMn = n/a	**Pass**
GROUP 2:		
Pu_t = 183.28	ϕPn_t = 240	**Stress Rating**
Vu = 0	ϕVn = 147.26	**55.5%**
Mu = n/a	ϕMn = n/a	**Pass**
GROUP 3:		
Pu_c = 170.15	ϕPn_c = 341.25	**Stress Rating**
Vu = 0	ϕVn = 102.38	**47.5%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	51.25	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**90.4%**	**Pass**

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Additional Anchor Rods: Division of Forces

Rev. H

Base Reactions from tnxTower:

Apply TIA-222-H Section 15.5? Yes

Moment	1859.8	kip-ft
Axial	32.0	kip
Shear	26.0	kip

Existing Anchor Rod Group Moment of Inertia

Number of rods, Nexisting	8	
Diameter of rods, Dexisting	2 1/4	in
Bolt Circle, BCexisting	40	in
Net Area, Anetexisting	3.25	in^2
Iexisting	5200	in^4

Additonal (New) Anchor Rod Group Moment of Inertia

Number of rods, Nnew	3	
Diameter of rods, Dnew	2 1/2	in
Fyrod	127	ksi
Furod	150	ksi
Bolt Circle, BCnew	47.1	in
Net Area, Anew	4.0	in^2
Inew	3328	in^4

Division of Forces

Itotal	8528	in^4
Percentage_existing	61%	
Percentage_new	39%	

Forces Remaining in Existing Anchor Rods

Mexisting	1134.1	kip-ft
Axexisting	32.0	kip
Sexisting	26.0	kip

Forces to New Anchor Rods

Mnew	725.7	kip-ft
Axnew	0	kip
Snew	0	kip

(It is assumed that all of the Axial and Shear loads will go to the existing anchor rods)

[See attached Flange tool output for additional anchor rod group capacity and structural rating values]

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Anchor Rod Bracket Calculations

(Design the anchor rod bracket and all components to resist the full capacity of the additional anchors)

Bracket Design Load (Anchor Tensile/Compression Capacity):(TIA-222-H, Section 4.9.9)

ϕPnc	508	kip		
ϕPnt	450.0	kip	Check Bracket for Anchor Rod:	Expected Load
ϕPn	508	kip		
Expected Load	240	kip		

Tube Design (Square HSS)

Member Size	5 XXS Pipe	

Member Properties
(AISC 15th Ed., Table 1-12)

Outside Diameter (ODHSS)	5.56	in
Area (AHSS)	11.34036408	in^2
(AeHSS)	8.51	in^2
Thickness (tHSS)	0.750	in
FyHSS	50	ksi
FuHSS	65	ksi
Length (LHSS)	18.0	in
Moment of Inertia (IHSS)	33.63476715	in^4
Radius of Gyration (rHSS)	1.722188615	in
Inside Dimension (IDHSS)	4.06	in
Extension of Tube Above Gusset	0	in

Bearing Check
(AISC 15th Ed., Equation J7-1)

ϕb	0.75	
Apb	3.56	in^2
Check_bear	[redacted]	0.31

Compression Check
(AISC 15th Ed., Eqs. E3-1 to E3-4)

ϕc	0.9	
K	1.0	
Lc	18.0	in
Fe	2620.1	ksi
Fcr	49.6	ksi
ϕPn_comp	510.3	kips
(AISC 15th Ed., Equation J4-6)		
Checkcomp	[redacted]	0.47

Gusset Plate Design

Gusset Plate width (wplate)	5.5	in
Gusset Plate thickness (tplate)	1.25	in
Lplate1	48	in
Lplate2	24	in
Gusset Plate Strength:		
Fyplate	65	ksi
Fuplate	80	ksi
Pole thickness (tpole)	0.3125	in
Load Angle	45	degrees

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Shear Check
(AISC 15th Ed., Eqs. J4-3 and J4-4)

Ag	30.0	in^2
Anv	30.0	in^2

Shear Yielding

ϕv	1.0	
ϕVplate	1170	kip
Checkshear	[redacted]	0.21

Shear Rupture

ϕv	0.75	
ϕVplate	1080	kip
Checkshear	[redacted]	0.22

Gusset Plate to Pole and Base Plate
Weld Design (Horizontal and Vertical Weld)
(AISC 15th Ed., Part 8)

Gusset plate thickness (tplate)	1.25	in
Pole Grade		
Fypole	65	ksi
Fupole	80	ksi
Base Plate Grade		
Fybase	60	
Fubase	75	
Gussett Plate Grade		
Fyplate	65	ksi
Fuplate	80	ksi
Height of vertical weld from base plate (H)	48	in
Notch	0.75	in
Gap between Base Plate and HSS	0	in
Vertical fillet weld size to pole (Dvpole)	6	(in sixteenths of an inch)
weldsizepole	3/8	
Weld Material Grade (FEXX)	70	ksi
Checkweld	[redacted]	0.825

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Gusset Plate to HSS Weld Design (AISC 15th Ed., Table 8-4)

Electrode Strength (FEXX)	70	ksi
Weld Size (in sixteenths of an inch) (D1)	6	in
weldsize1	3/8	in

(Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS)

ecc2	3.563	in
Load not in plane with weld group, k	0	
a	0.148	in
C1	1.00	
Coeff1	3.71	
ϕw	0.75	
Dmin1	4	(in sixteenths of an inch)
minweldsize	1/4	in
checkweld	[redacted]	
ϕRnweld1	400.68	kip
Checkweld1	[redacted]	0.60

Gusset Plate to Pole Punching Shear Check (max per unit length)
(AISC 15th Ed., Section J4.2)
(Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS)

ϕsy	1.0		
ϕsr	0.75		
ecc1	9.063	in	
M1	2175	kip-in	
S1	480	in^3	
fv	5.66	kip/in	
ϕFsy	24.38	kip/in	**(AISC 15th Ed., Equation J4-3)**
ϕFsr	22.50	kip/in	**(AISC 15th Ed., Equation J4-4)**
ϕFv	22.50	kip/in	
Check.PS1	[redacted]	0.25	

Gusset Plate to HSS Punching Shear Check(max per unit length)
(AISC 15th Ed., Section J4.2)
(Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS)

ecc2	3.563	in	
M2	855.1	kip-in	
S2	120	in^3	
fv	8.91	kip/in	
ϕFsy	45.00	kip/in	**(AISC 15th Ed., Equation J4-3)**
ϕFsr	43.88	kip/in	**(AISC 15th Ed., Equation J4-4)**
ϕFv	43.88	kip/in	
CheckPS2	[redacted]	0.20	

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Embedment Depth Calculations

Projected Embedment Depth (Lem)	5	ft	
Yield Strength of Rebar (fy)	60	ksi	
Concrete Strength (f'c)	3000	psi	
Transverse Reinforcement Index (ktr)	0		(Can be taken as 0 for design per ACI 318-14)
Epoxy Factor (ψe)	1		
Rebar Size Factor (ψs)	1		
Casting Position Factor(ψt)	1		
Concrete Weight Factor (λ)	1	√psi	
Pier Diameter (Dpier)	5.0	ft	
Cover (Cc)	3	in	
Rebar Size (ds)	8		
db	1	in	
Tie Size (Tie)	4		
Ts	0.5	in	
Number of vertical rebars (n)	20		

Development Length (ACI 318-14 Chapter 25)

BCrebar	52.0	in	
Srebar	8.2	in	
cb	4.0	in	
ld	32.9	in	**(ACI 318-14, Equation 25.4.2.3a)**

Calculate Max Distance Between Rebar and New Anchor Rods

A	4.1	in
B	2.5	in
G	4.8	in
l'd	3.25	ft

Epoxy Development Length

Bond Strength		
Epoxy	AF35LVE	
ϕbond	0.65	
sb	#N/A	psi
Lbe	#N/A	in

Required Embedment Length

Lmin	#N/A	ft
Check embedment	[redacted]	

Anchor Rod Pullout Test

ϕp	0.75	
Is this a CA DSA site?	No	
Pullout	**281**	kip

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Additional Anchor Rods: Division of Forces

Rev. H

Base Reactions from tnxTower:

Apply TIA-222-H Section 15.5? Yes

Moment	1859.8	kip-ft
Axial	32.0	kip
Shear	26.0	kip

Existing Anchor Rod Group Moment of Inertia

Number of rods, Nexisting	8	
Diameter of rods, Dexisting	2 1/4	in
Bolt Circle, BCexisting	40	in
Net Area, Anetexisting	3.25	in^2
Iexisting	5200	in^4

Additonal (New) Anchor Rod Group Moment of Inertia

Number of rods, Nnew	3	
Diameter of rods, Dnew	2 1/4	in
Fyrod	105	ksi
Furod	125	ksi
Bolt Circle, BCnew	47.0	in
Net Area, Anew	3.3	in^2
Inew	2692	in^4

Division of Forces

Itotal	7892	in^4
Percentage_existing	66%	
Percentage_new	34%	

Forces Remaining in Existing Anchor Rods

Mexisting	1225.4	kip-ft
Axexisting	32.0	kip
Sexisting	26.0	kip

Forces to New Anchor Rods

Mnew	634.4	kip-ft
Axnew	0	kip
Snew	0	kip

(It is assumed that all of the Axial and Shear loads will go to the existing anchor rods)

[See attached Flange tool output for additional anchor rod group capacity and structural rating values]

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Anchor Rod Bracket Calculations

(Design the anchor rod bracket and all components to resist the full capacity of the additional anchors)

Bracket Design Load (Anchor Tensile/Compression Capacity):(TIA-222-H, Section 4.9.9)

ϕPnc	341.25	kip		
ϕPnt	304.7	kip	Check Bracket for Anchor Rod:	Capacity
ϕPn	341.25	kip		
Expected Load	341.25	kip		

Tube Design (Square HSS)

Member Size HSS5x5x1/2

Member Properties
(AISC 15th Ed., Table 1-12)

Outside Diameter (ODHSS)	5.00	in
Area (AHSS)	7.88	in^2
(AeHSS)	5.91	in^2
Thickness (tHSS)	0.500	in
FyHSS	50	ksi
FuHSS	65	ksi
Length (LHSS)	27.0	in
Moment of Inertia (IHSS)	26	in^4
Radius of Gyration (rHSS)	1.82	in
Inside Dimension (IDHSS)	4.00	in
Extension of Tube Above Gusset	0	in

Bearing Check
(AISC 15th Ed., Equation J7-1)

ϕb	0.75	
Apb	5.06	in^2
Check_bear	[redacted]	0.64

Compression Check
(AISC 15th Ed., Eqs. E3-1 to E3-4)

ϕc	0.9	
K	1.0	
Lc	27.0	in
Fe	1300.5	ksi
Fcr	49.2	ksi
ϕPn_comp	354.6	kips
(AISC 15th Ed., Equation J4-6)		
Checkcomp	[redacted]	0.96

Gusset Plate Design

Gusset Plate width (wplate)	5.5	in
Gusset Plate thickness (tplate)	1.25	in
Lplate1	48	in
Lplate2	24	in
Gusset Plate Strength:		
Fyplate	65	ksi
Fuplate	80	ksi
Pole thickness (tpole)	0.3125	in
Load Angle	45	degrees

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Shear Check
(AISC 15th Ed., Eqs. J4-3 and J4-4)

Ag	30.0	in^2
Anv	30.0	in^2

Shear Yielding

ϕv	1.0	
ϕVplate	1170	kip
Checkshear	[redacted]	0.29

Shear Rupture

ϕv	0.75	
ϕVplate	1080	kip
Checkshear	[redacted]	0.32

Gusset Plate to Pole and Base Plate
Weld Design (Horizontal and Vertical Weld)
(AISC 15th Ed., Part 8)

Gusset plate thickness (tplate)	1.25	in
Pole Grade		
Fypole	65	ksi
Fupole	80	ksi
Base Plate Grade		
Fybase	60	
Fubase	75	
Gussett Plate Grade		
Fyplate	65	ksi
Fuplate	80	ksi
Height of vertical weld from base plate (H)	48	in
Notch	0.75	in
Gap between Base Plate and HSS	0	in
Vertical fillet weld size to pole (Dvpole)	6	(in sixteenths of an inch)
weldsizepole	3/8	
Weld Material Grade (FEXX)	70	ksi
Checkweld	[redacted]	0.741

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Gusset Plate to HSS Weld Design (AISC 15th Ed., Table 8-4)

Electrode Strength (FEXX)	70	ksi
Weld Size (in sixteenths of an inch) (D1)	6	in
weldsize1	3/8	in

(Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS)

ecc2	3.375	in
Load not in plane with weld group, k	0	
a	0.141	in
C1	1.00	
Coeff1	3.71	
ϕw	0.75	
Dmin1	6	(in sixteenths of an inch)
minweldsize	3/8	in
checkweld	[redacted]	
ϕRnweld1	400.68	kip
Checkweld1	[redacted]	0.85

Gusset Plate to Pole Punching Shear Check (max per unit length)
(AISC 15th Ed., Section J4.2)

(Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS)

ϕsy	1.0		
ϕsr	0.75		
ecc1	8.875	in	
M1	3029	kip-in	
S1	480	in^3	
fv	7.89	kip/in	
ϕFsy	24.38	kip/in	**(AISC 15th Ed., Equation J4-3)**
ϕFsr	22.50	kip/in	**(AISC 15th Ed., Equation J4-4)**
ϕFv	22.50	kip/in	
Check.PS1	[redacted]	0.35	

Gusset Plate to HSS Punching Shear Check(max per unit length)
(AISC 15th Ed., Section J4.2)

(Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS)

ecc2	3.375	in	
M2	1151.7	kip-in	
S2	120	in^3	
fv	12.00	kip/in	
ϕFsy	30.00	kip/in	**(AISC 15th Ed., Equation J4-3)**
ϕFsr	29.25	kip/in	**(AISC 15th Ed., Equation J4-4)**
ϕFv	29.25	kip/in	
CheckPS2	[redacted]	0.41	

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Embedment Depth Calculations

Projected Embedment Depth (Lem)	5	ft	
Yield Strength of Rebar (fy)	60	ksi	
Concrete Strength (f'c)	3000	psi	
Transverse Reinforcement Index (ktr)	0		(Can be taken as 0 for design per ACI 318-14)
Epoxy Factor (ψe)	1		
Rebar Size Factor (ψs)	1		
Casting Position Factor(ψt)	1		
Concrete Weight Factor (λ)	1	√psi	
Pier Diameter (Dpier)	5.0	ft	
Cover (Cc)	3	in	
Rebar Size (ds)	8		
db	1	in	
Tie Size (Tie)	4		
Ts	0.5	in	
Number of vertical rebars (n)	20		

Development Length (ACI 318-14 Chapter 25)

BCrebar	52.0	in	
Srebar	8.2	in	
cb	4.0	in	
ld	32.9	in	**(ACI 318-14, Equation 25.4.2.3a)**

Calculate Max Distance Between Rebar and New Anchor Rods

A	4.1	in	
B	2.5	in	
G	4.8	in	
l'd	3.25	ft	

Epoxy Development Length

Bond Strength			
Epoxy	AF35LVE		
ϕbond	0.65		
sb	1717	psi	
Lbe	43.3	in	

Required Embedment Length

Lmin	5.0	ft	
Check embedment	OK		

Anchor Rod Pullout Test

ϕp	0.75		
Is this a CA DSA site?	No		
Pullout	**190**	kip	

B+T GRP

PROJECT : 876399
CLIENT : CROWN CASTLE
JOB NO. : BU876399 DATE : 1/2/2019

DESIGN BY : KM
REVIEW BY : US

STRUCTURAL CAPACITY OF MICROPILE (UNCASED SECTION)

INPUT		
Design Load Comp.	160	kips
Production Test Load Comp.	171	
Design Load Ten.	160	kips
Test Load Ten.	171	
Nominal Bar Diameter,db	1.75	
Yield (F_y) - 0.8 f Pu A	270.00	kips
Bar Diameter	1.75	in
Bit Diameter	5.00	in
Grout Strength (G_c)	5.00	ksi
Design Code (AASHTO or NYC)	TIA-222-G A2 (LRFD)	
Unit Weight of Rock rd=	0.110	kcf
Micropile quantity, n	4.00	

REV G ANALYSIS

Net Allow. capacity of each Pile=			160	kips
Base Moment	1860	kip-ft	Load per pile	133

No. of micropile per leg: 4

Grade 150 All-Thread Rebar - Williams R71

Soil Interaction	83.03%	Pass
Micropile Steel	59.26%	Pass

Safety Factor Steel Comp. Design (Yield):	0.64
Safety Factor Steel Comp. Test (Yield):	0.64
Safety Factor Steel Ten. Design (Yield):	0.80
Safety Factor Steel Ten. Test (Yield):	0.80
Safety Factor Grout Design:	0.54
Safety Factor Grout Test:	0.54

Checks:

Load Taken on Grout in Compression

$F_g=A_g*(G_c*SF)$

A_g= 17.23 in^2

Design	F_g=	46.68 kips			
Test	F_g=	46.68 kips			

Load Taken on Steel in Compression

$F_s=F_y*SF$

*Steel Must Take 40% of Load

Design	F_s=	172.13 kips		**78.7%**	**Pass**
Test	F_s=	172.13 kips			

Total Load Taken on Pile in Compression

$F_c=F_g+F_s$

Design	F_c=	218.81 kips	>	160 kips	**Pass**
Test	F_c=	218.81 kips	>	170.67 kips	**Pass**

Total Load Taken on Pile in Tension

$F_t=F_y*SF$

Pull Test load Limited to 0.8*fy (PTI) for steel

Design	F_t=	216 kips	>	160 kips	**Pass**
Test	F_t=	216 kips	>	170.67 kips	**Pass**

GEOTECHNICAL BOND LENGTH OF MICROPILE

Geotechnical Design

Geo-strata 1 ultimate bond stress, tu1 =	0 psi
Geo-strata 2 ultimate bond stress, tu2 =	17 psi
Geo-strata 3 ultimate bond stress, tu3 =	11 psi
Geo-strata 4 ultimate bond stress, tu4 =	21 psi
Geo-strata 5 ultimate bond stress, tu5 =	23 psi
Geo-strata 6 ultimate bond stress, tu6 =	450 psi

	Ult kips/ft	FS (Design)-2		Depth	Load		
Soil-Grout Bond, α1 =	0.00	0.00	kips/ft	10	0.00	kips	
Soil-Grout Bond, α2 =	3.11	2.33	kips/ft	5	11.66	kips	
Soil-Grout Bond, α3 =	2.07	1.56	kips/ft	5	7.78	kips	
Soil-Grout Bond, α4 =	3.86	2.90	kips/ft	5	14.49	kips	
Soil-Grout Bond, α5 =	4.34	3.25	kips/ft	5	16.26	kips	
Soil-Grout Bond, α5 =	84.82	63.62	kips/ft	2	127.23	kips	
Bond Length				22 FT			
Total Length				32 FT	177	kips	Pass

DELTA OAKS GROUP

SUBSURFACE STRENGTH PARAMETERS - MICROPILES

B-1	0.0 – 3.3	-	-	-	-
	3.3 – 6.0	10.0	10.0	14.5	14.5
	6.0 – 8.0	6.5	6.5	8.0	8.0
	8.0 – 10.0	13.5	13.5	21.0	21.0
	10.0 – 15.0	22.0	16.5	34.5	25.5
	15.0 – 20.0	15.0	11.0	20.5	16.0
	20.0 – 25.0	27.5	20.5	45.0	33.5
	25.0 – 30.0	31.0	23.0	52.0	39.0
	30.0 – 50.0	450	450	-	-

- The micropiles should have an adequate design embedment length to resist the applied loads.
- Group effects can contribute to a reduction in resistance for the micropiles and should be taken into consideration during foundation analysis.
- Delta Oaks Group recommends an appropriate factor of safety be utilized and the appropriate manufacturer recommendations be followed for the analysis of the micropiles.

BU: 876705
WO:

Done By: DMC
Checked By: xxx
Date: 10/19/2018

CROWN CASTLE

Micropile Calculations

Reference

Number of Micropiles: $n := 4$

Micropile Bolt Circle: $BC := 168in$

Micropile Cross-seectional Area: $A_{mp} := 2.25in^2$

Micropile Capacity: $\phi P_n := 160kip$

Applied Moment: $M :=$ **1860 kip-ft**

Micropile Moment of Inertia: $I := \frac{n}{8} \cdot \left(BC^2\right) \cdot A_{mp} = 31752 \cdot in^4$

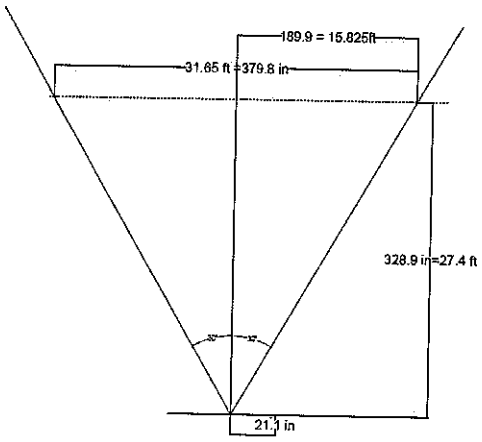
Distance to Extreme Micropile: $c := \frac{BC}{2} = 84 \cdot in$

Applied Micropile Force: $P := \frac{M \cdot c \cdot A_{mp}}{I} =$ **133.0 kip**

$RATING := \frac{P}{\phi P_n}$ RATING = **83.03 %**

Steel Capacity $Frg := 0.8 \cdot 120ksi \cdot 2.25in^2 = 216 \cdot kip$ controls

Rock Prism Failure:



Development length for 216 kips

$Rn := \Phi \cdot Ab \cdot Frg$

$250kip := 0.75 \cdot \pi \cdot 5in \cdot L \cdot 450psi$

$L := \frac{216kip}{0.75 \cdot \pi \cdot 5in \cdot 0.45ksi} = 3.4ft$

SINGLE ANCHOR

$V := \frac{1}{3} \cdot (31.65ft)^2 \cdot \pi \cdot \left(\frac{1}{4}\right) \cdot 27.40ft = 7185.66 \cdot ft^3$

Density of the Rock $\delta d := 0.13kcf$

$0.75 \cdot \delta d \cdot V = 700.6 \cdot kip$

$Rating := 216 \div 700 = 30.86 \cdot \%$

GROUP ANCHOR: Failure of Group Rock Mass does't control for compression case

APPENDIX D

TOWER MODIFICATION DRAWINGS

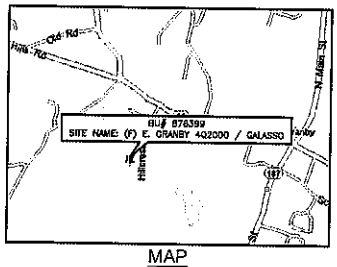
TOWER MODIFICATION DRAWINGS PREPARED FOR: CROWN CASTLE

LOOK UP!

SAFETY CLIMB: 'LOOK UP'
THE INTEGRITY OF THE WIRE ROPE SAFETY CLIMB SYSTEM SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION AND INSPECTION. TOWER REINFORCEMENTS AND EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF ANY WIRE ROPE SAFETY CLIMB ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, OR IMPACT TO THE ANCHORAGE POINTS IN ANY WAY. ANY COMPROMISED SAFETY CLIMB MUST BE REPORTED TO YOUR CROWN POC FOR RESOLUTION, INCLUDING EXISTING CONDITIONS.

SITE NAME:
(F) E. GRANBY 4Q2000 / GALASSO
BU NUMBER:
876399

SITE ADDRESS:
60 SOUTH MAIN ST.
EAST GRANBY, CT 06026
HARTFORD COUNTY, USA



MAP

DIRECTIONS

91 NORTH TO EXIT 40 (20 WEST). FOLLOW 20 WEST TO HILLCREST STREET ON LEFT, FOLLOW HILLCREST TO THE GATE. THE ADDRESS FOR THIS SITE WILL TAKE YOU TO THE MAIN ENTRANCE FOR TILCON ON SOUTH MAIN STREET. USE THE HILLCREST GATE TO ACCESS THE SITE.

PROJECT CONTACTS:

1. CROWN PROJECT MANAGER
DAN VADNEY
(518) 373-3510
DAN.VADNEY@CROWNCASTLE.COM

2. CROWN CONSTRUCTION MANAGER
JASON D'AMICO
(860) 209-0104
JASON.DAMICO@CROWNCASTLE.COM

3. ENGINEERING RFI CONTACT
KISHORE MACHANI
(918) 587-4630
KMACHANI@BTGRP.COM
MODDWGS@BTGRP.COM
1717 S BOULDER AVENUE, SUITE 300
TULSA, OK 74119

QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM B+T GROUP TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT B+T GROUP AT MODDWGS@BTGRP.COM.

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT 800-788-7011.

HOT WORK INCLUDED	
N/A	BASE GRINDING ONLY
X	BASE WELDING (AND GRINDING)
N/A	AERIAL GRINDING ONLY
X	AERIAL WELDING (AND GRINDING)

TOWER INFORMATION

TOWER MANUFACTURER / JOB #:	EEI / 7832
TOWER HEIGHT / TYPE:	98' MONOPOLE
TOWER LOCATION:	LAT. 41° 56' 29.59"
DATUM: (NAD 1983)	LONG. -72° 44' 19.248"
	ELEV. 262 FT AMSL
STRUCTURAL DESIGN DRAWING REPORT:	B+T GROUP / WO. # 1669315
STRUCTURAL ANALYSIS REPORT:	BLACK & VEATCH / WO. #1574116
STRUCTURAL ANALYSIS DATE:	06/13/18
ORDER ID / REVISION #:	397084 / 4
CCISITES DOCUMENT ID:	7607322

CODE COMPLIANCE

THIS REINFORCEMENT DESIGN HAS BEEN PERFORMED IN ACCORDANCE WITH THE TIA-222-H STANDARD. THIS ANALYSIS UTILIZES AN ULTIMATE 3-SECOND GUST WIND SPEED OF 120 MPH FROM THE 2018 CONNECTICUT BUILDING CODE AND THE 2015 INTERNATIONAL BUILDING CODE. EXPOSURE CATEGORY C AND RISK CATEGORY II WERE USED IN THIS REINFORCEMENT DESIGN.

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S1	TITLE SHEET
S2	MODIFICATION INSPECTION NOTES AND CHECKLIST
S3	GENERAL NOTES
S4	NG2 BOLT NOTES AND DETAILS
S5	FORGBOLT NOTES AND DETAILS
S6	AJAX ONESIDE™ BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE
S7	TOWER ELEV., SCHEDULE & TX LINE DIST. DIAG.
S8	SITE PLAN AND NOTES
S9	FOUNDATION MODIFICATION
S10	FOUNDATION SECTION
S11	TOWER SECTIONS (0'-30.5' AND 25.58'-55.58')
S12	IN-LINE SPLICE DETAIL
D1	ANCHOR ROD BRACKET DETAILS
D2	ANCHOR ROD BRACKET DETAIL

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/02/19	ISSUED FOR CONSTRUCTION
1	06/13/19	REV CODE COMPLIANCE

PROJECT NO:	12643.003.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001584
Expires 02/10/20

STATE OF CONNECTICUT
SCOTT S. PHILLIPS
31627
LICENSED
PROFESSIONAL ENGINEER

6/13/19

(F) E. GRANBY 4Q2000 / GALASSO
876399
60 SOUTH MAIN ST.
EAST GRANBY, CT
EXISTING 98' MONOPOLE

SHEET TITLE
TITLE SHEET

SHEET NUMBER: S1
REVISION: 1

MI CHECKLIST

REQUIRED	REPORT ITEM	APPLICABLE CROWN DOC #	BRIEF DESCRIPTION
PRE-CONSTRUCTION			
X	MI CHECKLIST DRAWING	CED-SOW-10007	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT.
X	EOR APPROVED SHOP DRAWINGS	CED-SOW-10007	ONCE THE PRE-MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS. THESE ARE TO INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLES, MOUNTS, STEP PEGS, SAFETY CLIMBS AND ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICATIONS ON THE TOWER. THESE DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. APPROVED ASSEMBLY/SHOP DRAWINGS SHALL BE SUBMITTED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATION INSPECTION	CED-SOW-10007	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS, SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATOR CERTIFIED WELD INSPECTION	CED-SOW-10007 CED-STD-10069	A CWI SHALL INSPECT ALL WELDING PERFORMED ON STRUCTURAL MEMBERS DURING FABRICATION. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORTS (MTR)	CED-SOW-10007	MATERIAL TEST REPORTS SHALL BE PROVIDED FOR MATERIAL USED AS REQUIRED PER SECTION 9.2.5 OF CED-SOW-10007. MTRS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR NDE INSPECTION REPORT	CED-SOW-10068 CED-STD-10068	CRITICAL SHOP WELDS THAT REQUIRE TESTING ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED NDT INSPECTOR SHALL PERFORM NON-DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	NDE OF MONOPOLE BASE PLATE	ENG-SOW-10033	A NDE OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTION FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	CED-SOW-10007	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
ADDITIONAL TESTING AND INSPECTIONS:			
N/A			
CONSTRUCTION			
X	FOUNDATION INSPECTIONS	CED-SOW-10144	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A VISUAL OBSERVATION OF THE REBAR SHALL BE PERFORMED BEFORE PLACING THE EPOXY. A SEALED WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	CONCRETE COMP. STRENGTH AND SLUMP TEST	CED-SOW-10144	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED AS PART OF THE FOUNDATION REPORT.
X	EARTHWORK	CED-SOW-10144	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND RESULTS INCLUDED AS PART OF THE FOUNDATION REPORT.
X	MICROPILE/ROCK ANCHOR	CED-SOW-10144	MICROPILES/ROCK ANCHORS SHALL BE INSPECTED BY THE FOUNDATION INSPECTION VENDOR AND SHALL BE INCLUDED AS PART OF THE FOUNDATION INSPECTION REPORT. ADDITIONAL TESTING AND/OR INSPECTION REQUIREMENTS ARE NOTED IN THESE CONTRACT DOCUMENTS.
X	POST-INSTALLED ANCHOR ROD VERIFICATION	CED-SOW-10007	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROWN REQUIREMENTS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	BASE PLATE GROUT VERIFICATION	ENG-STD-10321	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS REMIXED AND/OR INSTALLED IN ACCORDANCE WITH CROWN REQUIREMENTS FOR INCLUSION IN THE MI REPORT.
X	FIELD CERTIFIED WELD INSPECTION	CED-SOW-10068 CED-STD-10069	A CROWN APPROVED CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST FIELD WELDS, FOLLOWING ALL PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS APPLICABLE TO WELD INSPECTIONS. A REPORT SHALL BE PROVIDED. NDE OF FIELD WELDS SHALL BE PERFORMED AS REQUIRED BY CROWN STANDARDS AND CONTRACT DOCUMENTS. THE NDE REPORT SHALL BE INCLUDED IN THE CWI REPORT.
X	ON-SITE COLD GALVANIZING VERIFICATION	ENG-SID-10149 ENG-BUL-10149	THE GENERAL CONTRACTOR SHALL PROVIDE WRITTEN AND PHOTOGRAPHIC DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED PER MANUFACTURER SPECIFICATIONS AND APPLICABLE STANDARDS.
M/A	TENSION TWIST AND PLUMB	CED-PRC-10182 CED-STD-10261	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT IN ACCORDANCE WITH APPLICABLE STANDARDS DOCUMENTING TENSION TWIST AND PLUMB.
X	GC AS-BUILT DRAWINGS	CED-SOW-10007	THE GENERAL CONTRACTOR SHALL SUBMIT A LEGIBLE COPY OF THE ORIGINAL DESIGN DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD. EOR/RFI FORMS APPROVING ALL CHANGES SHALL BE SUBMITTED WHEN THE EOR IS SPECIFYING ADDITIONAL INSPECTIONS DESCRIPTION AND APPLICABLE STANDARDS SHALL BE APPLIED.
ADDITIONAL TESTING AND INSPECTIONS:			
N/A			
POST-CONSTRUCTION			
X	CONSTRUCTION COMPLIANCE LETTER	CED-SOW-10007	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS, INCLUDING LISTING ADDITIONAL PARTIES TO THE MODIFICATION PROCESS.
X	POST-INSTALLED ANCHOR ROD PULL TESTS	CED-PRC-10118	POST-INSTALLED ANCHOR RODS SHALL BE TESTED BY A CROWN APPROVED PULL TEST INSPECTOR AND A REPORT SHALL BE PROVIDED INDICATING TESTING RESULTS.
X	PHOTOGRAPHS	CED-SOW-10007	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI. PHOTOS SHALL DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
N/A	BOLT INSTALLATION VERIFICATION REPORT	CED-SOW-10007	THE MI INSPECTOR SHALL VERIFY THE INSTALLATION AND TIGHTNESS (10% OF ALL NON PRE-TENSIONED BOLTS INSTALLED AS PART OF THE MODIFICATION). THE MI INSPECTOR SHALL LOOSEN THE NUT AND VERIFY THE BOLT HOLE SIZE AND CONDITION. THE MI REPORT SHALL CONTAIN THE COMPLETED BOLT INSTALLATION VERIFICATION REPORT, INCLUDING THE SUPPORTING PHOTOGRAPHS.
X	PUNCHLIST DEVELOPMENT AND CORRECTION DOCUMENTATION	CED-PRC-10233 CED-FRM-10385	FINAL PUNCHLIST INDICATING ALL NONCONFORMANCE(S) IDENTIFIED AND THE FINAL RESOLUTION AND APPROVAL.
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	CED-SOW-10007	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTOR'S REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
ADDITIONAL TESTING AND INSPECTIONS:			
X	MICROPILE		MICROPILE TESTING AND INSPECTION PER ASTM D3689-07

NOTE: "X" DENOTES A DOCUMENT NEEDED FOR THE MI REPORT AND "N/A" DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT.

MODIFICATION INSPECTION NOTES

GENERAL

THE MI IS AN ON-SITE VISUAL AND HANDS-ON INSPECTION OF TOWER MODIFICATIONS INCLUDING A REVIEW OF CONSTRUCTION REPORTS AND ADDITIONAL PERTINENT DOCUMENTATION PROVIDED BY THE GENERAL CONTRACTOR (GC), AS WELL AS ANY INSPECTION DOCUMENTS PROVIDED BY 3RD PARTY INSPECTORS. THE MI IS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, IN ACCORDANCE WITH APPLICABLE CROWN STANDARDS; AND AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

NO DOCUMENT, CODE OR POLICY CAN ANTICIPATE EVERY SITUATION THAT MAY ARISE. ACCORDINGLY, THIS CHECKLIST IS INTENDED TO SERVE AS A SOURCE OF GUIDING PRINCIPLES IN ESTABLISHING GUIDELINES FOR MODIFICATION INSPECTION.

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, AND THE MI INSPECTOR DOES NOT TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES. THE MI INSPECTOR SHALL INSPECT AND NOTE CONFORMANCE/NONCONFORMANCE AND PROVIDE TO THE CROWN POINT OF CONTACT (CROWN POC) FOR EVALUATION.

ALL MI'S SHALL BE CONDUCTED BY A CROWN APPROVED MI INSPECTOR, WORKING FOR A CROWN APPROVED MI VENDOR. SEE CROWN CED-LST-10173, "APPROVED MI VENDORS".

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PURCHASE ORDER (PO) IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN THE GC AND/OR INSPECTOR SHALL CONTACT THE CROWN POINT OF CONTACT (PCC).

REFER TO CROWN CED-SOW-10007, "MODIFICATION INSPECTION SOW", FOR FURTHER DETAILS AND REQUIREMENTS.

SERVICE LEVEL COMMITMENT

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:

- THE GC SHALL PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY MINOR DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

REQUIRED PHOTOS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN ONLY FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO CROWN DOCUMENT # CED-SOW-10007.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
D	01/02/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127643.003.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / BLB
CHECKED BY:	MS / SSC

B+T ENGINEERING, INC.
PEC.0031564
Expires 02/10/20

STATE OF OKLAHOMA
SCOTT M. SMITH
31627
LICENSED
PROFESSIONAL ENGINEER
01/2/19

(F) E. GRANBY 4Q2000 / GALASSO
876399

60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

SHEET TITLE
MODIFICATION INSPECTION NOTES AND CHECKLIST

SHEET NUMBER: S2

REVISION: 0

GENERAL NOTES

1.1 ALL WORK SHALL COMPLY WITH THE TIA-222-H, ANSI/ASSE A10.48 AND ANSI/TIA-322 AS WELL AS ANY OTHER GOVERNING BUILDING CODES.
1.2 FIELD WORK WILL BE DONE AROUND EXISTING COAXIAL CABLE AND EQUIPMENT. ALL WORK SHALL BE DONE IN A MANNER SUCH THAT NO DAMAGE OCCURS TO THE EXISTING EQUIPMENT OR THE STRUCTURE.
1.3 A MINIMUM OF TWO BRUSH COATS OF CROWN APPROVED ZINC RICH PAINT SHALL BE APPLIED TO ANY FIELD CUTS OR FIELD DRILLED HOLES IN ACCORDANCEWITH ENG-BUL-10149 TOWER PROTECTIVE COATINGS BULLETIN.
1.4 THE USE OF A GAS TORCH OR WELDER WILL NOT BE PERMITTED ON THE TOWER WITHOUT THE CONSENT OF THE OWNER.
1.5 IN LIEU OF TEMPORARY BRACING CONTRACTOR MAY HAVE A STABILITY ANALYSIS PERFORMED BY AN ENGINEER LICENSED IN THE STATE THE TOWER IS LOCATED. THE ANALYSIS SHALL USE A MINIMUM WIND SPEED OF 45 mph (3-SEC) PER TIA-1019.
1.6 ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).
1.7 ALL THE PARTS STARTING WITH "CCI-" DESIGNATION – REFER TO "CROWN CASTLE APPROVED REINFORCEMENT COMPONENTS CATALOGUE EDITION 1" FOR PART DETAILS.
1.8 BLIND BOLTS ARE TO BE 20MM DIAMETER WITH CORRESPONDING 29MM DIAMETER SLEEVE WITH SPECIFIED STEEL GRADE.
1.9 ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION PER ASTM A153 / A153M OR A123, AS APPLICABLE. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO BRUSH COATS OF CROWN APPROVED ZINC RICH PAINT SHALL BE APPLIED IN ACCORDANCE WITH ENG-BUL-10149 TOWER PROTECTIVE COATINGS BULLETIN.
1.10 ALL SHIMS SHALL BE ASTM A36.
1.11 HOLES FOR BOLTS AND SHEAR SLEEVES ARE 30MM, U.N.O.
1.12 SHOP WELDS ARE ASSUMED E80XX OR GREATER, PER STANDARD SPLICE DETAIL.
1.13 IF SCOPE OF MODIFICATION REQUIRES REMOVAL OF TOWER ID TAG, IT MUST BE REPLACED.
1.14 THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS WRITTEN APPROVAL OF YOUR CROWN P.O.C. ALL ALTERATIONS TO A SAFETY CLIMB'S ORIGINAL MANUFACTURER'S CONFIGURATION MUST BE DESIGNED BY THE ENGINEER OF RECORD. IF THE GENERAL CONTRACTOR FINDS THAT THE CLIMBING FACILITIES ARE IMPEDED, EITHER DURING BIDDING, DURING PRE-FABRICATION MAPPING, OR WHILE ON-SITE, THE GENERAL CONTRACTOR SHALL CONTACT THE CROWN P.O.C. TO DETERMINE A METHOD OF RESOLUTION.
1.15 WHERE POSSIBLE, CLIMBING HARDWARE SHOULD REMAIN IN-LINE ALONG THE POLE. IF AN OBSTRUCTION CAUSES A LATERAL OFFSET OF 2'-0" OR MORE, CLIMBING ANCHORS SHALL BE PROVIDED AT EACH CHANGE IN ALIGNMENT. IF NEW REINFORCEMENT REQUIRES STEP BOLT BRACKETS, INSTALL PRIOR TO GALVANIZATION OF STEEL.
1.16 ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GC AND/OR FABRICATOR.
1.17 IF, DURING THE COURSE OF A FOUNDATION MODIFICATION, THE GC ENCOUNTERS EXISTING CONDUIT LOCATED WITHIN THE CONFINES OF THE EXISTING OR PROPOSED FOUNDATION CONCRETE, AND THIS CONDUIT IS NOT IN A LOCATION THAT IS SPECIFIED WITHIN THESE DESIGN DRAWINGS, THE GC SHALL IMMEDIATELY CONTACT THE E.O.R. FOR GUIDANCE BEFORE PROCEEDING WITH THE INSTALLATION OF THE PROPOSED FOUNDATION MODIFICATIONS. IF CONDUIT IS TO BE INSTALLED THROUGH THE EXISTING FOUNDATION OR PROPOSED FOUNDATION MODIFICATIONS AND HASN'T BEEN SPECIFIED WITHIN THESE DESIGN DRAWINGS THEN THE GC SHALL IMMEDIATELY CONTACT THE E.O.R. FOR GUIDANCE PRIOR TO PROCEEDING WITH THE INSTALLATION OF THE PROPOSED FOUNDATION MODIFICATIONS.

FABRICATION

2.1 ALL WORK SHALL BE DONE IN ACCORDANCE WITH A.I.S.C. "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
2.2 STRUCTURAL STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS:

	YIELD	ASTM SPECS
A. STEEL SHAPES AND PLATES, U.N.O.	65ksi	A572
B. STEEL PIPE (MSS TUBING)	50ksi	A500 GR. C
C. STEEL PIPE	50ksi	---

2.3 ALL NEW MATERIAL INCLUDING STRUCTURAL STEEL AND FASTENERS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 AND A153.
2.4 WELDING SHALL MEET ANSI/AWS D1.1 STRUCTURAL WELDING CODE (LATEST REVISION). ELECTRODES SHALL BE E80 SERIES.
2.5 CONTRACTOR SHALL PROVIDE SHOP FABRICATION DRAWINGS TO B+T GROUP 5 DAYS PRIOR TO FABRICATION.

FIELD NDE MINIMUM REQUIREMENTS

3.1 ALL NDE SHALL BE IN ACCORDANCE WITH AWS D1.1.
3.2 FOR NEW BASE STIFFENERS (INCLUSIVE OF TRANSITION STIFFENERS) AND ANCHOR ROD BRACKETS, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT.
3.3 FOR NEW PLAT PLATE REINFORCEMENT AT THE BASE OF THE TOWER, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT, BUT MAY BE LIMITED TO A HEIGHT OF 10'-0".
3.4 FOR NDE OF THE EXISTING BASE PLATE CIRCUMFERENTIAL WELD, GC SHALL REFERENCE THE MI CHECKLIST FOR APPLICABILITY. PLEASE SEE ENG-SOW-10033: TOWER BASE PLATE NDE, AND ENG-BUL-10251: NDE REQUIREMENTS FOR MONOPOLE TO PREVENT CONNECTION FAILURE. NOTIFY THE E.O.R. AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING MODIFICATIONS THAT HAVE BEEN WELDED TO THE BASE PLATE.
3.5 ALL TESTING LIMITATIONS SHALL BE NOTED IN THE NDE REPORT.

BASEPLATE GROUT REMOVAL

4.1 THE GC SHALL BEGIN THIS PROCEDURE AS EARLY AS POSSIBLE DURING THE MODIFICATION PROCESS SO THAT IF ISSUES ARISE, THEY CAN BE RESOLVED WITHIN THE ANTICIPATED MODIFICATION TIMELINE.
4.2 IF ANY DETERIORATED GROUT EXISTS, BEGIN AT THIS LOCATION. REMOVE DETERIORATED GROUT AND THE GROUT AROUND THE NEAREST ONE OR TWO ANCHOR RODS TO FULLY EXPOSE THE LEVELING NUT. IF THE GC DISCOVERS THAT A HALF NUT OR JAM NUT WAS USED AS A LEVELING NUT, OR IF NO LEVELING NUT IS PRESENT, IMMEDIATELY CONTACT CEO AND THE CROWN POC (TYPICALLY THE MOD PM) FOR A RESOLUTION. DO NOT REMOVE ANY ADDITIONAL GROUT UNTIL DIRECTED TO BY CROWN.
4.3 OTHERWISE, CHECK THE LEVELING NUT FOR TIGHTNESS IN ACCORDANCE WITH SECTION 1.3.2.3 OF ENG-PRC-10012 "BASE PLATE GROUT REPAIR". IF SEVERE CORROSION / MATERIAL LOSS IS FOUND OR CORROSION EXISTS TO THE POINT WHERE THE LEVELING NUT IS UNABLE TO BE TIGHTENED WHEN OBVIOUSLY LOOSE, IMMEDIATELY NOTIFY THE CROWN POC (TYPICALLY THE MOD PM). REFERENCE ENG-BUL-10114 "RUST CLASSIFICATION" FOR EXAMPLES OF MATERIAL LOSS. DO NOT REMOVE ANY ADDITIONAL GROUT UNTIL DIRECTED TO BY CROWN.
4.4 IN THE EVENT THAT SEVERE CORROSION IS NOT ENCOUNTERED, AND BEING SURE TO CHECK EACH ANCHOR ROD FOR CORROSION PER ENG-BUL-10114 "RUST CLASSIFICATION", REMOVE ALL EXISTING BASEPLATE GROUT WHILE CHECKING EACH LEVELING NUT FOR TIGHTNESS IN ACCORDANCE WITH SECTION 1.3.2.3 OF ENG-PRC-10012 "BASE PLATE GROUT REPAIR".
4.5 CONSISTENT WITH SECTION 1.3.2.4 OF ENG-PRC-10012 "BASE PLATE GROUT REPAIR", HAND TOOL CLEAN TO SSPC-SP2 AND SOLVENT CLEAN TO SSPC-SP1, ALL EXPOSED STRUCTURAL STEEL ELEMENTS, INCLUDING ANCHOR RODS, LEVELING NUTS AND UNDERSIDE OF BASE PLATE TO THE GREATEST EXTENT POSSIBLE, ENSURE THAT ALL OLD GROUT IS REMOVED TO ALLOW COLD GALVANIZING TO ADHERE TO THE STEEL.
4.6 APPLY BY BRUSH TWO COATS OF A CROWN-APPROVED COLD-GALVANIZING COMPOUND TO ALL EXPOSED STRUCTURAL STEEL ELEMENTS BENEATH THE BASE PLATE AND ALLOW CURING IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION. A LIST OF CROWN-APPROVED DIRECT APPLICATION COLD-GALVANIZING COMPOUNDS CAN BE FOUND IN ENG-STD-10149 "TOWER PROTECTIVE COATINGS GUIDELINES" SECTION 2.1.1.
4.7 THE GC SHALL PROVIDE PHOTOS OF EACH ANCHOR ROD WITH LEVELING NUT AFTER CLEANING BUT BEFORE COLD-GALVANIZATION AND ALSO AGAIN AFTER COLD-GALVANIZATION, FOR INCLUSION IN THE MI REPORT.

KEY NOTES

(2) TOWER MODIFICATION I.D.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/02/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127643.003-01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001654
Expires 02/10/20

STATE OF CONNECTICUT
SCOTT C. LEVANCE
31627
LICENSED
PROFESSIONAL ENGINEER
6/13/19

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

(F) E. GRANBY 4Q2000 / GALASSO
876399

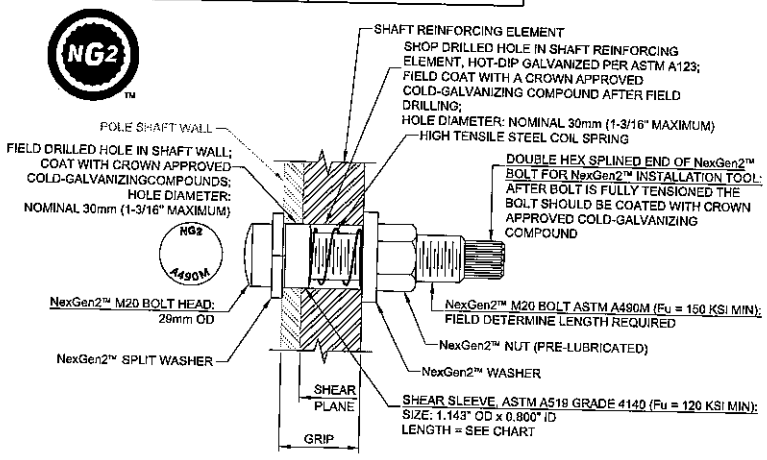
60 SOUTH MAIN ST.
EAST GRANBY, CT

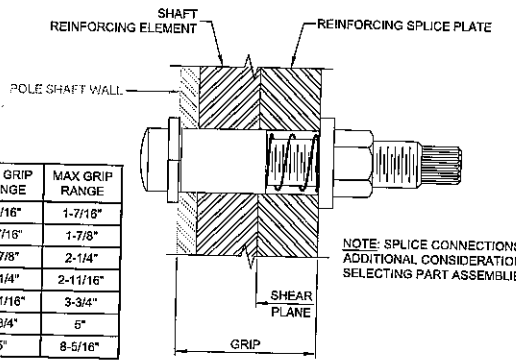
EXISTING 95' MONOPOLE

SHEET TITLE
GENERAL NOTES

SHEET NUMBER: S3
REVISION: 0

INTERIOR OF POLE SHAFT	EXTERIOR OF POLE SHAFT





NOTE: SPLICE CONNECTIONS REQUIRE ADDITIONAL CONSIDERATION WHEN SELECTING PART ASSEMBLIES

PART NUMBER	BOLT LENGTH	SLEEVE LENGTH	MIN GRIP RANGE	MAX GRIP RANGE
2NG2036	M20x95	11/16"	15/16"	1-7/16"
2NG2048	M20x95	1-3/16"	1-7/16"	1-7/8"
2NG2057	M20x95	1-5/8"	1-7/8"	2-1/4"
2NG2068	M20x135	2"	2-1/4"	2-11/16"
2NG2096	M20x135	2-7/16"	2-11/16"	3-3/4"
2NG2127	M20x175	3"	3-3/4"	5"
2NG2212	M20x250	4"	5"	8-5/16"

NOTES:

1. ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30mm DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1 3/16".
2. NexGen2™ COMPLETE ASSEMBLY SHALL BE MAGNI 565 COATED PER ASTM F2833 AS APPROPRIATE.
3. INSTALL PER MANUFACTURER'S INSTRUCTIONS.

MANUFACTURER:

ALLFASTENERS
959 LAKE ROAD
MEDINA, OHIO, USA 44256
PHONE: 440-232-6080
WEBSITES: WWW.ALLFASTENERS.COM WWW.AFTOWER.COM

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

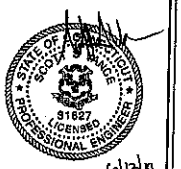
CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/02/19	ISSUED FOR CONSTRUCTION

PROJECT NO: 127643.003.01
PROJECT ENG: KISHORE MACHANI
DRAWN BY: SDP / GLS
CHECKED BY: US / SSO

B+T ENGINEERING, INC.
PEO.0031564
Expires 02/10/20



6/13/19

(F) E. GRANBY 4Q2000 / GALASSO
878399

60 SOUTH MAIN ST.
EAST GRANBY, CT

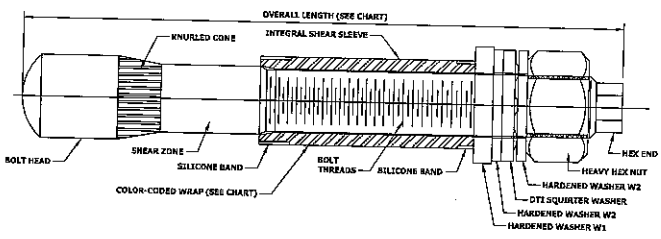
EXISTING 98' MONOPOLE

SHEET TITLE
NG2 BOLT NOTES AND DETAILS

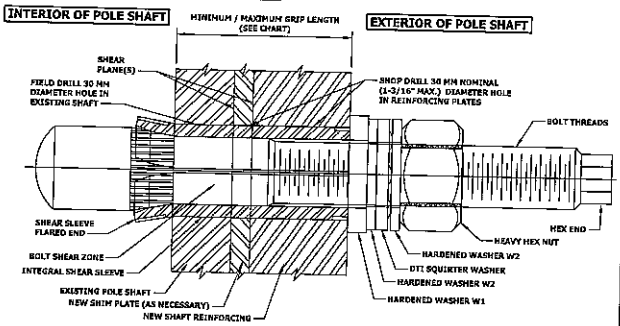
SHEET NUMBER: S4
REVISION: 0

FORGBolt™ NOTE SHEET: A325/PC8.8 LANDSCAPE VERSION DATE 01/29/2015; Rev. 1.0 04/23/2015

NOTES:
1. **ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.**
2. **ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.**



PRE-INSTALLED FORGBolt™ ASSEMBLY DETAIL 1



INSTALLED FORGBolt™ ASSEMBLY DETAIL 2

BOLT HOLE NOTES:

1. **ALL SHOP-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM SHOP-DRILLED HOLE DIAMETER PERMITTED IS 1-3/16".**
2. **ALL FIELD-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM FIELD-DRILLED HOLE DIAMETER PERMITTED IS 30 MM.**

DISTRIBUTOR CONTACT:
PRECISION TOWER PRODUCTS
PHONE: **888-926-4857**
EMAIL: info@precisiontowerproducts.com
WEB: www.precisiontowerproducts.com

CONTAINS PROPRIETARY INFORMATION
PATENT PENDING

FORGBolt™		AISC Group A Material: ASTM A325 and PC8.8 (Tensile Stress, Fu = 120 ksi minimum)				
GROUP A	FORGBolt™ Size (mm)	Overall Length (inches)	Estimated Weight Each (lbs)	Grip Range (inch)	Comment	Color Code
FORGBolt™ A325 - PC8.8 1	**135**	5.31	1.3	3/8" to 1"	--	**RED**
2	**160**	6.30	1.6	3/4" to 1-1/2"	--	**GREEN**
3	**195**	7.68	1.9	1-1/4" to 2-1/4"	--	**BLUE**
4	**260**	10.24	2.6	2" to 3-1/2"	Splice Bolt	**YELLOW**
5	**365**	14.37	3.6	3-1/2" to 5-1/2"	Flange Jump Bolt	**ORANGE**
6	**440**	17.32	4.3	5-1/2" to 8-1/2"	Flange Jump Bolt	**BLACK**
DTI Note	Each Group A (A325/PC8.8) FORGBolt™ assembly shall have a 'Squirter' DTI that is compatible with a M20-PC8.8 bolt.					

FORGBolt™ Installation

Follow all Manufacturer/Distributer Recommendations for Installation, Tightening, and Inspection.

1. FIELD DRILL HOLES TO 30 MM DIAMETER.
2. SELECT CORRECT BOLT SIZE FOR INSTALLATION GRIP (REFER TO PLANS).
3. INSERT BOLT ASSEMBLY THROUGH HOLES IN SHAFT REINFORCING PLATES AND SEAT THE HARDENED WASHER W1 FLUSH AGAINST OUTSIDE OF PLATE.
4. HAND TIGHTEN NUT TO FINGER TIGHT.
5. TIGHTEN NUT TO PRETENSIONED CONDITION AND UNTIL DTI SHOWS PROPER INDICATION.
6. PROPERLY DOCUMENT AND INSPECT BOLT TIGHTENING PER PLAN REQUIREMENTS.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/02/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127543.003.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001864
Expires 02/10/20

STATE OF OKLAHOMA — SCOTT L. FRANCIS — 31827 — LICENSED PROFESSIONAL ENGINEER

6/13/19

(F) E. GRANBY 4Q2000 / GALASSO 876399

59 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 90' MONOPOLE

SHEET TITLE
FORGBOLT NOTES AND DETAILS

SHEET NUMBER: S5
REVISION: 0

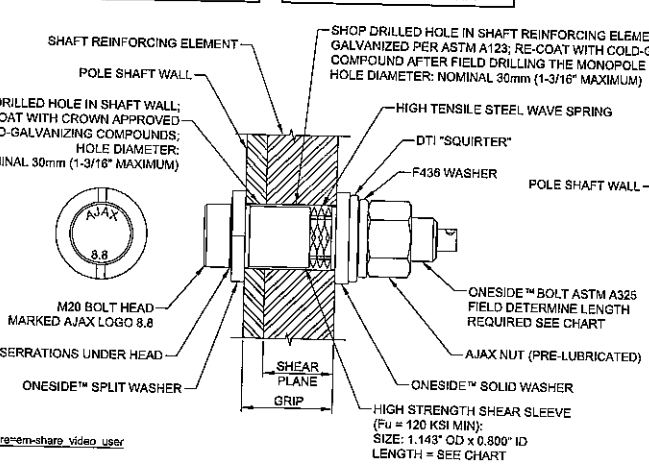
AJAX FASTENERS

ONESIDE™

PATENT US 7,373,709B2

MANUFACTURER INSTALLATION VIDEO

https://www.youtube.com/watch?v=ZGBS0eLrZsw&feature=em-share_video_user



NOTE:
SPLICE CONNECTIONS REQUIRE ADDITIONAL CONSIDERATION WHEN SELECTING PART ASSEMBLIES

AJAX ONESIDE™ BOLT DETAIL

CODE	SIZE	COLOR	SLEEVE LENGTH	GRIP	GRIP IMP
OSBA20.65-6	M20 x 65	ORANGE	6.0 (0.236")	12.5 / 20.0	0.500" / 0.787"
OSBA20.95-14	M20 x 95	BLACK	14.0 (0.551")	20.0 / 32.0	0.787" / 1.259"
OSBA20.95-22	M20 x 95	GREEN	22.0 (0.866")	30.0 / 50.0	1.181" / 1.968"
OSBA20.95-30	M20 x 95	YELLOW	30.0 (1.181")	40.5 / 50.0	1.595" / 1.968"
OSBA20.135-39	M20 x 135	BLUE	39.0 (1.535")	49.0 / 77.0	1.929" / 3.031"
OSBA20.135-48	M20 x 135	BROWN	48.0 (1.889")	60.5 / 77.0	2.375" / 3.031"
OSBA20.135-57	M20 x 135	PURPLE	57.0 (2.244")	67.0 / 90.0	2.637" / 3.543"
OSBA20.165-76	M20 x 165	RED	76.0 (3.000")	87.0 / 120.0	3.425" / 4.724"
OSBA20.250	M20 x 250	SILVER	MTO	121.0 / 211.0	4.724" / 8.310"

MANUFACTURER
AJAX FASTENERS
SALES + TECH: ONESIDE@AJAXFAST.COM.AU

DISTRIBUTOR
IRA SVENSGAARD AND ASSOCIATES
PETER SVENDSGAARD - PETERS@IRASVENS.COM
JOHN KILLAM - JOHN@IRASVENS.COM
PHONE (530) 647-8225
FAX (530) 647-8229

BOLT ASSEMBLY AND INSTALLATION:
1. BOLT MUST BE PURCHASED PRE-ASSEMBLED.
2. FOLLOW BOLT AND DTI MANUFACTURERS INSTRUCTIONS FOR INSTALLATION.

INSPECTION:
1. A MINIMUM OF 4 OUT OF 5 SQUIRTER® DTI PROTRUSIONS SHALL BE ENGAGED IN ANY AJAX/DTI BOLT ASSEMBLY IN THE REINFORCING MEMBERS. A FEELER GAGE MAY BE USED TO VERIFY PROTRUSION COMPRESSION.
2. INSPECTIONS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS AND CROWN DOCUMENT ENG-SOW-10007: *MODIFICATION INSPECTION SOW.*

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/02/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127643.003.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	LIS / BSC

B+T ENGINEERING, INC.
FEC.0001564
Expires 02/10/20

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
6/13/19

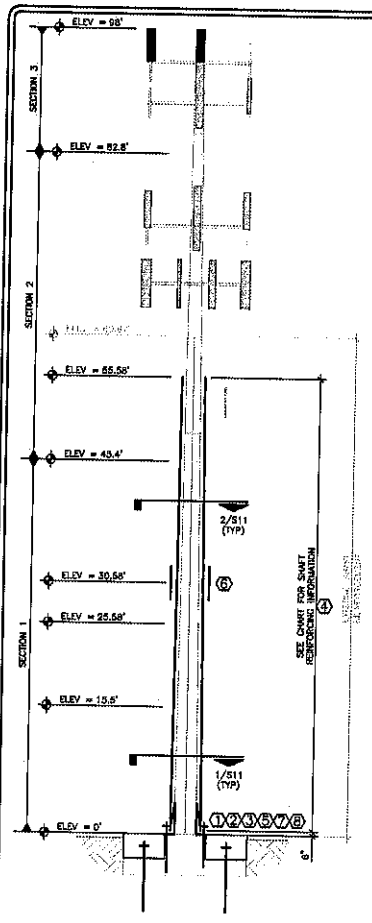
(F) E. GRANBY 4Q2000 / GALASSO
876399

60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

SHEET TITLE
AJAX ONESIDE™ BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE

SHEET NUMBER:	REVISION:
S6	0



1 TOWER ELEVATION
SCALE: N.T.S.

CCI FLAT PLATE-BILL OF MATERIALS (65KSI)

BOTTOM ELEVATION	TOP ELEVATION	FLAT PLATE DESIGNATION	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	FLAT #	BOLTS PER PLATE	TOTAL BOLT QTY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	TOTAL STEEL WEIGHT
0'-0"	30'-8"	CCI-SFP-08012530	30'-0"	2	2 & 15	37	74	11	11	19"	1658 LBS.
0'-0"	15'-8"	CCI-SFP-04510015	15'-0"	1	7	19	19	8	8	20"	230 LBS.
23'-7"	35'-7"	CCI-SFP-04510030	30'-0"	1	8	28	28	6	6	20"	459 LBS.
30'-7"	55'-7"	CCI-SFP-04510025	25'-0"	2	2 & 15	25	50	6	6	20"	765 LBS.
							171				3112 LBS.

ALL BOLTS SHALL BE PRE-APPROVED BLIND M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE AND BOLTS) AND INSTALLATION PROCEDURES.

NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER FITTING OF REINFORCEMENT ON MONOPOLES. SHIMS FOR MONOPOLE REINFORCEMENT MEMBER SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESS SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED. FINGER SHIMS AND HORSESHOE SHIMS ARE PERMITTED. STACKED SHIMS SHALL BE NO GREATER THAN 1/4" WITHOUT E.O.R. APPROVAL.
2. FOR PLATES STARTING AT 0", THE BOTTOM OF THE FLAT PLATE SHALL BEGIN AT 6" +/- 1". FOR SINGLE PLATES OR MULTIPLE PLATES SPLICED TOGETHER, THE BOTTOM OF THE FLAT PLATE RUN SHALL BEGIN AT THE PROPOSED ELEVATION +/- 3". FOR MULTIPLE PLATE SPLICED TOGETHER, THE TOP OF THE FLAT PLATE IS TO BE PLACED SUCH THAT THERE IS NO MORE THAN 3" DIFFERENCE BETWEEN THE ACTUAL OVERALL LENGTH OF THE SPAN AND THE PROPOSED OVERALL LENGTH OF THE SPAN, FROM THE BOTTOM OF THE BOTTOM PLATE TO THE TOP OF THE TOP PLATE.

EXISTING MEMBER SCHEDULE

SECTION	NUMBER OF SIDES	THICKNESS	ASTM STEEL GRADE	Fy (ksi)	BOTTOM DIAMETER	TOP DIAMETER	LAP SPLICE
1	18	0.3125"	N/A	65	32.00"	21.50"	41"
2	18	0.2500"	N/A	65	22.86"	14.25"	29"
3	18	0.1675"	N/A	65	15.28"	12.00"	---
EXISTING BASE PLATE GRADE = 60 ksi (ASTM GRADE = A871)							
EXISTING ANCHOR RODS = 2.25"ø AND GRADE = 75 ksi							

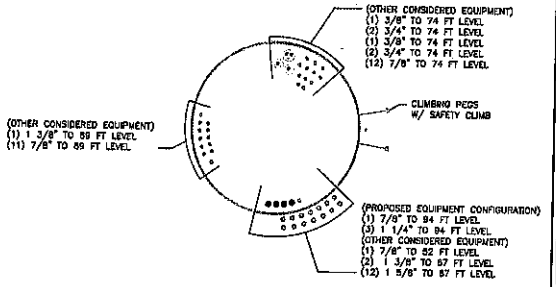
EXISTING TOWER HAS BEEN PREVIOUSLY MODIFIED

REFERENCE DRAWINGS BY:	DATE
ICTS ENGINEERING SERVICES	11/03/09
PAUL J. FORD & COMPANY	06/27/12
GPD ENGINEERING AND ARCHITECTURE PROFESSIONAL CORPORATION	07/29/15

TOWER MODIFICATIONS:

1. MODIFY FOUNDATION
   RE: SHEET S9 THRU S10.
2. REMOVE EXISTING BASE PLATE STIFFENERS AT 0'
   RE: SHEET S11.
3. REMOVE EXISTING ANCHOR ROD BRACKET AND INSTALL NEW ANCHOR ROD BRACKET AT 0'
   RE: SHEET S11.
4. INSTALL NEW REINFORCING ELEMENTS FROM 0.5' TO 55.58'
   RE: SHEET S11.
5. INSTALL NEW ANCHOR RODS AND ANCHOR ROD BRACKETS WITH FOOT PADS AT 0'
   RE: SHEET S11.
6. INSTALL NEW IN-LINE SPLICE AT 30.58'
   RE: SHEET S12.
7. REMOVE EXISTING BASE PLATE GROUT. SEE BASE PLATE GROUT REMOVAL NOTES SHEET S3.
8. RE-INSTALL BASE PLATE GROUT (AFTER ALL BASE WORK) PER ENG-PRC-10012 "BASE PLATE GROUT REPAIR"

A. PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL BUDGET A SITE VISIT TO CHECK CRITICAL DIMENSIONS AND VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY AND SHALL NOT BE USED FOR FABRICATION. ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GENERAL CONTRACTOR AND/OR FABRICATOR.
B. THE NEW AND EXISTING TRANSMISSION LINES MUST BE DISTRIBUTED AS SHOWN IN THE TX LINE DIST. DIAGRAM RE: DETAIL 2/S7.
C. MODIFICATIONS SHALL BE COMPLETED PRIOR TO ADDING THE PROPOSED APPURTENANCES. AN IBM PROVIDED BY A REGISTERED PROFESSIONAL ENGINEER WILL SUPERSEDE THIS CONDITION / REQUIREMENT.



2 TX LINE DISTRIBUTION DIAGRAM
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/02/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127643.003.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	BDP / GLS
CHECKED BY:	LIS / BSC

B+T ENGINEERING, INC.
PEC.0001264
Expires 02/10/20

STATE OF OKLAHOMA
COMMITTED TO EXCELLENCE
31627
LICENSED
PROFESSIONAL ENGINEER
1/18/19

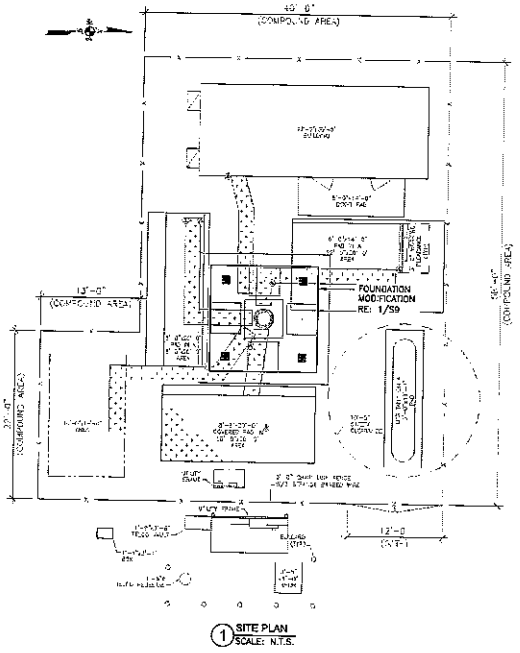
(F) E. GRANBY 4Q2000 / GALASSO
876399

60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 88' MONOPOLE

SHEET TITLE
TOWER ELEV., SCHEDULE AND TX LINE DIST. DIAG.

SHEET NUMBER: S7
REVISION: 0



1 SITE PLAN
SCALE: N.T.S.

CONTRACTOR NOTES:

1. THE CONTRACTOR SHALL WALK THIS SITE PRIOR TO BIDDING.
2. TOWER FOUNDATION IS IN CLOSE PROXIMITY TO EXISTING RADS, BUILDINGS, AND FENCE. IF DAMAGE OCCURS DURING INSTALLATION OF FOUNDATION MODIFICATIONS, CONSTRUCTION PRICE SHALL INCLUDE REPLACEMENT OR REPAIR OF THE DAMAGED ITEMS.
3. ALL WORK SHALL COMPLY WITH LOCAL CODES, SAFETY REGULATIONS AND UNLESS NOTED OTHERWISE, THE LATEST EDITION OF ACI 318 "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE".
4. IF ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS AND/OR CONDITIONS SPECIFIED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY WORK THAT WOULD BE AFFECTED.
5. TAKE ALL MEASURES NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING DRILLING OPERATIONS. NOTIFY B+T GROUP IMMEDIATELY IF EXISTING REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW ANCHORS. MINOR ADJUSTMENT TO PROPOSED LOCATION OF NEW ANCHORS MAY BE REQUIRED.
6. TEMPORARY REMOVAL/PERMANENT RELOCATION OF THE GROUND EQUIPMENT MAY BE REQUIRED. THE GC SHALL OBTAIN THE TOWER OWNER'S PERMISSION PRIOR TO TEMPORARY REMOVAL/PERMANENT RELOCATION.
   *** NOTES 7 AND 8 APPLY ONLY TO NEW GUY ANCHOR FOUNDATIONS ***
7. NEW FOUNDATION TO BEAR AT THE MINIMUM SPECIFIED DEPTH. IF MINIMUM EXCAVATION DEPTH IS NOT MET, CONTACT E.O.R. PRIOR TO PROCEEDING.
8. ANGLE OF ANCHOR SHAFT DEPENDS ON FINAL BEARING DEPTH. REPORT ANY DEVIATIONS AND COORDINATE WITH THE E.O.R. BEFORE PROCEEDING.

EXCAVATION NOTES:

1. CONTRACTOR SHALL EMPLOY ALL NECESSARY MEASURES TO PROTECT EXISTING STRUCTURES, FOUNDATIONS AND UTILITIES DURING EXCAVATION AND CONSTRUCTION OF THE FOUNDATIONS.
2. CONTRACTOR SHALL NOT UNDERCUT THE EXISTING FOUNDATION.
3. BACKFILL MATERIAL SHALL BE COMPACTED TO A MINIMUM UNIT WEIGHT OF 115 PCF OR THE NET WEIGHT SPECIFIED IN THE GEO-TECH REPORT, THE SOIL SHALL BE INSTALLED IN 6" TO 8" LIFTS AND COMPACTED THOROUGHLY TO ACHIEVE APPROPRIATE UNIT WEIGHT.
4. FIELD MEASUREMENT OF SPECIFIED DENSITY IS RECOMMENDED. THE GEOTECHNICAL ENGINEER HAS LIBERTY TO CHOOSE BEST METHOD TO EMPLOY TO ENSURE PROPER COMPACTION IS ACHIEVED AND UNIT WEIGHT IS REACHED AS DESIRED. DIRECT FIELD DENSITY MEASUREMENT TEST PER ASTM D1556: SAND-CONE METHOD, ASTM D2937: DRIVE CYLINDER METHOD, OR ASTM D2167: RUBBER BALLOON METHOD IS ACCEPTABLE. INDIRECT TEST SUCH AS ASTM D6938: NUCLEAR METHOD IS ALSO ACCEPTABLE WITH GEOTECHNICAL ENGINEER'S APPROVAL.
5. FOUNDATION DESIGN IS BASED ON GEOTECHNICAL INVESTIGATION REPORT
   CCI DOC # 1531971
   PREPARED BY DELTA OAKS GROUP
   DATED 10/19/18
6. WATER TABLE WAS NOT ENCOUNTERED DURING GEO-TECH INVESTIGATION.

CONCRETE NOTES:

1. ALL DETAILING, FABRICATION AND PLACING OF REINFORCING BARS SHALL BE IN ACCORDANCE WITH THE ACI DETAILING MANUAL SP-66 (LATEST REVISION).
2. REINFORCING BARS SHALL BE GRADE 60 DEFORMED BARS CONFORMING TO ASTM SPECIFICATION A615, EXCEPT TIES WHICH MAY BE ASTM A615 (GRADE 40). USE CLASS B LAP SPLICES.
3. ALL REINFORCING BARS SHALL BE TIED WITH TIE WIRE AT ALL REINFORCING BAR INTERSECTIONS. THE CONTRACTOR SHALL SUPPORT THE REINFORCING BAR MAT WITH STEEL CHAIRS SPACED NO MORE THAN 4 FEET O.C.
4. ALL WATER SHALL BE REMOVED FROM THE BOTTOM OF THE EXCAVATION PRIOR TO COMPACTING FILL AND PLACING CONCRETE.
5. CONCRETE SHALL BE NORMAL WEIGHT AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
6. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED SOIL WHERE POSSIBLE. FORMS, WHEN REQUIRED SHALL BE REMOVED PRIOR TO BACKFILLING.
7. PREPARE AND SUBMIT BATCH TICKETS FOR EACH TYPE AND STRENGTH OF CONCRETE.
8. FOR FIELD MIXING, PREPARE AND SUBMIT MIX DESIGNS FOR PRE-APPROVAL FOR EACH TYPE AND STRENGTH OF CONCRETE IN ACCORDANCE WITH ACI 211, "PROPORTIONING CONCRETE MIXTURES", AND ACI 301, "SPECIFICATIONS FOR STRUCTURAL CONCRETE".
9. ALL CONCRETE SHALL BE NORMAL WEIGHT CONCRETE.
10. SLUMP TEST SHALL BE MADE IN ACCORDANCE WITH ASTM C143. THE ALLOWABLE CONCRETE SLUMP SHALL BE 4 INCHES (±1") UNLESS ADMIXTURES ARE USED. ADMIXTURE SHALL BE IN ACCORDANCE WITH ASTMC494 STANDARD TYPES A, B, C, D OR E.
11. THE ENGINEER SHALL PRE-APPROVE SUPERPLASTICIZER USE.
12. CEMENT SHALL CONFORM TO ASTM C150 TYPE II. FINE AGGREGATE SHALL CONFORM TO ASTM C33. COURSE AGGREGATE SHALL BE GRAVEL OF CRUSHED STONE CONFORMING TO ASTM C33. MAXIMUM AGGREGATE SIZE SHALL BE 3/4".
13. WATER SHALL BE CLEAN AND FREE FROM OILS, ACIDS, ALKALIES AND ORGANIC MATERIALS. NO ADDITIONAL WATER SHALL BE ADDED TO THE CONCRETE AT THE JOB SITE.
14. DO NOT USE CHLORIDE-CONTAINING ADMIXTURES.
15. AIR ENTRAINING ADMIXTURES SHALL CONFORM TO ASTM C260.
16. HOT WEATHER CONCRETE PLACEMENT SHALL COMPLY WITH ACI 305R. COLD WEATHER CONCRETE PLACEMENT SHALL COMPLY WITH ACI 306.1.
17. CONCRETE SHALL BE PLACED WITH 24 HOURS OF EXCAVATION INSPECTIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING EXPOSED EXCAVATIONS PRIOR TO CONCRETE PLACEMENT.
18. PLACE CONCRETE BY USING A CHUTE OR HOPPER DEVICE SUCH THAT CONCRETE SHALL NOT FREE FALL FROM A HEIGHT GREATER THAN 5 FEET. DEPOSIT CONCRETE WITHIN THE CENTER OF THE STEEL REINFORCING CAGE TO PREVENT SEGREGATION.
19. CONSOLIDATE PLACED CONCRETE WITH MECHANICAL VIBRATING EQUIPMENT IN ACCORDANCE WITH ACI 309R. DO NOT USE VIBRATORS TO TRANSPORT CONCRETE.
20. CONCRETE SHALL BE CURED IN ACCORDANCE WITH ACI 301. WHEN APPLICABLE, CURING COMPOUNDS SHALL BE WATER CLEAR, STYRENE ACRYLATE TYPE A MINIMUM SOLIDS CONTENT OF 30%. APPLICATION SHALL BE IN CONFORMANCE WITH MANUFACTURE'S INSTRUCTIONS.
21. ALL CONCRETE TESTING SHALL BE ACCORDANCE WITH ACI 318. A MINIMUM OF (2) 6"x12" CONCRETE CYLINDERS PER ANCHOR BLOCK AND A MINIMUM OF (6) 6"x12" CYLINDERS PER BATCH REQUIRED.
22. FOR THE LESSER OF 25 C.Y. OR ONE DAY'S PLACEMENT, A MINIMUM OF 4 CONCRETE CYLINDERS SHALL BE TAKEN. CONCRETE SHALL BE TESTED AS REQUIRED BY OWNER'S PROJECT MANAGER.

B+T GRP
1717 S. BOULDER AVE.
SUITE 350
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/02/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127643.003.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001864
Expires 02/10/20

STATE OF CONNECTICUT
SCOTT S. CHOATE
31627
LICENSED
PROFESSIONAL ENGINEER
6/13/19

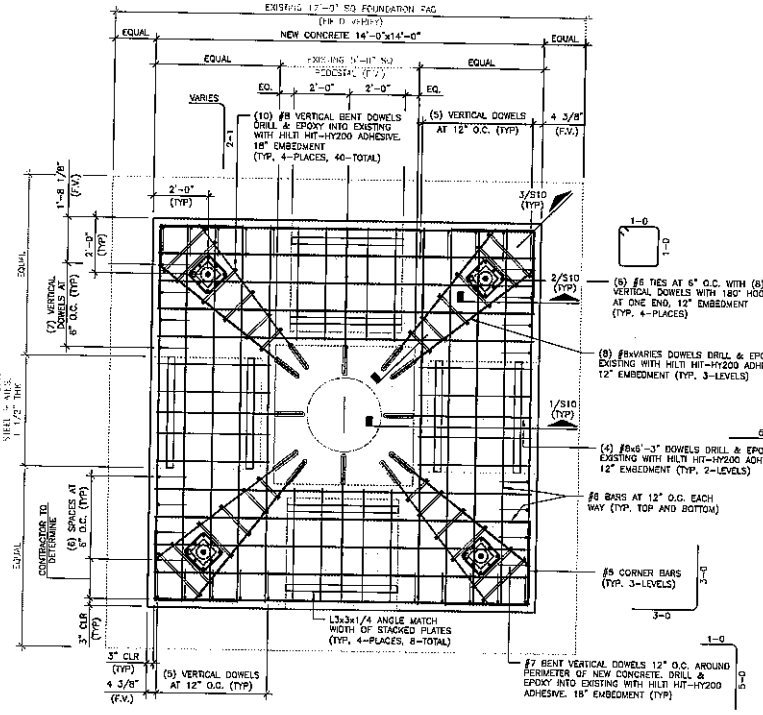
(F) E. GRANBY 4Q2000 / GALASSO
676399

60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

SHEET TITLE
SITE PLAN AND NOTES

SHEET NUMBER:	REVISION:
S8	0



1 FOUNDATION MODIFICATION
SCALE: N.T.S.

MICROPILE NOTES:

1. THE CONTRACTOR SHALL WALK THIS SITE PRIOR TO BIDDING. THE LOCATION OF SOME OF THE EXISTING EQUIPMENT ON THE PAD WASN'T AVAILABLE AT THE TIME OF DESIGN. CHANGES TO THE MICROPILE LAYOUT MAY BE NECESSARY TO FACILITATE INSTALLATION.
2. ALL DIMENSIONS TO BE VERIFIED BY CONTRACTOR PRIOR TO ORDERING MATERIALS.
3. BARS SHALL BE EPOXY COATED OR HOT DIP GALVANIZED WITH FABRICATED GREASED PVC SLEEVE THROUGH THE STRESSING LENGTH (UNO). THE PROPERTIES OF THE BAR SHALL CONFORM TO ASTM A519 OR A513 FOR TYPE-E, ASTM A722 FOR 150 KSI FOR TYPE-A, AND ASTM A615 FOR 75 KSI ALL THREAD RODS FOR TYPE-A INSTALLATIONS.
4. USE PVC CENTRALIZERS TO ASSURE GOOD GROUT COVER AROUND THE BAR. (FOR TYPE-E INSTALLATIONS, USE STEEL CENTRALIZER IN FRONT OF THE COUPLING DURING THE DRILLING OPERATION)
5. GROUT TO HAVE A MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF 5000 PSI.
6. CONTRACTOR SHALL FULLY GROUT THE DRILL HOLE THROUGH A GROUT TUBE RUNNING TO THE BOTTOM OF THE DRILL HOLE UNTIL CLEAN GROUT RETURNS TO THE SURFACE OF THE DRILL HOLE FOR TYPE-A INSTALLATION.
7. ADJACENT MICROPILES SHALL BE INSTALLED WITH AN APPROPRIATE TIME LAG IN ORDER TO LIMIT DISTURBANCE FROM DRILLING.
8. PULL TEST TO CONFORM TO ASTM D3689-07.
9. IT IS RECOMMENDED THAT THE INSTALLATION AND TESTING OF THE MICROPILES BE OBSERVED BY A QUALIFIED REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER OR ANOTHER THIRD PARTY INSPECTOR FAMILIAR WITH THE PROCEDURES FOR INSTALLATION AND TESTING OF ANCHORAGE SYSTEMS. PULL TEST NEEDS TO BE PERFORMED PER THE DIRECTION OF A CROWN APPROVED FOUNDATION INSPECTOR. PULL TEST CAN BE WAIVED OFF IF DEEMED APPROPRIATE BY THE INSPECTOR. PULL TEST TO 171 KIPS.
10. DESIGN CAPACITY CONSIDERED IN THE ANALYSIS: NET ALLOWABLE (TENSION) = 160 KIPS. NET ALLOWABLE (COMPRESSION) = 160 KIPS. CONTRACTOR IS FREE TO USE ANY OTHER MANUFACTURER PROVIDED THEY PROVE THAT THE SUBSTITUTED SYSTEM HAS AN EQUIVALENT CAPACITY OR GREATER.

TO ORDER PARTS CONTACT:

WILLIAMS FORM ENGINEERING CORP.
8165 GRAPHIC DR.
BELMONT, MI 49306
PHONE: (616) 868-0615
E-MAIL: WILLIAMS@WILLIAMSFORM.COM

B+T GRP
1717 S. BOULDER AVE.
SUITE 200
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/02/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127643.003.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/20

STATE OF CONNECTICUT
SCOTT S. DANCE
31827
LICENSED PROFESSIONAL ENGINEER
6/13/19

(F) E. GRANBY 4Q2000 / GALASSO
878399

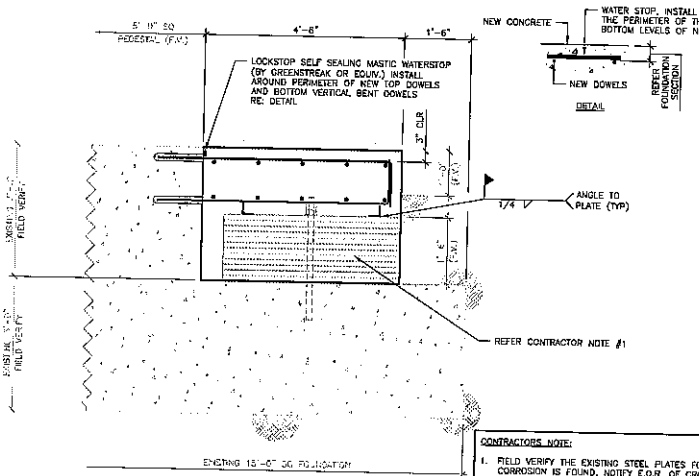
69 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 69' MONOPOLE

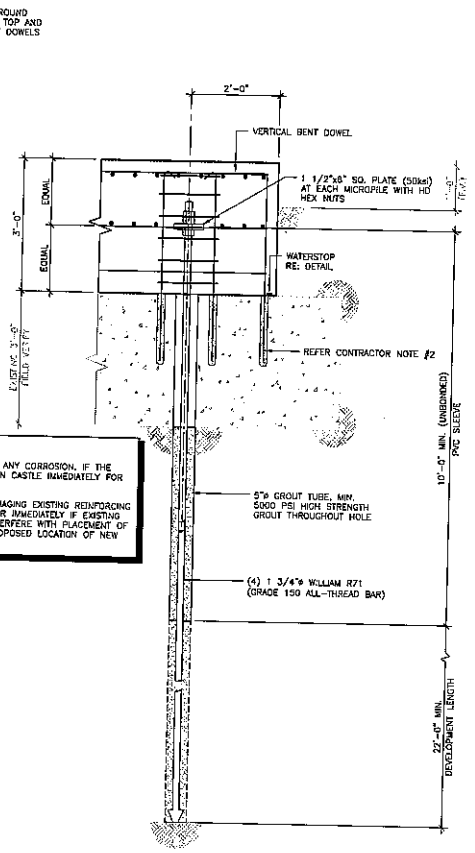
SHEET TITLE

FOUNDATION MODIFICATION

SHEET NUMBER:	REVISION:
S9	0



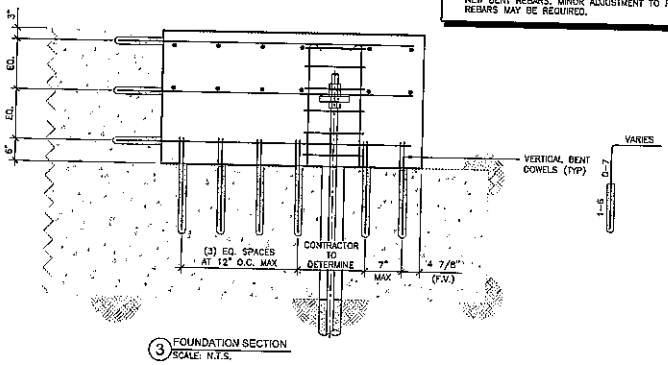
1 FOUNDATION SECTION
SCALE: N.T.S.



2 FOUNDATION SECTION
SCALE: N.T.S.

CONTRACTORS NOTE:

1. FIELD VERIFY THE EXISTING STEEL PLATES FOR ANY CORROSION. IF THE CORROSION IS FOUND, NOTIFY E.O.R. OF CROWN CASTLE IMMEDIATELY FOR APPROPRIATE REMEDIAL MEASURES.
2. TAKE ALL MEASURES NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING CORING OPERATIONS. NOTIFY E.O.R IMMEDIATELY IF EXISTING REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW BENT REBARS. MINOR ADJUSTMENT TO PROPOSED LOCATION OF NEW REBARS MAY BE REQUIRED.



3 FOUNDATION SECTION
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/02/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127843.003.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/20

STATE OF CONNECTICUT * SCOTT D. PHILLIPS * 31627 LICENSED PROFESSIONAL ENGINEER

6/13/19

(F) E. GRANBY 4Q2000 / GALASSO
876399

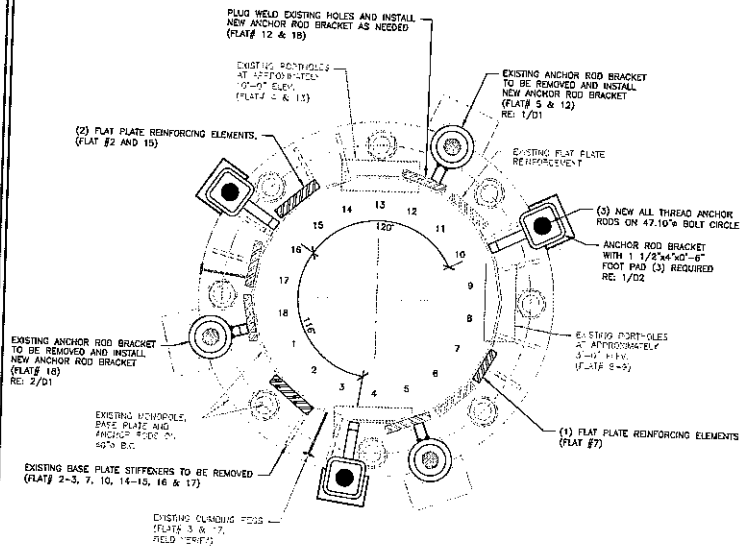
60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

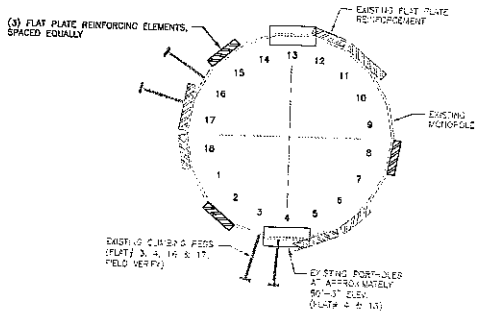
SHEET TITLE
FOUNDATION SECTION

SHEET NUMBER: S10

REVISION: 0



1 TOWER SECTION (0'-30.5')
SCALE: N.T.S.



2 TOWER SECTION (25.58'-55.58')
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
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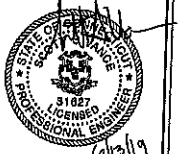
CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/02/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127643.093.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	EOP / GLS
CHECKED BY:	LIS / SSC

B+T ENGINEERING, INC.
PEC.0001854
Expires 06/10/20



6/13/19

(F) E. GRANBY 4Q2000 / GALASSO
876399

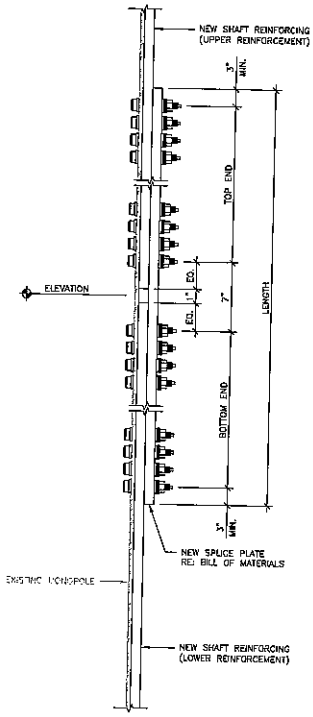
60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

SHEET TITLE
TOWER SECTIONS
(0'-30.5' AND 25.58'-55.58')

SHEET NUMBER: S11

REVISION: 0



1 FLAT PLATE IN-LINE SPLICE DETAIL
SCALE: N.T.S.

SPLICE PLATE-BILL OF MATERIALS (65KSI)									
ELEVATION	PART NUMBER	WIDTH	THICKNESS	LENGTH	QTY	BOLTS HOLES PER SPLICE	TOTAL BOLTS HOLES	TOTAL STEEL WEIGHT	
30'-6 1/2"	CCI-SP-045100-6-11	4 1/2"	1"	4'-10"	2	17	34	148	LBS.

(A) O.C. DISTANCE ON TERMINATION BOLTS TO BE 3 IN. U.N.O.
(B) USE SHIM PLATES AS REQUIRED.
(C) NUMBER OF ADDITIONAL BOLTS ARE FOR SPLICING INTO EXISTING REINFORCEMENT.
(D) STEEL WEIGHT NOT INCLUDED IN S7 BILL OF MATERIALS.

B+T GRP
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CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/03/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127643.003.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/20

STATE OF CONNECTICUT
SHOTTA S. VANCE
31827
LICENSED
PROFESSIONAL ENGINEER
01/3/19

(F) E. GRANBY 4Q2000 / GALASSO
876399

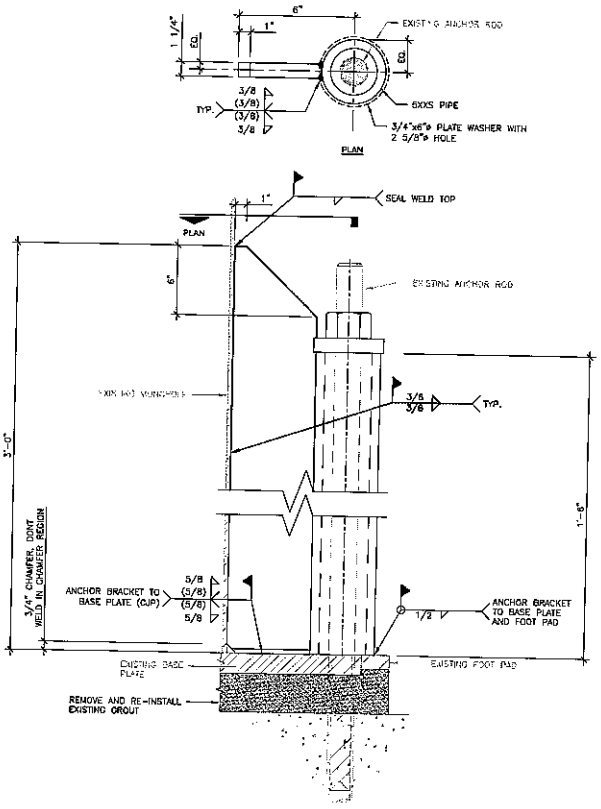
60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

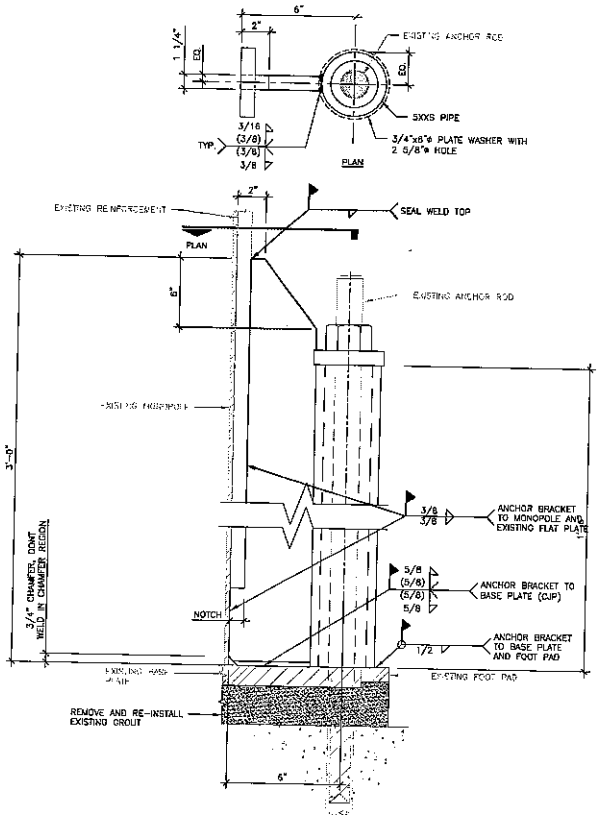
SHEET TITLE
IN-LINE SPLICE DETAIL

SHEET NUMBER: S12

REVISION: 0



1 ANCHOR ROD BRACKET DETAIL
SCALE: N.T.S.



2 ANCHOR ROD BRACKET DETAIL
SCALE: N.T.S.

B+T GRP
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www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/02/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127643-003.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/20

STATE OF CONNECTICUT
SCOTT L. GALASSO
31627
LICENSED
PROFESSIONAL ENGINEER
01/3/19

(F) E. GRANBY 4 02000 / GALASSO
876399

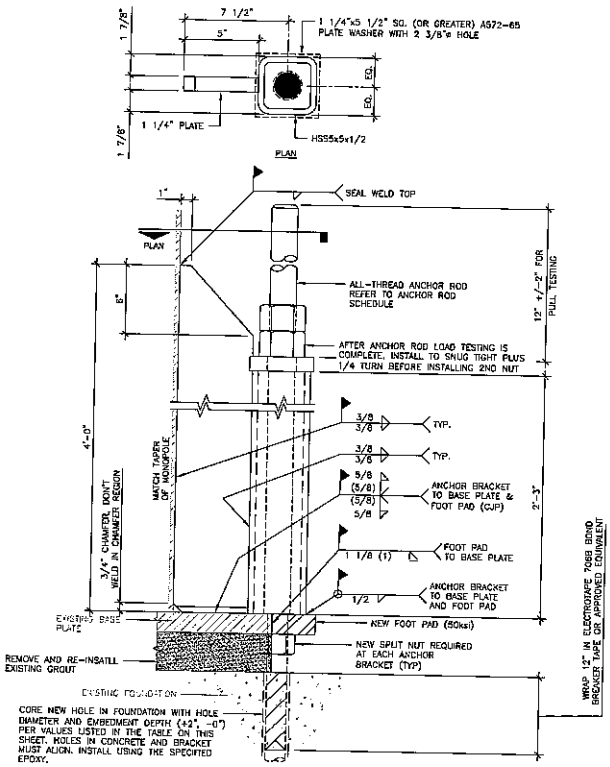
60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 85' MONOPOLE

SHEET TITLE
ANCHOR ROD
BRACKET DETAILS

SHEET NUMBER:	REVISION:
D1	0

ANCHOR ROD SCHEDULE							
PART NUMBER	DIAMETER	LENGTH	MATERIALS	EMBEDMENT DEPTH	HOLE SIZE	EPOXY	TARGET TENSION
CCI-AR-0225	2 1/4"	8'-10"	A193-B7	5'-6"	2 1/2"	ALLFASTNERS AF35LV EPOXY GROUT	190



1 ANCHOR ROD BRACKET
SCALE: N.T.S.

ANCHOR ROD NOTES:

1. PLATE WASHER MUST FULLY BEAR ON THE TUBE.
2. REFERENCE CC APPROVED COMPONENTS (CURRENT VERISON) FOR ANCHOR ROD DIMENSIONS.
3. RODS MUST BE GALVANIZED FROM THE TOP OF THE PROJECTION TO 15" BELOW THE SURFACE OF THE CONCRETE, AT A MINIMUM.
4. COREO HOLES MUST BE MECHANICALLY ROUGHENED USING A CARBIDE HOLE ROUGHENER OR EQUIVALENT. BRUSHING WITH A NYLON OR WIRE BRUSH SHALL BE USED IN THE PROCESS OF HOLE CLEANING, BUT DOES NOT SATISFY THE HOLE ROUGHENING REQUIREMENT.
5. FOLLOW EPOXY MANUFACTURER'S RECOMMENDATIONS FOR HOLE CLEANING.
6. ALL HOLES MUST BE DRY PRIOR TO PLACING EPOXY.
7. FOLLOW EPOXY MANUFACTURER'S RECOMMENDATIONS REGARDING HANDLING OF THREADED ROD AND EPOXY, AS WELL AS ALL INSTALLATION INSTRUCTIONS AND REQUIREMENTS.
8. TAKE ALL MEASUREMENTS NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING CORING OPERATIONS. NOTIFY E.O.R. IMMEDIATELY IF EXISTING REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW ANCHORS. MINOR ADJUSTMENT TO PROPOSED LOCATION OF NEW ANCHORS MAY BE REQUIRED.
9. IF BASE PLATE GROUT REMOVAL IS REQUIRED FOR ANCHOR ROD INSTALLATION, SEE ENG-PRC-10012: BASE PLATE GROUT REPAIR, FOR PROCEDURES AND RECOMMENDED MANUFACTURERS. CONTRACTOR TO DETERMINE THE QUANTITY REQUIRED.
10. ONCE ALL RESIN AND GROUT HAVE CURED, NEW ANCHOR ROD REINFORCING SHALL BE TARGET TENSIONED TO THE VALUE LISTED IN THE TABLE ON THIS SHEET. SEE ENG-PRC-10119: PULL-OUT TESTING POST-INSTALLED ANCHOR RODS, FOR SPECIFICATIONS.
11. CONTRACTOR TO VERIFY THAT A PULL TEST IS ABLE TO BE PERFORMED USING THE ANCHOR ROD PROJECTION SHOWN.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

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PROJECT NO:	127643.003.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001554
Expires 02/10/20

STATE OF CONNECTICUT
SCOTT D. PHILLIPS
31627
LICENSED PROFESSIONAL ENGINEER
6/13/19

(F) E. GRANBY 4Q2060 / GALASSO
876399

60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

SHEET TITLE
ANCHOR ROD BRACKET DETAIL

SHEET NUMBER:	REVISION:
D2	0

EBI Consulting

environmental | engineering | due diligence

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

Sprint Existing Facility

Site ID: CT43XC804

(F) E. Granby 4Q2000 / Galasso
60 South Main Street
East Granby, Connecticut 06026

June 3, 2019

EBI Project Number: 6219002028

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**41.34%**

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

EBI Consulting

environmental | engineering | due diligence

June 3, 2019

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

Emissions Analysis for Site: CT43XC804 - (F) E. Granby 4Q2000 / Galasso

EBI Consulting was directed to analyze the proposed Sprint facility located at **60 South Main Street** in **East Granby, 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 60 South Main Street in East Granby, 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 RFS APXVTM14-ALU-I20 for the 2500 MHz channel(s), the Commscope NNVV-65B-R4 for the 800 MHz / 1900 MHz channel(s) in Sector A, the RFS APXVTM14-ALU-I20 for the 2500 MHz channel(s), the Commscope NNVV-65B-R4 for the 800 MHz / 1900 MHz channel(s) in Sector B, the RFS APXVTM14-ALU-I20 for the 2500 MHz channel(s), the Commscope NNVV-65B-R4 for the 800 MHz / 1900 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 97 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.

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Sprint Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APXVTM14-ALU-I20	Make / Model:	RFS APXVTM14-ALU-I20	Make / Model:	RFS APXVTM14-ALU-I20
Frequency Bands:	2500 MHz	Frequency Bands:	2500 MHz	Frequency Bands:	2500 MHz
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	97 feet	Height (AGL):	97 feet	Height (AGL):	97 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):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A1 MPE %:	**2.38%**	Antenna B1 MPE %:	**2.38%**	Antenna C1 MPE %:	**2.38%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4
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):	97 feet	Height (AGL):	97 feet	Height (AGL):	97 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 A2 MPE %:	**4.66%**	Antenna B2 MPE %:	**4.66%**	Antenna C2 MPE %:	**4.66%**

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

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Site Composite MPE %	
Carrier	MPE %
Sprint (Max at Sector A):	7.04%
AT&T	10.66%
Metro PCS	1.36%
Verizon	17.97%
T-Mobile	4.31%
Site Total MPE % :	41.34%

Sprint MPE % Per Sector	
Sprint Sector A Total:	7.04%
Sprint Sector B Total:	7.04%
Sprint Sector C Total:	7.04%
Site Total MPE % :	41.34%

Sprint Maximum MPE Power Values (Sector A)

Sprint Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 2500 MHz BRS	8	778.09	97.0	23.78	2500 MHz BRS	1000	2.38%
Sprint 800 MHz CDMA	4	858.95	97.0	13.13	800 MHz CDMA	533	2.46%
Sprint 1900 MHz PCS	4	1439.50	97.0	22.00	1900 MHz PCS	1000	2.20%
						Total:	**7.04%**

• 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:	7.04%
Sector B:	7.04%
Sector C:	7.04%
Sprint Maximum MPE % (Sector A):	7.04%
Site Total:	41.34%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **41.34%** 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.

Sprint

CROWN CASTLE

PR

SI

SI

SI

SI

SI

MA

SITE INFORMATION

TOWER OWNER:
CROWN ATLANTIC COMPANY LLC.
2000 CORPORATE DRIVE
CANONSBURG, PA 15317
(704) 405-6555

LATITUDE (NAD83):
41° 56' 29.6" N
41.941553°

LONGITUDE (NAD83):
72° 44' 19.3" W
-72.738680°

COUNTY:
HARTFORD

ZONING JURISDICTION:
TBD

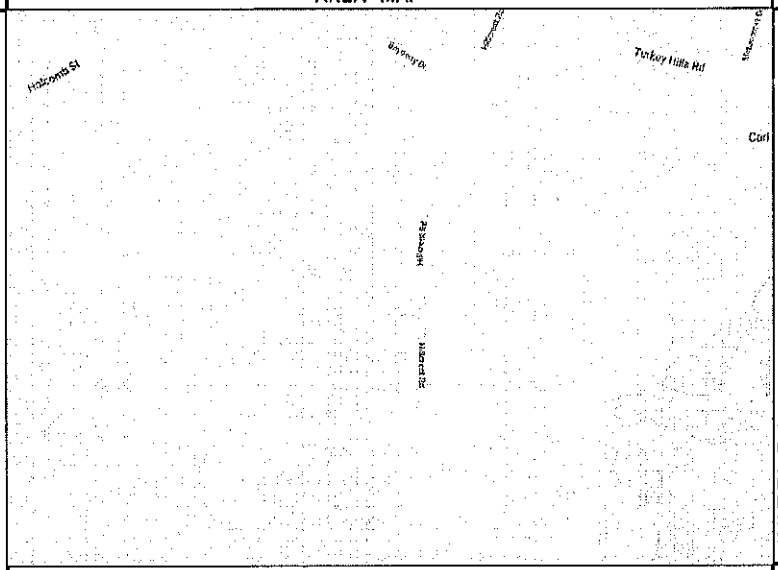
ZONING DISTRICT:
N/A

POWER COMPANY:
CONNECTICUT LIGHT & POWER
(860) 947-2000

SPRINT CONSTRUCTION:
TBD

CROWN PM:
SCOTT WIATROSKI
(201) 236-9228

AREA MAP



LOCATION MAP

SPRINT PROPOSES TO
TELECOMMUNICATIONS

- INSTALL 2.5 EQUIP
- REMOVE (6) PANEL
- INSTALL (1) HANDR
- INSTALL (6) PANEL
- INSTALL (12) RRHs
- REMOVE (6) COAX
- INSTALL (4) HYBRI
- RELOCATE 1900 RF

THESE PLANS HAVE BE
UNMANNED TELECOMMU
ACCORDANCE WITH THE
INCORPORATED THIS SC
FOR CONSTRUCTION UN
STABILITY ANALYSIS PR
STRUCTURAL ANALYSIS

ALL WORK SHALL
ACCORDANCE WI
CODES AS ADOP
NOTHING IN THES
NOT CONFORMING

1. 2015 INTER
2. TIA-222-G
3. NFPA 780 -
4. 2017 NATIO EDITION
5. ANY OTHER MOST RECE
6. LOCAL BUIL
7. CITY/COUNT

THESE OUTLINE SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT STANDARD CONSTRUCTION SPECIFICATIONS, INCLUDING
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–63–CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
5. GR–78–CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
3. GR–1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY –GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
4. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC") AND NFPA 101 (LIFE SAFETY CODE).
5. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
6. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
7. AMERICAN CONCRETE INSTITUTE (ACI)
8. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
9. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
10. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
11. PORTLAND CEMENT ASSOCIATION (PCA)
12. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
13. BRICK INDUSTRY ASSOCIATION (BIA)
14. AMERICAN WELDING SOCIETY (AWS)
15. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
16. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
17. DOOR AND HARDWARE INSTITUTE (DHI)
18. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
19. 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 FO
WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DI
PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SH
ATTENTION OF THE SPRINT CONSTRUCTION MANAGER PRIOR
WORK. NO COMPENSATION WILL BE AWARDED BASED ON C
KNOWLEDGE OR FIELD CONDITIONS.

1.7 POINT OF CONTACT: COMMUNICATION BETWEEN SPRINT AND
FLOW THROUGH THE SINGLE SPRINT CONSTRUCTION MANAGE
THE PROJECT FOR SPRINT.

1.8 ON–SITE SUPERVISION: THE CONTRACTOR SHALL SUPERVISE
AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, M
SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE C
CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDEN
ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMAN

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

A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS S
DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUC
DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMP
MARKUP SET SHALL BE DELIVERED TO THE COMPANY OI
REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S
PRODUCTION OF "AS–BUILT" DRAWINGS.

B. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODI
REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AN
SHALL BE INCLUDED AS PART OF THE WORK. CONTRAC
CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO
WORK.

C. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS
SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARA
ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS,
AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE R
A CLARIFICATION FROM THE SPRINT CONSTRUCTION MAN
PROCEEDING WITH THE WORK.

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

1.11 UTILITIES SERVICES: WHERE NECESSARY TO CUT EXISTING
CONDUITS, CABLES, ETC., OF UTILITY SERVICES, OR OF FIRE
COMMUNICATIONS SYSTEMS, THEY SHALL BE CUT AND CAPP
WHERE SHOWN. ALL SUCH ACTIONS SHALL BE COORDINATE
COMPANY INVOLVED:

1.12 PERMITS / FEES: WHEN REQUIRED THAT A PERMIT OR C
A PUBLIC UTILITY PROVIDER FOR NEW SERVICE TO THE CON
PAYMENT OF SUCH FEE SHALL BE THE RESPONSIBILITY OF

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

1.14 METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION: C
PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLA
MOPS.

NOTE: IN SHORT–FORM SPECIFICATIONS ON THE DRAWINGS
APPLICABLE MOPS INCLUDING EN–2012–001, EN–2013–00

1.15 USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHA
ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEI
IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES A
POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILI
FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PRO
AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTH
CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVI
THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LES
UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT
THE CONTRACT DOCUMENTS.

3.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCES
AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRE
ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

3.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR
HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE
THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENG
CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL CO
A WORK AREA FOR COMPANY'S TEST AGENCY.

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

CONTINUE FROM SP-1

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 FORWARD NOTIFICATION).
6. POWER INSTALL DATE (POPULATE FIELD IN SMS AND NOTIFICATION).
7. TELCO READY DATE (POPULATE FIELD IN SMS AND/ NOTIFICATION).
8. PPC (OR SHELTER) INSTALL DATE (POPULATE FIELD NOTIFICATION).
9. TOWER CONSTRUCTION START DATE (POPULATE FIELD FORWARD NOTIFICATION).
10. TOWER CONSTRUCTION COMPLETE DATE (POPULATE FORWARD NOTIFICATION).
11. BTS AND RADIO EQUIPMENT DELIVERED AT SITE DATE SMS AND/OR FORWARD NOTIFICATION).
12. NETWORK OPERATIONS HANDOFF CHECKLIST (HOC W FORM IN SMS)
13. CIVIL CONSTRUCTION COMPLETE DATE (POPULATE FIE FORWARD NOTIFICATION).
14. SITE CONSTRUCTION PROGRESS PHOTOS UNLOADED

SECTION 01 400 - SUBMITTALS & TESTS

PART 1 - GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SE SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELES AND MADE A PART OF THESE SPECIFICATIONS HEREWITH

1.3 SUBMITTALS:

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

B. SUBMIT THE FOLLOWING TO COMPANY REPRESENTATIVE

1. CONCRETE MIX-DESIGNS FOR TOWER FOUNDATIONS 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 DRAWINGS.
5. CHEMICAL GROUNDING DESIGN

D. ALTERNATES: AT THE COMPANY'S REQUEST, ANY ALTERN OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRIN MANAGER FOR APPROVAL PRIOR TO BEING SHIPPED TO AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHAL OF COST REDUCTION PROPOSED FOR USE OF ALTERNAT

1.4 TESTS AND INSPECTIONS:

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CO INSPECTIONS AND PROJECT DOCUMENTATION.

B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BU FOLLOWING:

1. COAX SWEEPS AND FIBER TESTS PER CURRENT VER TS-0200 ANTENNA LINE ACCEPTANCE STANDARDS.
2. AGL, AZIMUTH AND DOWNTILT USING ELECTRONIC CO MADE-FOR-THE-PURPOSE ANTENNA ALIGNMENT TOO
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPEC A RESULT OF TESTING.

C. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES, BUT FOLLOWING:

1. AZIMUTH, DOWNTILT, AGL - UPLOAD REPORT FROM TO SITERRA TASK 465. INSTALLED AZIMUTH, DOWN CONFORM TO THE RF DATA SHEETS. SWEEP AND
2. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP SERIALIZED EQUIPMENT
3. ALL AVAILABLE JURISDICTIONAL INFORMATION
4. PDF SCAN OF REDLINES PRODUCED IN FIELD

CONTINUE FROM SP-2

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

C. 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.

D. 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 01 400 - SUBMITTALS & TESTS

PART 1 - GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SE SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELES 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 REP STATUS. THIS STATUS REPORT FORMAT WILL BE PROVIDE SPRINT. THE REPORT WILL CONTAIN SITE ID NUMBER, TI SITE, INCLUDING THE BASELINE DATE, ESTIMATED COMPL COMPLETION DATE.

B. REPORT INFORMATION WILL BE TRANSMITTED TO SPRINT REQUIRED. THIS INFORMATION WILL PROVIDE A BASIS FO AND PAYMENT.

3.2 PROJECT CONFERENCE CALLS:

A. SPRINT MAY HOLD WEEKLY PROJECT CONFERENCE CALL REQUIRED TO COMMUNICATE SITE STATUS, MILESTONE C MILESTONE PROJECTIONS, AND ANSWER ANY OTHER SITE NECESSARY.

3.3 PROJECT TRACKING IN SMS:

A. CONTRACTOR SHALL PROVIDE SCHEDULE UPDATES AND SYSTEM ON A WEEKLY BASIS.

3.4 ADDITIONAL REPORTING:

A. ADDITIONAL OR ALTERNATE REPORTING REQUIREMENTS M REPORT AS DETERMINED TO BE REASONABLY NECESSAR

3.5 PROJECT PHOTOGRAPHS:

A. FILE DIGITAL PHOTOGRAPHS OF COMPLETED SITE IN JPE PHOTO LIBRARY FOR THE RESPECTIVE SITE. PHOTOGRAP LABELED WITH SITE NUMBER, NAME AND DESCRIPTION, A MINIMUM THE FOLLOWING AS APPLICABLE:

1. 1SHELTER AND TOWER OVERVIEW.

2. TOWER FOUNDATION(S) - FORMS AND STEEL BEFOR ON GUYED TOWERS).

3. TOWER FOUNDATION(S) POUR WITH VIBRATOR IN US GUYED TOWERS).

4. TOWER STEEL AS BEING INSTALLED INTO HOLE (SH 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 IM

9. SHELTER FOUNDATION--FORMS AND STEEL BEFORE

10. SHELTER FOUNDATION POUR WITH VIBRATOR IN USE

11. COAX CABLE ENTRY INTO SHELTER.

12. PLATFORM MECHANICAL CONNECTIONS TO TOWER/MO

13. ROOFTOP PRE AND POST CONSTRUCTION PHOTOS T AND INTERIOR CEILING.

14. PHOTOS OF TOWER TOP COAX LINE COLOR CODING GROUND LEVEL.

15. PHOTOS OF ALL APPROPRIATE COMPANY OR REGUL

16. PHOTOS OF EQUIPMENT BOLT DOWN INSIDE SHELTE

17. POWER AND TELCO ENTRANCE TO COMPANY ENCLOS TELCO SUPPLY LOCATIONS INCLUDING METER/DISCO

18. ELECTRICAL TRENCH(S) WITH ELECTRICAL / CONDUI

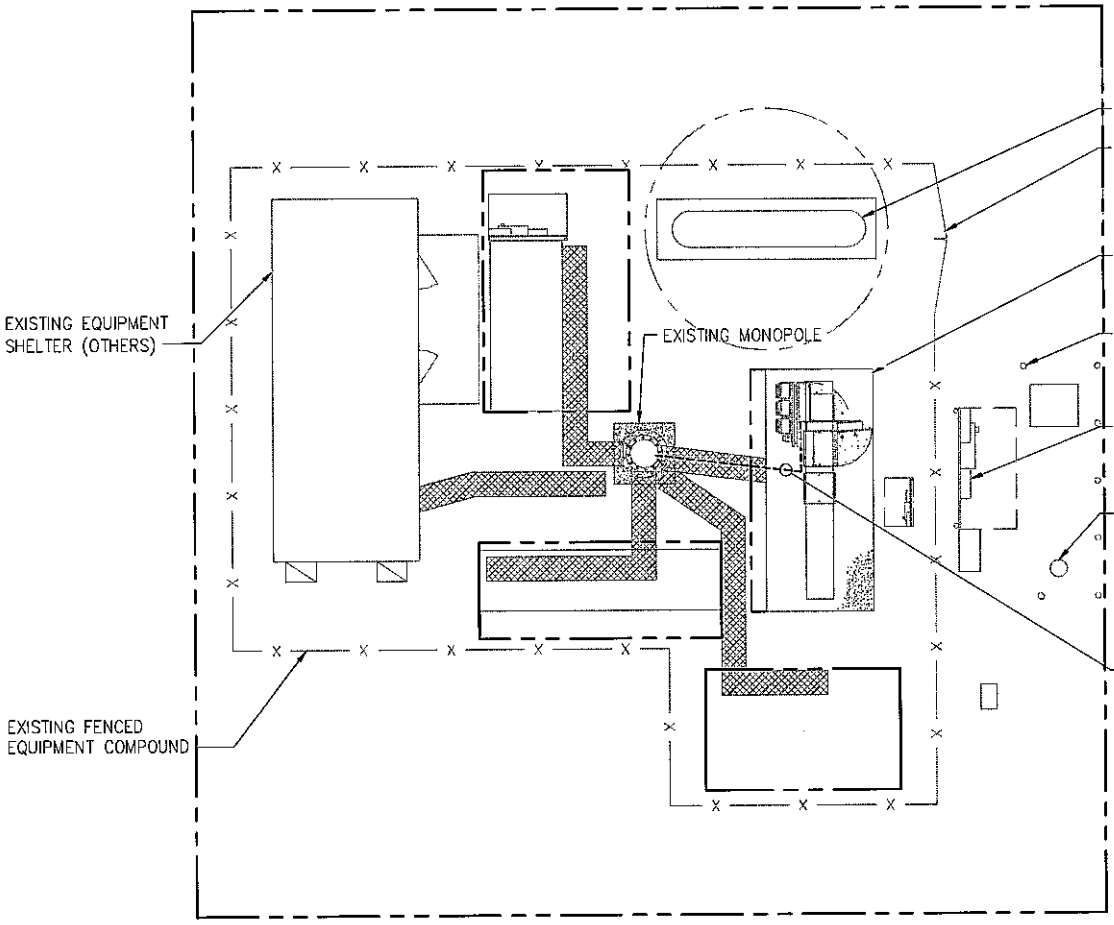
19. ELECTRICAL TRENCH(S) WITH FOIL-BACKED TAPE BE

20. TELCO TRENCH WITH TELEPHONE / CONDUIT BEFOR

21. TELCO TRENCH WITH FOIL-BACKED TAPE BEFORE F

22. SHELTER GROUND-RING TRENCH WITH GROUND-WIR ALL CAD WELDS AND BEND RADII).

23. TOWER GROUND-RING TRENCH WITH GROUND-WIRE ALL CAD WELDS AND BEND RADII).



N

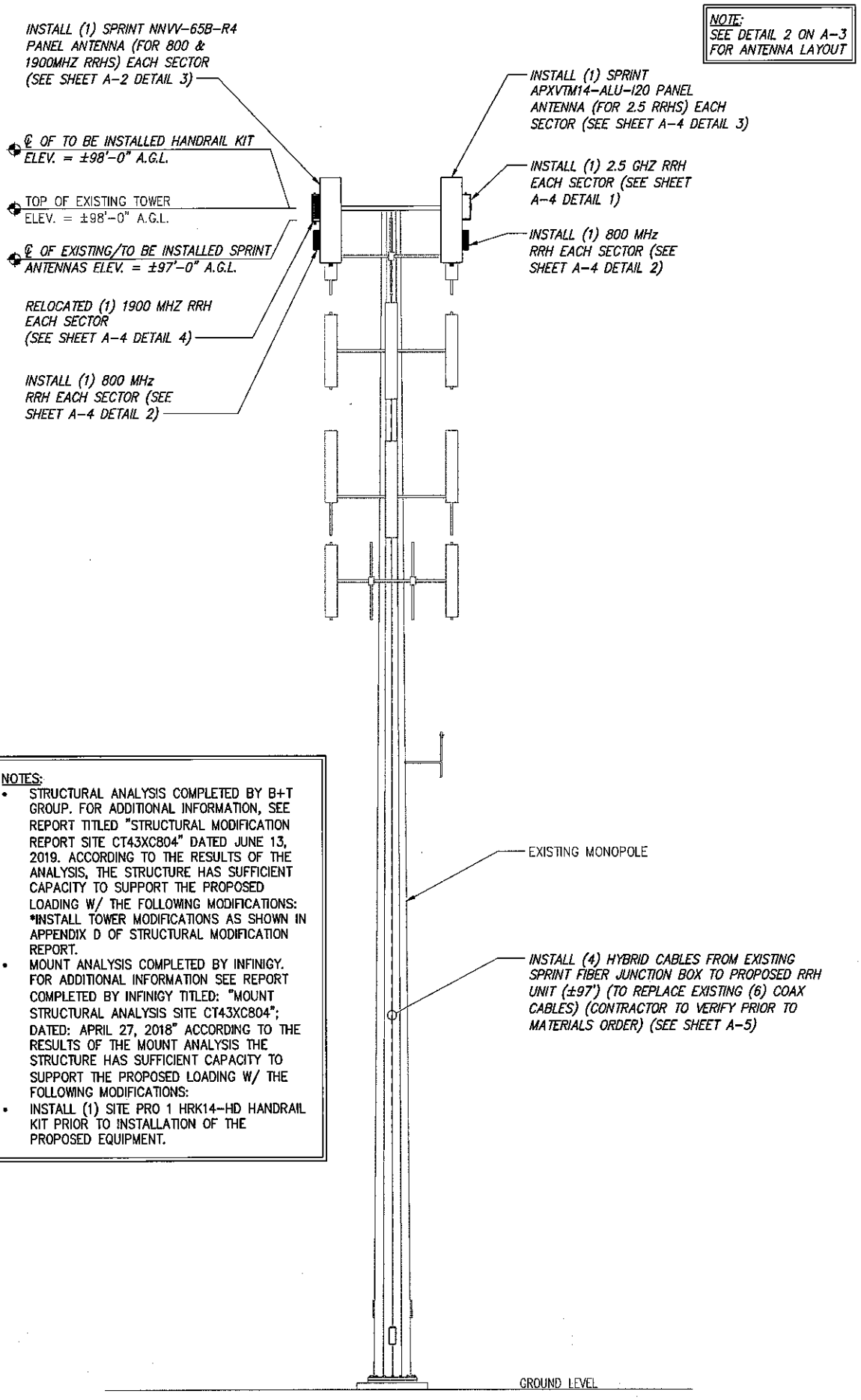
4' 0 4' 8' 16'

(IN FEET)

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

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

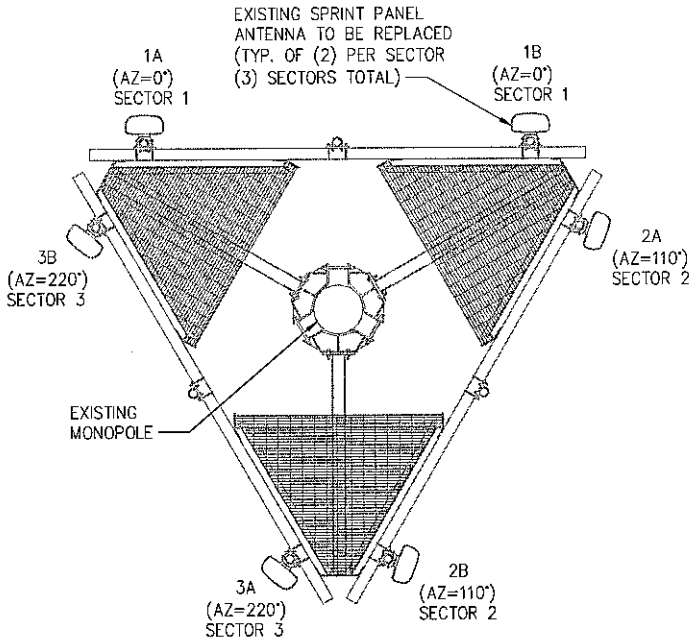
OVERALL SITE PLAN	SCALE: AS NOTED	1



NOTES:

- STRUCTURAL ANALYSIS COMPLETED BY B+T GROUP. FOR ADDITIONAL INFORMATION, SEE REPORT TITLED "STRUCTURAL MODIFICATION REPORT SITE CT43XC804" DATED JUNE 13, 2019. ACCORDING TO THE RESULTS OF THE ANALYSIS, THE STRUCTURE HAS SUFFICIENT CAPACITY TO SUPPORT THE PROPOSED LOADING W/ THE FOLLOWING MODIFICATIONS: *INSTALL TOWER MODIFICATIONS AS SHOWN IN APPENDIX D OF STRUCTURAL MODIFICATION REPORT.
- MOUNT ANALYSIS COMPLETED BY INFINIGY. FOR ADDITIONAL INFORMATION SEE REPORT COMPLETED BY INFINIGY TITLED: "MOUNT STRUCTURAL ANALYSIS SITE CT43XC804"; DATED: APRIL 27, 2018" ACCORDING TO THE RESULTS OF THE MOUNT ANALYSIS THE STRUCTURE HAS SUFFICIENT CAPACITY TO SUPPORT THE PROPOSED LOADING W/ THE FOLLOWING MODIFICATIONS:
- INSTALL (1) SITE PRO 1 HRK14-HD HANDRAIL KIT PRIOR TO INSTALLATION OF THE PROPOSED EQUIPMENT.

TOWER ELEVATION	NO SCALE	1



INSTALL (1) SPRINT APX
PANEL ANTENNA (FOR 2
SECTOR (SEE SHEET A-

INSTALL (1) 2.5 GHZ RR
SECTOR (SEE SHEET A-

MOUNT MOD NO
INSTALL (1) SI
HANDRAIL KIT
PLATFORM AT
HANDRAIL KIT
VIEW FOR CLAR

THE CONFIGURATION PLANS ARE BA
PROVIDED INFORMATION AND ARE F
PURPOSES ONLY. CONTRACTOR TO
CONDITIONS PRIOR TO CONSTRUCTI

EXISTING ANTENNA LAYOUT	NO SCALE	1

NOTES:

1. ALL ANTENNA HEIGHTS ARE TO CENTER OF HORIZONTAL ANTENNA.

2. VERIFY AZIMUTH AND CL HEIGHT WITH AS-BUILT DRAWINGS IF AVAILABLE.

3. NO OBJECT IS TO BE WITHIN 45 DEGREES OF BORE-SIGHT OF 2.5G OR ANY OTHER TOWER ANTENNA. IF NECESSARY, 2.5G ANTENNA CAN BE PLACED AT FAR EDGE OF HORIZONTAL ANTENNA MOUNT MEMBER FOR CLEAR LINE OF SITE OR EVEN ON ANOTHER SECTOR FOR CLEAR LINE OF SITE.

4. 2.5G ANTENNA MUST BE AT LEAST 6" FROM 1900MHZ ANTENNA, 30" FROM 800MHZ ANTENNA AND 30MHZ FROM DUAL BAND 1900MHZ AND 800MHZ ANTENNA.

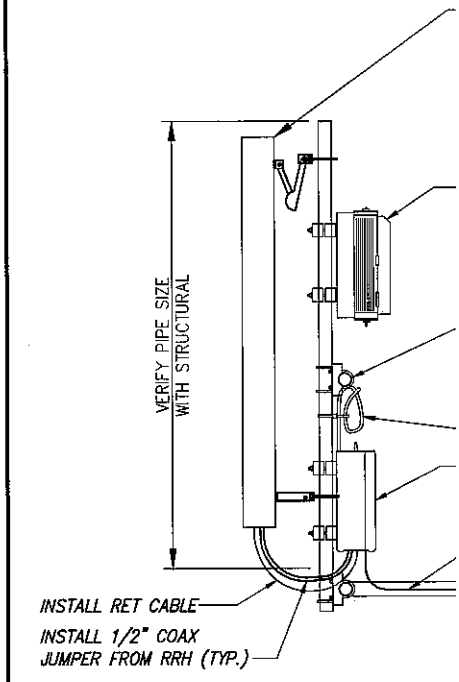
5. IF ANTENNAS ARE MOUNTED ON A FACE SURFACE SUCH AS A BUILDING WALL, PARAPET WALL, OR WATER TOWER WALL, THIS RFDS MUST BE ACCOMPANIED BY A SKETCH PROVIDED BY ITS ORIGINATING RF ENGINEER CALLING OUT THE EXACT LOCATION OF WHERE ANTENNA IS TO BE LOCATED. CONTACT SPRINT RF ENGINEER IF THE SKETCH IS MISSING.

6. GENERAL CONTRACTOR TO FIELD VERIFY AZIMUTH AND CL HEIGHT AND MECHANICAL DOWNTILT. IF DIFFERENT THAN CALLED OUT BELOW, 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 CONTACT INFORMATION ABOVE FOR FURTHER INSTRUCTIONS. IF SPRINT DOES NOT RESPOND WITHIN ONE HOUR, PLACE 2.5G ANTENNA AT SAME CL HEIGHT AS 1.9G ANTENNA AND EMAIL CORRECT CL HEIGHT AND AZIMUTH TO SPRINT RF ENGINEER. UPDATE AS-BUILD DRAWING WITH CORRECT CL HEIGHT. ALSO EMAIL CORRECT 1900 MHZ AND 800 MHZ ANTENNA CL HEIGHT, AZIMUTH AND MECHANICAL DOWNTILT TO RF ENGINEER.

7. 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.

8. 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. IN ADDITION, 2.5G ANTENNA IS NOT TO BE PLACED IN FRONT OF ANY OTHER ANTENNA USING THE SAME 45 DEGREE RULE. THIS INCLUDES SPRINT AND NON-SPRINT ANTENNAS.

9. 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/



NOTES:

1. CUT DC CONDUCTORS TO LENGTH.

2. COIL FIBER CABLE AND SECURE AT SIDE OF RRH.

3. DO NO EXCEED BEND RADIUS.

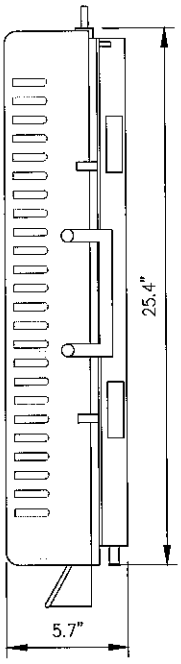
NOTE:
CONTRACTOR
BEHIND ANTE
DOES NOT IN
PLATFORM/T-

NOTES	NO SCALE	3

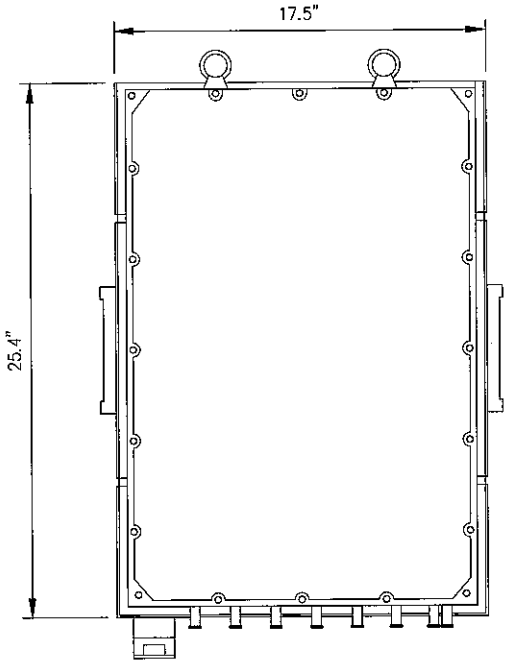
RRH: ALCATEL LUCENT TD-RRH8X20

COLOR: LIGHT GREY

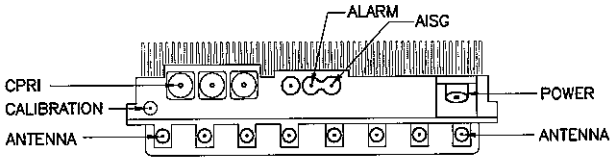
WEIGHT: 70 LBS.



SIDE VIEW



FRONT VIEW



PLAN VIEW

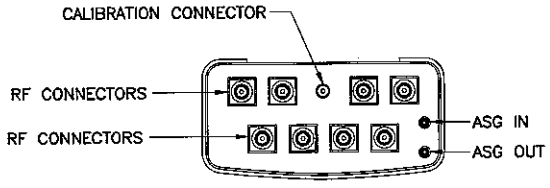
NOTES

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

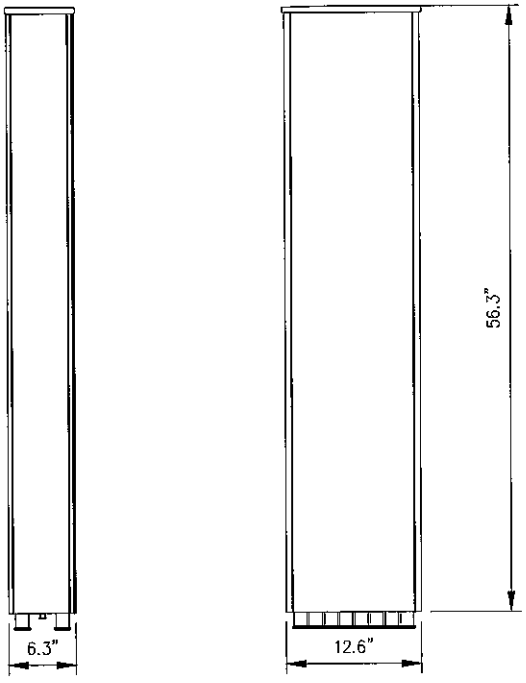
2.5 RRH'S	NO SCALE	1

ANTENNA RFS APXVTM14-ALU-I20

RADOME MATERIAL:	ASA
RADOME COLOR:	LIGHT GREY
DIMENSIONS, HxWxD.in(mim):	56.3"x12.6"x6.3" (1430x320x160mm)
WEIGHT:	56.2 lbs
CONNECTORS:	(8) 4.1/9.5 DIN FEMALE (1) NF - CALIBRATION CONNECTOR



PLAN VIEW

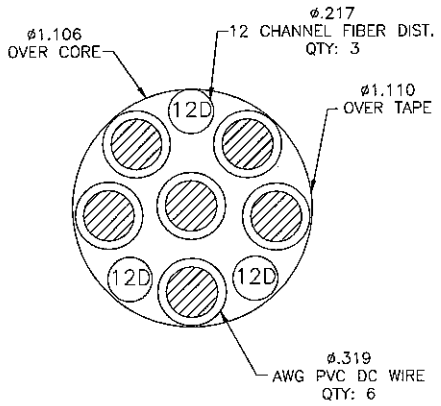


SIDE VIEW FRONT VIEW

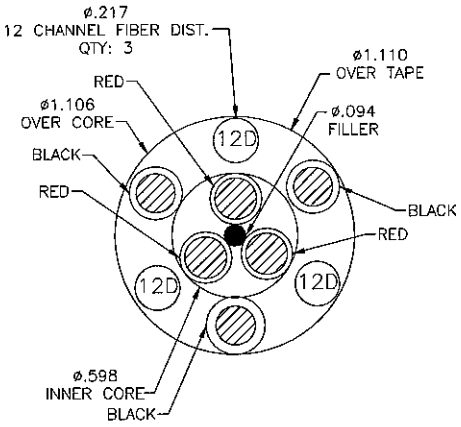
2.5 ANTENNA	NO SCALE	3

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



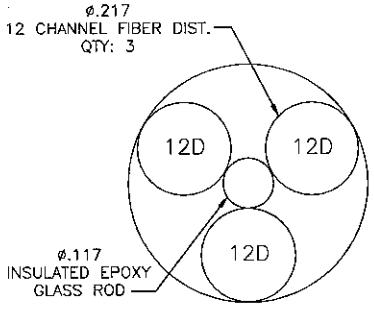
4 AWG



8 & 6 AWG

RFS HYBRIFLEX JUMPER CABLE SCHEDULE

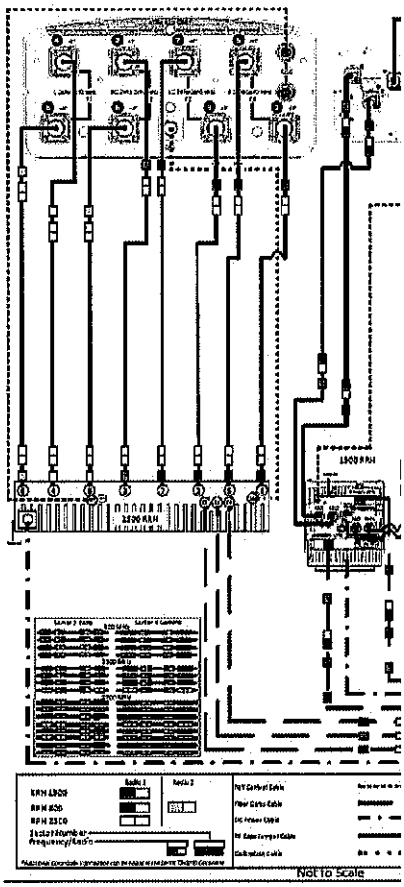
Fiber Only	**Hybrid Jumper cable** MN: HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	MN: HBF012-M3-10F1	10 ft
	MN: HBF012-M3-15F1	15 ft
	MN: HBF012-M3-20F1	20 ft
	MN: HBF012-M3-25F1	25 ft
	MN: HBF012-M3-30F1	30 ft
8 AWG Power	**Hybrid Jumper cable** MN: HBF058-08U1M3-5F1 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
	MN: HBF058-08U1M3-20F1	20 ft
	MN: HBF058-08U1M3-25F1	25 ft
	MN: HBF058-08U1M3-30F1	30 ft
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
	MN: HBF058-13U1M3-20F1	20 ft
	MN: HBF058-13U1M3-25F1	25 ft
	MN: HBF058-13U1M3-30F1	30 ft
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
	MN: HBF078-21U1M3-20F1	20 ft
	MN: HBF078-21U1M3-25F1	25 ft
	MN: HBF078-21U1M3-30F1	30 ft



FIBER ONLY

NOTE:
SPRINT CM TO CONFIRM HYBRID OR FIBER RISER CABLE AND HYBRID OR FIBER JUMPER CABLE MODEL NUMBERS IF HYBRID CABLES ARE REQUIRED BEFORE PREPARING BOM.

ALU 211 APXVTM14-ALU-I20 & NNVV



Prepared by	Creation Date	Revision Number	
Mark Elliott	February 13, 2016	R-1	Nokia-A Tri-Band Fiber Conne
Approved by	Approval Date		(Nokia-A Two-800, One-1900, & One-25
RAN Hardware & Antenna Teams	February 23, 2017		

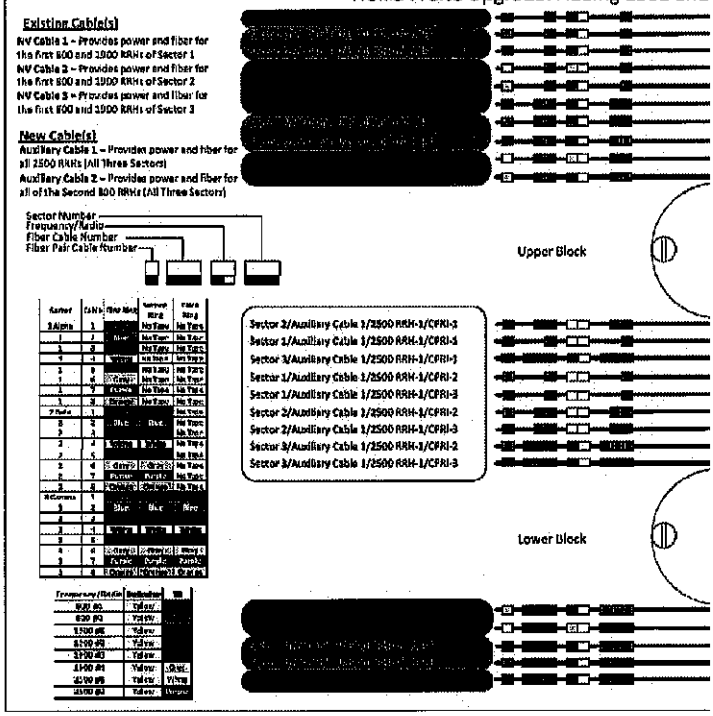
Nokia-A Site Upgrade: Adding 2500 and

Existing Cable(s)

NV Cable 1 – Provides power and fiber for the first 800 and 1900 RRHs of Sector 1
NV Cable 2 – Provides power and fiber for the first 800 and 1900 RRHs of Sector 2
NV Cable 3 – Provides power and fiber for the first 800 and 1900 RRHs of Sector 3

New Cable(s)

Auxiliary Cable 1 – Provides power and fiber for all 2500 RRHs (All Three Sectors)
Auxiliary Cable 2 – Provides power and fiber for all of the Second 800 RRHs (All Three Sectors)



PLUMBING DIAGRAM

FINAL EQUIPMENT CONFI

SECTOR	ANTENNA MANUFACTURER	ANTENNA MODEL	RAD CENTER
1	RFS	APXVTM14-ALU-I20	97'
	COMMSCOPE	NNVV-65B-R4	97'
2	RFS	APXVTM14-ALU-I20	97'
	COMMSCOPE	NNVV-65B-R4	97'
3	RFS	APXVTM14-ALU-I20	97'
	COMMSCOPE	NNVV-65B-R4	97'

FEEDER CABLES

MANUFACTURER	MODEL
RFS/CELWAVE	HB114-1-08U4-M5F
RFS/CELWAVE	HB114-1-08U3M12-XXXF

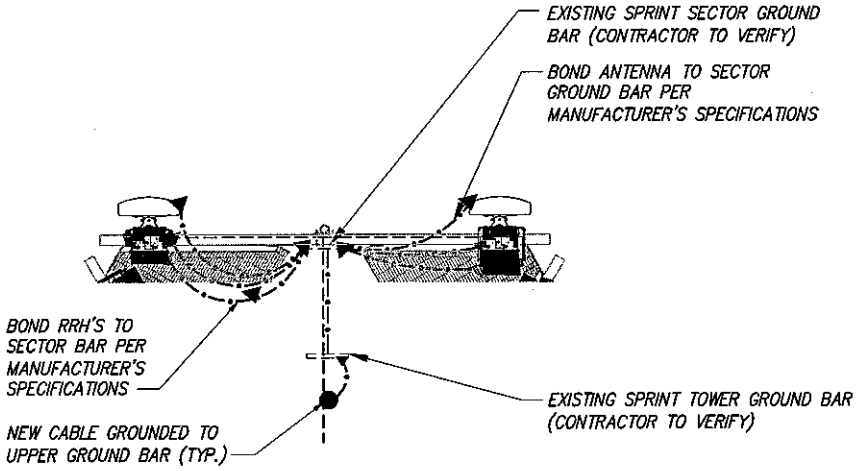
LEGEND
EXISTING
PROPOSED

NOTES:
1. CONTRACTOR TO VERIFY PROPOSED ANTENNA INFORMATION IS THE MOST C
2. CONTRACTOR TO CONFIRM CABLE LENGTHS PRIOR TO CONSTRUCTION.

ANTENNA/CABLE SCHEDUL

LEGEND:

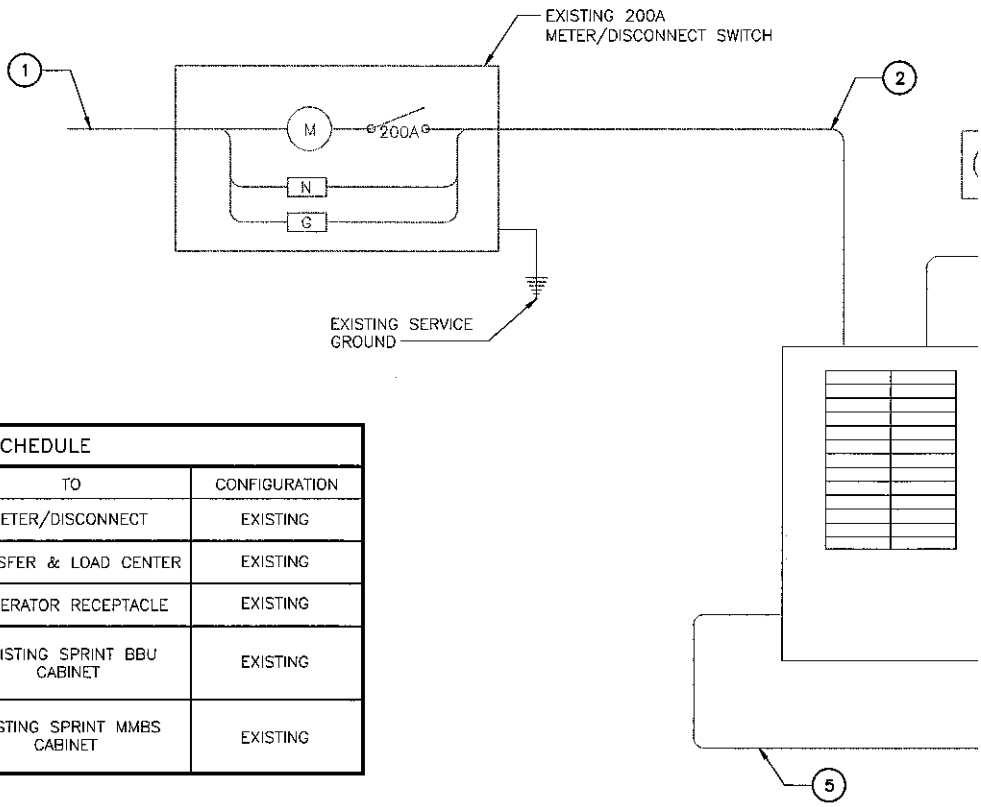
- G — EXISTING GROUND RING
- ■ CADWELD CONNECTION (EXOTHERMIC WELD)
- ▲ MECHANICAL CONNECTION
- ⊗ GROUND ROD
- ● CABLE GROUND KIT



TYPICAL ANTENNA GROUNDING PLAN | NO SCALE | 2

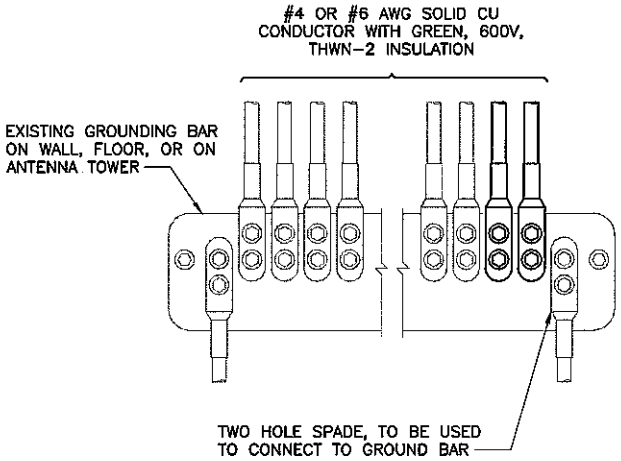
NOTES

CG SHALL REFERENCE ALL SPECS FOR "CONNECTING THE POWER SUPPLY" OF THE NEW INSTALLATION DOCUMENTS, FOR ALL CONNECTION SPECIFICATIONS.



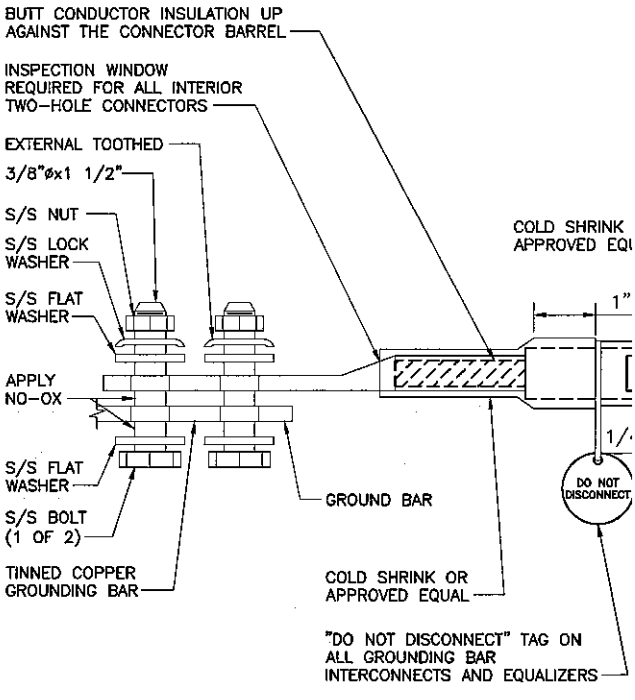
CIRCUIT SCHEDULE			
NO	FROM	TO	CONFIGURATION
1	UTILITY SOURCE	METER/DISCONNECT	EXISTING
2	METER/DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	TRANSFER & LOAD CENTER	EXISTING SPRINT BBU CABINET	EXISTING
5	TRANSFER & LOAD CENTER	EXISTING SPRINT MMBS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

ELECTRICAL ONE-LINE DIAGR



NOTES

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	NO SCALE	2	TWO HOLE LUG	NO SC

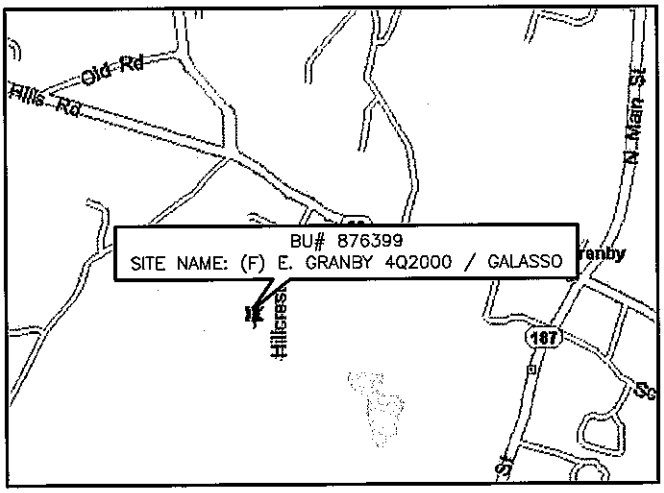
TOWER MODIFICATION DRAWINGS PREPARED FOR: CROWN CASTLE

SAFETY CLIMB: 'LOOK UP'
THE INTEGRITY OF THE WIRE ROPE SAFETY CLIMB SYSTEM SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION AND INSPECTION. TOWER REINFORCEMENTS AND EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF ANY WIRE ROPE SAFETY CLIMB ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, OR IMPACT TO THE ANCHORAGE POINTS IN ANY WAY. ANY COMPROMISED SAFETY CLIMB MUST BE REPORTED TO YOUR CROWN POC FOR RESOLUTION, INCLUDING EXISTING CONDITIONS.

SITE NAME:
(F) E. GRANBY 4Q2000 / GALASSO

BU NUMBER:
876399

SITE ADDRESS:
60 SOUTH MAIN ST.
EAST GRANBY, CT 06026
HARTFORD COUNTY, USA



MAP

DIRECTIONS

91 NORTH TO EXIT 40 (20 WEST). FOLLOW 20 WEST TO HILLCREST STREET ON LEFT, FOLLOW HILLCREST TO THE GATE. THE ADDRESS FOR THIS SITE WILL TAKE YOU TO THE MAIN ENTRANCE FOR TILCON ON SOUTH MAIN STREET. USE THE HILLCREST GATE TO ACCESS THE SITE.

PROJECT CONTACTS:

1. CROWN PROJECT MANAGE
   DAN VADNEY
   (518) 373-3510
   DAN.VADNEY@CROWNCASTLE

2. CROWN CONSTRUCTION M
   JASON D'AMICO
   (860) 209-0104
   JASON.DAMICO@CROWNCAST

3. ENGINEERING RFI CONTAC
   KISHORE MACHANI
   (918) 587-4630
   KMACHANI@BTGRP.COM
   MODDWGS@BTGRP.COM
   1717 S BOULDER AVENUE, SUI
   TULSA, OK 74119

QUALIFIED ENGINEERING SERVICES ARE AV
FROM B+T GROUP TO ASSIST CONTRACTO
CLASS IV RIGGING PLAN REVIEWS. FOR REQ
QUALIFIED ENGINEERING SERVICES, PLEASE C
B+T GROUP AT MODDWGS@BTGRP.COM.

ATTENTION ALL CONTRACTORS, ANYTIME YO
ACCESS A CROWN SITE FOR ANY REASON
ARE TO CALL THE CROWN NOC UPON AR
AND DEPARTURE, DAILY AT 800-788-701

HOT WORK INCLUDED	
N/A	BASE GRINDING ONLY
X	BASE WELDING (AND GRINDING)
N/A	AERIAL GRINDING ONLY
X	AERIAL WELDING (AND GRINDING)

MI CHECKLIST

REQUIRED	REPORT ITEM	APPLICABLE CROWN DOC #	BRIEF DESCRIPTION
PRE-CONSTRUCTION			
X	MI CHECKLIST DRAWING	CED-SOW-10007	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT.
X	EOR APPROVED SHOP DRAWINGS	CED-SOW-10007	ONCE THE PRE-MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRA DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS. THESE ARE TO INCLUDE, BUT ARE NO OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLES, MOUNTS, STEP ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICAT DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. APPROVED ASSEMBLY/SHOP DRA THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATION INSPECTION	CED-SOW-10007	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE THE CONTRACT DOCUMENTS, SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THI
X	FABRICATOR CERTIFIED WELD INSPECTION	CED-SOW-10007 CED-STD-10069	A CWI SHALL INSPECT ALL WELDING PERFORMED ON STRUCTURAL MEMBERS DURING FABRICATIO BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORTS (MTR)	CED-SOW-10007	MATERIAL TEST REPORTS SHALL BE PROVIDED FOR MATERIAL USED AS REQUIRED PER SECTION MTRS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR NDE INSPECTION REPORT	CED-SOW-10066 CED-STD-10069	CRITICAL SHOP WELDS THAT REQUIRE TESTING ARE NOTED ON THESE CONTRACT DRAWINGS. A C PERFORM NON-DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSP REPORT.
N/A	NDE OF MONOPOLE BASE PLATE	ENG-SOW-10033	A NDE OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	CED-SOW-10007	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN TH
ADDITIONAL TESTING AND INSPECTIONS:			
N/A			
CONSTRUCTION			
X	FOUNDATION INSPECTIONS	CED-SOW-10144	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACIN OBSERVATION OF THE REBAR SHALL BE PERFORMED BEFORE PLACING THE EPOXY. A SEALED W PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	CONCRETE COMP. STRENGTH AND SLUMP TEST	CED-SOW-10144	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROV FOUNDATION REPORT.
X	EARTHWORK	CED-SOW-10144	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER PART OF THE FOUNDATION REPORT.
X	MICROPILE/ROCK ANCHOR	CED-SOW-10144	MICROPILES/ROCK ANCHORS SHALL BE INSPECTED BY THE FOUNDATION INSPECTION VENDOR AN OF THE FOUNDATION INSPECTION REPORT, ADDITIONAL TESTING AND/OR INSPECTION REQUIREME CONTRACT DOCUMENTS.
X	POST-INSTALLED ANCHOR ROD VERIFICATION	CED-SOW-10007	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROW SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	BASE PLATE GROUT VERIFICATION	ENG-STD-10323	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTI REMOVED AND/OR INSTALLED IN ACCORDANCE WITH CROWN REQUIREMENTS FOR INCLUSION IN
X	FIELD CERTIFIED WELD INSPECTION	CED-SOW-10066 CED-STD-10069	A CROWN APPROVED CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST FIELD WELDS, FOLL IN CROWN STANDARD DOCUMENTS APPLICABLE TO WELD INSPECTIONS. A REPORT SHALL BE PR SHALL BE PERFORMED AS REQUIRED BY CROWN STANDARDS AND CONTRACT DOCUMENTS. THE IN THE CWI REPORT.
X	ON-SITE COLD GALVANIZING VERIFICATION	ENG-STD-10149 ENG-BUL-10149	THE GENERAL CONTRACTOR SHALL PROVIDE WRITTEN AND PHOTOGRAPHIC DOCUMENTATION TO T ANY ON-SITE COLD GALVANIZING WAS APPLIED PER MANUFACTURER SPECIFICATIONS AND APPLI
N/A	TENSION TWIST AND PLUMB	CED-PRC-10182 CED-STD-10261	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT IN ACCORDANCE WITH APPLICABLE STAND AND PLUMB.
X	GC AS-BUILT DRAWINGS	CED-SOW-10007	THE GENERAL CONTRACTOR SHALL SUBMIT A LEGIBLE COPY OF THE ORIGINAL DESIGN DRAWINGS AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINE FORMS APPROVING ALL CHANGES SHALL BE SUBMITTED WHEN THE EOR IS SPECIFYING ADDITION APPLICABLE STANDARDS SHALL BE APPLIED.
ADDITIONAL TESTING AND INSPECTIONS:			
N/A			
POST-CONSTRUCTION			
X	CONSTRUCTION COMPLIANCE LETTER	CED-SOW-10007	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED STANDARDS AND THESE CONTRACT DRAWINGS, INCLUDING LISTING ADDITIONAL PARTIES TO THE M
X	POST-INSTALLED ANCHOR ROD PULL TESTS	CED-PRC-10119	POST-INSTALLED ANCHOR RODS SHALL BE TESTED BY A CROWN APPROVED PULL TEST INSPECT PROVIDED INDICATING TESTING RESULTS.
X	PHOTOGRAPHS	CED-SOW-10007	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI. PHOTOS SHALL DOCUMENT ALL PHASES OF TH BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
N/A	BOLT INSTALLATION VERIFICATION REPORT	CED-SOW-10007	THE MI INSPECTOR SHALL VERIFY THE INSTALLATION AND TIGHTNESS 10% OF ALL NON PRE-TE OF THE MODIFICATION. THE MI INSPECTOR SHALL LOOSEN THE NUT AND VERIFY THE BOLT HOL REPORT SHALL CONTAIN THE COMPLETED BOLT INSTALLATION VERIFICATION REPORT, INCLUDING
X	PUNCHLIST DEVELOPMENT AND CORRECTION DOCUMENTATION	CED-PRC-10283 CED-FRM-10285	FINAL PUNCHLIST INDICATING ALL NONCONFORMANCE(S) IDENTIFIED AND THE FINAL RESOLUTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	CED-SOW-10007	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACT ACTUAL COMPLETED INSTALLATION.
ADDITIONAL TESTING AND INSPECTIONS:			
X	MICROPILE		MICROPILE TESTING AND INSPECTION PER ASTM D3687-07

NOTE: "X" DENOTES A DOCUMENT NEEDED FOR THE MI REPORT AND "N/A" DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT.

GENERAL NO

1.1 ALL WORK SHALL COMPLY WITH THE TIA-222-H, ANSI/ASSE A10.48 AND ANSI/TIA-322 AS WELL AS ANY
1.2 FIELD WORK WILL BE DONE AROUND EXISTING COAXIAL CABLE AND EQUIPMENT. ALL WORK SHALL BE D STRUCTURE.
1.3 A MINIMUM OF TWO BRUSH COATS OF CROWN APPROVED ZINC RICH PAINT SHALL BE APPLIED TO ANY F PROTECTIVE COATINGS BULLETIN.
1.4 THE USE OF A GAS TORCH OR WELDER WILL NOT BE PERMITTED ON THE TOWER WITHOUT THE CONSENT
1.5 IN LIEU OF TEMPORARY BRACING CONTRACTOR MAY HAVE A STABILITY ANALYSIS PERFORMED BY AN ENGI WIND SPEED OF 45 mph (3-SEC) PER TIA-1019.
1.6 ALL CONSTRUCTION MEANS AND METHODS: INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING P CONTRACTOR FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RI STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER WITH THE ANSI/TIA-322 (LATEST EDITION).
1.7 ALL THE PARTS STARTING WITH "CCI-" DESIGNATION -- REFER TO "CROWN CASTLE APPROVED REINFORCE
1.8 BLIND BOLTS ARE TO BE 20MM DIAMETER WITH CORRESPONDING 29MM DIAMETER SLEEVE WITH SPECIFIED
1.9 ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION PER ASTM A153 / A153M OR A123, AS GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO BRUSH COATS OF CROWN APPROVED ZINC RICH PA BULLETIN.
1.10 ALL SHIMS SHALL BE ASTM A36.
1.11 HOLES FOR BOLTS AND SHEAR SLEEVES ARE 30MM, U.N.O.
1.12 SHOP WELDS ARE ASSUMED E80XX OR GREATER, PER STANDARD SPLICE DETAIL.
1.13 IF SCOPE OF MODIFICATION REQUIRES REMOVAL OF TOWER ID TAG, IT MUST BE REPLACED.
1.14 THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFI ALTERATIONS TO A SAFETY CLIMB'S ORIGINAL MANUFACTURER'S CONFIGURATION MUST BE DESIGNED FACILITIES ARE IMPEDED, EITHER DURING BIDDING, DURING PRE-FABRICATION MAPPING, OR WHILE ON-SI OF RESOLUTION.
1.15 WHERE POSSIBLE, CLIMBING HARDWARE SHOULD REMAIN IN-LINE ALONG THE POLE. IF AN OBSTRUCTION EACH CHANGE IN ALIGNMENT. IF NEW REINFORCEMENT REQUIRES STEP BOLT BRACKETS, INSTALL PRIOR T
1.16 ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GC AND/OR
1.17 IF, DURING THE COURSE OF A FOUNDATION MODIFICATION, THE GC ENCOUNTERS EXISTING CONDUIT LO THIS CONDUIT IS NOT IN A LOCATION THAT IS SPECIFIED WITHIN THESE DESIGN DRAWINGS, THE GC INSTALLATION OF THE PROPOSED FOUNDATION MODIFICATIONS. IF CONDUIT IS TO BE INSTALLED THROUG SPECIFIED WITHIN THESE DESIGN DRAWINGS THEN THE GC SHALL IMMEDIATELY CONTACT THE E.O.R. FO MODIFICATIONS.

FABRICATION

2.1 ALL WORK SHALL BE DONE IN ACCORDANCE WITH A.I.S.C. "SPECIFICATIONS FOR THE DESIGN, FABRICATIO
2.2 STRUCTURAL STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS:

	YIELD	ASTM SPECS
A. STEEL SHAPES AND PLATES, U.N.O.	65ksi	A572
B. STEEL PIPE (HSS TUBING)	50ksi	A500 GR. C
C. STEEL PIPE	50ksi	---

2.3 ALL NEW MATERIAL INCLUDING STRUCTURAL STEEL AND FASTENERS SHALL BE HOT DIPPED GALVANIZED A
2.4 WELDING SHALL MEET ANSI/AWS D1.1 STRUCTURAL WELDING CODE (LATEST REVISION). ELECTRODES SHAL
2.5 CONTRACTOR SHALL PROVIDE SHOP FABRICATION DRAWINGS TO B+T GROUP 5 DAYS PRIOR TO FABRICATI

FIELD NDE MINIMUM REQUIREMENTS

3.1 ALL NDE SHALL BE IN ACCORDANCE WITH AWS D1.1.
3.2 FOR NEW BASE STIFFENERS (INCLUSIVE OF TRANSITION STIFFENERS) AND ANCHOR ROD BRACKETS, CO PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT.
3.3 FOR NEW FLAT PLATE REINFORCEMENT AT THE BASE OF THE TOWER, COMPLETE JOINT PENETRATION WE SHALL BE 100% INSPECTED BY MT, BUT MAY BE LIMITED TO A HEIGHT OF 10'-0".
3.4 FOR NDE OF THE EXISTING BASE PLATE CIRCUMFERENTIAL WELD, GC SHALL REFERENCE THE MI CH ENG-BUL-10051: NDE REQUIREMENTS FOR MONOPOLE TO PREVENT CONNECTION FAILURE. NOTIFY TI BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING MODIFICATIONS THAT HAVE BEEN WELDED TO TH
3.5 ALL TESTING LIMITATIONS SHALL BE NOTED IN THE NDE REPORT.

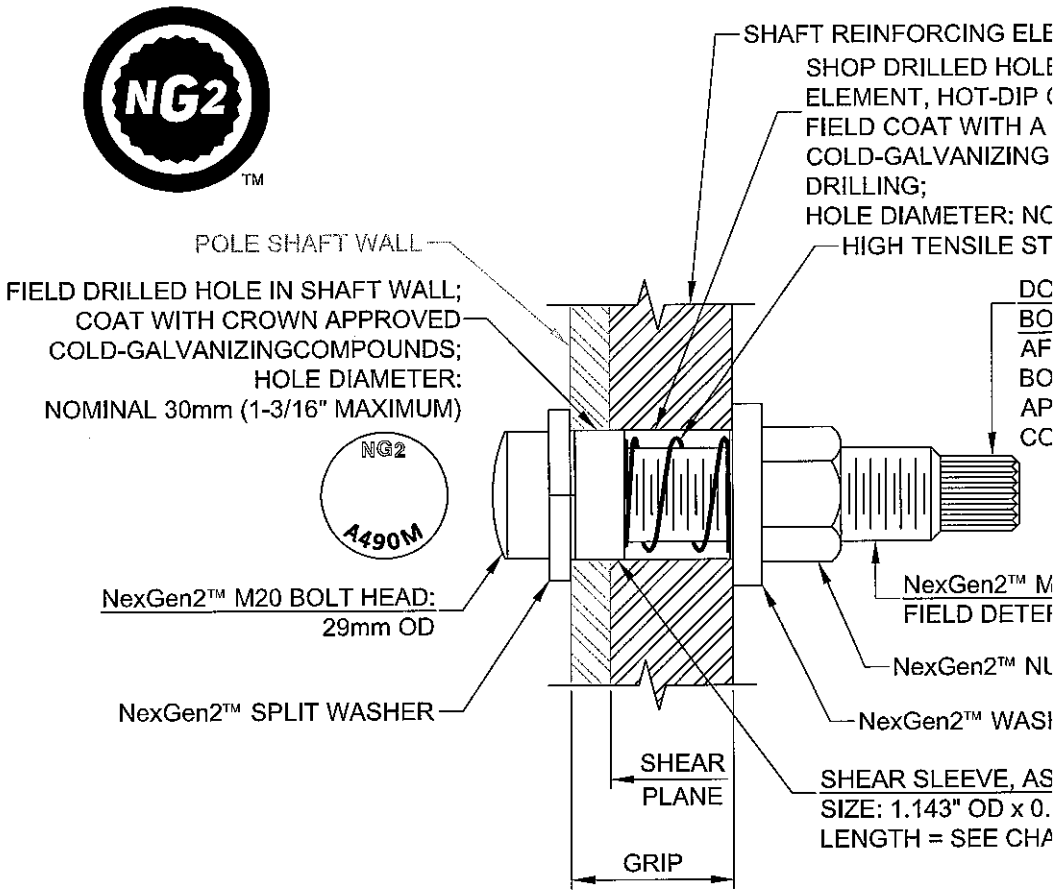
BASEPLATE GROUT REMOVAL

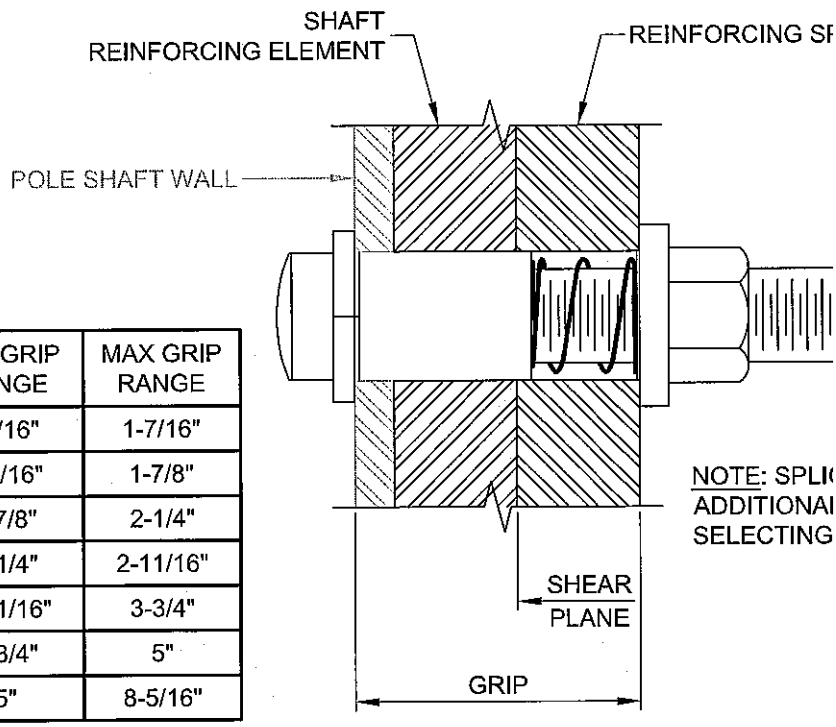
4.1 THE GC SHALL BEGIN THIS PROCEDURE AS EARLY AS POSSIBLE DURING THE MODIFICATION PROCESS TIMELINE.
4.2 IF ANY DETERIORATED GROUT EXISTS, BEGIN AT THIS LOCATION. REMOVE DETERIORATED GROUT AND THE NUT. IF THE GC DISCOVERS THAT A HALF NUT OR JAM NUT WAS USED AS A LEVELING NUT, OR IF NO MOD PM) FOR A RESOLUTION. DO NOT REMOVE ANY ADDITIONAL GROUT UNTIL DIRECTED TO BY CROWN.
4.3 OTHERWISE, CHECK THE LEVELING NUT FOR TIGHTNESS IN ACCORDANCE WITH SECTION 1.3.2.3 OF EI FOUND OR CORROSION EXISTS TO THE POINT WHERE THE LEVELING NUT IS UNABLE TO BE TIGHTENED REFERENCE ENG-BUL-10114 "RUST CLASSIFICATION" FOR EXAMPLES OF MATERIAL LOSS. DO NOT REMOV
4.4 IN THE EVENT THAT SEVERE CORROSION IS NOT ENCOUNTERED, AND BEING SURE TO CHECK EACH EXISTING BASEPLATE GROUT WHILE CHECKING EACH LEVELING NUT FOR TIGHTNESS IN ACCORDANCE WITH
4.5 CONSISTENT WITH SECTION 1.3.2.4 OF ENG-PRC-10012 "BASE PLATE GROUT REPAIR", HAND TOOL C ELEMENTS, INCLUDING ANCHOR RODS, LEVELING NUTS AND UNDERSIDE OF BASE PLATE TO THE G GALVANIZING TO ADHERE TO THE STEEL.
4.6 APPLY BY BRUSH TWO COATS OF A CROWN-APPROVED COLD-GALVANIZING COMPOUND TO ALL EX ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION. A LIST OF CROWN-APPROVED DIRECT PROTECTIVE COATINGS GUIDELINES" SECTION 2.1.1.
4.7 THE GC SHALL PROVIDE PHOTOS OF EACH ANCHOR ROD WITH LEVELING NUT AFTER CLEANING BUT BE THE MI REPORT.

KEY NOTE

(#) TOWER MODIFICATION I.D.

INTERIOR OF POLE SHAFT	EXTERIOR OF POLE SHAFT



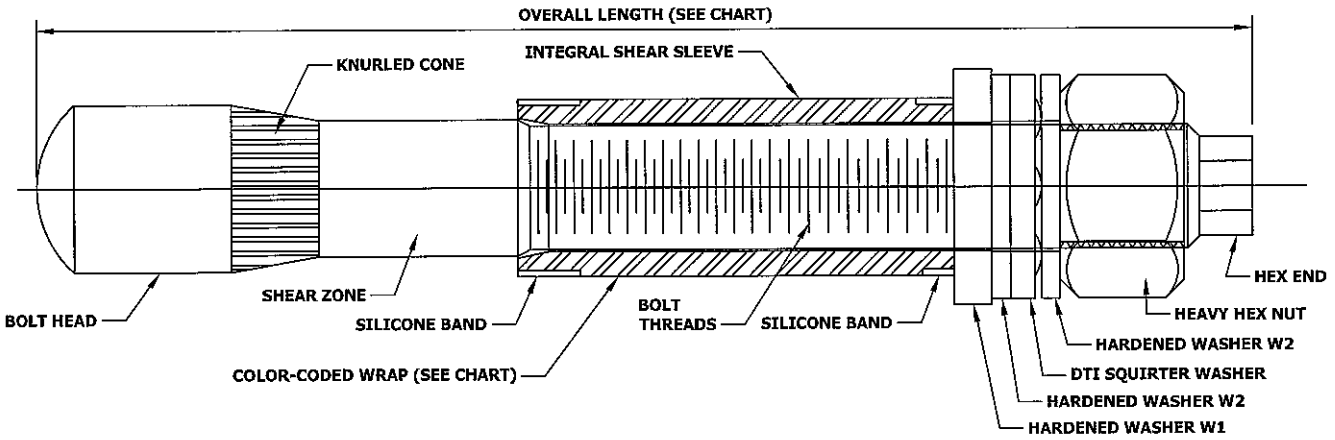


PART NUMBER	BOLT LENGTH	SLEEVE LENGTH	MIN GRIP RANGE	MAX GRIP RANGE
2NG2036	M20x95	11/16"	15/16"	1-7/16"
2NG2048	M20x95	1-3/16"	1-7/16"	1-7/8"
2NG2057	M20x95	1-5/8"	1-7/8"	2-1/4"
2NG2068	M20x135	2"	2-1/4"	2-11/16"
2NG2096	M20x135	2-7/16"	2-11/16"	3-3/4"
2NG2127	M20x175	3"	3-3/4"	5"
2NG2212	M20x250	4"	5"	8-5/16"

NOTES:

1. **ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCO OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.**
2. **ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIF JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.**

INTERIO



PRE-INSTALLED FORGBolt™ ASSEMBLY DETAIL 1

BOLT HOLE NOTES:

1. **ALL SHOP-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM SHOP-DRILLED HOLE DIAMETER PERMITTED IS 1-3/16".**
2. **ALL FIELD-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM FIELD-DRILLED HOLE DIAMETER PERMITTED IS 30 MM.**

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PRO

FORGBolt™		AISC Group A Material: ASTM A325 and PC8.8 (Tensile Stress, Fu = 120 ksi minimum)				
GROUP A	FORGBolt™ Size (mm)	Overall Length (inches)	Estimated Weight Each (lbs)	Grip Range (inch)	Comment	Color Code
FORGBolt™ A325 - PC8.8 1	135	5.31	1.3	3/8" to 1"	--	RED
2	160	6.30	1.6	3/4" to 1-1/2"	--	GREEN
3	195	7.68	1.9	1-1/4" to 2-1/4"	--	BLUE
4	260	10.24	2.6	2" to 3-1/2"	Splice Bolt	YELLOW
5	365	14.37	3.6	3-1/2" to 5-1/2"	Flange Jump Bolt	ORANGE
6	440	17.32	4.3	5-1/2" to 8-1/2"	Flange Jump Bolt	BLACK
DTI Note	Each Group A (A325/PC8.8) FORGBolt™ assembly shall have a 'Squirter' DTI that is compatible with a M20-PC8.8 bolt.					

FORG

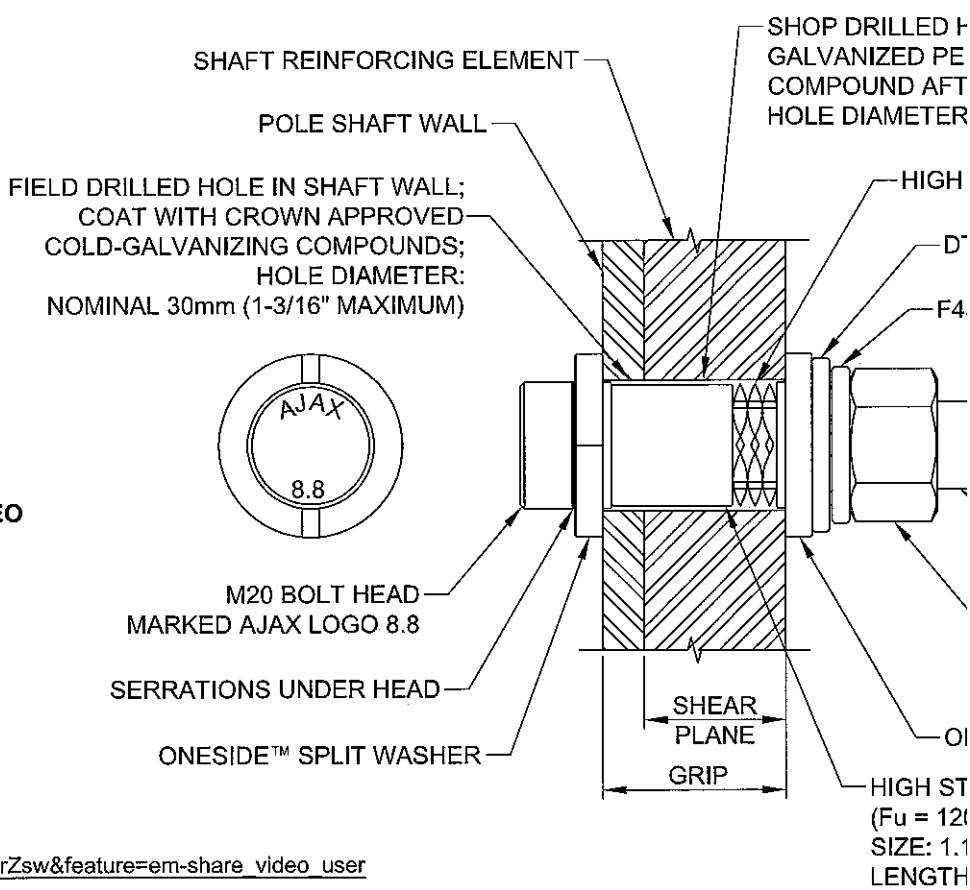
Follow al Recomm Tigh

1. FIELD DRILL
2. SELECT COR (REFER TO
3. INSERT BOL REINFORCIN WASHER W1
4. HAND TIGHT
5. TIGHTEN NU UNTIL DTI S
6. PROPERLY D PER PLAN RE

AJAX FASTENERS

ONESIDE™

PATENT US 7,373,709B2



MANUFACTURER INSTALLATION VIDEO

https://www.youtube.com/watch?v=ZGBS0eLrZsw&feature=em-share_video_user

AJAX ONESIDE™ BOLT DET

CODE	SIZE	COLOR	SLEEVE LEN
OSBA20.65-6	M20 x 65	ORANGE	6.0 (0.236
OSBA20.95-14	M20 x 95	BLACK	14.0 (0.55
OSBA20.95-22	M20 x 95	GREEN	22.0 (0.86
OSBA20.95-30	M20 x 95	YELLOW	30.0 (1.18
OSBA20.135-39	M20 x 135	BLUE	39.0 (1.53
OSBA20.135-48	M20 x 135	BROWN	48.0 (1.88
OSBA20.135-57	M20 x 135	PURPLE	57.0 (2.24
OSBA20.165-76	M20 x 165	RED	76.0 (3.00
OSBA20.250	M20 x 250	SILVER	MTO

MANUFACTURER
AJAX FASTENERS
SALES + TECH: ONESIDE@AJAXFAST.COM.AU

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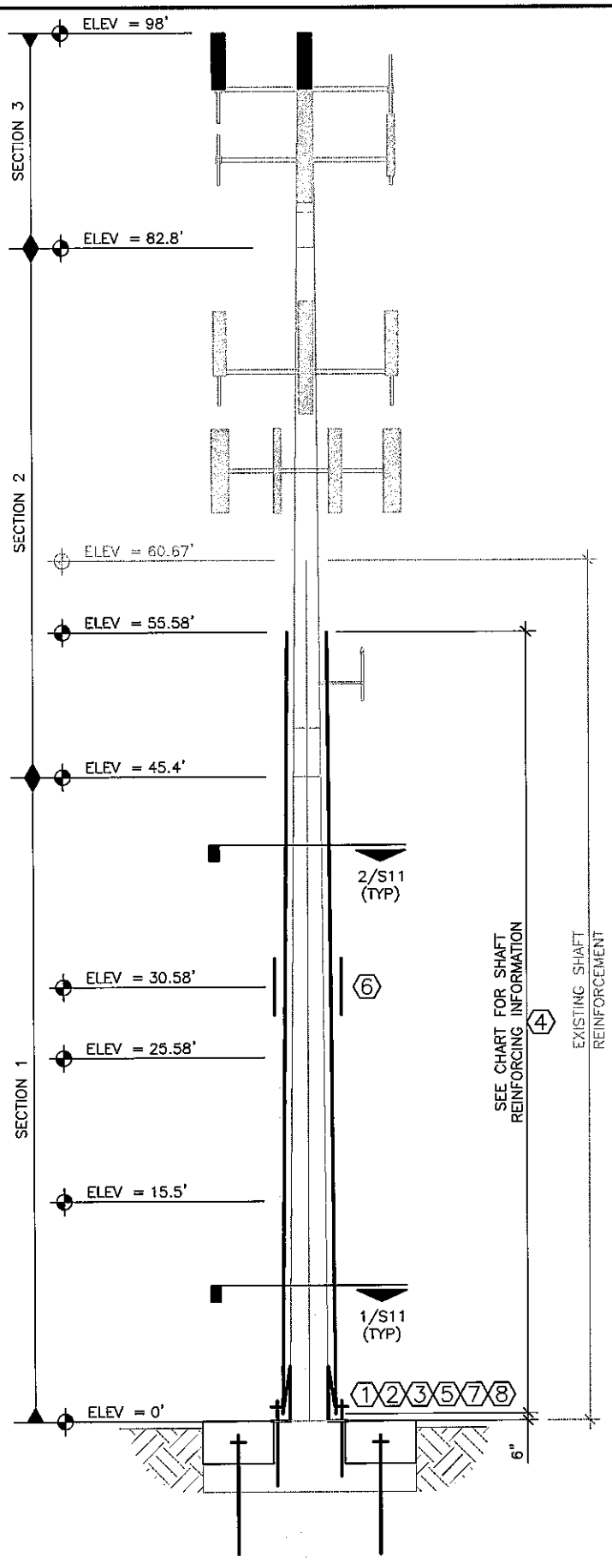
FAX (530) 647-8229

BOLT ASSEMBLY AND INSTALLATION:

1. BOLT MUST BE PURCHASED PRE-ASSEMBLED.
2. FOLLOW BOLT AND DTI MANUFACTURERS INSTRUCTIONS FOR INSTALLATION.

INSPECTION:

1. A MINIMUM OF 4 OUT OF 5 SQUIRTER® DTI PROTRUSIONS SHALL BE ENGAGED IN ANY AJAX/DTI BOLT ASSEMBL FEELER GAGE MAY BE USED TO VERIFY PROTRUSION COMPRESSION.
2. INSPECTIONS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS AND CROWN DOCUMEN *INSPECTION SOW*.



1 TOWER ELEVATION
SCALE: N.T.S.

BOTTOM ELEVATION	TOP ELEVATION	FLAT PLATE DESIGNATION	FLAT PLATE LENGTH
0'-6"	30'-6"	CCI-SFP-06512530	30'-0"
0'-6"	15'-6"	CCI-SFP-04510015	15'-0"
25'-7"	55'-7"	CCI-SFP-04510030	30'-0"
30'-7"	55'-7"	CCI-SFP-04510025	25'-0"

ALL BOLTS SHALL BE PRE-APPROVED BLIND M20 BOLTS WITH H
Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE AND BO

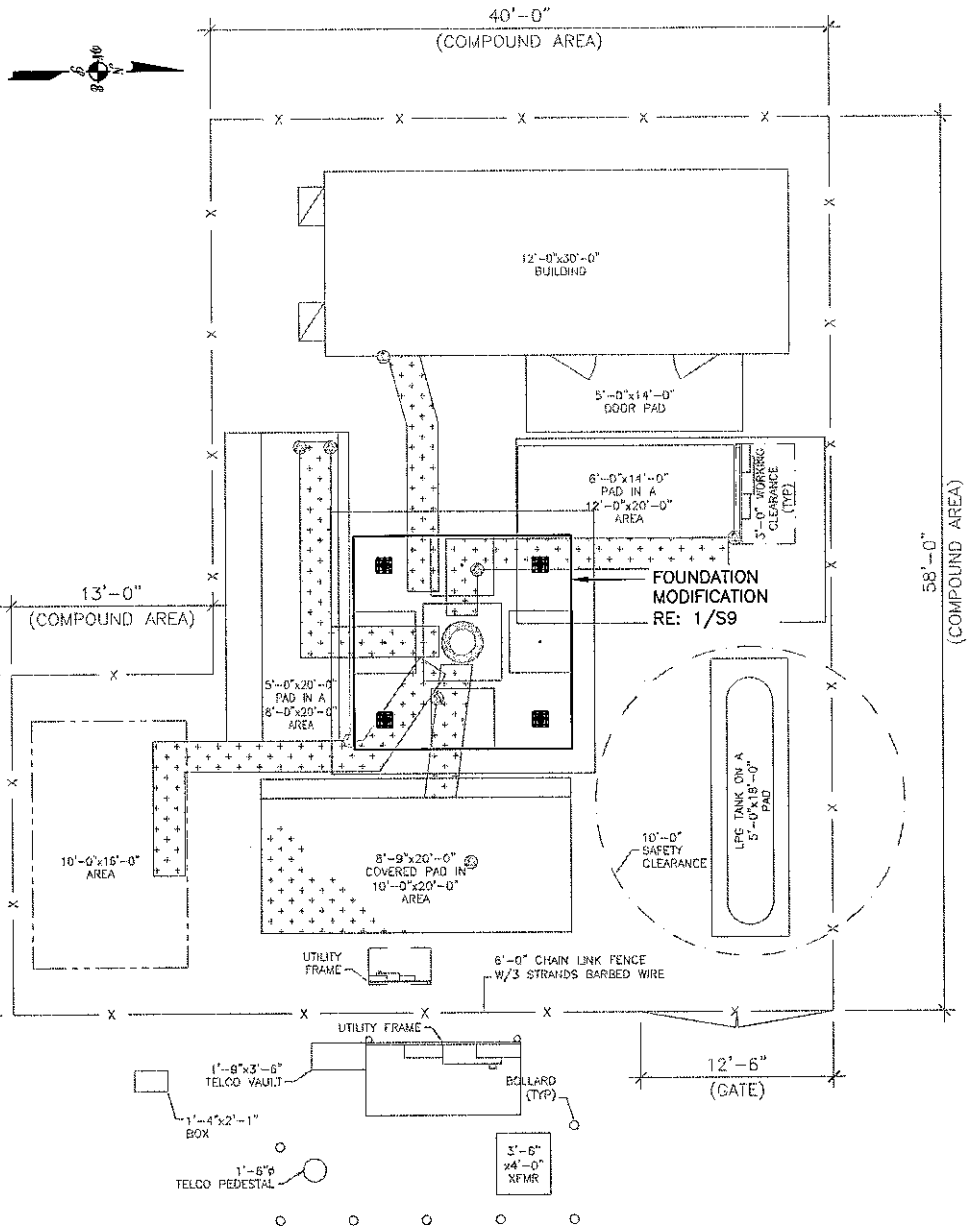
NO
1.

2.

TOWER MODIFICATIONS:

1. MODIFY FOUNDATION
RE: SHEET S8 THRU S10.
2. REMOVE EXISTING BASE PLATE STIFFENERS AT 0'
RE: SHEET S11.
3. REMOVE EXISTING ANCHOR ROD BRACKET AND INSTALL NEW ANCHOR ROD BRACKET AT 0'
RE: SHEET S11.
4. INSTALL NEW REINFORCING ELEMENTS FROM 0.5' TO 55.58'
RE: SHEET S11.
5. INSTALL NEW ANCHOR RODS AND ANCHOR ROD BRACKETS WITH FOOT PADS AT 0'
RE: SHEET S11.
6. INSTALL NEW IN-LINE SPLICE AT 30.58'
RE: SHEET S12.
7. REMOVE EXISTING BASE PLATE GROUT. SEE BASE PLATE GROUT REMOVAL NOTES SHEET S3.
8. RE-INSTALL BASE PLATE GROUT (AFTER ALL BASE WORK) PER ENG-PRC-10012 "BASE PLATE GROUT REPAIR"

A. PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL BUDGET A SITE VISIT TO CHECK CRITICAL DIMENSIONS AND VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY AND SHALL NOT BE USED FOR FABRICATION. ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GENERAL CONTRACTOR AND/OR FABRICATOR.
B. THE NEW AND EXISTING TRANSMISSION LINES MUST BE DISTRIBUTED AS SHOWN IN THE TX LINE DIST. DIAGRAM RE: DETAIL 2/S7.
C. MODIFICATIONS SHALL BE COMPLETED PRIOR TO ADDING THE PROPOSED APPURTENANCES. AN IBM PROVIDED BY A REGISTERED PROFESSIONAL ENGINEER WILL SUPERSEDE THIS CONDITION / REQUIREMENT.



1 SITE PLAN
SCALE: N.T.S.

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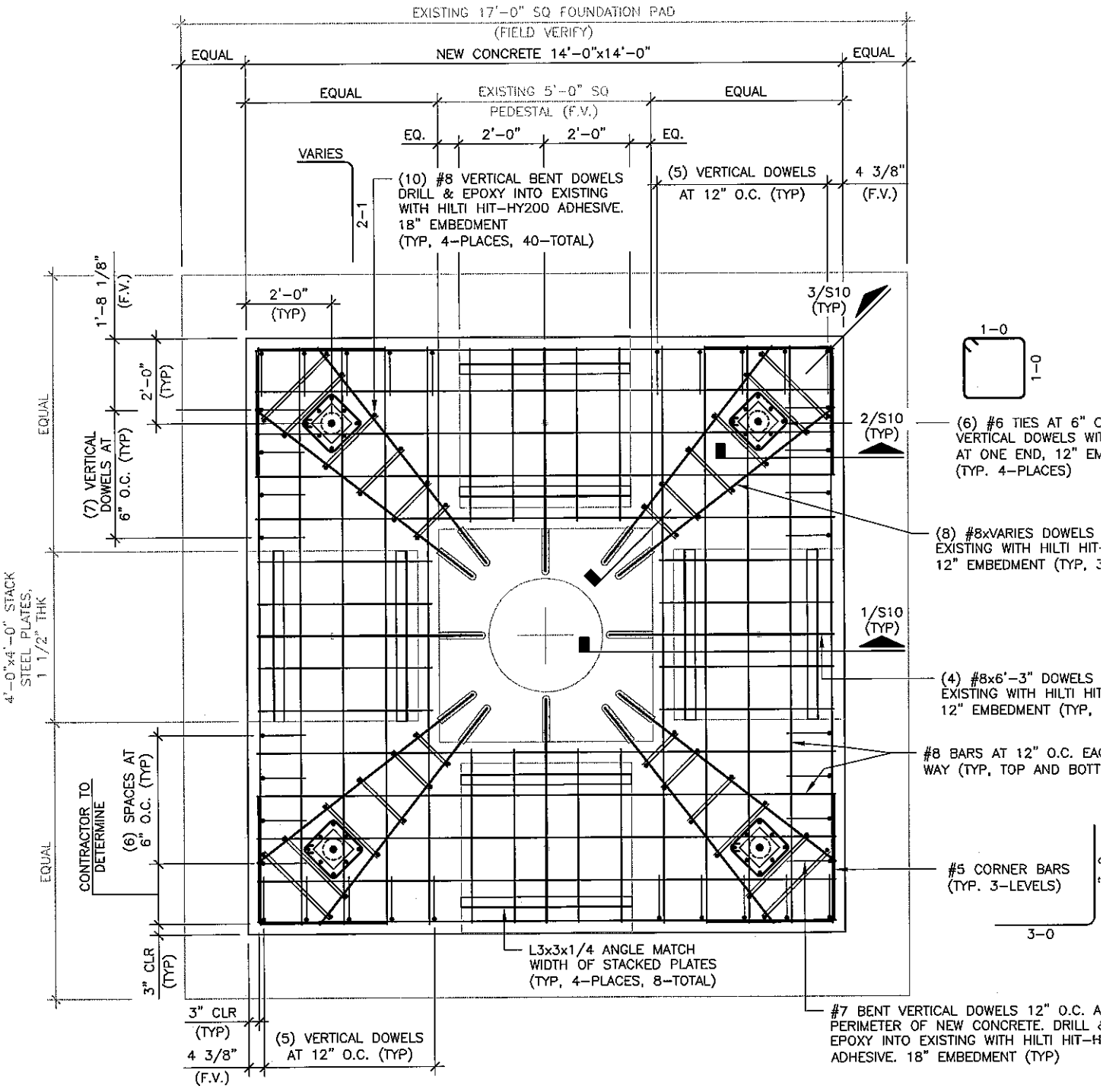
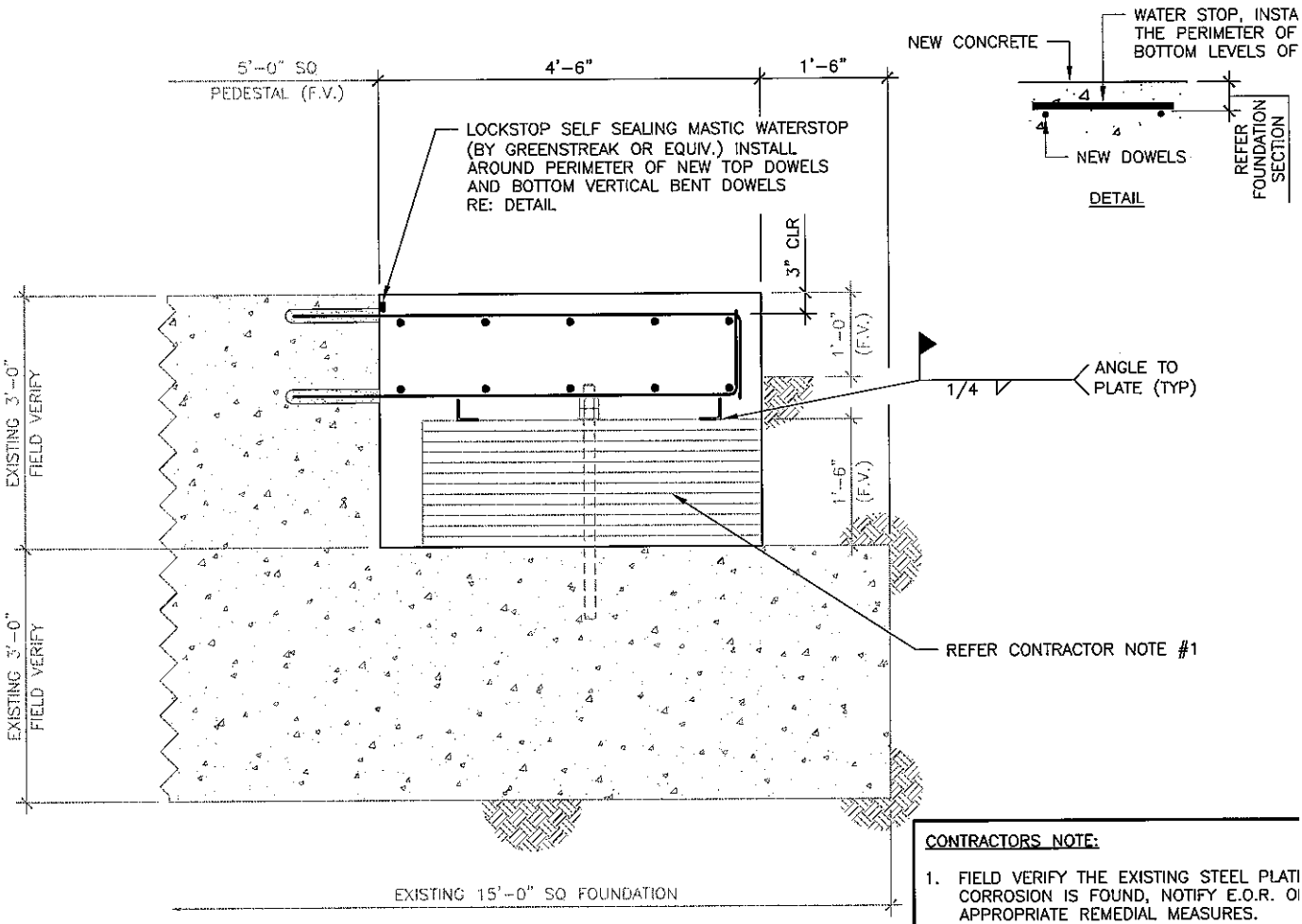


1 FOUNDATION MODIFICATION
SCALE: N.T.S.

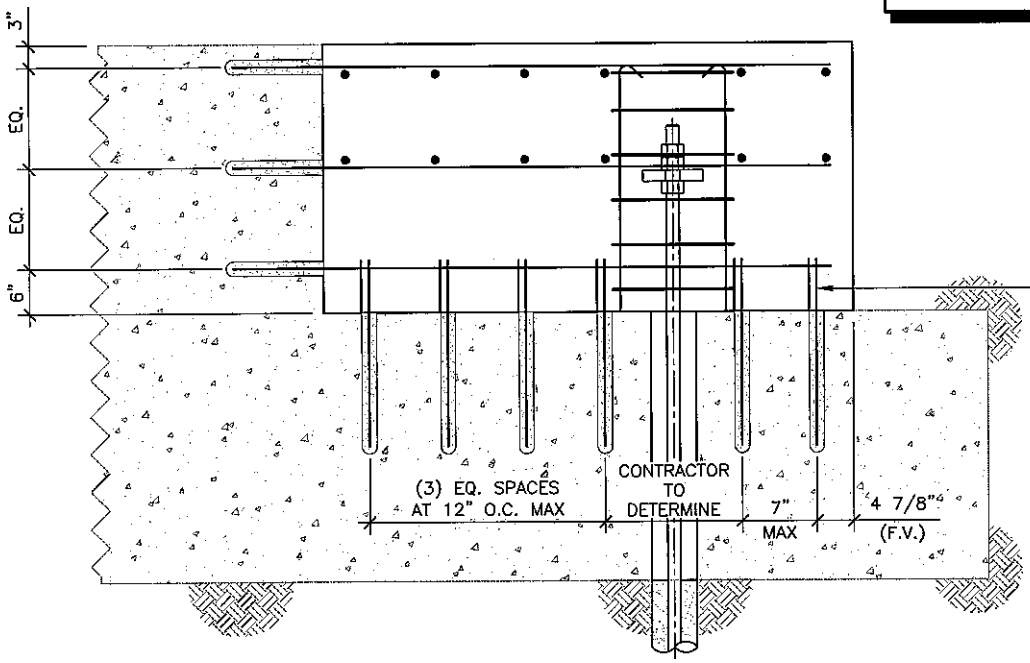


1 FOUNDATION SECTION
SCALE: N.T.S.

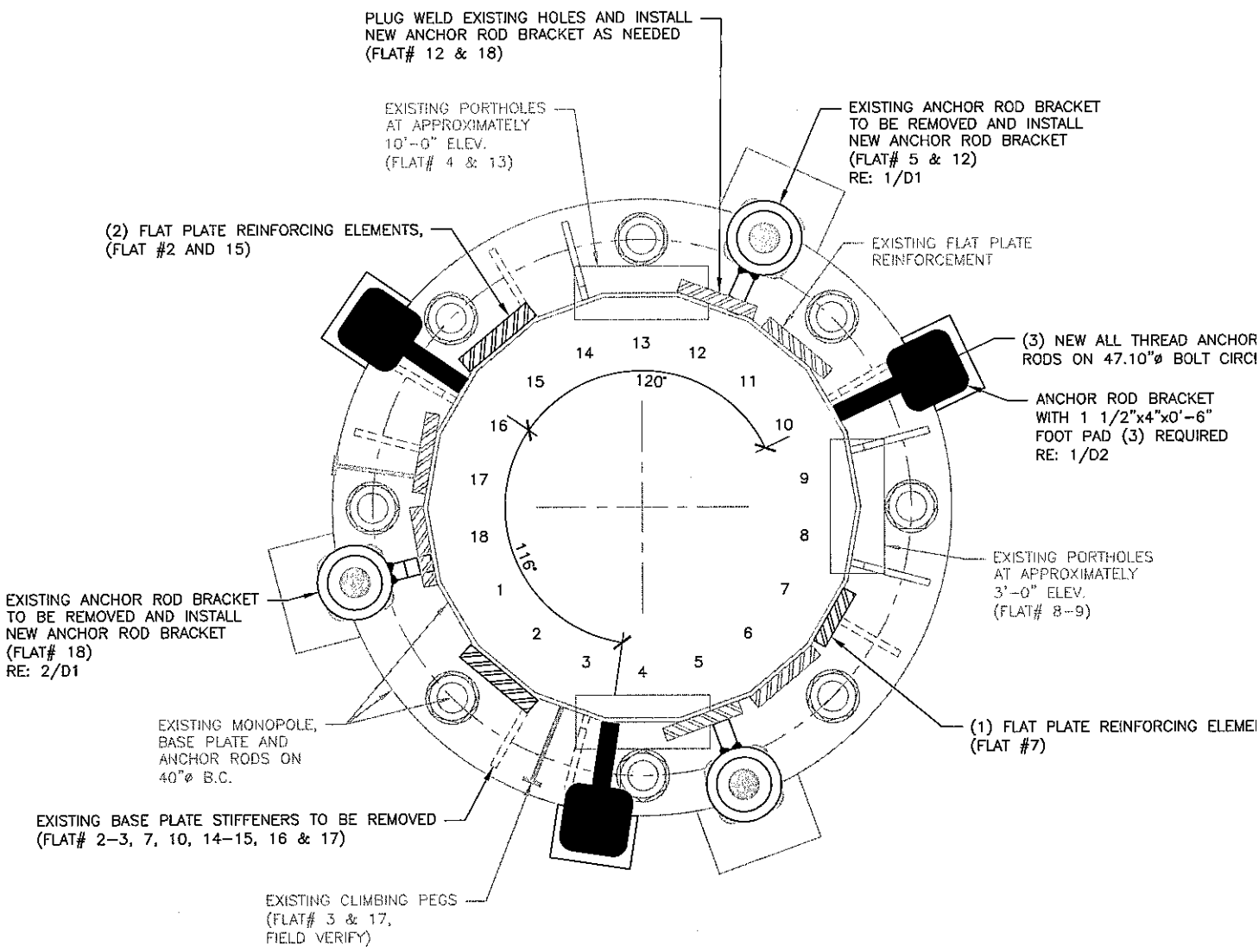
DETAIL

CONTRACTORS NOTE:

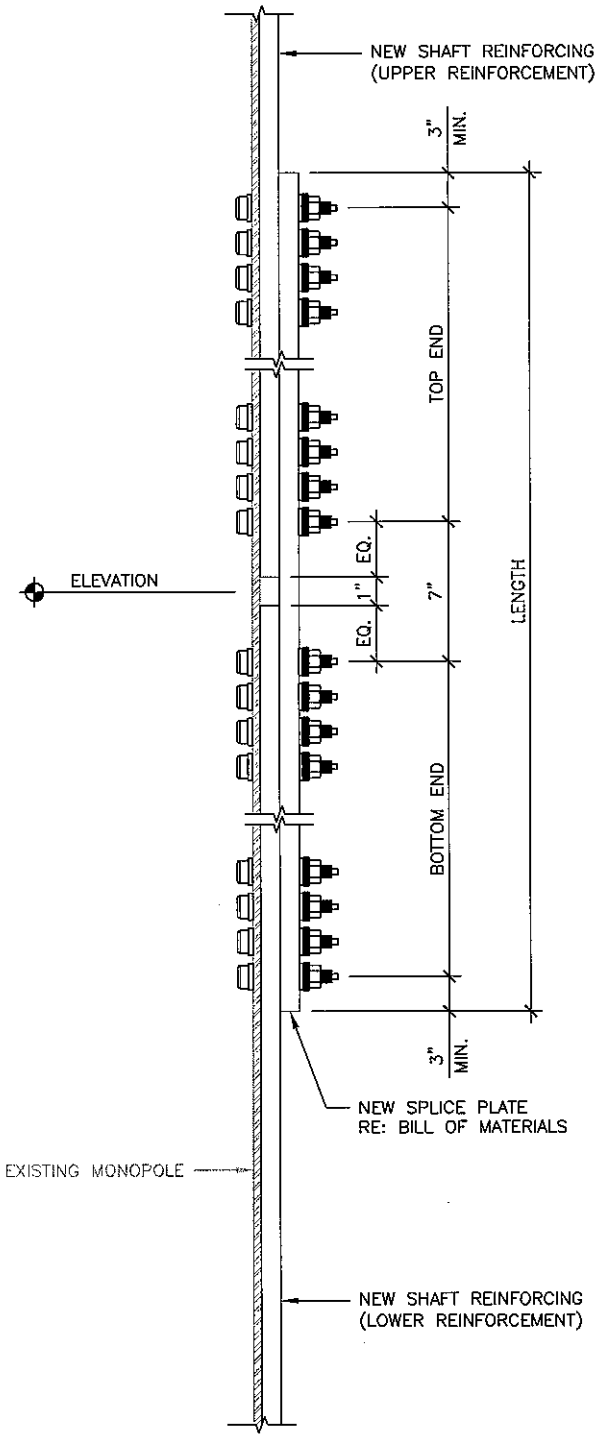
1. FIELD VERIFY THE EXISTING STEEL PLATI CORROSION IS FOUND, NOTIFY E.O.R. O APPROPRIATE REMEDIAL MEASURES.
2. TAKE ALL MEASURES NECESSARY TO AV BARS DURING CORING OPERATIONS. NOT REINFORCING BARS ARE ENCOUNTERED NEW BENT REBARS. MINOR ADJUSTMENT REBARS MAY BE REQUIRED.



3 FOUNDATION SECTION
SCALE: N.T.S.



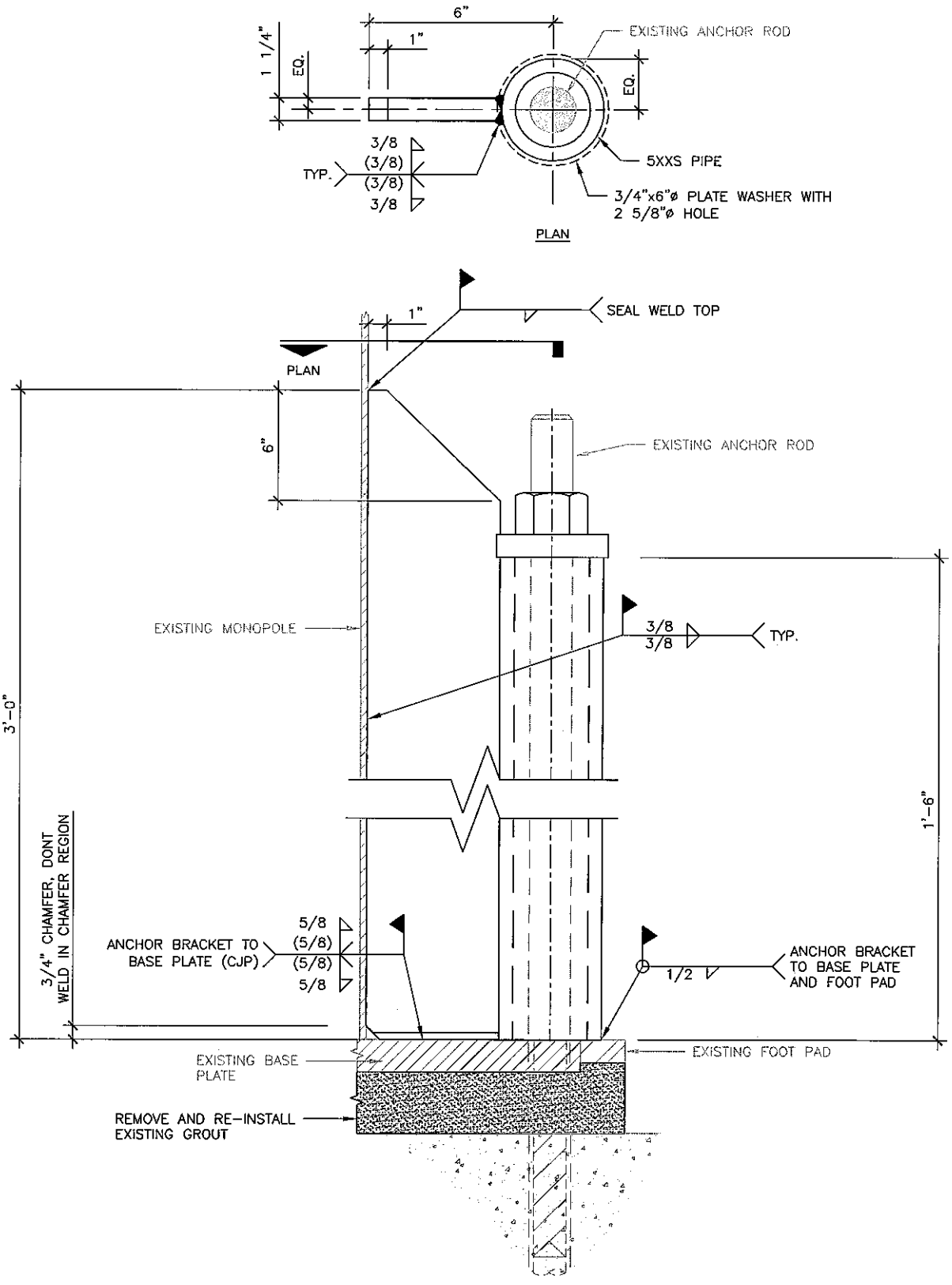
1 TOWER SECTION (0'-30.5')
SCALE: N.T.S.



1 FLAT PLATE IN-LINE SPLICE DETAIL
SCALE: N.T.S.

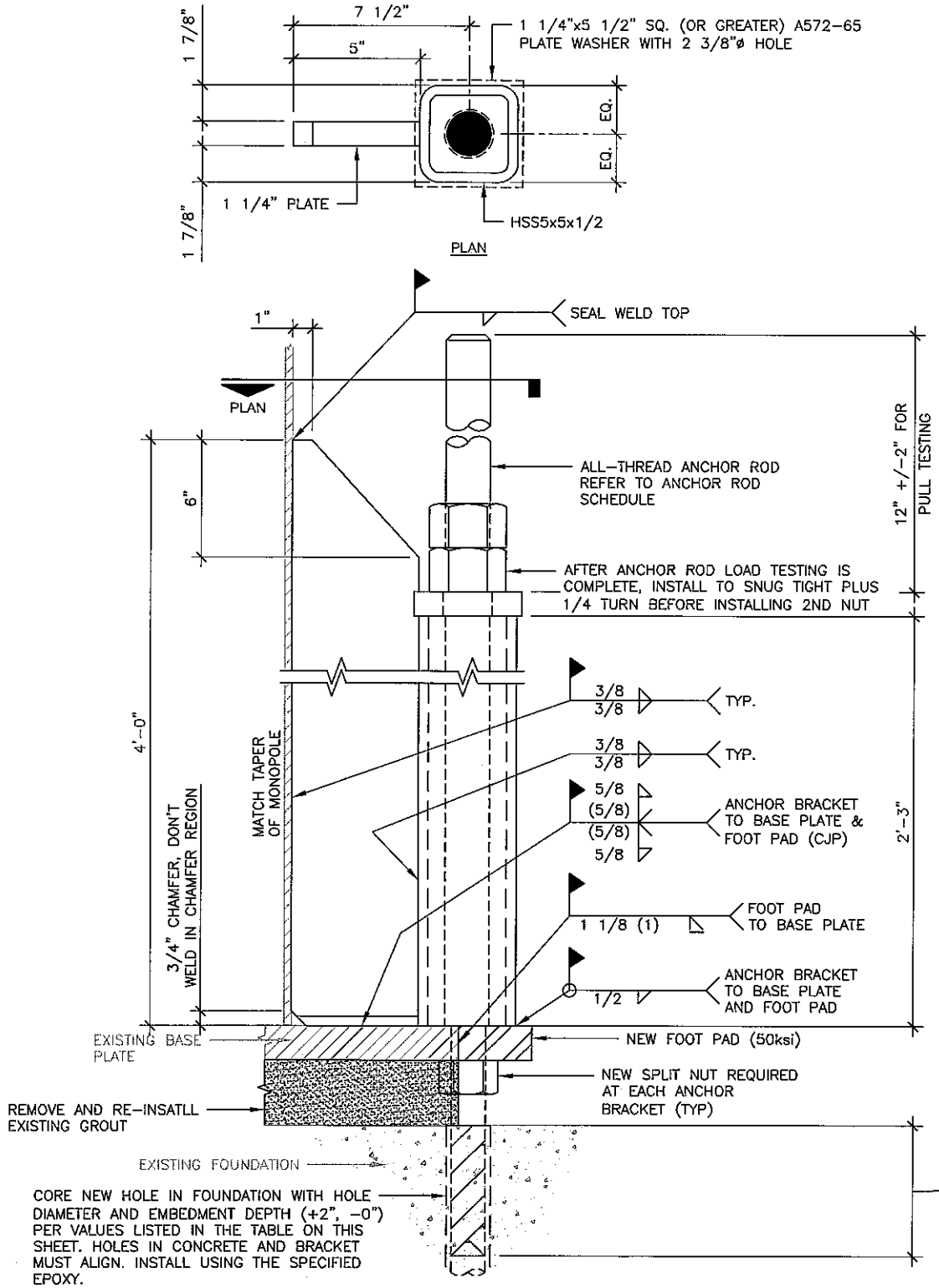
		S
ELEVATION	PART NUMBER	
30'–6 1/2"	CCI–SP–045100–6–11	

(A) O.C. DISTANCE ON TERMINATION BOLTS TO
(B) USE SHIM PLATES AS REQUIRED.
(C) NUMBER OF ADDITIONAL BOLTS ARE FOR
(D) STEEL WEIGHT NOT INCLUDED IN S7 BILL



1 ANCHOR ROD BRACKET DETAIL
SCALE: N.T.S.

PART NUMBER	DIAMETER	LENGTH
CCI-AR-0225	2 1/4"	8'-10"



1 ANCHOR ROD BRACKET
SCALE: N.T.S.